CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H01 ELECTRIC ELEMENTS

(NOTES omitted)

H01L SEMICONDUCTOR DEVICES NOT COVERED BY CLASS H10 (use of semiconductor

devices for measuring <u>G01</u>; resistors in general <u>H01C</u>; magnets, inductors or transformers <u>H01F</u>; capacitors in general <u>H01G</u>; electrolytic devices <u>H01G 9/00</u>; batteries or accumulators <u>H01M</u>; waveguides, resonators or lines of the waveguide type <u>H01P</u>; line connectors or current collectors <u>H01R</u>; stimulated-emission devices <u>H01S</u>; electromechanical resonators <u>H03H</u>; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers <u>H04R</u>; electric light sources in general <u>H05B</u>; printed circuits, hybrid circuits, casings or constructional details of electrical apparatus, manufacture of assemblages of electrical components <u>H05K</u>; use of semiconductor devices in circuits having a particular application, see the subclass for the application)

NOTES

- 1. This subclass is residual to class <u>H10</u>.
- 2. This subclass covers:
 - semiconductor devices for rectifying, amplifying, oscillating or switching; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
 - semiconductor devices sensitive to radiation; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
 - semiconductor devices for light emission; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
 - processes or apparatus for the manufacture or treatment of semiconductor or solid-state devices where the type of device is not listed under bullets 1 to 3, above, or not essential;
 - constructional details or arrangements of semiconductor or solid-state devices not covered by class <u>H10</u> and not specific to types of devices listed under bullets 1 to 3, above;
 - packaging or assembling of semiconductor or solid-state devices covered by this subclass or by class H10.
- 3. In this subclass, the following terms or expressions are used with the meaning indicated:
 - "wafer" means a slice of semiconductor or crystalline substrate material, which can be modified by impurity diffusion (doping), ion implantation or epitaxy, and whose active surface can be processed into arrays of discrete components or integrated circuits;
 - "solid state body" means the body of material within which, or at the surface of which, the physical effects characteristic of the device occur;
 - "electrode" is a region in or on the body of the device (other than the solid state body itself), which exerts an electrical influence on the solid state body, irrespective of whether or not an external electrical connection is made thereto. An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions, only those portions which exert an influence on the solid state body by virtue of their shape, size, or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads;
 - "device" means an electric circuit element; where an electric circuit element is one of a plurality of elements formed in or on a common substrate; it is referred to as a "component";
 - "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g.
 electroforming, before it is ready for use but which does not require the addition of further structural units;
 - "parts" includes all structural units which are included in a complete device;
 - "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of
 the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which
 consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation";
 - "integrated circuit" is a device where all components, e.g. diodes or resistors, are built up on a common substrate and form the device including interconnections between the components;
 - "assembly" of a device is the building up of the device from its constructional units; the term covers the provision of fillings in containers.

H01L (continued)

- 4. In this subclass, both the process or apparatus for the manufacture or treatment of a device and the device itself are classified, whenever both of these are described sufficiently to be of interest.
- 5. Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the Periodic Table of chemical elements the CPC refers. In this subclass, the system used is the 8 group system, indicated by Roman numerals in the Periodic Table thereunder.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

| Ci C groups. | | |
|------------------------|------------|------------------------|
| H01L 21/301 | covered by | H01L 21/30 |
| H01L 21/328 | covered by | H01L 29/66075 |
| H01L 21/329 | covered by | H01L 29/66083 |
| H01L 21/33 | covered by | H01L 29/66227 |
| H01L 21/331 | covered by | H01L 29/66234 |
| H01L 21/332 | covered by | H01L 29/66363 |
| H01L 21/334 | covered by | H01L 29/66075 |
| H01L 21/335 | covered by | H01L 29/66409 |
| H01L 21/336 | covered by | H01L 29/66477 |
| H01L 21/337 | covered by | H01L 29/66893 |
| H01L 21/338 | covered by | H01L 29/66848 |
| H01L 21/339 | covered by | H01L 29/66946 |
| H01L 21/36-H01L 21/368 | covered by | H01L 21/02107 |
| H01L 21/58 | covered by | H01L 24/80 |
| H01L 21/66 | covered by | H01L 22/00 |
| H01L 21/98 | covered by | H01L 25/50 |
| H01L 29/38 | covered by | H01L 29/04-H01L 29/365 |
| H01L 29/96 | covered by | H01L 29/68-H01L 29/945 |
| | | |

2. {In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.}

| 21/00 | Processes or apparatus adapted for the | 21/02046 {Dry cleaning only (<u>H01L 21/02085</u> takes |
|----------------------|--|--|
| | manufacture or treatment of semiconductor or | precedence)} |
| | solid state devices or of parts thereof | 21/02049 { with gaseous HF} |
| 21/02 | Manufacture or treatment of semiconductor devices or of parts thereof | 21/02052 {Wet cleaning only (<u>H01L 21/02085</u> takes precedence)} |
| 21/02002 | • {Preparing wafers} | 21/02054 {combining dry and wet cleaning steps (H01L 21/02085 takes precedence)} |
| | <u>NOTES</u> | 21/02057 {Cleaning during device manufacture} |
| | This group <u>covers</u> processes for manufacturing wafers prior to the fabrication of any device, | 21/0206 {during, before or after processing of insulating layers} |
| | i.e. between the sawing of ingots (covered by B28D) and the cleaning of substrates (covered | 21/02063 {the processing being the formation of vias or contact holes} |
| | by H01L 21/02041). 2. This group does not cover: | 21/02065 {the processing being a planarization of insulating layers} |
| | simple use of grinding or polishing machines <u>B24B</u> thermal smoothening <u>H01L 21/324</u> | 21/02068 {during, before or after processing of conductive layers, e.g. polysilicon or amorphous silicon layers} |
| 21/02005 21/02008 | {Preparing bulk and homogeneous wafers} {Multistep processes} | 21/02071 {the processing being a delineation, e.g. RIE, of conductive layers} |
| 21/0201 21/02013 | {Specific process step} {Grinding, lapping} | 21/02074 {the processing being a planarization of conductive layers} |
| | {Backside treatment} {Chemical etching} | 21/02076 {Cleaning after the substrates have been singulated} |
| 21/02013 | • • • • • {Edge treatment, chamfering} | 21/02079 {Cleaning for reclaiming} |
| 21/02021 | {Mirror polishing} | 21/02082 {product to be cleaned} |
| 21/02024 | {Setting crystal orientation} | 21/02085 {Cleaning of diamond} |
| 21/02027 | {Setting crystal orientation} {Making porous regions on the surface} | 21/02087 {Cleaning of wafer edges} |
| 21/0203 | { Waking porous regions on the surface } { by reclaiming or re-processing } | 21/0209 {Cleaning of wafer backside} |
| 21/02032 | {Shaping} | 21/02093 {Cleaning of porous materials} |
| 21/02033 | {Cleaning} | 21/02096 {only mechanical cleaning} |
| 21/02041 | . {Cleaning}. {Cleaning before device manufacture, i.e. | 21/02098 {only involving lasers, e.g. laser ablation} |
| 21/02043 | Begin-Of-Line process} | 21/02101 {only involving supercritical fluids} |

| | Forming layers (deposition in general <u>C23C</u> ; rystal growth in general <u>C30B</u>)} | 21/02137 | • • • | • • | • {the material comprising alkyl silsesquioxane, e.g. MSQ} |
|----------|---|----------------------|-------|---------|--|
| <u>y</u> | VARNING | 21/0214 | • • | | • {the material being a silicon oxynitride, e.g. SiON or SiON:H} |
| | Groups <u>H01L 21/02104</u> – <u>H01L 21/02694</u> are incomplete pending reclassification of documents from groups <u>H01L 21/06</u> , <u>H01L 21/16</u> , and <u>H01L 21/20</u> . | 21/02142 | • • • | | {the material containing silicon and at least one metal element, e.g. metal silicate based insulators or metal silicon oxynitrides} |
| | Groups <u>H01L 21/02104</u> – <u>H01L 21/02694</u> , <u>H01L 21/06</u> , <u>H01L 21/20</u> , and <u>H01L 21/16</u> | 21/02145 | • • | | • {the material containing aluminium, e.g. AlSiOx} |
| | should be considered in order to perform a complete search. | 21/02148 | • • • | • • | • {the material containing hafnium, e.g. HfSiOx or HfSiON} |
| 21/02107 | {Forming insulating materials on a substrate} | 21/0215 | • • • | | {the material containing tantalum, e.g. TaSiOx} |
| | WARNING | 21/02153 | • • | | • {the material containing titanium, |
| | Groups H01L 21/02107 – H01L 21/02326 are incomplete pending reclassification of documents from groups H01L 21/312, H01L 21/314, H01L 21/316, and | 21/02156 | • • | | e.g. TiSiOx}• {the material containing at least one rare earth element, e.g. silicate of lanthanides, scandium or yttrium} |
| | <u>H01L 21/318</u> . | 21/02159 | • • • | • • | • {the material containing zirconium, e.g. ZrSiOx} |
| | Groups H01L 21/02107 – H01L 21/02326, H01L 21/312, H01L 21/314, H01L 21/316, | 21/02161 | • • • | | • {the material containing more than one metal element} |
| | and <u>H01L 21/318</u> should be considered in order to perform a complete search. | 21/02164 | • • • | | {the material being a silicon oxide, e.g. SiO ₂ } |
| 21/02109 | {characterised by the type of layer, e.g. type of material, porous/non-porous, pre-cursors, | | | | <u>NOTE</u> |
| 21/02112 | mixtures or laminates} {characterised by the material of the layer} | | | | The formation of silicon oxide layers is classified in this group |
| | <u>NOTE</u> | | | | regardless of the precursor or of the process of formation; |
| | Layers comprising sublayers, i.e. multi-layers, are additionally classified in H01L 21/022; porous layers are additionally classified in H01L 21/02203 | | | | in case of explicit statements on doping, on rest-groups, or on material components <u>see</u> <u>H01L 21/02126</u> and subgroups; deposition of silicon oxide from |
| 21/02115 | • • • {the material being carbon, e.g. alpha-C, diamond or hydrogen doped carbon} | | | | organic precursors without further statements on film composition is classified here and |
| 21/02118 | (carbon based polymeric organic or inorganic material, e.g. polyimides, poly cyclobutene or PVC (polymers per se | 21/02167 | | | in <u>H01L 21/02205</u> and subgroups {the material being a silicon carbide |
| 21/0212 | C08G, photoresist per se G03F) {the material being fluoro carbon compounds, e.g.(CFx) n, (CHxFy) n | 21/02107 | • • • | • | not containing oxygen, e.g. SiC, SiC:H or silicon carbonitrides (H01L 21/02126 and H01L 21/0214 |
| 21/02123 | or polytetrafluoroethylene} {the material containing silicon} | 21/0217 | | | take precedence)} {the material being a silicon nitride |
| 21/02126 | • • • { the material containing Si, O, and at least one of H, N, C, F, or other nonmetal elements, e.g. SiOC, SiOC:H or SiONC} | 21/02172 | | . { | not containing oxygen, e.g. SixNy or SixByNz (H01L 21/02126 and H01L 21/0214 take precedence)} the material containing at least one |
| 21/02129 | { the material being boron or phosphorus doped silicon oxides, e.g. BPSG, BSG or PSG} | | | n n | netal element, e.g. metal oxides, netal nitrides, metal oxynitrides or netal carbides (materials containing |
| | NOTE | | | | ilicon <u>H01L 21/02123;</u> metal silicates <u>H01L 21/02142</u>)} |
| | Halogen, e.g. fluorine, containing BPSG, PSG, BSG, and the like, are additionally classified in H01L 21/02131 | 21/02175 21/02178 | • • • | | $ \begin{aligned} & \{ \text{characterised by the metal} \\ & (\underline{\text{H01L 21/02197}} \text{ takes precedence}) \} \\ & \cdot \\ & \{ \text{the material containing} \\ & \text{aluminium, e.g. } Al_2O_3 \} \end{aligned} $ |
| 21/02131 | • • • • {the material being halogen doped silicon oxides, e.g. FSG} | 21/02181 | • • • | • • | • {the material containing hafnium, e.g. HfO_2 } |
| 21/02134 | • • • • { the material comprising hydrogen silsesquioxane, e.g. HSQ} | 21/02183 | • • | • • | • {the material containing tantalum, e.g. Ta ₂ O ₅ } |
| | 1 · · · · · · · · · · · · · · · · · · · | 21/02186 | • • • | • • | . {the material containing titanium, e.g. TiO_2 } |

| 21/02189 {the material containing zirconium, e.g. ZrO ₂ } | 21/02247 {formation by nitridation, e.g. nitridation of the substrate} |
|--|---|
| 21/02192 {the material containing at least one rare earth metal element, e.g. | 21/02249 {formation by combined oxidation and nitridation performed simultaneously} |
| oxides of lanthanides, scandium or yttrium} | 21/02252 {formation by plasma treatment, e.g. plasma oxidation of the substrate (after |
| 21/02194 { the material containing more than one metal element } | treatment of an insulating film by plasma H01L 21/3105 and subgroups)} |
| 21/02197 {the material having a perovskite structure, e.g. BaTiO ₃ } | 21/02255 {formation by thermal treatment (H01L 21/02252 takes precedence; |
| 21/022 {the layer being a laminate, i.e. composed of sublayers, e.g. stacks of alternating | after treatment of an insulating film <u>H01L 21/3105</u> and subgroups)} |
| high-k metal oxides (adhesion layers or buffer layers <u>H01L 21/02304</u> , | 21/02258 {formation by anodic treatment, e.g. anodic oxidation} |
| <u>H01L 21/02362</u>)} | 21/0226 {formation by a deposition process (per se |
| 21/02203 {the layer being porous} | <u>C23C</u>)} |
| 21/02205 {the layer being characterised by the precursor material for deposition} | 21/02263 {deposition from the gas or vapour phase} |
| 21/02208 {the precursor containing a compound comprising Si} | NOTE This group and subgroups also cover |
| 21/02211 {the compound being a silane, e.g. disilane, methylsilane or chlorosilane} | deposition methods in which the gas or vapour is produced by physical |
| 21/02214 {the compound comprising silicon and oxygen} | means, e.g. ablation from targets or heating of source material |
| <u>NOTE</u> | · · |
| This group <u>does not cover</u> mixtures of a silane and oxygen | 21/02266 {deposition by physical ablation of a target, e.g. sputtering, reactive sputtering, physical vapour deposition |
| 21/02216 { the compound being a molecule comprising at least one silicon- | or pulsed laser deposition} 21/02269 {deposition by thermal evaporation} |
| | (H01L 21/02293 takes precedence) |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or | (<u>H01L 21/02293</u> takes precedence)} NOTE |
| oxygen bond and the compound having hydrogen or an organic | NOTE Subject matter relating to |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or | NOTE |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} |
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| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02255 and H01L 21/02252, depending on the type of reaction 21/0223 {formation by oxidation, e.g. oxidation | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} NOTE Subject matter relating to cyclic plasma CVD is additionally |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02255 and H01L 21/02252, depending on the type of reaction | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02252, depending on the type of reaction 21/0223 {formation by oxidation, e.g. oxidation of the substrate} 21/0223 {for mation by oxidation, e.g. oxidation of the substrate} 21/0223 {for the semiconductor substrate or a semiconductor layer} | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} NOTE Subject matter relating to cyclic plasma CVD is additionally classified in H01L 21/02274 21/02282 {liquid deposition, e.g. spin-coating, solgel techniques, spray coating} |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {the compound being a silazane} 21/02227 {formation by a process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02255 and H01L 21/02252, depending on the type of reaction 21/0223 {formation by oxidation, e.g. oxidation of the substrate} 21/02233 {for the semiconductor substrate or a semiconductor layer} 21/02236 {group IV semiconductor} 21/02238 {silicon in uncombined form, i.e. | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} NOTE Subject matter relating to cyclic plasma CVD is additionally classified in H01L 21/02274 21/02282 {liquid deposition, e.g. spin-coating, solgel techniques, spray coating} 21/02285 {Langmuir-Blodgett techniques} 21/02288 {printing, e.g. ink-jet printing (per se |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02252, depending on the type of reaction 21/0223 {formation by oxidation, e.g. oxidation of the substrate} 21/0223 {for the semiconductor substrate or a semiconductor layer} 21/02236 {group IV semiconductor} | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} NOTE Subject matter relating to cyclic plasma CVD is additionally classified in H01L 21/02274 21/02282 {liquid deposition, e.g. spin-coating, solgel techniques, spray coating} 21/02285 {Langmuir-Blodgett techniques} 21/02288 {printing, e.g. ink-jet printing (per se B41J)} |
| oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane} 21/02219 {the compound comprising silicon and nitrogen} NOTE This group does not cover mixtures of silane and nitrogen 21/02222 {the compound being a silazane} 21/02225 {characterised by the process for the formation of the insulating layer} 21/02227 {formation by a process other than a deposition process} NOTE Subject matter classified in the range of H01L 21/0223 - H01L 21/02249 is additionally classified in H01L 21/02249, H01L 21/02255 and H01L 21/02252, depending on the type of reaction 21/0223 {formation by oxidation, e.g. oxidation of the substrate} 21/02233 {of the semiconductor substrate or a semiconductor layer} 21/02236 {group IV semiconductor} 21/02238 {silicon in uncombined form, i.e. pure silicon} | Subject matter relating to molecular beam epitaxy is classified in this group 21/02271 {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition (H01L 21/02266 takes precedence)} 21/02274 {in the presence of a plasma [PECVD]} 21/02277 {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD} 21/0228 {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD} NOTE Subject matter relating to cyclic plasma CVD is additionally classified in H01L 21/02274 21/02282 {liquid deposition, e.g. spin-coating, solgel techniques, spray coating} 21/02285 {Langmuir-Blodgett techniques} 21/02288 {printing, e.g. ink-jet printing (per se B41J)} |

| 21/02293 {formation of epitaxial layers by a deposition process (epitaxial growth per se C30B)} | completion of the insulating layer are covered by H01L 21/3105 and subgroups |
|--|--|
| NOTE | 21/02321 (introduction of substances into an |
| Formation of non-epitaxial layers by MBE, ALE, etc. is not covered by this group; for MBE see | already existing insulating layer (<u>H01L 21/02227</u> and subgroups take precedence)} |
| <u>H01L 21/02269</u> ; for ALE <u>see</u> | NOTE |
| <u>H01L 21/0228</u> | processes like the introduction of |
| 21/02296 {characterised by the treatment performed before or after the formation of the layer (H01L 21/02227 and subgroups take precedence)} | phosphorus into silicon oxide by diffusion, or doping of an already existing insulating layer are covered by this group and subgroups; for |
| NOTE | the method of introduction, see |
| This group and subgroups only cover | H01L 21/02337, H01L 21/02343, |
| processes which are directly linked to | <u>H01L 21/02345</u> and subgroups |
| the layer formation; routine anneals, | 21/02323 {introduction of oxygen} |
| i.e. thermal treatment without further features like a special atmosphere, | 21/02326 { into a nitride layer, e.g. changing SiN to SiON} |
| presence of a plasma, thermally | 21/02329 {introduction of nitrogen} |
| induced chemical reactions, change of phase (crystal structure) etc. are | 21/02332 { into an oxide layer, e.g. changing SiO to SiON} |
| not classified here; for cleaning <u>see</u> <u>H01L 21/02041</u> and subgroups; for | 21/02334 {in-situ cleaning after layer formation, e.g. removing process residues} |
| etching processes see H01L 21/311 and subgroups; for planarization processes | NOTE |
| see <u>H01L 21/31051</u> and subgroups; for processes to repair etch damage see <u>H01L 21/3105</u> and subgroups | Subject matter relating to the cleaning processes for semiconductor devices in general is covered by |
| 21/02299 {pre-treatment} | H01L 21/02041 and subgroups |
| <u>NOTE</u> | 21/02337 {treatment by exposure to a gas or |
| This group and subgroups cover | vapour} 21/0234 {treatment by exposure to a plasma} |
| treatments to improve adhesion | 21/02343 {treatment by exposure to a liquid} |
| or change the surface termination; for etching see <u>H01L 21/306</u> and | 21/02345 {treatment by exposure to radiation, e.g. visible light} |
| subgroups and <u>H01L 21/311</u> and subgroups | 21/02348 {treatment by exposure to UV light} |
| 21/02301 {in-situ cleaning} | 21/02351 {treatment by exposure to corpuscular radiation, e.g. exposure to electrons, |
| NOTE | alpha-particles, protons or ions} 21/02354 {using a coherent radiation, e.g. a |
| Subject matter relating to the | laser} |
| cleaning processes for semiconductor devices in general is covered by | 21/02356 {treatment to change the morphology of the insulating layer, e.g. transformation |
| H01L 21/02041 and subgroups | of an amorphous layer into a crystalline layer} |
| 21/02304 {formation of intermediate layers, e.g. buffer layers, layers to improve | 21/02359 {treatment to change the surface groups of the insulating layer} |
| adhesion, lattice match or diffusion barriers} | 21/02362 {formation of intermediate layers, e.g. |
| 21/02307 {treatment by exposure to a liquid} | capping layers or diffusion barriers} |
| 21/0231 {treatment by exposure to electromagnetic radiation, e.g. UV | |
| light} 21/02312 {treatment by exposure to a gas or vapour} | |
| 21/02315 {treatment by exposure to a plasma} 21/02318 {post-treatment} | |
| NOTE | |
| | |
| This group only covers processes that are part of the layer formation; treatments which are performed after | |
| | |

| 21/02365 {Forming inorganic semiconducting materials | 21/02452 {including tin} |
|--|---|
| on a substrate (for light-sensitive devices | 21/02455 {Group 13/15 materials} |
| <u>H01L 31/00</u>)} | 21/02458 {Nitrides} |
| <u>WARNINGS</u> | 21/02461 {Phosphides} |
| 1. Group H01L 21/02365 is incomplete | 21/02463 {Arsenides} |
| pending reclassification of documents | 21/02466 {Antimonides} |
| from groups <u>H01L 21/06</u> , <u>H01L 21/16</u> | 21/02469 {Group 12/16 materials} |
| and H01L 21/20. | 21/02472 {Oxides} |
| Groups <u>H01L 21/06</u> , <u>H01L 21/16</u> , and | 21/02474 {Sulfides} |
| H01L 21/20 should be considered in order | 21/02477 {Selenides} |
| to perform a complete search. | 21/0248 {Tellurides} |
| 2. Groups H01L 21/02365 - H01L 21/02694 | 21/02483 {Oxide semiconducting materials |
| are incomplete pending reclassification of | not being Group 12/16 materials, e.g. |
| documents from groups <u>H01L 21/2018</u> , | ternary compounds} |
| H01L 21/2022, H01L 21/2026, | 21/02485 {Other chalcogenide semiconducting |
| H01L 21/203, H01L 21/2033, | materials not being oxides, e.g. ternary |
| <u>H01L 21/2036, H01L 21/205,</u> | compounds} |
| <u>H01L 21/2053, H01L 21/2056,</u> | 21/02488 {Insulating materials} |
| H01L 21/208 and H01L 21/2085. | 21/02491 {Conductive materials} |
| All groups listed in this Warning should be | 21/02494 {Structure} |
| considered in order to perform a complete | 21/02496 {Layer structure} |
| search. | 21/02499 {Monolayers} |
| 21/02267 (C-l-+ | 21/02502 {consisting of two layers} |
| 21/02367 {Substrates} | 21/02505 {consisting of more than two layers} |
| 21/0237 {Materials} | 21/02507 (Alternating layers, e.g. |
| 21/02373 {Group 14 semiconducting materials} | superlattice} |
| 21/02376 {Carbon, e.g. diamond-like carbon} | 21/0251 {Graded layers} |
| 21/02378 {Silicon carbide} | 21/02513 {Microstructure} |
| 21/02381 {Silicon, silicon germanium, | 21/02516 {Crystal orientation} |
| germanium} | 21/02518 {Deposited layers} |
| 21/02384 {including tin} | 21/02521 {Materials} |
| 21/02387 {Group 13/15 materials} | 21/02524 {Group 14 semiconducting materials} |
| 21/02389 {Nitrides} | 21/02527 {Carbon, e.g. diamond-like carbon} |
| 21/02392 {Phosphides} | 21/02529 {Silicon carbide} |
| 21/02395 {Arsenides} | 21/02532 (Silicon, silicon germanium, |
| 21/02398 {Antimonides} | germanium} |
| 21/024 {Group 12/16 materials} | 21/02535 {including tin} |
| 21/02403 {Oxides} | 21/02538 {Group 13/15 materials} |
| 21/02406 {Sulfides} | 21/0254 {Nitrides} |
| 21/02409 {Selenides} | 21/02543 {Phosphides} |
| 21/02411 {Tellurides} | 21/02546 {Arsenides} |
| 21/02414 {Oxide semiconducting materials | 21/02549 {Antimonides} |
| not being Group 12/16 materials, e.g. | 21/02551 {Group 12/16 materials} |
| ternary compounds} | 21/02554 {Oxides} |
| 21/02417 {Chalcogenide semiconducting | 21/02557 {Sulfides} |
| materials not being oxides, e.g. ternary | 21/0256 {Selenides} |
| compounds} | 21/02562 {Tellurides} |
| 21/0242 {Crystalline insulating materials} | 21/02565 {Oxide semiconducting materials |
| 21/02422 {Non-crystalline insulating materials, e.g. glass, polymers} | not being Group 12/16 materials, e.g. |
| | ternary compounds} |
| 21/02425 {Conductive materials, e.g. metallic silicides} | 21/02568 {Chalcogenide semiconducting |
| 21/02428 {Structure} | materials not being oxides, e.g. ternary |
| 21/0243 {Structure} | compounds} |
| 21/0243 {Surface structure} 21/02433 {Crystal orientation} | 21/0257 {Doping during depositing} |
| the state of the s | 21/02573 {Conductivity type} |
| 21/02436 {Intermediate layers between substrates and | 21/02576 {N-type} |
| deposited layers} | 21/02579 {P-type} |
| 21/02439 {Materials} | 21/02581 {Transition metal or rare earth |
| 21/02441 {Group 14 semiconducting materials} | elements} |
| 21/02444 {Carbon, e.g. diamond-like carbon} | 21/02584 {Delta-doping} |
| 21/02447 {Silicon carbide} | 21/02587 {Structure} |
| 21/0245 {Silicon, silicon germanium, germanium} | 21/0259 {Microstructure} |
| germamum _} | • |

| 21/02592 | 21/027 . Making masks on semiconductor bodies for further photolithographic processing not provided for in group H01L 21/18 or H01L 21/34 {(photographic masks or originals per se G03F 1/00; registration or positioning of photographic masks or originals G03F 9/00; photographic cameras G03B; control of position G05D 3/00)} 21/0271 {comprising organic layers} 21/0272 {for lift-off processes} |
|--|---|
| 21/02612 {Formation types} | 21/0273 {characterised by the treatment of photoresist |
| 21/02614 {Transformation of metal, e.g. oxidation, | layers} |
| nitridation} | 21/0274 {Photolithographic processes} |
| 21/02617 {Deposition types} | 21/0275 {using lasers} |
| 21/0262 {Reduction or decomposition of gaseous | 21/0276 {using an anti-reflective coating (anti- |
| compounds, e.g. CVD} 21/02623 {Liquid deposition} | reflective coating for lithography in |
| 21/02625 {Liquid deposition} 21/02625 {using melted materials} | general <u>G03F 7/09</u>)} |
| 21/02628 { using mened materials} | 21/0277 {Electrolithographic processes} |
| | 21/0278 {Röntgenlithographic or X-ray |
| 21/02631 {Physical deposition at reduced pressure, e.g. MBE, sputtering, | lithographic processes} |
| evaporation} | 21/0279 {Ionlithographic processes} |
| 21/02634 {Homoepitaxy} | 21/033 comprising inorganic layers |
| 21/02636 {Selective deposition, e.g. | 21/0331 {for lift-off processes} |
| simultaneous growth of mono- and | 21/0332 {characterised by their composition, e.g. |
| non-monocrystalline semiconductor | multilayer masks, materials} |
| materials} | 21/0334 {characterised by their size, orientation, |
| 21/02639 {Preparation of substrate for selective deposition} | disposition, behaviour, shape, in horizontal or vertical plane} |
| 21/02642 {Mask materials other than SiO_2 or | 21/0335 (characterised by their behaviour |
| SiN} | during the process, e.g. soluble masks, |
| 21/02645 { Seed materials } | redeposited masks} |
| 21/02647 {Lateral overgrowth} | 21/0337 {characterised by the process involved |
| 21/0265 {Pendeoepitaxy} | to create the mask, e.g. lift-off masks, |
| 21/02653 {Vapour-liquid-solid growth} | sidewalls, or to modify the mask, e.g. pre- |
| 21/02656 {Special treatments} | treatment, post-treatment} |
| 21/02658 {Pretreatments (cleaning in general | 21/0338 {Process specially adapted to improve the resolution of the mask} |
| H01L 21/02041)} | 21/04 • the devices having potential barriers, e.g. a PN |
| 21/02661 {In-situ cleaning} | junction, depletion layer or carrier concentration |
| 21/02664 {Aftertreatments (planarisation in general | layer |
| H01L 21/304)} | 21/0405 {the devices having semiconductor bodies |
| 21/02667 {Crystallisation or recrystallisation of | comprising semiconducting carbon, e.g. |
| non-monocrystalline semiconductor | diamond, diamond-like carbon (multistep |
| materials, e.g. regrowth} | processes for the manufacture of said devices |
| 21/02669 { using crystallisation inhibiting | <u>H01L 29/66015</u>)} |
| elements} | NOTE |
| 21/02672 {using crystallisation enhancing | |
| elements} | This group <u>covers</u> passivation |
| 21/02675 {using laser beams} | 21/041 {Making n- or p-doped regions} |
| 21/02678 {Beam shaping, e.g. using a mask} | 21/0415 {using ion implantation} |
| 21/0268 {Shape of mask} | 21/042 {Changing their shape, e.g. forming |
| 21/02683 {Continuous wave laser beam} | recesses (etching of the semiconductor body |
| 21/02686 {Pulsed laser beam} | H01L 21/302)} |
| 21/02689 {using particle beams} | 21/0425 {Making electrodes} |
| 21/02691 {Scanning of a beam} | 21/043 {Ohmic electrodes} |
| 21/02694 {Controlling the interface between | 21/0435 {Schottky electrodes} |
| substrate and epitaxial layer, e.g. by ion | 21/044 {Conductor-insulator-semiconductor |
| implantation followed by annealing} | electrodes} |
| 21/02697 {Forming conducting materials on a substrate} | 21/0445 {the devices having semiconductor bodies comprising crystalline silicon carbide (multistep processes for the manufacture of |
| | said devices <u>H01L 29/66053</u>)} |
| | 21/045 {passivating silicon carbide surfaces} |
| | |

| NOTE Processes where ion implantation of boron and subsequent amenaling does not profuse a p-toped region are classified elsewhere, e.g. HIDL 2:104845 21/1445 | 21/0455 | • • • • {Making n or p doped regions or layers, e.g. using diffusion} | 21/18 the devices having semiconductor bodies comprising elements of Group IV of the |
|---|---------|--|---|
| Processes where ion implantation of borron and subsequent namealing does not produce a p-doped region are classified elsewhere, e.g. H011_21.045 21/0465 | 21/046 | | with or without impurities, e.g. doping |
| does not produce a p-doped region are classified chewhere, e.g. HOIL 21,0445 21,0465 | | | |
| are classified bewhere, e.g. H01L 210445 210465 | | | NOTE |
| 21/0475 Characterised by the angle between the ion beam and the crystal planes or the main crystal surface] | 21/0465 | are classified elsewhere, e.g. H01L 21/0445 | apparatus which, by using the appropriate technology, are clearly suitable for |
| body, e.g. forming recesses, (etching of the semiconductor body H011, 21/302)] 21/048 | 21/047 | • • • • {characterised by the angle between the ion beam and the crystal planes or the main crystal surface} | bodies comprise elements of Group IV of the Periodic Table or AIIIBV compounds, even if the material used is not explicitly |
| 21/048 | 21/04/5 | body, e.g. forming recesses, (etching of the | • |
| Commercial Section Commerc | 21/048 | | |
| Cloud Clou | | , | |
| 21/06 | 21/049 | | |
| 21/06 . the devices having semiconductor bodies comprising selenium or tellurium in uncombined form other than as impurities in semiconductor bodies of other materials 21/10 . Preparation of the foundation plate 21/10 . Preliminary treatment of the selenium or tellurium to the foundation plate, or the subsequent treatment of the combination 21/101 . (Application of the selenium or tellurium to the foundation plate) . Conversion of the selenium or tellurium to the foundation plate being or conductive state conductive state conductive state conductive . Provision of discrete insulating layers, i.e. non-genetic barrier layers 21/12 . Application of a non-genetic conductor wafers to semiconductor wafers for junction formation plate seminor rellurium has been applied to the foundation plate seminor or tellurium after the selenium or tellurium has been applied to the foundation plate seminor or tellurium after the selenium or | 21/0495 | | |
| semiconductor bodies of other materials 21/10 | | the devices having semiconductor bodies | |
| 21/108 Preparation of the foundation plate 21/10 Preliminary treatment of the selenium or tellurium, its application to the foundation plate, or the subsequent treatment of the combination 21/101 | | • | WARNING |
| 21/101 Preliminary treatment of the selenium or tellurium, is application to the foundation plate, combination 21/101 (Application of the selenium or tellurium to the foundation plate) 21/103 (Conversion of the selenium or tellurium to the conductive state 21/105 Treatment of the surface of the selenium or tellurium to the conductive state 21/106 Provision of discrete insulating layers, i.e. non-genetic barrier layers 21/12 Application of an electrode to the exposed surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate electroforming to form a barrier 21/14 Treatment of the complete device, e.g. by electroforming to form a barrier perliminary treatment of the foundation of the foundation plate, preliminary treatment of the foundation plate, preliminary treatment of the foundation plate of the foundation plate (Poundation plate) 21/161 (Reduction of an on-genetic conductive layer) 21/162 (Reduction of the copper oxide, treatment of the oxide layer) 21/163 (Reduction of a non-genetic conductive layer) 21/164 (Application of a non-genetic conductive layer) 21/165 (Reduction of the complete device, e.g. of the oxide layer) 21/166 (Application of a non-genetic conductive layer) 21/167 (Application of a non-genetic conductive layer) 21/168 (Treatment of the complete device, e.g. of the oxide layer) 21/169 (Treatment of the complete device, e.g. of the oxide layer) 21/160 (Application of a non-genetic conductive layer) 21/161 (Application of a non-genetic conductive layer) 21/162 (Application of a non-genetic conductive layer) 21/163 (Treatment of the complete device, e.g. of the oxide layer) 21/165 (Treatment of the complete device, e.g. of the oxide layer) 21/166 (Treatment of the complete device, e.g. of the oxide layer) 21/167 (Application of a non-genetic conductive layer) 21/168 (Treatment of the complete device, e.g. of the oxide layer) | 21/08 | | |
| tellurium, its application to the foundation plate, or the subsequent treatment of the combination 21/101 | | Preliminary treatment of the selenium or | |
| 21/103 Conversion of the selenium or tellurium to the foundation plate 21/2003 | | plate, or the subsequent treatment of the | Groups <u>H01L 21/20</u> and <u>H01L 21/02365</u> - <u>H01L 21/02694</u> should be considered in |
| 21/103 | 21/101 | | |
| the conductive state 1 Treatment of the surface of the selenium or tellurium layer after having been made conductive 21/108 Provision of discrete insulating layers, i.e. non-genetic barrier layers 21/12 Application of an electrode to the exposed surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate 21/14 Treatment of the complete device, e.g. by electroforming to form a barrier 21/15 Ageing 21/16 the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide 21/16 Preparation of the foundation plate, preliminary treatment of the foundation plate (Holl 21/165) takes precedence) 21/16 (Oxidation and subsequent heat treatment of the foundation of the foundation of the foundation of the foundation of the complete device, e.g. by electroforming to form a barrier 21/16 (Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate (Holl 21/165) takes precedence) 21/16 (Oxidation and subsequent heat treatment of the foundation of the foundation of the foundation of the foundation of the complete device, e.g. takes precedence) 21/16 (Oxidation of a non-genetic conductive layer) 21/16 (Application of a non-genetic conductive layer) 21/16 (Application of a non-genetic conductive layer) 21/16 (Treatment of the complete device, e.g. | 21/103 | | , |
| 21/105 Treatment of the surface of the selenium or tellurium layer after having been made conductive 21/108 Provision of discrete insulating layers, i.e. non-genetic barrier layers 21/12 Application of an electrode to the exposed surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate 21/14 Treatment of the complete device, e.g. by electroforming to form a barrier 21/15 Ageing 21/16 the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide 21/161 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate wakes precedence}; 21/163 {Reduction of the copper oxide, treatment of the oxide layer} 21/165 {Reduction of a non-genetic conductive layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. by electroforming to form a barrier 21/2015 {the substrate being of crystalline insulating material, e.g. sapphire} 21/2015 {the substrate being of crystalline semiconductor material, e.g. lattice adaptation, heteroepitaxy} 21/2018 . {Selective epilaxial growth, e.g. simultaneous deposition of mono - and non-mono semiconductor materials} WARNING Group H01L 21/2018 is no longer used for the classification of documents as of August 1, 2022. The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694. Groups H01L 21/02365 - H01L 21/02694. Groups H01L 21/02365 - H01L 21/02694. Should be considered in order to perform a complete search. | 21/103 | | |
| 21/108 Provision of discrete insulating layers, i.e. non-genetic barrier layers 21/12 Application of an electrode to the exposed surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate 21/2011 | 21/105 | or tellurium layer after having been made | semiconducting substrates using an intermediate insulating layer |
| surface of the selenium or tellurium after the selenium or tellurium has been applied to the foundation plate 21/14 | 21/108 | | bonding of semiconductor wafers to semiconductor wafers for junction |
| selenium or tellurium has been applied to the foundation plate 21/14 Treatment of the complete device, e.g. by electroforming to form a barrier 21/14 Ageing 21/145 Ageing 21/16 the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide 21/16 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate} 21/164 {Preliminary treatment of the foundation plate} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. 21/2018 {Treatment of the complete device, e.g. 21/2018 {The substrate being of crystalline semiconductor material, e.g. lattice adaptation, heteroepitaxy} 21/2018 {Selective epilaxial growth, e.g. simultaneous deposition of mono - and non-mono semiconductor materials} WARNING Group Holl 21/2018 is no longer used for the classification of documents as of August 1, 2022. The content of this group is being reclassified into groups Holl 21/02365 - Holl 21/02694. Groups Holl 21/2018 and Holl 21/02365 - Holl 21/02694. Groups Holl 21/2018 on of a non-genetic conductive layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/12 | | |
| 21/14 Treatment of the complete device, e.g. by electroforming to form a barrier 21/145 Ageing 21/16 the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide 21/161 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate, plate} 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g.} 21/168 {Treatment of the complete device, e.g.} 21/2018 Semiconductor material, e.g. lattice adaptation, heteroepitaxy} 21/2018 {Selective epilaxial growth, e.g. simultaneous deposition of mono - and non-mono semiconductor materials} WARNING Group H01L 21/2018 is no longer used for the classification of documents as of August 1, 2022. The content of this group is being reclassified into groups H01L 21/02365 - H01L 21/02694. Groups H01L 21/2018 and H01L 21/02365 - H01L 21/02694 H01L 21/02365 - H01L 21/02694 Should be considered in order to perform a complete search. | | selenium or tellurium has been applied to the | insulating material, e.g. sapphire} |
| electroforming to form a barrier 21/145 Ageing 21/16 the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide 21/161 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, preliminary treatment of the foundation plate plate} 21/162 {Preliminary treatment of the foundation plate, preliminary treatment of the foundation plate} 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/14 | | |
| 21/161 the devices having semiconductor bodies comprising cuprous oxide or cuprous iodide 21/161 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate} 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g.} | 21/11 | | |
| comprising cuprous oxide or cuprous iodide 21/161 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate, reduction treatment} 21/164 {Preliminary treatment of the foundation plate} 21/165 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/145 | | |
| 21/161 {Preparation of the foundation plate, preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate} 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/16 | | |
| preliminary treatment oxidation of the foundation plate, reduction treatment} 21/162 {Preliminary treatment of the foundation plate} 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/161 | | |
| 21/162 {Preliminary treatment of the foundation plate} 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/101 | preliminary treatment oxidation of the | |
| 21/164 {Oxidation and subsequent heat treatment of the foundation plate (H01L 21/165 being reclassified into groups takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/162 | • • • • {Preliminary treatment of the foundation | |
| of the foundation plate (H01L 21/165 takes precedence)} 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/164 | . , | |
| 21/165 {Reduction of the copper oxide, treatment of the oxide layer} 21/167 {Application of a non-genetic conductive layer} 21/168 {Treatment of the complete device, e.g. | 21/104 | of the foundation plate (H01L 21/165 | being reclassified into groups |
| 21/167 {Application of a non-genetic conductive layer} should be considered in order to perform a complete search. 21/168 {Treatment of the complete device, e.g. | 21/165 | {Reduction of the copper oxide, treatment | Groups H01L 21/2018 and |
| 21/168 {Treatment of the complete device, e.g. | 21/167 | • • • • {Application of a non-genetic conductive | should be considered in order to |
| | 21/168 | • • • {Treatment of the complete device, e.g. | |

21/2022 {Epitaxial regrowth of non-. {Epitaxial deposition of AIII BV monocrystalline semiconductor (Frozen) (Frozen) compounds} materials, e.g. lateral epitaxy by seeded WARNING solidification, solid-state crystallization, Group H01L 21/2036 is no longer solid-state graphoepitaxy, explosive crystallization, grain growth in used for the classification of documents as of August 1, 2022. polycrystalline materials} The content of this group is WARNING being reclassified into groups Group H01L 21/2022 is no longer used H01L 21/02365 - H01L 21/02694. for the classification of documents as of Groups H01L 21/2036 and August 1, 2022. H01L 21/02365 - H01L 21/02694 The content of this group is should be considered in order to being reclassified into groups perform a complete search. H01L 21/02365 - H01L 21/02694. 21/205 using reduction or decomposition of Groups H01L 21/2022 and (Frozen) a gaseous compound yielding a solid H01L 21/02365 - H01L 21/02694 condensate, i.e. chemical deposition should be considered in order to perform a complete search. WARNING Group H01L 21/205 is no longer used 21/2026 {using a coherent energy beam, e.g. for the classification of documents as of (Frozen) laser or electron beam} August 1, 2022. **WARNING** The content of this group is Group H01L 21/2026 is no longer being reclassified into groups used for the classification of H01L 21/02365 - H01L 21/02694. documents as of August 1, 2022. Groups H01L 21/205 and The content of this group is H01L 21/02365 - H01L 21/02694 being reclassified into groups should be considered in order to H01L 21/02365 - H01L 21/02694. perform a complete search. Groups H01L 21/2026 and 21/2053 {Expitaxial deposition of elements of H01L 21/02365 - H01L 21/02694 Group IV of the Periodic System, e.g. (Frozen) should be considered in order to Si, Ge} perform a complete search. WARNING 21/203 using physical deposition, e.g. vacuum Group H01L 21/2053 is no longer (Frozen) deposition, sputtering used for the classification of WARNING documents as of August 1, 2022. Group H01L 21/203 is no longer used The content of this group is for the classification of documents as of being reclassified into groups August 1, 2022. H01L 21/02365 - H01L 21/02694. The content of this group is Groups H01L 21/2053 and being reclassified into groups H01L 21/02365 - H01L 21/02694 H01L 21/02365 - H01L 21/02694. should be considered in order to Groups H01L 21/203 and perform a complete search. H01L 21/02365 - H01L 21/02694 21/2056 $\cdot \cdot \cdot \cdot \cdot \cdot \cdot$ {Epitaxial deposition of $A_{III}B_{V}$ should be considered in order to compounds} (Frozen) perform a complete search. **WARNING** 21/2033 {Epitaxial deposition of elements of Group IV of the Periodic System, e.g. Group H01L 21/2056 is no longer (Frozen) used for the classification of Si, Ge} documents as of August 1, 2022. **WARNING** The content of this group is Group H01L 21/2033 is no longer being reclassified into groups used for the classification of H01L 21/02365 - H01L 21/02694. documents as of August 1, 2022. Groups H01L 21/2056 and The content of this group is H01L 21/02365 - H01L 21/02694 being reclassified into groups should be considered in order to H01L 21/02365 - H01L 21/02694. perform a complete search. Groups H01L 21/2033 and H01L 21/02365 - H01L 21/02694 should be considered in order to

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perform a complete search.

| 21/208 . (Frozen) | using liquid deposition | 21/2252 {using predeposition of impurities into the semiconductor surface, e.g. |
|-------------------|---|--|
| (| <u>WARNING</u> | from a gaseous phase} |
| | Group H01L 21/208 is no longer used | 21/2253 {by ion implantation} |
| | for the classification of documents as of | 21/2254 {from or through or into an applied |
| | August 1, 2022. | layer, e.g. photoresist, nitrides} |
| | The content of this group is | 21/2255 {the applied layer comprising |
| | being reclassified into groups | oxides only, e.g. P ₂ O ₅ , PSG, |
| | <u>H01L 21/02365</u> - <u>H01L 21/02694</u> . | H_3BO_3 , doped oxides} |
| | Groups <u>H01L 21/208</u> and | 21/2256 {through the applied layer} |
| | <u>H01L 21/02365</u> - <u>H01L 21/02694</u> | 21/2257 {the applied layer being silicon or |
| | should be considered in order to | silicide or SIPOS, e.g. polysilicon, |
| | perform a complete search. | porous silicon} |
| 21/2085 | {Epitaxial deposition of $A_{III}B_V$ | 21/2258 { Diffusion into or out of $A_{III}B_V$ |
| (Frozen) | compounds} | compounds} |
| (1 rozen) | • | 21/228 using diffusion into or out of a solid from |
| | WARNING | or into a liquid phase, e.g. alloy diffusion |
| | Group H01L 21/2085 is no longer | processes {(<u>H01L 21/221</u> - <u>H01L 21/222</u> |
| | used for the classification of | take precedence)} |
| | documents as of August 1, 2022. | 21/24 Alloying of impurity materials, e.g. doping materials, electrode materials, with a |
| | The content of this group is | semiconductor body {(H01L 21/182 takes |
| | being reclassified into groups | precedence)} |
| | H01L 21/02365 - H01L 21/02694. | 21/242 {Alloying of doping materials with A _{III} B _V |
| | Groups H01L 21/2085 and | compounds} |
| | <u>H01L 21/02365</u> - <u>H01L 21/02694</u> | 21/244 {Alloying of electrode materials} |
| | should be considered in order to | 21/246 {with $A_{III}B_V$ compounds} |
| | perform a complete search. | 21/248 {Apparatus specially adapted for the |
| 21/22 | Diffusion of impurity materials, e.g. | alloying} |
| | doping materials, electrode materials, | 21/26 Bombardment with radiation |
| | into or out of a semiconductor body, | $\{(\underline{\text{H01L }21/3105} \text{ takes precedence})\}$ |
| | or between semiconductor regions; | 21/2605 {using natural radiation, e.g. alpha, beta or |
| | {Interactions between two or more | gamma radiation} |
| | impurities; Redistribution of impurities} | 21/261 to produce a nuclear reaction transmuting |
| 21/2205 . | • • • {from the substrate during epitaxy, | chemical elements |
| | e.g. autodoping; Preventing or using | 21/263 with high-energy radiation (H01L 21/261 |
| 21/221 | autodoping} | takes precedence) |
| | · · · · {of killers} | 21/2633 {for etching, e.g. sputteretching} |
| | {in $A_{III}B_V$ compounds} | 21/2636 {for heating, e.g. electron beam heating |
| | {Lithium-drift} | 21/265 producing ion implantation |
| | {Diffusion sources} | 21/26506 {in group IV semiconductors} |
| 21/223 . | using diffusion into or out of a solid from or into a gaseous phase | 21/26513 {of electrically active species} |
| | {(H01L 21/221 - H01L 21/222 take | 21/2652 {Through-implantation} |
| | precedence; diffusion through an applied | 21/26526 {Recoil-implantation} 21/26533 {of electrically inactive species in |
| | layer <u>H01L 21/225</u>)} | 21/26533 {of electrically inactive species in silicon to make buried insulating |
| 21/2233 . | {Diffusion into or out of $A_{III}B_V$ | layers} |
| | compounds} | 21/2654 $\{ \text{in } A_{III}B_{V} \text{ compounds} \}$ |
| | • • • • {from or into a plasma phase} | 21/26546 {of electrically active species} |
| 21/225 . | using diffusion into or out of a solid from | 21/26553 {Through-implantation} |
| | or into a solid phase, e.g. a doped oxide | 21/2656 {characterised by the implantation |
| | layer {(<u>H01L 21/221</u> - <u>H01L 21/222</u> take | of both electrically active and |
| 21/2251 | precedence)} | inactive species in the same |
| 21/2251 . | {Diffusion into or out of group IV | semiconductor region to be doped} |
| | semiconductors} | 21/26566 {of a cluster, e.g. using a gas cluster |
| | <u>NOTE</u> | ion beam} |
| | {In groups | 2021/26573 {in diamond} |
| | H01L 21/2254 - H01L 21/2257 | 21/2658 {of a molecular ion, e.g. decaborane} |
| | one should consider the main | 21/26586 {characterised by the angle between |
| | compositional parts of the applied | the ion beam and the crystal planes or |
| | layer just before the diffusion step} | the main crystal surface} |
| | | 21/26593 {at a temperature lower than room |
| | | temperature} |

| 21/266 using masks {(<u>H01L 21/26586</u> takes precedence)} | 21/28061 { the conductor comprising a metal or metal silicide |
|---|--|
| 21/268 using electromagnetic radiation, e.g. laser radiation | formed by deposition, e.g. sputter deposition, i.e. |
| 21/2683 {using X-ray lasers} | without a silicidation reaction |
| 21/2686 {using incoherent radiation} | (<u>H01L 21/28052</u> takes precedence)} |
| 21/28 Manufacture of electrodes on semiconductor bodies using processes | NOTE |
| or apparatus not provided for in groups | |
| H01L 21/20 - H01L 21/268 {(etching for | To assess the coverage of groups H01L 21/28052 and |
| patterning the electrodes <u>H01L 21/311</u> , <u>H01L 21/3213</u> ; multistep manufacturing | <u>H01L 21/28061</u> , barrier |
| processes for data storage electrodes | layers, e.g. TaSiN, are not considered |
| H01L 29/4011)} | |
| 21/28008 {Making conductor-insulator-semiconductor electrodes} | 21/2807 { the final conductor layer next to the insulator being Si or Ge or C |
| 21/28017 {the insulator being formed after the | and their alloys except Si} |
| semiconductor body, the semiconductor | 21/28079 {the final conductor layer next to |
| being silicon} | the insulator being a single metal, e.g. Ta, W, Mo, Al} |
| NOTE | 21/28088 {the final conductor layer next to |
| This group <u>covers</u> deposition of the insulators, including epitaxial | the insulator being a composite, e.g. |
| insulators, and the conductors within | TiN} 21/28097 {the final conductor layer next |
| the same process or chamber | to the insulator being a metallic |
| 21/28026 {characterised by the conductor | silicide} |
| (<u>H01L 21/28176</u> takes precedence)} | 21/28105 { the final conductor next to the insulator having a lateral |
| <u>NOTE</u> | composition or doping variation, or |
| When the final conductor | being formed laterally by more than one deposition step} |
| comprises a superconductor, subject matter is not classified | 21/28114 {characterised by the sectional |
| according to the subgroups | shape, e.g. T, inverted-T} |
| TIO11 01/00007 TIO11 01/00007 | ,,e. |
| H01L 21/28035 - H01L 21/28097. Instead, it is classified in | NOTE |
| H01L 21/28035 - H01L 21/28097. Instead, it is classified in H01L 21/28026 | NOTE Documents are also |
| Instead, it is classified in | NOTE Documents are also classified in groups |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, | NOTE Documents are also |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/2810; when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/2810! when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the | Documents are also classified in groups H01L 21/28035 - H01L 21/2810! when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon | Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed) | Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating} |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon | Documents are also classified in groups H01L 21/28035 - H01L 21/2810! when the composition is also relevant 21/28123 . |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation | Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating} |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation | Documents are also classified in groups H01L 21/28035 - H01L 21/28105 when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating} 21/2815 {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation | Documents are also classified in groups H01L 21/28035 - H01L 21/2810; when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating} 21/2815 {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, plating} |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation | Documents are also classified in groups H01L 21/28035 - H01L 21/2810! when the composition is also relevant 21/28123 {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating} 21/2815 {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, plating} 21/2815 {Making the insulator} 21/28167 {on single crystalline silicon, |
| Instead, it is classified in H01L 21/28026 21/28035 {the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities (H01L 21/28105 takes precedence)} NOTE A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator 21/28044 {the conductor comprising at least another non-silicon conductive layer} 21/28052 {the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer (formed by metal ion implantation | NOTE Documents are also classified in groups H01L 21/28035 - H01L 21/2810! when the composition is also relevant 21/28123 . {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects} 21/28132 . {conducting part of electrode is difined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating} 21/28141 . {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating} 21/2815 . {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, plating} 4 Making the insulator} |

| 21/28176 {with a treatment, e.g. annealing, | 21/28525 {the conductive layers |
|--|---|
| after the formation of the definitive gate conductor} | comprising semiconducting material (H01L 21/28518, |
| 21/28185 {with a treatment, e.g. annealing, | H01L 21/28537 take |
| after the formation of the | precedence)} |
| gate insulator and before the | 21/28531 {Making of side-wall contacts} |
| formation of the definitive gate | 21/28537 Deposition of Schottky |
| conductor} | electrodes} |
| 21/28194 {by deposition, e.g. evaporation, | 21/2855 {by physical means, e.g. |
| ALD, CVD, sputtering, laser | sputtering, evaporation |
| deposition (H01L 21/28202 takes | (<u>H01L 21/28518</u> - <u>H01L 21/28537</u> |
| precedence)} | and <u>H01L 21/28568</u> take |
| 21/28202 {in a nitrogen-containing | precedence)} |
| ambient, e.g. nitride deposition, | 21/28556 {by chemical means, e.g. CVD, |
| growth, oxynitridation, NH_3 nitridation, N_2O oxidation, | LPCVD, PECVD, laser CVD (H01L 21/28518 - H01L 21/28537 |
| thermal nitridation, RTN, plasma | and <u>H01L 21/28568</u> take |
| nitridation, RPN} | precedence)} |
| 21/28211 {in a gaseous ambient using | 21/28562 {Selective deposition} |
| an oxygen or a water vapour, | 21/28568 {the conductive layers |
| e.g. RTO, possibly through | comprising transition metals |
| a layer (<u>H01L 21/28194</u> | (<u>H01L 21/28518</u> takes |
| and <u>H01L 21/28202</u> take | precedence)} |
| precedence)} | 21/28575 {on semiconductor bodies |
| <u>NOTE</u> | comprising $A_{III}B_V$ compounds} |
| thin oxidation layers used | 21/28581 {Deposition of Schottky electrodes} |
| as a barrier layer or as a | 21/28587 (characterised by the sectional |
| buffer layer, e.g. before the | shape, e.g. T, inverted T} |
| fomation of a high-k insulator, are classified here only if | 21/28593 (asymmetrical sectional |
| important per se | shape} |
| | 21/288 from a liquid, e.g. electrolytic deposition |
| 21/2822 { with substrate doping, e.g. N, Ge, | 21/2885 {using an external electrical current, |
| C implantation, before formation of | i.e. electro-deposition} |
| the insulator} 21/28229 {by deposition of a layer, | 21/30 Treatment of semiconductor bodies using |
| 21/28229 {by deposition of a layer, e.g. metal, metal compound | processes or apparatus not provided for in groups H01L 21/20 - H01L 21/26 |
| or poysilicon, followed by | (manufacture of electrodes thereon |
| transformation thereof into an | H01L 21/28) |
| insulating layer} | 21/3003 {Hydrogenation or deuterisation, e.g. |
| 21/28238 { with sacrificial oxide} | using atomic hydrogen from a plasma} |
| 21/28247 { passivation or protection of the | 21/3006 {of $A_{III}B_V$ compounds} |
| electrode, e.g. using re-oxidation} | 21/302 to change their surface-physical |
| 21/28255 {the insulator being formed after the | characteristics or shape, e.g. etching, |
| semiconductor body, the semiconductor | polishing, cutting |
| belonging to Group IV and not being elemental silicon, e.g. Ge, SiGe, SiGeC} | 21/304 Mechanical treatment, e.g. grinding, |
| | polishing, cutting {(H01L 21/30625 |
| 21/28264 {the insulator being formed after the semiconductor body, the semiconductor | takes precedence)} |
| being a III-V compound} | 21/3043 {Making grooves, e.g. cutting} 21/3046 {using blasting, e.g. sand-blasting |
| 21/283 Deposition of conductive or insulating | (H01L 21/2633 takes precedence) |
| materials for electrodes {conducting | 21/306 Chemical or electrical treatment, e.g. |
| electric current} | electrolytic etching (to form insulating |
| 21/285 from a gas or vapour, e.g. condensation | layers <u>H01L 21/31</u>) |
| 21/28506 {of conductive layers} | 21/30604 {Chemical etching} |
| 21/28512 (on semiconductor bodies | 21/30608 (Anisotropic liquid etching |
| comprising elements of Group IV of the Periodic Table } | (<u>H01L 21/3063</u> takes precedence)} |
| 21/28518 {the conductive layers | 21/30612 {Etching of A _{III} B _V compounds} |
| comprising silicides | 21/30617 {Anisotropic liquid etching} 21/30621 {Vapour phase etching} |
| (<u>H01L 21/28537</u> takes | 21/30621 {Vapour phase etching} 21/30625 {With simultaneous mechanical |
| precedence)} | treatment, e.g. mechanico-chemical |
| | polishing} |
| | 21/3063 Electrolytic etching |
| | . • |

| $21/30635 \dots \dots \{ \text{ of } A_{III}B_V \text{ compounds} \}$ $21/3065 \dots \dots \text{Plasma etching; Reactive-ion etching}$ | 21/312 Organic layers, e.g. photoresist (Frozen) (H01L 21/3105, H01L 21/32 take |
|---|--|
| 21/30655 {comprising alternated and repeated etching and passivation | precedence; {photoresists <u>per se</u> <u>G03C</u> }) WARNING |
| steps, e.g. Bosch process} | |
| 21/308 using masks (<u>H01L 21/3063</u> , | Groups <u>H01L 21/312</u> – |
| H01L 21/3065 take precedence) | H01L 21/3128 are no longer used for the classification of documents |
| 21/3081 {characterised by their | as of May 1, 2011. The content of |
| composition, e.g. multilayer masks, materials} | these groups is being reclassified |
| 21/3083 { characterised by their size, | into groups <u>H01L 21/02107</u> – |
| orientation, disposition, behaviour, | <u>H01L 21/02326</u> . |
| shape, in horizontal or vertical | Groups <u>H01L 21/02107</u> – |
| plane } | H01L 21/02326 should be considered in order to perform a |
| 21/3085 {characterised by their behaviour | complete search. |
| during the process, e.g. soluble masks, redeposited masks} | • |
| 21/3086 {characterised by the process | 21/3121 {Layers comprising organo-silicon |
| involved to create the mask, | (Frozen) compounds} 21/3122 {layers comprising polysiloxane |
| e.g. lift-off masks, sidewalls, | 21/3122 {layers comprising polysiloxane (Frozen) compounds} |
| or to modify the mask, e.g. pre- | 21/3124 |
| treatment, post-treatment} | (Frozen) silsesquioxane} |
| 21/3088 {Process specially adapted to improve the resolution of the | 21/3125 {layers comprising silazane |
| mask} | (Frozen) compounds} |
| 21/31 to form insulating layers thereon, e.g. for | 21/3127 {Layers comprising fluoro (Frozen) (hydro)carbon compounds, e.g. |
| masking or by using photolithographic | polytetrafluoroethylene} |
| techniques (encapsulating layers H01L 21/56); After treatment of these | 21/3128 {by Langmuir-Blodgett techniques} |
| layers; Selection of materials for these | (Frozen) |
| layers | 21/314 Inorganic layers (<u>H01L 21/3105</u> , |
| 21/3105 After-treatment | (Frozen) $\underline{\text{H01L } 21/32}$ take precedence) |
| 21/31051 {Planarisation of the insulating layers (H01L 21/31058 takes precedence)} | WARNING |
| 21/31053 {involving a dielectric removal | Groups <u>H01L 21/314</u> – <u>H01L 21/3185</u> are no longer used |
| step} | for the classification of documents as |
| 21/31055 {the removal being a chemical | of May 1, 2011. The content of these |
| etching step, e.g. dry etching (etching per se H01L 21/311)} | group is being reclassified into group |
| 21/31056 {the removal being a selective | <u>H01L 21/02107</u> – <u>H01L 21/02326</u> . |
| chemical etching step, e.g. | Groups <u>H01L 21/02107</u> – <u>H01L 21/02326</u> should be |
| selective dry etching through a | considered in order to perform a |
| mask} | complete search. |
| 21/31058 (of organic layers) | 21/3141 {Deposition using atomic layer |
| 21/311 Etching the insulating layers {by chemical or physical means | 21/3141 {Deposition using atomic layer (Frozen) deposition techniques [ALD]} |
| (H01L 21/31058 takes precedence) | 21/3142 {of nano-laminates, e.g. alternating |
| 21/31105 {Etching inorganic layers} | (Frozen) layers of Al203-Hf02} |
| 21/31111 {by chemical means} | 21/3143 {composed of alternated layers or |
| 21/31116 {by dry-etching} | (Frozen) of mixtures of nitrides and oxides or of oxinitrides, e.g. formation of |
| 21/31122 (of layers not containing Si, | oxinitrides, e.g. formation of oxinitride by oxidation of nitride |
| e.g. PZT, Al_2O_3 } 21/31127 {Etching organic layers} | layers} |
| 21/31133 {by chemical means} | 21/3144 {on silicon} |
| 21/31138 {by dry-etching} | (Frozen) |
| 21/31144 {using masks} | 21/3145 (formed by deposition from a gas |
| 21/3115 Doping the insulating layers | (Frozen) or vapour} 21/3146 {Carbon layers, e.g. diamond-like |
| 21/31155 {by ion implantation} | (Frozen) layers} |
| | 21/3147 {Epitaxial deposition of insulating |
| | (Frozen) materials} |
| | 21/3148 {Silicon Carbide layers} |
| | (Frozen) 2021/3149 {Langmuir-Blodgett techniques} |
| | (Frozen) |
| | |

| 21/316 | composed of oxides or glassy oxides or oxide based glass | (Frozen) | • • • {by anodic oxidation} |
|-------------------------------|--|----------------------------|---|
| | <u>WARNING</u> | 21/31691 (<i>Frozen</i>) | • • {with perovskite structure} |
| | Group H01L 21/316 is no longer used for the classification of documents as of May 1, 2011. | 21/31695 (Frozen) | • • {Deposition of porous oxides or porous glassy oxides or oxide based porous glass} |
| | The content of this group is being reclassified into groups | 21/318 | • composed of nitrides |
| | H01L 21/02107 – H01L 21/02326. | (Frozen) | <u>WARNING</u> |
| 21/31604 | Groups H01L 21/02107 – H01L 21/02326 should be considered in order to perform a complete search. • {Deposition from a gas or vapour | | Group H01L 21/318 is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups H01L 21/02107 – H01L 21/02326. |
| (Frozen) | (<u>H01L 21/31691</u> , <u>H01L 21/31695</u> take precedence)} | | Groups <u>H01L 21/02107</u> – |
| 21/31608 (Frozen) | • • {Deposition of SiO ₂ (H01L 21/31625, H01L 21/31629 and H01L 21/31633 take | 21/3185 | H01L 21/02326 should be considered in order to perform a complete search. • • {of siliconnitrides} |
| | precedence)} | (Frozen) | • (or sincommutees) |
| 21/31612 | • • • {on a silicon body} | 21/32 | using masks |
| (Frozen) 21/31616 (Frozen) | {Deposition of Al_2O_3 } | 21/3205 | Deposition of non-insulating-, e.g. conductive- or resistive-, layers on insulating layers; After-treatment of |
| 21/3162 | • • • {on a silicon body} | | these layers (manufacture of electrodes H01L 21/28) |
| 21/31625 | • • {Deposition of boron or | 21/32051 | • {Deposition of metallic or metal- |
| (Frozen) | phosphorus doped silicon oxide, | | silicide layers} |
| 21/31629 | e.g. BSG, PSG, BPSG}. {Deposition of halogen doped | 21/32053 | • • {of metal-silicide layers} |
| (Frozen) | silicon oxide, e.g. fluorine doped silicon oxide} | 21/32055 | {Deposition of semiconductive layers, e.g. poly - or amorphous silicon layers} |
| 21/31633 | • • {Deposition of carbon doped | 21/32056 | • {Deposition of conductive or |
| (Frozen) 21/31637 | silicon oxide, e.g. SiOC}• {Deposition of Tantalum oxides, | | semi-conductive organic layers (H01L 21/32058 takes precedence)} |
| (Frozen) | e.g. Ta ₂ O ₅ } | 21/32058 | • {Deposition of superconductive |
| 21/31641 | , | | layers} |
| (Frozen) 21/31645 | e.g. ZrO₂} • {Deposition of Hafnium oxides, | | • After treatment |
| (Frozen) | e.g. HfO ₂ } | 21/32105 | • • {Oxidation of silicon-containing layers} |
| 21/3165 | • {formed by oxidation (H01L 21/31691, H01L 21/31695 | 21/3211 | {Nitridation of silicon-containing layers} |
| 0.1/0.1 17.1 | take precedence)} | 21/32115 | • • {Planarisation} |
| 21/31654 | • • {of semiconductor materials, e.g. the body itself} | 21/3212 | • • • {by chemical mechanical polishing [CMP]} |
| 21/31658 (<i>Frozen</i>) | • • {by thermal oxidation, e.g. of SiGe} | 21/32125 | • • • {by simultaneously passing an electrical current, i.e. |
| , | {of silicon in uncombined | | electrochemical mechanical |
| (Frozen) | form} | | polishing, e.g. ECMP} |
| 21/31666 | • • • • {of AIII BV compounds} | 21/3213 | • Physical or chemical etching of the layers, e.g. to produce |
| 21/3167 (<i>Frozen</i>) | • • • {of anodic oxidation} | | a patterned layer from a pre- deposited extensive layer |
| | • • • {of silicon} | 21/32131 | • • {by physical means only} |
| (Frozen) | | | • • • {of silicon-containing layers} |
| 21/31679 (<i>Frozen</i>) | • • • {of AIII BV compounds} | | • • • {by chemical means only} |
| | • • {of metallic layers, e.g. Al | | {by liquid etching only} {by vapour etching only} |
| (Frozen) | deposited on the body, e.g. | | {by vapour etcning only} {using plasmas} |
| | formation of multi-layer | | {of silicon-containing |
| | insulating structures} | | layers} |

| 21/32138 | anti-corrosion processes} | 21/388 using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion |
|----------|--|---|
| 21/32139 | , | processes |
| 21/3215 | Doping the layers | 21/40 Alloying of impurity materials, e.g. doping |
| 21/32155 | {Doping polycristalline - or amorphous silicon layers} | materials, electrode materials, with a semiconductor body |
| 21/322 | to modify their internal properties, e.g. to | 21/42 Bombardment with radiation |
| 21/322 | produce internal imperfections | 21/423 with high-energy radiation |
| 21/3221 | • • • • • {of silicon bodies, e.g. for gettering} | 21/425 producing ion implantation |
| | | 21/426 using masks |
| 21/3223 | (using cavities formed by hydrogen | |
| 21/2225 | or noble gas ion implantation} | 21/428 using electromagnetic radiation, e.g. laser radiation |
| 21/3225 | {Thermally inducing defects using | |
| | oxygen present in the silicon body | 21/44 Manufacture of electrodes on |
| | for intrinsic gettering (H01L 21/3226 | semiconductor bodies using processes |
| | takes precedence)} | or apparatus not provided for in groups |
| | NOTE | <u>H01L 21/38</u> - <u>H01L 21/428</u> |
| | Cattoring vains both authinais and | 21/441 Deposition of conductive or insulating |
| | Gettering using both extrinsic and | materials for electrodes |
| | intrinsic gettering techniques is classified in both H01L 21/3221 | 21/443 from a gas or vapour, e.g. condensation |
| | | 21/445 from a liquid, e.g. electrolytic deposition |
| | and <u>H01L 21/3225</u> | 21/447 involving the application of pressure, e.g. |
| 21/3226 | • • • • • • {of silicon on insulator} | thermo-compression bonding |
| 21/3228 | $\cdot \cdot $ | 21/449 involving the application of mechanical |
| 21/3220 | them semi-insulating} | vibrations, e.g. ultrasonic vibrations |
| 21/324 | Thermal treatment for modifying | 21/46 Treatment of semiconductor bodies using |
| 21/324 | the properties of semiconductor | processes or apparatus not provided for |
| | bodies, e.g. annealing, sintering | in groups H01L 21/428 (manufacture of |
| | (H01L 21/20 - H01L 21/288 and | electrodes thereon H01L 21/44) |
| | H01L 21/302 - H01L 21/322 take | 21/461 to change their surface-physical |
| | precedence) | characteristics or shape, e.g. etching, |
| 21/3242 | • • • • { for the formation of PN junctions | polishing, cutting |
| 21/3212 | without addition of impurities | 21/463 Mechanical treatment, e.g. grinding, |
| | (H01L 21/22 takes precedence)} | ultrasonic treatment |
| 21/3245 | $\cdot \cdot \cdot \cdot \cdot \cdot \{ \text{ of } A_{III}B_{V} \text{ compounds} \}$ | 21/465 Chemical or electrical treatment, e.g. |
| 21/3247 | • • • • {for altering the shape, e.g. smoothing | electrolytic etching (to form insulating |
| 21/3247 | the surface} | layers <u>H01L 21/469</u>) |
| | , | 21/467 using masks |
| | <u>WARNING</u> | 21/469 to form insulating layers thereon, |
| | Group H01L 21/3247 is incomplete | e.g. for masking or by using |
| | pending reclassification of | photolithographic techniques |
| | documents from group H01L 21/324. | (encapsulating layers <u>H01L 21/56</u>); |
| | Groups <u>H01L 21/324</u> and | After-treatment of these layers |
| | H01L 21/3247 should be considered | 21/47 Organic layers, e.g. photoresist |
| | in order to perform a complete | (<u>H01L 21/475</u> , <u>H01L 21/4757</u> take |
| | search. | precedence) |
| ** *** | | 21/471 Inorganic layers (<u>H01L 21/475</u> , |
| 21/326 | Application of electric currents | H01L 21/4757 take precedence) |
| | or fields, e.g. for electroforming | 21/473 composed of oxides or glassy |
| | (<u>H01L 21/20</u> - <u>H01L 21/288</u> and | oxides or oxide based glass |
| | <u>H01L 21/302</u> - <u>H01L 21/324</u> take | 21/475 using masks |
| 01/04 | precedence) | 21/4757 After-treatment |
| 21/34 | the devices having semiconductor bodies | 21/47573 {Etching the layer} |
| | not provided for in groups {H01L 21/0405, | 21/47576 {Doping the layer} |
| | H01L 21/0445}, H01L 21/06, H01L 21/16 and | 21/4763 Deposition of non-insulating, e.g. |
| | <u>H01L 21/18</u> with or without impurities, e.g. | conductive -, resistive -, layers on |
| 21/29 | doping materials | insulating layers; After-treatment of |
| 21/38 | Diffusion of impurity materials, e.g. doping materials, electrode materials, into or | these layers (manufacture of electrodes |
| | out of a semiconductor body, or between | <u>H01L 21/28</u> , { <u>H01L 21/44</u> }) |
| | semiconductor regions | 21/47635 {After-treatment of these layers} |
| 21/383 | using diffusion into or out of a solid from | |
| 21/303 | or into a gaseous phase | |
| 21/385 | using diffusion into or out of a solid from | |
| 21/303 | or into a solid phase, e.g. a doped oxide | |
| | layer | |
| | -mj | |

| 21/477 | Thermal treatment for modifying | 21/4875 {Connection or disconnection of other |
|---------|--|---|
| | the properties of semiconductor | leads to or from bases or plates} |
| | bodies, e.g. annealing, sintering | 21/4878 {Mechanical treatment, e.g. deforming} |
| | (<u>H01L 21/38</u> - <u>H01L 21/449</u> and | 21/4882 {Assembly of heatsink parts} |
| | $\underline{\text{H01L } 21/461}$ - $\underline{\text{H01L } 21/475}$ take | 21/4885 {Wire-like parts or pins (wire ball |
| | precedence) | formation <u>B23K 20/00</u> ; methods related to |
| 21/479 | Application of electric currents | connecting semiconductor or other solid |
| | or fields, e.g. for electroforming | state bodies <u>H01L 24/00</u>)} |
| | (<u>H01L 21/38</u> - <u>H01L 21/449</u> and | 21/4889 {Connection or disconnection of other |
| | <u>H01L 21/461</u> - <u>H01L 21/475</u> take | leads to or from wire-like parts, e.g. |
| | precedence) | wires} |
| 21/48 | Manufacture or treatment of parts, e.g. | 21/4892 {Cleaning} |
| | containers, prior to assembly of the devices, | 21/4896 {Mechanical treatment, e.g. cutting, |
| | using processes not provided for in a single one | bending} |
| | of the subgroups <u>H01L 21/06</u> - <u>H01L 21/326</u> | 21/50 Assembly of semiconductor devices |
| | NOTE | using processes or apparatus not provided |
| | | for in a single one of the subgroups |
| | In this group, the expression "treatment" | H01L 21/06 - H01L 21/326, {e.g. sealing of a |
| | covers also the removal of leads from parts | cap to a base of a container} |
| 21/4803 | • • • {Insulating or insulated parts, e.g. | NOTE |
| | mountings, containers, diamond heatsinks | |
| | (H01L 21/4846 takes precedence; printed | Arrangements for connecting or |
| | circuit boards <u>H05K 1/00</u>)} | disconnecting semiconductor or other solid |
| 21/4807 | {Ceramic parts} | state bodies, or methods related thereto, |
| 21/481 | • • • • {Insulating layers on insulating parts, with | other than those arrangements or methods |
| | or without metallisation} | covered by the following subgroups, are |
| 21/4814 | {Conductive parts} | covered by <u>H01L 24/00</u> |
| 21/4817 | • • • • { for containers, e.g. caps (<u>H01L 21/4871</u> | 21/52 Mounting semiconductor bodies in |
| | takes precedence)} | containers |
| 21/4821 | • • • • {Flat leads, e.g. lead frames with or | 21/54 Providing fillings in containers, e.g. gas |
| | without insulating supports} | fillings |
| 21/4825 | {Connection or disconnection of other | 21/56 Encapsulations, e.g. encapsulation layers, |
| | leads to or from flat leads, e.g. wires, | coatings |
| | bumps, other flat leads} | 21/561 {Batch processing} |
| 21/4828 | • • • • • {Etching (etching for cleaning without | 21/563 {Encapsulation of active face of |
| | patterning <u>H01L 21/4835</u>)} | flip-chip device, e.g. underfilling |
| 21/4832 | • • • • • Etching a temporary substrate after | or underencapsulation of flip-chip, |
| | encapsulation process to form leads} | encapsulation preform on chip or |
| 21/4835 | • • • • • {Cleaning, e.g. removing of solder} | mounting substrate} |
| 21/4839 | {Assembly of a flat lead with an | 21/565 {Moulds} |
| | insulating support, e.g. for TAB} | 21/566 {Release layers for moulds, e.g. release |
| 21/4842 | • • • • • {Mechanical treatment, e.g. punching, | layers, layers against residue during |
| | cutting, deforming, cold welding} | moulding} |
| 21/4846 | • • • • {Leads on or in insulating or | 21/568 {Temporary substrate used as |
| | insulated substrates, e.g. metallisation | encapsulation process aid (H01L 21/4832 |
| | (H01L 21/4821 takes precedence; | and H01L 21/566 take precedence)} |
| | metallisation of ceramics in general | 21/60 Attaching {or detaching} leads or other |
| | <u>C04B 41/51;</u> printed circuits <u>H05K 3/00</u>)} | conductive members, to be used for carrying |
| 21/485 | {Adaptation of interconnections, e.g. | current to or from the device in operation |
| | engineering charges, repair techniques} | 2021/60007 {involving a soldering or an alloying |
| 21/4853 | {Connection or disconnection of other | process} |
| | leads to or from a metallisation, e.g. | 2021/60015 {using plate connectors, e.g. layer, film} |
| | pins, wires, bumps} | 2021/60022 {using bump connectors, e.g. for flip |
| 21/4857 | {Multilayer substrates (multilayer | chip mounting} |
| | metallisation on monolayer substrate | 2021/6003 {Apparatus therefor} |
| | H01L 21/4846)} | 2021/60037 {Right-up bonding} |
| 21/486 | • • • • • • {Via connections through the substrate | 2021/60045 {Right-up boliding} |
| | with or without pins} | connectors prior to bonding} |
| 21/4864 | {Cleaning, e.g. removing of solder} | 2021/60052 (Oxide removing step, e.g. flux, |
| 21/4867 | {Applying pastes or inks, e.g. | rosin} |
| | screen printing (H01L 21/486 takes | 2021/6006 {with temporary supporting member |
| | precedence)} | not part of an apparatus, e.g. |
| 21/4871 | • • • • {Bases, plates or heatsinks} | removable coating, film or substrate} |
| | | removable conting, that of substitute |

| 2021/60067 {Aligning the bump connectors with the mounting substrate} | 2021/60285 {involving the use of mechanical auxiliary parts without the use of an alloying or |
|---|---|
| 2021/60075 {involving active alignment, i.e. by apparatus steering, e.g. using alignment marks, sensors} | soldering process, e.g. pressure contacts} 2021/60292 {involving the use of an electron or laser beam} |
| 2021/60082 { involving passive alignment, e.g. using surface energy, chemical reactions, thermal equilibrium} | 21/603 involving the application of pressure, e.g. thermo-compression bonding (H01L 21/607 takes precedence) |
| 2021/6009 {involving guiding structures, e.g. structures that are left at least partly in the bonded product, spacers} | 21/607 involving the application of mechanical vibrations, e.g. ultrasonic vibrations 21/62 the devices having no potential barriers |
| 2021/60097 {Applying energy, e.g. for the soldering or alloying process} | 21/64 • Manufacture or treatment of solid state devices other than semiconductor devices, or of parts |
| 2021/60105 {using electromagnetic radiation} 2021/60112 {Coherent radiation, i.e. laser | thereof, not peculiar to a single device provided for in groups <u>H01L 31/00</u> - <u>H10K 99/00</u> |
| beam} | 21/67 . Apparatus specially adapted for handling |
| 2021/6012 {Incoherent radiation, e.g. polychromatic heating lamp} | semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus |
| 2021/60127 {Induction heating, i.e. eddy currents} | specially adapted for handling wafers during manufacture or treatment of semiconductor or |
| 2021/60135 {using convection, e.g. reflow oven} | electric solid state devices or components {; Apparatus not specifically provided for elsewhere |
| 2021/60142 { with a graded temperature | (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, |
| profile} 2021/6015 {using conduction, e.g. chuck} | e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302; apparatus for |
| heater, thermocompression} 2021/60157 { with a graded temperature | manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies |
| profile} 2021/60165 {using an electron beam} | and for methods related thereto <u>H01L 24/74;</u>)} |
| 2021/60172 {using an observer} | <u>NOTE</u> |
| 2021/6018 {Unidirectional static pressure} | In this subgroup the term substrate designates a |
| 2021/60187 { Undirectional static pressure; } | semiconductor or electric solid state device or |
| | Semiconductor of electric sond state device of |
| using vacuum or pressurised | |
| using vacuum or pressurised | component, or a wafer |
| liquid} | |
| liquid} 2021/60195 {using dynamic pressure, e.g. | component, or a wafer |
| liquid} 2021/60195 { using dynamic pressure, e.g. ultrasonic or thermosonic bonding} | component, or a wafer 21/67005 • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary |
| liquid} 2021/60195 {using dynamic pressure, e.g. ultrasonic or thermosonic bonding} 2021/60202 {using a protective atmosphere, e.g. with forming or shielding gas} | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or |
| liquid} 2021/60195 {using dynamic pressure, e.g. ultrasonic or thermosonic bonding} 2021/60202 {using a protective atmosphere, e.g. | component, or a wafer 21/67005 • • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} |
| liquid} 2021/60195 | component, or a wafer 21/67005 . • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 . • • {Apparatus for manufacture or treatment |
| liquid} 2021/60195 | component, or a wafer 21/67005 . • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 . • {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for |
| liquid} 2021/60195 | component, or a wafer 21/67005 . • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 . • • {Apparatus for manufacture or treatment |
| liquid} 2021/60195 | component, or a wafer 21/67005 • • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 • • {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals |
| liquid} 2021/60195 | component, or a wafer 21/67005 • • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 • • • {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material |
| liquid} 2021/60195 | component, or a wafer 21/67005 • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 • • {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} |
| liquid} 2021/60195 | component, or a wafer 21/67005 • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 • • {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 • • • {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} |
| liquid} 2021/60195 | component, or a wafer 21/67005 . • {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 . • {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 . • • {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 . • • • {for general liquid treatment, e.g. etching} |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for drying} 21/6704 {for wet cleaning or washing} 21/67046 {using mainly scrubbing means, e.g. brushes} |
| liquid} 2021/60195 | component, or a wafer 21/67005 . |
| liquid} 2021/60195 | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 . {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for wet cleaning or washing} 21/6704 {for wet cleaning or washing} 21/6704 {using mainly spraying means, e.g. nozzles} |
| liquid} 2021/60195 | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for wet cleaning or washing} 21/67046 {for wet cleaning or washing} 21/67051 {using mainly spraying means, e.g. nozzles} 21/67057 {with the semiconductor substrates |
| liquid} 2021/60195 {using dynamic pressure, e.g. ultrasonic or thermosonic bonding} 2021/60202 {using a protective atmosphere, e.g. with forming or shielding gas} 2021/6021 {using an autocatalytic reaction} 2021/60217 {Detaching bump connectors, e.g. after testing} 2021/60225 {Arrangement of bump connectors prior to mounting} 2021/60232 {wherein the bump connectors are disposed only on the semiconductor chip} 2021/6024 {wherein the bump connectors are disposed only on the mounting substrate} 2021/60247 {wherein the bump connectors are disposed on both the semiconductor chip and the mounting substrate, e.g. bump to bump} 2021/60255 {wherein the bump connectors are provided as prepeg, e.g. are provided in an insulating plate member} 2021/60262 {Lateral distribution of bump connectors prior to mounting} | component, or a wafer 21/67005 {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for wet cleaning or washing} 21/67046 {for wet cleaning or washing} 21/67051 {using mainly scrubbing means, e.g. nozzles} 21/67057 {with the semiconductor substrates being dipped in baths or vessels} |
| liquid} 2021/60195 {using dynamic pressure, e.g. ultrasonic or thermosonic bonding} 2021/60202 {using a protective atmosphere, e.g. with forming or shielding gas} 2021/6021 {using an autocatalytic reaction} 2021/60217 {Detaching bump connectors, e.g. after testing} 2021/60225 {Arrangement of bump connectors prior to mounting} 2021/60232 {wherein the bump connectors are disposed only on the semiconductor chip} 2021/6024 {wherein the bump connectors are disposed only on the mounting substrate} 2021/60247 {wherein the bump connectors are disposed on both the semiconductor chip and the mounting substrate, e.g. bump to bump} 2021/60255 {wherein the bump connectors are provided as prepeg, e.g. are provided in an insulating plate member} 2021/60262 {Lateral distribution of bump connectors prior to mounting} 2021/6027 {Mounting on semiconductor | component, or a wafer 21/67005 {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for wet cleaning or washing} 21/67040 {for wet cleaning or washing} 21/67051 {using mainly scrubbing means, e.g. brushes} 21/67057 {with the semiconductor substrates being dipped in baths or vessels} 21/67063 {for etching} |
| liquid} 2021/60195 . | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for drying} 21/6704 {for wet cleaning or washing} 21/67051 {using mainly scrubbing means, e.g. brushes} 21/67057 {with the semiconductor substrates being dipped in baths or vessels} 21/67063 {for drying etching} |
| liquid} 2021/60195 . | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for drying} 21/67046 {for wet cleaning or washing} 21/67051 {using mainly spraying means, e.g. nozzles} 21/67057 {with the semiconductor substrates being dipped in baths or vessels} 21/67069 {for drying etching} 21/67075 {for wet etching} |
| liquid} 2021/60195 . | component, or a wafer 21/67005 . {Apparatus not specifically provided for elsewhere (processes per se H01L 21/30, H01L 21/46, H01L 23/00; simple temporary support means, e.g. using adhesives, electric or magnetic means H01L 21/68, H01L 21/302)} 21/67011 {Apparatus for manufacture or treatment (processes H01L 21/30, H01L 21/46; for production or after-treatment of single crystals or homogeneous polycrystalline material C30B 35/00)} 21/67017 {Apparatus for fluid treatment (H01L 21/67126, H01L 21/6715 take precedence)} 21/67023 {for general liquid treatment, e.g. etching followed by cleaning} 21/67028 {for cleaning followed by drying, rinsing, stripping, blasting or the like} 21/67034 {for drying} 21/6704 {for wet cleaning or washing} 21/67051 {using mainly scrubbing means, e.g. brushes} 21/67057 {with the semiconductor substrates being dipped in baths or vessels} 21/67063 {for drying etching} |

| 21/67086 { with the semiconductor substrates | 21/67242 { Apparatus for monitoring, sorting or marking |
|--|--|
| being dipped in baths or vessels} | (testing or measuring during manufacture |
| 21/67092 {Apparatus for mechanical treatment (or grinding or cutting, see the relevant groups in | H01L 22/00, marks per se H01L 23/544; testing individual semiconductor devices |
| subclasses <u>B24B</u> or <u>B28D</u>)} | G01R 31/26)} |
| 21/67098 {Apparatus for thermal treatment} | 21/67248 {Temperature monitoring} |
| 21/67103 {mainly by conduction} | 21/67253 {Process monitoring, e.g. flow or thickness |
| 21/67109 {mainly by convection} | monitoring} |
| 21/67115 { mainly by radiation} | 21/67259 {Position monitoring, e.g. misposition |
| 21/67121 {Apparatus for making assemblies not | detection or presence detection} |
| otherwise provided for, e.g. package | 21/67265 {of substrates stored in a container, a magazine, a carrier, a boat or the like} |
| constructions \\ 21/67126 \{Apparatus for sealing, encapsulating, | 21/67271 {Sorting devices} |
| glassing, decapsulating or the like (processes | 21/67276 • • • • {Production flow monitoring, e.g. for |
| H01L 23/02, H01L 23/28)} | increasing throughput (program-control |
| 21/67132 {Apparatus for placing on an insulating | systems per se G05B 19/00, e.g. total factory |
| substrate, e.g. tape} | control <u>G05B 19/418</u>)} |
| 21/67138 {Apparatus for wiring semiconductor or | 21/67282 {Marking devices} |
| solid state device} | 21/67288 {Monitoring of warpage, curvature, damage, defects or the like} |
| 21/67144 {Apparatus for mounting on conductive members, e.g. leadframes or conductors on | 21/67294 {using identification means, e.g. labels on |
| insulating substrates} | substrates or labels on containers} |
| 21/6715 { Apparatus for applying a liquid, a resin, | 21/673 using specially adapted carriers {or holders; |
| an ink or the like (H01L 21/67126 takes | Fixing the workpieces on such carriers or holders |
| precedence)} | (holders for supporting a complete device in |
| 21/67155 {Apparatus for manufacturing or treating in a | operation <u>H01L 23/32</u>)} |
| plurality of work-stations} | 21/67303 • • • {Vertical boat type carrier whereby the substrates are horizontally supported, e.g. |
| 21/67161 {characterized by the layout of the process chambers} | comprising rod-shaped elements} |
| 21/67167 {surrounding a central transfer | 21/67306 {characterized by a material, a roughness, a |
| chamber} | coating or the like} |
| 21/67173 {in-line arrangement} | 21/67309 {characterized by the substrate support} |
| 21/67178 {vertical arrangement} | 21/67313 {Horizontal boat type carrier whereby the |
| 21/67184 {characterized by the presence of more | substrates are vertically supported, e.g. comprising rod-shaped elements} |
| than one transfer chamber} | 21/67316 {characterized by a material, a roughness, a |
| 21/6719 {characterized by the construction of the processing chambers, e.g. modular | coating or the like} |
| processing chambers} | 21/6732 {Vertical carrier comprising wall type elements |
| 21/67196 {characterized by the construction of the | whereby the substrates are horizontally |
| transfer chamber} | supported, e.g. comprising sidewalls} |
| 21/67201 {characterized by the construction of the | 21/67323 {characterized by a material, a roughness, a |
| load-lock chamber} | coating or the like} 21/67326 {Horizontal carrier comprising wall type} |
| 21/67207 {comprising a chamber adapted to a | elements whereby the substrates are vertically |
| particular process} 21/67213 {comprising at least one ion or | supported, e.g. comprising sidewalls} |
| electron beam chamber (coating by | 21/6733 {characterized by a material, a roughness, a |
| ion implantation <u>C23C</u> ; ion or electron | coating or the like} |
| beam tubes <u>H01J 37/00</u>)} | 21/67333 {Trays for chips (magazine for components |
| 21/67219 {comprising at least one polishing | <u>H05K 13/0084</u>)} |
| chamber (polishing apparatuses <u>B24B</u>)} | 21/67336 {characterized by a material, a roughness, a coating or the like} |
| 21/67225 {comprising at least one lithography | 21/6734 • • • {specially adapted for supporting large square |
| chamber (lithographic apparatuses G03F 7/00)} | shaped substrates (containers and packaging |
| 21/6723 {comprising at least one plating | elements for glass sheets <u>B65D 85/48</u> , |
| chamber (electroless plating apparatuses | transporting of glass products during their |
| C23C, electroplating apparatuses | manufacture <u>C03B 35/00</u>)} |
| <u>C25D</u>)} | 21/67343 {characterized by a material, a roughness, a coating or the like} |
| 21/67236 { the substrates being processed being not | 21/67346 • • • {characterized by being specially adapted for |
| semiconductor wafers, e.g. leadframes or chips} | supporting a single substrate or by comprising a |
| Simpo j | stack of such individual supports} |
| | 21/6735 {Closed carriers} |
| | 21/67353 {specially adapted for a single substrate} |
| | |

| 21/67250 | 21/6776 {Continuous loading and unloading into and out of a processing chamber, e.g. transporting belts within processing |
|--|--|
| 21/67359 {specially adapted for containing masks, reticles or pellicles} | chambers} |
| 21/67363 {specially adapted for containing substrates other than wafers (<u>H01L 21/67356</u> , <u>H01L 21/67359</u> take precedence)} | 21/67763 {the wafers being stored in a carrier, involving loading and unloading (H01L 21/6779 takes precedence)} |
| 21/67366 {characterised by materials, roughness, coatings or the like (materials relating to an | 21/67766 {Mechanical parts of transfer devices (robots in general in <u>B25J</u>)} |
| injection moulding process <u>B29C 45/00</u> ; | 21/67769 {Storage means} |
| chemical composition of materials | 21/67772 {involving removal of lid, door, cover} |
| <u>C08L 51/00</u>)} | 21/67775 {Docking arrangements} |
| 21/67369 {characterised by shock absorbing elements, | 21/67778 {involving loading and unloading of wafers} |
| e.g. retainers or cushions} | 21/67781 {Batch transfer of wafers} |
| 21/67373 {characterised by locking systems} | 21/67784 {using air tracks} |
| 21/67376 {characterised by sealing arrangements} 21/67379 {characterised by coupling elements, | 21/67787 {with angular orientation of the workpieces} |
| kinematic members, handles or elements to be externally gripped} | 21/6779 {the workpieces being stored in a carrier, involving loading and unloading} |
| 21/67383 {characterised by substrate supports} | 21/67793 {with orientating and positioning by means of a |
| 21/67386 {characterised by the construction of the | vibratory bowl or track} 21/67796 {with angular orientation of workpieces} |
| closed carrier} | (H01L 21/67787 and H01L 21/67793 take |
| 21/67389 {characterised by atmosphere control} | precedence)} |
| 21/67393 {characterised by the presence of | 21/68 • for positioning, orientation or alignment |
| atmosphere modifying elements inside or | 21/681 {using optical controlling means} |
| attached to the closed carrierl} | 21/682 {Mask-wafer alignment (in general G03F 7/70, |
| 21/67396 {characterised by the presence of antistatic | <u>G03F 9/70</u>)} |
| elements \} 21/677 . for conveying, e.g. between different | 21/683 for supporting or gripping (for conveying |
| 21/677 for conveying, e.g. between different workstations | H01L 21/677, for positioning, orientation or |
| 21/67703 {between different workstations} | alignment <u>H01L 21/68</u>) |
| 21/67706 {Mechanical details, e.g. roller, belt | 21/6831 {using electrostatic chucks} 21/6833 {Details of electrostatic chucks} |
| (H01L 21/67709 takes precedence)} | 21/6835 {Using temporarily an auxiliary support} |
| 21/67709 {using magnetic elements} | |
| 21/67712 {the substrate being handled substantially | <u>NOTE</u> |
| vertically} | H01L 21/6835, details of the apparatus are |
| 21/67715 {Changing the direction of the conveying path} | to be further indexed using the indexing codes chosen from <u>H01L 2221/68304</u> and |
| 21/67718 {Changing orientation of the substrate, | subgroups |
| e.g. from a horizontal position to a vertical | |
| position} 21/67721 {the substrates to be conveyed not | 21/6836 {Wafer tapes, e.g. grinding or dicing support tapes (adhesive tapes in general <u>C09J 7/20</u>)} |
| being semiconductor wafers or large planar substrates, e.g. chips, lead frames | 21/6838 • • • { with gripping and holding devices using a vacuum; Bernoulli devices} |
| planal substrates, e.g. chips, lead frames | 21/697 using machanical magneta a chucke alamne |
| (<u>H01L 21/6773</u> takes precedence)} | 21/687 using mechanical means, e.g. chucks, clamps |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} | or pinches {(using elecrostatic chucks |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path | or pinches {(using elecrostatic chucks H01L 21/6831)} |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} | or pinches {(using elecrostatic chucks |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} | or pinches {(using elecrostatic chucks |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} | or pinches {(using elecrostatic chucks |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} | or pinches {(using elecrostatic chucks |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots in general in B25J)} | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} 21/68735 {characterised by edge profile or support |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots in general in B25J)} 21/67745 {characterized by movements or sequence of movements of transfer devices} 21/67748 {horizontal transfer of a single workpiece} | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} 21/68735 {characterised by edge profile or support profile} |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots in general in B25J)} 21/67745 {characterized by movements or sequence of movements of transfer devices} 21/67748 {horizontal transfer of a single workpiece} 21/67751 {vertical transfer of a single workpiece} | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} 21/68735 {characterised by edge profile or support profile} 21/68742 {characterised by a lifting arrangement, |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots in general in B25J)} 21/67745 {characterized by movements or sequence of movements of transfer devices} 21/67748 {horizontal transfer of a single workpiece} 21/67751 {vertical transfer of a batch of | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} 21/68735 {characterised by edge profile or support profile} |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots in general in B25J)} 21/67745 {characterized by movements or sequence of movements of transfer devices} 21/67748 {horizontal transfer of a single workpiece} 21/67751 {vertical transfer of a batch of workpieces} | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} 21/68735 {characterised by edge profile or support profile} 21/68742 {characterised by a lifting arrangement, e.g. lift pins} |
| (H01L 21/6773 takes precedence)} 21/67724 {by means of a cart or a vehicule} 21/67727 {using a general scheme of a conveying path within a factory} 21/6773 {Conveying cassettes, containers or carriers} 21/67733 {Overhead conveying} 21/67736 {Loading to or unloading from a conveyor} 21/67739 {into and out of processing chamber} 21/67742 {Mechanical parts of transfer devices (robots in general in B25J)} 21/67745 {characterized by movements or sequence of movements of transfer devices} 21/67748 {horizontal transfer of a single workpiece} 21/67751 {vertical transfer of a batch of | or pinches {(using elecrostatic chucks H01L 21/6831)} 21/68707 {the wafers being placed on a robot blade, or gripped by a gripper for conveyance} 21/68714 {the wafers being placed on a susceptor, stage or support} 21/68721 {characterised by edge clamping, e.g. clamping ring} 21/68728 {characterised by a plurality of separate clamping members, e.g. clamping fingers} 21/68735 {characterised by edge profile or support profile} 21/68742 {characterised by a lifting arrangement, e.g. lift pins} 21/6875 {characterised by a plurality of individual |

| 21/68764 {characterised by a movable susceptor, stage or support, others than those only rotating on their own vertical axis, e.g. susceptors on a rotating caroussel} | 21/76213 {introducing electrical inactive or active impurities in the local oxidation region, e.g. to alter LOCOS oxide growth characteristics or for additional isolation |
|--|--|
| 21/68771 {characterised by supporting more than one semiconductor substrate} | purpose} 21/76216 {introducing electrical active} |
| 21/68778 {characterised by supporting substrates others than wafers, e.g. chips} | impurities in the local oxidation region for the sole purpose of creating channel stoppers} |
| 21/68785 {characterised by the mechanical construction of the susceptor, stage or support} | 21/76218 {introducing both types of electrical active impurities in the local |
| 21/68792 {characterised by the construction of the shaft} 21/70 . Manufacture or treatment of devices consisting of a | oxidation region for the sole purpose of creating channel stoppers, e.g. for isolation of |
| plurality of solid state components formed in or on a | complementary doped regions } |
| common substrate or of parts thereof; Manufacture of integrated circuit devices or of parts thereof | 21/76221 { with a plurality of successive local oxidation steps} |
| ({multistep manufacturing processes of assemblies | 21/76224 {using trench refilling with dielectric |
| consisting of a plurality of individual semiconductor or other solid state devices <u>H01L 25/00</u> ; } | materials (trench filling with polycristalline silicon H01L 21/763; |
| manufacture of assemblies consisting of preformed | together with vertical isolation, e.g. |
| electrical components <u>H05K 3/00</u> , <u>H05K 13/00</u>) | trench refilling in a SOI substrate H01L 21/76264)} |
| 21/702 • { of thick-or thin-film circuits or parts thereof} 21/705 • • { of thick-film circuits or parts thereof} | 21/76227 {the dielectric materials being obtained |
| 21/707 {of thin-film circuits or parts thereof} | by full chemical transformation of |
| 21/71 Manufacture of specific parts of devices | non-dielectric materials, such as polycristalline silicon, metals } |
| defined in group <u>H01L 21/70</u> ({ <u>H01L 21/0405</u> , <u>H01L 21/0445</u> }, <u>H01L 21/28</u> , <u>H01L 21/44</u> , | 21/76229 {Concurrent filling of a plurality of |
| <u>H01L 21/48</u> take precedence) | trenches having a different trench shape or dimension, e.g. rectangular and |
| 21/74 Making of {localized} buried regions, e.g. buried collector layers, internal connections | V-shaped trenches, wide and narrow |
| {substrate contacts} | trenches, shallow and deep trenches} |
| 21/743 {Making of internal connections, substrate | 21/76232 {of trenches having a shape other than rectangular or V-shape, e.g. rounded |
| contacts} 21/746 {for AIII-BV integrated circuits} | corners, oblique or rounded trench walls |
| 21/76 Making of isolation regions between | (<u>H01L 21/76229</u> takes precedence)} |
| components | 21/76235 {trench shape altered by a local oxidation of silicon process step, e.g. |
| 21/7602 {between components manufactured in an active substrate comprising SiC compounds} | trench corner rounding by LOCOS} |
| 21/7605 {between components manufactured in | 21/76237 {introducing impurities in trench side or bottom walls, e.g. for forming channel |
| an active substrate comprising AIII BV compounds} | stoppers or alter isolation behavior} |
| 21/7607 {between components manufactured in | 21/7624 {using semiconductor on insulator |
| an active substrate comprising $A_{II}B_{VI}$ | [SOI] technology (H01L 21/76297 takes precedence; manufacture of |
| compounds} 21/761 PN junctions | integrated circuits on insulating substrates |
| 21/762 Dielectric regions {, e.g. EPIC dielectric | <u>H01L 21/84</u> ; silicon on sapphire [SOS] technology <u>H01L 21/86</u>)} |
| isolation, LOCOS; Trench refilling | 21/76243 {using silicon implanted buried |
| techniques, SOI technology, use of channel stoppers} | insulating layers, e.g. oxide layers, i.e. |
| 21/76202 {using a local oxidation of silicon, e.g. | SIMOX techniques} 21/76245 {using full isolation by porous oxide |
| LOCOS, SWAMI, SILO (<u>H01L 21/76235</u> takes precedence; together with vertical | silicon, i.e. FIPOS techniques} |
| isolation, e.g. LOCOS in a SOI substrate, | 21/76248 { using lateral overgrowth techniques, i.e. ELO techniques} |
| H01L 21/76264)} | 21/76251 {using bonding techniques} |
| 21/76205 { in a region being recessed from the surface, e.g. in a recess, groove, tub or | 21/76254 {with separation/delamination along |
| trench region} | an ion implanted layer, e.g. Smart-cut, Unibond} |
| 21/76208 {using auxiliary pillars in the recessed | 21/76256 {using silicon etch back techniques, |
| region, e.g. to form LOCOS over extended areas} | e.g. BESOI, ELTRAN} |
| 21/7621 {the recessed region having a shape | 21/76259 {with separation/delamination along a porous layer} |
| other than rectangular, e.g. rounded or oblique shape (H01L 21/76208 takes | 21/76262 {using selective deposition of single |
| precedence)} | crystal silicon, i.e. SEG techniques} |
| | |

| 21/76264 {SOI together with lateral isolation, e.g. using local oxidation of silicon, | 21/76808 {involving intermediate temporary filling with material} |
|--|--|
| or dielectric or polycristalline material | 21/7681 {involving one or more buried masks} |
| refilled trench or air gap isolation regions, e.g. completely isolated | 21/76811 {involving multiple stacked prepatterned masks} |
| semiconductor islands} | 21/76813 {involving a partial via etch} |
| 21/76267 {Vertical isolation by silicon | 21/76814 {post-treatment or after-treatment, |
| implanted buried insulating layers, | e.g. cleaning or removal of oxides on |
| e.g. oxide layers, i.e. SIMOX | underlying conductors} |
| techniques} | 21/76816 {Aspects relating to the layout of |
| 21/7627 {Vertical isolation by full isolation | the pattern or to the size of vias or |
| by porous oxide silicon, i.e. FIPOS | trenches (layout of the interconnections |
| techniques} | <u>per se H01L 23/528;</u> CAD of ICs |
| 21/76272 {Vertical isolation by lateral | G06F 30/00)} |
| overgrowth techniques, i.e. ELO | 21/76817 {using printing or stamping techniques} |
| techniques} | 21/76819 (Smoothing of the dielectric (planarisation |
| 21/76275 {Vertical isolation by bonding | of insulating materials per se |
| techniques} | H01L 21/31051)} |
| 21/76278 {Vertical isolation by selective | 21/7682 {the dielectric comprising air gaps} |
| deposition of single crystal silicon, | 21/76822 {Modification of the material of dielectric |
| i.e. SEG techniques} | layers, e.g. grading, after-treatment to |
| 21/76281 {Lateral isolation by selective | improve the stability of the layers, to |
| oxidation of silicon} | increase their density etc.} |
| 21/76283 {Lateral isolation by refilling of | 21/76823 {transforming an insulating layer into a |
| trenches with dielectric material} | conductive layer} |
| 21/76286 {Lateral isolation by refilling of | 21/76825 {by exposing the layer to particle |
| trenches with polycristalline material} | radiation, e.g. ion implantation, |
| 21/76289 {Lateral isolation by air gap} | irradiation with UV light or electrons |
| 21/76291 {Lateral isolation by field effect} | etc. (plasma treatment <u>H01L 21/76826</u>)} |
| 21/76294 {using selective deposition of single | 21/76826 {by contacting the layer with gases, |
| crystal silicon, i.e. SEG techniques} | liquids or plasmas} |
| 21/76297 {Dielectric isolation using EPIC | 21/76828 {thermal treatment} |
| techniques, i.e. epitaxial passivated | 21/76829 {characterised by the formation of thin |
| integrated circuit} | functional dielectric layers, e.g. dielectric |
| 21/763 Polycrystalline semiconductor regions | etch-stop, barrier, capping or liner layers} |
| $\{(\underline{\text{H01L }21/76264} \text{ takes precedence})\}$ | 21/76831 {in via holes or trenches, e.g. non- |
| 21/764 Air gaps {(<u>H01L 21/76264</u> takes | conductive sidewall liners} |
| precedence)} | 21/76832 {Multiple layers} |
| 21/765 by field effect $\{(\underline{\text{H01L } 21/76264} \text{ takes})\}$ | 21/76834 {formation of thin insulating films on |
| precedence)} | the sidewalls or on top of conductors |
| 21/768 Applying interconnections to be used for | (<u>H01L 21/76831</u> takes precedence)} |
| carrying current between separate components | 21/76835 {Combinations of two or more different |
| within a device {comprising conductors and | dielectric layers having a low dielectric |
| dielectrics} | constant (<u>H01L 21/76832</u> takes |
| NOTE | precedence)} |
| | 21/76837 {Filling up the space between adjacent |
| Groups HOLL 21/768 HOLL 21/76808 acres | conductive structures; Gap-filling |
| H01L 21/768 - H01L 21/76898cover multi-step processes for manufacturing | properties of dielectrics} |
| | 21/76838 {characterised by the formation and the after- |
| | |
| interconnections. Information peculiar to single-step processes should also be | treatment of the conductors (etching for |
| to single-step processes should also be | treatment of the conductors (etching for patterning the conductors <u>H01L 21/3213</u>)} |
| to single-step processes should also be classified in the corresponding group, e.g. | |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 | patterning the conductors <u>H01L 21/3213</u>)} NOTE |
| to single-step processes should also be classified in the corresponding group, e.g. | patterning the conductors <u>H01L 21/3213</u>)} NOTE When the interconnect is also used |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 | patterning the conductors <u>H01L 21/3213</u>)} NOTE When the interconnect is also used as the conductor part of a conductor |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, | NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 | NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 | NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 21/76801 {characterised by the formation and the aftertreatment of the dielectrics, e.g. smoothing} | NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026 |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 21/76801 {characterised by the formation and the aftertreatment of the dielectrics, e.g. smoothing} 21/76802 {by forming openings in dielectrics} | patterning the conductors H01L 21/3213) NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026 21/7684 {Smoothing; Planarisation} |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 21/76801 {characterised by the formation and the aftertreatment of the dielectrics, e.g. smoothing} 21/76802 {by forming openings in dielectrics} 21/76804 {by forming tapered via holes} | patterning the conductors H01L 21/3213)} NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026 21/7684 {Smoothing; Planarisation} 21/76841 {Barrier, adhesion or liner layers} |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 21/76801 • (characterised by the formation and the aftertreatment of the dielectrics, e.g. smoothing) 21/76802 • (by forming openings in dielectrics) 21/76804 • • (by forming tapered via holes) 21/76805 • (the opening being a via or contact hole | patterning the conductors H01L 21/3213)} NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026 21/7684 {Smoothing; Planarisation} 21/76841 {Barrier, adhesion or liner layers} 21/76843 {formed in openings in a dielectric} |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 21/76801 • (characterised by the formation and the aftertreatment of the dielectrics, e.g. smoothing) 21/76802 • (by forming openings in dielectrics) 21/76804 • (by forming tapered via holes) 21/76805 • (the opening being a via or contact hole penetrating the underlying conductor) | patterning the conductors H01L 21/3213)} NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026 21/7684 {Smoothing; Planarisation} 21/76841 {Barrier, adhesion or liner layers} 21/76843 {formed in openings in a dielectric} 21/76844 {Bottomless liners} |
| to single-step processes should also be classified in the corresponding group, e.g. • cleaning H01L 21/02041 • etching H01L 21/311, H01L 21/3213 • masking H01L 21/027, H01L 21/033, H01L 21/31144, H01L 21/32139 • planarizing H01L 21/3105, H01L 21/321 21/76801 • (characterised by the formation and the aftertreatment of the dielectrics, e.g. smoothing) 21/76802 • (by forming openings in dielectrics) 21/76804 • • (by forming tapered via holes) 21/76805 • (the opening being a via or contact hole | patterning the conductors H01L 21/3213)} NOTE When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. H01L 21/28026 21/7684 {Smoothing; Planarisation} 21/76841 {Barrier, adhesion or liner layers} 21/76843 {formed in openings in a dielectric} |

| 21/76847 { the layer being positioned within the main fill metal } 21/76849 { the layer being positioned on top of | 21/76886 {Modifying permanently or temporarily the pattern or the conductivity of conductive members, e.g. formation of |
|--|---|
| the main fill metal} 21/7685 {the layer covering a conductive structure (H01L 21/76849 takes precedence)} | alloys, reduction of contact resistances} 21/76888 {By rendering at least a portion of the conductor non conductive, e.g. oxidation} |
| 21/76852 { the layer also covering the sidewalls of the conductive structure} | 21/76889 {by forming silicides of refractory metals} |
| 21/76853 {characterized by particular aftertreatment steps} | 21/76891 {by using superconducting materials} 21/76892 {modifying the pattern} |
| 21/76855 {After-treatment introducing at least one additional element into the layer} | 21/76894 {using a laser, e.g. laser cutting, laser direct writing, laser repair} |
| 21/76856 {by treatment in plasmas or gaseous environments, e.g. nitriding a refractory metal liner} | 21/76895 {Local interconnects; Local pads, as exemplified by patent document EP0896365} |
| 21/76858 {by diffusing alloying elements} | 21/76897 {Formation of self-aligned vias or contact |
| 21/76859 {by ion implantation} | plugs, i.e. involving a lithographically |
| 21/76861 {Post-treatment or after-treatment not introducing additional chemical | uncritical step (self-aligned silicidation on field effect transistors <u>H01L 29/665</u>)} |
| elements into the layer} | 21/76898 {formed through a semiconductor substrate} |
| 21/76862 {Bombardment with particles, e.g. treatment in noble gas plasmas; UV irradiation} | Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in, or on, a common substrate |
| 21/76864 {Thermal treatment} | (electrically programmable read-only memories |
| 21/76865 {Selective removal of parts of | or multistep manufacturing processes therefor |
| the layer (<u>H01L 21/76844</u> takes precedence)} | <u>H10B 69/00)</u> NOTE |
| 21/76867 {characterized by methods of formation | |
| other than PVD, CVD or deposition from a liquids (PVD H01L 21/2855; | Integration processes for the manufacture of devices of the type classified in <u>H01L 27/14</u> , |
| CVD H01L 21/28556; deposition from | H01L 27/15, H10N 19/00, H10N 39/00, |
| liquids <u>H01L 21/288</u>)} | <u>H10N 59/00, H10N 79/00, H10N 89/00,</u> |
| 21/76868 {Forming or treating discontinuous | H10K 19/00, H10K 39/00, H10K 59/00 and H10K 65/00 are not classified in this |
| thin films, e.g. repair, enhancement or | group and its sub-groups. Instead, as they are |
| reinforcement of discontinuous thin films} | peculiar to said devices, they are classified together with the devices Multistep processes |
| 21/7687 {Thin films associated with contacts of capacitors} | for manufacturing memory structures |
| 21/76871 {Layers specifically deposited to | in general using field effect technology |
| enhance or enable the nucleation of | are covered by <u>H10B 99/00</u> ; Multistep |
| further layers, i.e. seed layers} | processes for manufacturing dynamic random access memory structures are covered |
| 21/76873 {for electroplating} | by H10B 12/01; Multistep processes for |
| 21/76874 {for electroless plating} | manufacturing static random access memory |
| 21/76876 {for deposition from the gas phase, | structures are covered by H10B 10/00; |
| e.g. CVD} | Multistep processes for manufacturing |
| 21/76877 {Filling of holes, grooves or trenches, e.g. vias, with conductive material} | read-only memory structures are covered by <u>H10B 20/00</u> ; Multistep processes for |
| 21/76879 {by selective deposition of conductive | manufacturing electrically programmable |
| material in the vias, e.g. selective C.V.D. on semiconductor material, | read-only memory structures are covered by H10B 69/00 |
| plating (plating on semiconductors in general <u>H01L 21/288</u>)} | 2021/775 {comprising a plurality of TFTs on a non- |
| 21/7688 {by deposition over sacrificial masking | semiconducting substrate, e.g. driving circuits |
| layer, e.g. lift-off (lift-off per se H01L 21/0272)} | for AMLCDs} 21/78 with subsequent division of the substrate into |
| 21/76882 {Reflowing or applying of pressure to better fill the contact hole} | plural individual devices (cutting to change the surface-physical characteristics or shape of |
| 21/76883 {Post-treatment or after-treatment of the | semiconductor bodies <u>H01L 21/304</u>) |
| conductive material} | 21/7806 {involving the separation of the active layers from a substrate} |
| 21/76885 {By forming conductive members before deposition of protective insulating material, e.g. pillars, studs} | 21/7813 {leaving a reusable substrate, e.g. epitaxial lift off} |
| | |

| 21/792 | 21/922456 |
|--|--|
| 21/782 to produce devices, each consisting of a single circuit element (<u>H01L 21/82</u> takes | 21/823456 {gate conductors with different shapes, lengths or dimensions} |
| precedence) | 21/823462 { with a particular manufacturing |
| 21/784 the substrate being a semiconductor body | method of the gate insulating layers, e.g. different gate insulating |
| 21/786 the substrate being other than a semiconductor body, e.g. insulating body | layer thicknesses, particular gate |
| 21/82 to produce devices, e.g. integrated circuits, | insulator materials or particular |
| each consisting of a plurality of components | gate insulator implants} |
| 21/8206 { the substrate being a semiconductor, | 21/823468 {with a particular manufacturing |
| using diamond technology (H01L 21/8258 | method of the gate sidewall spacers, e.g. double spacers, |
| takes precedence)} 21/8213 {the substrate being a semiconductor, | particular spacer material or shape } |
| 21/8213 { the substrate being a semiconductor, using SiC technology (H01L 21/8258 | 21/823475 {interconnection or wiring or |
| takes precedence)} | contact manufacturing related |
| 21/822 the substrate being a semiconductor, using | aspects} |
| silicon technology (<u>H01L 21/8258</u> takes | 21/823481 {isolation region manufacturing related aspects, e.g. to avoid |
| precedence) 21/8221 {Three dimensional integrated circuits | interaction of isolation region with |
| stacked in different levels } | adjacent structure} |
| 21/8222 Bipolar technology | 21/823487 { with a particular manufacturing |
| 21/8224 comprising a combination of vertical | method of vertical transistor |
| and lateral transistors | structures, i.e. with channel vertical to the substrate surface (with a |
| 21/8226 comprising merged transistor logic or | current flow parallel to the substrate |
| integrated injection logic 21/8228 Complementary devices, e.g. | surface <u>H01L 21/823431</u>)} |
| complementary transistors | 21/823493 {with a particular manufacturing |
| 21/82285 {Complementary vertical | method of the wells or tubs, e.g. twin tubs, high energy well |
| transistors} | implants, buried implanted layers |
| 21/8232 Field-effect technology | for lateral isolation [BILLI]} |
| 21/8234 MIS technology {, i.e. integration processes of field effect transistors | 21/8236 Combination of enhancement and |
| of the conductor-insulator- | depletion transistors |
| semiconductor type} | 21/8238 Complementary field-effect transistors, e.g. CMOS |
| 21/823406 (Combination of charge coupled | 21/823807 {with a particular manufacturing |
| devices, i.e. CCD, or BBD} 21/823412 { with a particular manufacturing | method of the channel structures, |
| method of the channel structures, | e.g. channel implants, halo or |
| e.g. channel implants, halo or | pocket implants, or channel materials} |
| pocket implants, or channel | 21/823814 {with a particular manufacturing |
| materials} | method of the source or drain |
| 21/823418 { with a particular manufacturing method of the source or drain | structures, e.g. specific source |
| structures, e.g. specific source or | or drain implants or silicided source or drain structures or |
| drain implants or silicided source or | raised source or drain structures \ |
| drain structures or raised source or | 21/823821 { with a particular manufacturing |
| drain structures} 21/823425 {manufacturing common source} | method of transistors with |
| or drain regions between a | a horizontal current flow in a vertical sidewall of a |
| plurality of conductor-insulator- | semiconductor body, e.g. |
| semiconductor structures} | FinFET, MuGFET} |
| 21/823431 { with a particular manufacturing method of transistors with a | 21/823828 { with a particular manufacturing |
| horizontal current flow in a vertical | method of the gate conductors, |
| sidewall of a semiconductor body, | e.g. particular materials, shapes} |
| e.g. FinFET, MuGFET} | 21/823835 { silicided or salicided gate conductors } |
| 21/823437 { with a particular manufacturing | 21/823842 {gate conductors with different |
| method of the gate conductors, e.g. particular materials, shapes} | gate conductor materials |
| 21/823443 { silicided or salicided gate | or different gate conductor |
| conductors} | implants, e.g. dual gate structures} |
| 21/82345 { gate conductors with different | 21/82385 {gate conductors with different |
| gate conductor materials or different gate conductor | shapes, lengths or dimensions} |
| implants, e.g. dual gate | |
| structures} | |
| | |

| 21/8254 21/8256 21/8258 | precedence) the substrate being a semiconductor, using II-VI technology (H01L 21/8258 takes precedence) the substrate being a semiconductor, using technologies not covered by one of groups {H01L 21/8206, H01L 21/8213}, H01L 21/822, H01L 21/8252 and H01L 21/8254 (H01L 21/8258 takes precedence) the substrate being a semiconductor, using a combination of technologies covered by {H01L 21/8206, H01L 21/8213}, H01L 21/8254 and L21/8252, H01L 21/8254 and L21/8254 and L21/8254. | 22/34 23/00 | to or from the solid state body in operation H01L 23/48)} • {Circuits for electrically characterising or monitoring manufacturing processes, e. g. whole test die, wafers filled with test structures, on-board-devices incorporated on each die, process control monitors or pad structures thereof, devices in scribe line (switching, multiplexing, gating devices G01R 19/25; process control with lithography, e.g. dose control, G03F 7/20; structures for alignment control by optical means G03F 7/70633)} Details of semiconductor or other solid state devices (H01L 25/00 takes precedence {; structural |
|-------------------------------|---|-------------|---|
| 21/84 21/845 | H01L 21/8254 or H01L 21/8256 the substrate being other than a semiconductor body, e.g. being an insulating body {including field-effect transistors with | | devices (<u>H01L 25/00</u>) takes precedence {; structural arrangements for testing or measuring during manufacture or treatment, or for reliability measurements <u>H01L 22/00</u> ; arrangements for connecting or disconnecting semiconductor or solid-state bodies, or methods related thereto <u>H01L 24/00</u> ; |
| 21/043 | a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. | | finger print sensors <u>G06V 40/12</u> }) |
| 21/86 22/00 | sidewall of a semiconductor body, e.g. FinFET, MuGFET} the insulating body being sapphire, e.g. silicon on sapphire structure, i.e. SOS {Testing or measuring during manufacture or treatment; Reliability measurements, i.e. testing of parts without further processing to modify the parts as such; Structural arrangements therefor} | | NOTE This group does not cover: • details of semiconductor bodies or of electrodes of devices provided for in group H01L 29/00, which details are covered by that group; • details peculiar to devices provided for in a single main group of groups H01L 31/00, H01L 33/00, H10K 30/00, H10K 50/00, |

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|------------------------|---|------------------|--|
| H01L 23/00 (continued) | H10K 59/00, H10K 71/00, H10K 85/00, | 23/24 | • • solid or gel at the normal operating temperature |
| | <u>H10K 99/00, H10N 10/00, H10N 30/00,</u> <u>H10N 35/00, H10N 50/00, H10N 52/00,</u> | | of the device {(<u>H01L 23/3135</u> takes precedence)} |
| | H10N 60/00, which details are covered by those groups. | 23/26 | including materials for absorbing or reacting with moisture or other undesired substances {, e.g. getters} |
| 23/02 | • Containers; Seals (H01L 23/12, H01L 23/34, H01L 23/48, H01L 23/552, {H01L 23/66} take precedence; {for memories G11C}) | 23/28 | • Encapsulations, e.g. encapsulating layers, coatings, {e.g. for protection}(<u>H01L 23/552</u> takes |
| 23/04 | characterised by the shape {of the container or parts, e.g. caps, walls} | 22/20 | precedence; {insulating layers for contacts or interconnections <u>H01L 23/5329</u> }) |
| 23/041 | • • • {the container being a hollow construction having no base used as a mounting for the | 23/29 23/291 | characterised by the material {, e.g. carbon (interlayer dielectrics <u>H01L 23/5329</u>)} Qxides or nitrides or carbides, e.g. ceramics, |
| 23/043 | semiconductor body} the container being a hollow construction and | | glass} |
| 23/043 | having a conductive base as a mounting as well as a lead for the semiconductor body | 23/293 23/295 | {Organic, e.g. plastic} {containing a filler (H01L 23/296 takes precedence)} |
| 23/045 | • • • the other leads having an insulating passage through the base | 23/296 | • • • {Organo-silicon compounds} |
| 23/047 | the other leads being parallel to the base | 23/298 | • • • {Semiconductor material, e.g. amorphous |
| 23/049 | the other leads being perpendicular to the | | silicon} |
| 23/04) | base | 23/31 | characterised by the arrangement {or shape} |
| 23/051 | another lead being formed by a cover plate | 23/3107 | • • • {the device being completely enclosed} |
| 23/053 | parallel to the base plate, e.g. sandwich type the container being a hollow construction and | 23/3114 | • • • • {the device being a chip scale package, e.g. CSP} |
| 23/033 | having an insulating {or insulated} base as a mounting for the semiconductor body | 23/3121 | • • • {a substrate forming part of the encapsulation} |
| 23/055 | • • • • the leads having a passage through the base {(H01L 23/057 takes precedence)} | 23/3128 | • • • • {the substrate having spherical bumps for external connection} |
| 23/057 | the leads being parallel to the base | 23/3135 | {Double encapsulation or coating and |
| 23/06 | characterised by the material of the container or its electrical properties | 23/3142 | encapsulation} {Sealing arrangements between parts, e.g. |
| 23/08 | • • • the material being an electrical insulator, e.g. glass | 23/315 | adhesion promotors} {the encapsulation having a cavity} |
| 23/10 | characterised by the material or arrangement of seals between parts, e.g. between cap and base of | 23/3157 | • • • {Partial encapsulation or coating (mask layer used as insulation layer <u>H01L 21/31</u>)} |
| | the container or between leads and walls of the | 23/3164 | • • • {the coating being a foil} |
| | container | 23/3171 | • • • (the coating being directly applied to the |
| 23/12 | Mountings, e.g. non-detachable insulating substrates | | semiconductor body, e.g. passivation layer |
| | | | (H01L 23/3178 takes precedence)} |
| 23/13 | characterised by the shape | 23/3178 | • • • • {Coating or filling in grooves made in the |
| 23/14 | • characterised by the material or its electrical properties {(printed circuit boards H05K 1/00)} | 23/3185 | semiconductor body} {the coating covering also the sidewalls of |
| 23/142 | • • • {Metallic substrates having insulating layers} | | the semiconductor body} |
| 23/145 | • • • {Organic substrates, e.g. plastic} | 23/3192 | • • • {Multilayer coating} |
| 23/147 | • • • {Semiconductor insulating substrates | 23/32 | Holders for supporting the complete device in |
| 22/15 | (semiconductor conductive substrates H01L 23/4926)} | 25,72 | operation, i.e. detachable fixtures (<u>H01L 23/40</u> takes precedence) |
| 23/15 | • • • Ceramic or glass substrates {(<u>H01L 23/142</u> , <u>H01L 23/145</u> , <u>H01L 23/147</u> take precedence)} | 23/34 | Arrangements for cooling, heating, ventilating or temperature compensation {; Temperature |
| 23/16 | Fillings or auxiliary members in containers {or encapsulations}, e.g. centering rings (H01L 23/42, H01L 23/552 take precedence) | | sensing arrangements (thermal treatment apparatus H01L 21/00)} |
| 23/18 | Fillings characterised by the material, its physical or chemical properties, or its arrangement within | 23/345 | • • {Arrangements for heating (thermal treatment apparatus <u>H01L 21/00</u>)} |
| | the complete device | 23/36 | Selection of materials, or shaping, to facilitate cooling or heating, e.g. heatsinks {(<u>H01L 23/28</u>, |
| | <u>NOTE</u> | | <u>H01L 23/40, H01L 23/42, H01L 23/44,</u> |
| | Group <u>H01L 23/26</u> takes precedence over groups <u>H01L 23/20</u> - <u>H01L 23/24</u> | | <u>H01L 23/46</u> take precedence; heating <u>H01L 23/345</u>)} |
| 23/20 | gaseous at the normal operating temperature of | 23/367 | Cooling facilitated by shape of device {(H01L 23/38, H01L 23/40, H01L 23/42, |
| 23/22 | the device liquid at the normal operating temperature of | 02/2670 | <u>H01L 23/44, H01L 23/46</u> take precedence)} |
| <i>23122</i> | the device | 23/3672 | • • • {Foil-like cooling fins or heat sinks (being part of lead-frames H01L 23/49568)} |
| | | 23/3675 | • • • {characterised by the shape of the housing} |

| 23/3677 | • • • {Wire-like or pin-like cooling fins or heat | 23/4338 {Pistons, e.g. spring-loaded members} |
|------------|--|---|
| 23/3077 | sinks} | 23/4338 {Pistons, e.g. spring-loaded members} 23/44 the complete device being wholly immersed |
| 23/373 | Cooling facilitated by selection of materials for | in a fluid other than air { (H01L 23/427 takes |
| 23/3/3 | the device {or materials for thermal expansion | precedence)} |
| | adaptation, e.g. carbon} | 23/445 {the fluid being a liquefied gas, e.g. in a |
| 23/3731 | • • • {Ceramic materials or glass (H01L 23/3732, | cryogenic vessel} |
| | H01L 23/3733, H01L 23/3735, | 23/46 involving the transfer of heat by flowing fluids |
| | H01L 23/3737, H01L 23/3738 take | (<u>H01L 23/42</u> , <u>H01L 23/44</u> take precedence) |
| | precedence)} | 23/467 by flowing gases, e.g. air {(<u>H01L 23/473</u> takes |
| 23/3732 | • • • {Diamonds} | precedence)} |
| 23/3733 | • • • {having a heterogeneous or anisotropic | 23/473 by flowing liquids {(<u>H01L 23/4332</u> , |
| | structure, e.g. powder or fibres in a matrix, | <u>H01L 23/4338</u> take precedence)} |
| | wire mesh, porous structures (<u>H01L 23/3732</u> , | 23/4735 {Jet impingement (<u>H01L 23/4336</u> takes |
| 22/2725 | H01L 23/3737 take precedence) | precedence)} |
| 23/3735 | • • • {Laminates or multilayers, e.g. direct bond copper ceramic substrates} | . Arrangements for conducting electric current to or |
| 23/3736 | • • • • {Metallic materials (H01L 23/3732, | from the solid state body in operation, e.g. leads, terminal arrangements {; Selection of materials |
| 23/3/30 | H01L 23/3733, H01L 23/3735, | therefor} |
| | H01L 23/3737, H01L 23/3738 take | |
| | precedence)} | <u>NOTE</u> |
| 23/3737 | {Organic materials with or without a | Arrangements for connecting or disconnecting |
| | thermoconductive filler} | semiconductor or other solid state bodies, |
| 23/3738 | • • • {Semiconductor materials} | or methods related thereto, other than those |
| 23/38 | Cooling arrangements using the Peltier effect | arrangements or methods covered by the |
| 23/40 | Mountings or securing means for detachable | following subgroups, are covered by H01L 24/00 |
| | cooling or heating arrangements {(heating | 23/481 {Internal lead connections, e.g. via connections, |
| 22/100 | H01L 23/345); fixed by friction, plugs or springs} | feedthrough structures} |
| 23/4006 | • • { with bolts or screws } | 23/482 consisting of lead-in layers inseparably applied |
| 23/4012 | • • • • (for stacked arrangements of a plurality of | to the semiconductor body {(electrodes |
| | semiconductor devices (assemblies <u>per se</u> <u>H01L 25/00</u>)} | <u>H01L 29/40</u>)} |
| 2023/4018 | • • • • {characterised by the type of device to be | 23/4821 {Bridge structure with air gap} |
| 2023/4016 | heated or cooled} | 23/4822 {Beam leads} |
| 2023/4025 | • • • • • Base discrete devices, e.g. presspack, | 23/4824 {Pads with extended contours, e.g. grid |
| 2020, 1020 | disc-type transistors} | structure, branch structure, finger structure} |
| 2023/4031 | • • • • {Packaged discrete devices, e.g. to-3 | 23/4825 {for devices consisting of semiconductor layers on insulating or semi-insulating substrates, e.g. |
| | housings, diodes} | silicon on sapphire devices, i.e. SOS} |
| 2023/4037 | {characterised by thermal path or place of | 23/4827 • • • {Materials} |
| | attachment of heatsink} | 23/4828 {Conductive organic material or pastes, e.g. |
| | • • • • {heatsink to have chip} | conductive adhesives, inks} |
| 2023/405 | • • • • {heatsink to package} | 23/485 consisting of layered constructions comprising |
| 2023/4056 | • • • • {heatsink to additional heatsink} | conductive layers and insulating layers, |
| 2023/4062 | • • • • {heatsink to or through board or cabinet} | e.g. planar contacts {(H01L 23/4821, |
| 2023/4068 | {Heatconductors between device and | <u>H01L 23/4822, H01L 23/4824, H01L 23/4825</u> |
| | heatsink, e.g. compliant heat-spreaders, | take precedence; materials <u>H01L 23/532</u> , |
| 2022/4075 | heat-conducting bands} {Mechanical elements} | bond pads <u>H01L 24/02</u> , bump connectors |
| | {Compliant clamping elements not | H01L 24/10)} 23/4855 {Overhang structure} |
| 2023/4001 | primarily serving heat-conduction} | 23/488 consisting of soldered {or bonded} constructions |
| 2023/4087 | | {(bump connectors H01L 24/01)} |
| 2023/ 100/ | clamping or screwing parts} | 23/49 wire-like {arrangements or pins or rods (using |
| 23/4093 | • • {Snap-on arrangements, e.g. clips} | optical fibres <u>H01L 23/48</u> ; pins attached to |
| 23/42 | Fillings or auxiliary members in containers {or | insulating substrates H01L 23/49811)} |
| | encapsulations} selected or arranged to facilitate | 23/492 Bases or plates {or solder therefor} |
| | heating or cooling | 23/4922 {having a heterogeneous or anisotropic |
| 23/427 | • • Cooling by change of state, e.g. use of heat | structure} |
| | pipes {(by liquefied gas <u>H01L 23/445</u>)} | 23/4924 {characterised by the materials} |
| 23/4275 | • • • {by melting or evaporation of solids} | 23/4926 {the materials containing semiconductor |
| 23/433 | • • • Auxiliary members {in containers} | material } |
| | characterised by their shape, e.g. pistons | 23/4928 {the materials containing carbon} |
| 23/4332 | {Bellows} | 23/495 Lead-frames {or other flat leads (H01L 23/498 |
| 23/4334 | (Auxiliary members in encapsulations | takes precedence; lead frame interconnections |
| 22/4226 | (H01L 23/49568 takes precedence) | between components H01L 23/52)} |
| 23/4336 | • • • {in combination with jet impingement} | 23/49503 {characterised by the die pad} |

| 23/49506 {an insulative substrate being used | 23/49822 {Multilayer substrates (multilayer |
|---|---|
| as a diepad, e.g. ceramic, plastic | metallisation on monolayer substrate |
| (<u>H01L 23/49531</u> takes precedence)} | H01L 23/498)} |
| 23/4951 {Chip-on-leads or leads-on-chip | 23/49827 {Via connections through the substrates, |
| techniques, i.e. inner lead fingers being | e.g. pins going through the substrate, coaxial |
| used as die pad} | cables (<u>H01L 23/49822</u> , <u>H01L 23/49833</u> , |
| 23/49513 {having bonding material between chip | H01L 23/4985, H01L 23/49861 take |
| and die pad} | precedence)} |
| 23/49517 {Additional leads} | 23/49833 • • • { the chip support structure consisting of a |
| 23/4952 {the additional leads being a bump or a | plurality of insulating substrates} |
| wire} | 23/49838 • • • • {Geometry or layout} |
| 23/49524 { the additional leads being a tape carrier or | 23/49844 {for devices being provided for in |
| flat leads} | <u>H01L 29/00</u> } |
| 23/49527 {the additional leads being a multilayer} | 23/4985 {Flexible insulating substrates |
| 23/49531 {the additional leads being a wiring board} | (<u>H01L 23/49572</u> and <u>H01L 23/49855</u> take |
| 23/49534 {Multi-layer} | precedence)} |
| 23/49537 {Plurality of lead frames mounted in one | 23/49855 • • • • {for flat-cards, e.g. credit cards (cards per se |
| device} | <u>G06K 19/00</u>)} |
| 23/49541 {Geometry of the lead-frame} | 23/49861 {Lead-frames fixed on or encapsulated |
| 23/49544 {Deformation absorbing parts in the | in insulating substrates (H01L 23/4985, |
| lead frame plane, e.g. meanderline shape | <u>H01L 23/49805</u> take precedence)} |
| (<u>H01L 23/49562</u> takes precedence)} | 23/49866 {characterised by the materials (materials |
| 23/49548 {Cross section geometry (<u>H01L 23/49562</u> | of the substrates <u>H01L 23/14</u> , of the lead- |
| takes precedence)} | frames <u>H01L 23/49579</u>)} |
| 23/49551 {characterised by bent parts} | 23/49872 {the conductive materials containing |
| 23/49555 {the bent parts being the outer leads} | semiconductor material} |
| 23/49558 {Insulating layers on lead frames, e.g. | 23/49877 {Carbon, e.g. fullerenes (superconducting |
| bridging members} | fullerenes <u>H10N 60/853</u>)} |
| 23/49562 {for devices being provided for in | 23/49883 {the conductive materials containing |
| H01L 29/00} | organic materials or pastes, e.g. for thick |
| 23/49565 {Side rails of the lead frame, e.g. with | films (for printed circuits <u>H05K 1/092</u>)} |
| perforations, sprocket holes} | 23/49888 {the conductive materials containing |
| 23/49568 {specifically adapted to facilitate heat | superconducting material} |
| dissipation} | 23/49894 {Materials of the insulating layers or |
| 23/49572 {consisting of thin flexible metallic | coatings} |
| tape with or without a film carrier | 23/50 for integrated circuit devices, {e.g. power bus, |
| (<u>H01L 23/49503</u> - <u>H01L 23/49568</u> and | number of leads}(H01L 23/482 - H01L 23/498 take precedence) |
| <u>H01L 23/49575</u> - <u>H01L 23/49579</u> take | 23/52 • Arrangements for conducting electric current within |
| precedence)} | the device in operation from one component to |
| 23/49575 {Assemblies of semiconductor devices on | another {, i.e. interconnections, e.g. wires, lead |
| lead frames} | frames (optical interconnections <u>G02B 6/00</u>)} |
| 23/49579 {characterised by the materials of the lead | 23/522 . including external interconnections consisting |
| frames or layers thereon} | of a multilayer structure of conductive and |
| 23/49582 {Metallic layers on lead frames} | insulating layers inseparably formed on the |
| 23/49586 {Insulating layers on lead frames} | semiconductor body |
| 23/49589 {Capacitor integral with or on the leadframe} | 23/5221 {Crossover interconnections} |
| 23/49593 {Battery in combination with a leadframe} | 23/5222 {Capacitive arrangements or effects of, or |
| 23/49596 {Oscillators in combination with lead- | between wiring layers (other capacitive |
| frames} | arrangements <u>H01L 23/642</u>)} |
| 23/498 Leads, {i.e. metallisations or lead-frames} on | 23/5223 {Capacitor integral with wiring layers} |
| insulating substrates, {e.g. chip carriers (shape | 23/5225 {Shielding layers formed together with |
| of the substrate H01L 23/13)} | wiring layers} |
| 23/49805 {the leads being also applied on the sidewalls | 23/5226 {Via connections in a multilevel |
| or the bottom of the substrate, e.g. leadless | interconnection structure} |
| packages for surface mounting} | 23/5227 • • • {Inductive arrangements or effects of, or |
| 23/49811 {Additional leads joined to the metallisation | between, wiring layers (other inductive |
| on the insulating substrate, e.g. pins, bumps, wires, flat leads (H01L 23/49827 takes | arrangements <u>H01L 23/645</u>)} |
| precedence)} | 23/5228 {Resistive arrangements or effects of, or |
| 23/49816 {Spherical bumps on the substrate for | between, wiring layers (other resistive |
| external connection, e.g. ball grid arrays | arrangements H01L 23/647)} |
| [BGA]} | 23/525 with adaptable interconnections |
| £J) | 23/5252 {comprising anti-fuses, i.e. connections |
| | having their state changed from non- |
| | conductive to conductive} |

| 23/5254 | • • • • { the change of state resulting from the use of an external beam, e.g. laser beam or ion beam } | 23/5383 | • • • {Multilayer substrates (<u>H01L 23/5385</u> takes precedence; multilayer metallisation on monolayer substrates <u>H01L 23/538</u>)} |
|----------------------|--|------------------|---|
| 23/5256 | {comprising fuses, i.e. connections having their state changed from conductive to non-conductive} | 23/5384 | • • • {Conductive vias through the substrate with or without pins, e.g. buried coaxial conductors (H01L 23/5383, H01L 23/5385 |
| 23/5258 | • • • • { the change of state resulting from the use of an external beam, e.g. laser beam or ion | | take precedence; pins attached to insulating substrates <u>H01L 23/49811</u>)} |
| 23/528 | beam} {Geometry or} layout of the interconnection | 23/5385 | • • {Assembly of a plurality of insulating substrates} |
| | structure {(<u>H01L 27/0207</u> takes precedence; algorithms <u>G06F 30/00</u>)} | 23/5386 | • • • {Geometry or layout of the interconnection structure} |
| 23/5283 23/5286 | {Cross-sectional geometry} {Arrangements of power or ground buses} | 23/5387 | • • {Flexible insulating substrates (H01L 23/5388 takes precedence)} |
| 23/532 | characterised by the materials | 23/5388 | • • { for flat cards, e.g. credit cards (cards per se G06K 19/00) } |
| 23/53204 23/53209 | • • • {based on metals, e.g. alloys, metal | 23/5389 | • • • {the chips being integrally enclosed by the |
| | silicides (<u>H01L 23/53285</u> takes precedence)} | 23/544 | interconnect and support structures}Marks applied to semiconductor devices {or parts}, |
| | {the principal metal being aluminium} | | e.g. registration marks, {alignment structures, wafer maps (test patterns for characterising or monitoring |
| | {Aluminium alloys} {Additional layers associated with | | manufacturing processes <u>H01L 22/00</u>)} |
| | aluminium layers, e.g. adhesion, barrier, cladding layers} | | NOTE |
| | • • • • { the principal metal being copper } | | When classifying in group H01L 23/544, details are to be further indexed by using the |
| | {Copper alloys} {Additional layers associated with | | indexing codes chosen from <u>H01L 2223/544</u> and subgroups |
| | copper layers, e.g. adhesion, barrier, cladding layers} | 23/552 | Protection against radiation, e.g. light {or |
| 23/53242 | {the principal metal being a noble metal, | | electromagnetic waves} |
| 23/53247 | e.g. gold} {Noble-metal alloys} | 23/556 23/562 | against alpha rays{Protection against mechanical damage |
| | • • • • • • {Additional layers associated with noble-metal layers, e.g. adhesion, | 23/564 | (H01L 23/02, H01L 23/28 take precedence)} • {Details not otherwise provided for, e.g. protection |
| | barrier, cladding layers} | | against moisture (getters H01L 23/26)} |
| 23/53257 | • • • • • { the principal metal being a refractory metal } | 23/57 | • {Protection from inspection, reverse engineering or tampering} |
| | {Refractory-metal alloys} | 23/573 | • • {using passive means} |
| 23/53266 | {Additional layers associated with refractory-metal layers, e.g. adhesion, | 23/576 23/58 | • • {using active circuits} |
| | barrier, cladding layers} | 23/36 | Structural electrical arrangements for semiconductor devices not otherwise provided for {, e.g. in |
| 23/53271 | • • • • {containing semiconductor material, e.g. polysilicon} | | combination with batteries (<u>H01L 23/49593</u> , <u>H01L 23/49596</u> take precedence)} |
| 23/53276 | {containing carbon, e.g. fullerenes | 23/585 | • • {comprising conductive layers or plates or strips |
| | (superconducting fullerenes H10N 60/853)} | | or rods or rings (<u>H01L 23/60</u> , <u>H01L 23/62</u> , <u>H01L 23/64</u> , <u>H01L 23/66</u> take precedence)} |
| 23/5328 | • • • • {containing conductive organic materials or pastes, e.g. conductive adhesives, inks} | 23/60 | Protection against electrostatic charges or discharges, e.g. Faraday shields |
| 23/53285 | {containing superconducting materials} | 23/62 | Protection against overvoltage, e.g. fuses, shunts |
| 23/5329 | {Insulating materials} | 23/64 | Impedance arrangements |
| 23/53295 | {Stacked insulating layers} | 23/642 | • • • {Capacitive arrangements (H01L 23/49589, |
| 23/535 | including internal interconnections, e.g. cross- under constructions {(internal lead connections H01L 23/481)} | | H01L 23/645, H01L 23/647, H01L 23/66 take precedence; capacitive effects between wiring layers on the semiconductor body |
| 23/538 | • the interconnection structure between a plurality | | H01L 23/5222)} |
| | of semiconductor chips being formed on, or in, insulating substrates ({H05K takes precedence; | 23/645 | • • {Inductive arrangements (<u>H01L 23/647</u> , <u>H01L 23/66</u> take precedence)} |
| | manufacture or treatment <u>H01L 21/4846</u> }; mountings <u>per se H01L 23/12</u> ; {materials | 23/647 | • • • {Resistive arrangements (<u>H01L 23/66</u> , <u>H01L 23/62</u> take precedence)} |
| | H01L 23/49866}) | 23/66 | High-frequency adaptations |
| 23/5381 | • • • {Crossover interconnections, e.g. bridge stepovers} | | NOTE |
| 23/5382 | • • {Adaptable interconnections, e.g. for | | When classifying in group H01L 23/66, |
| _3,5502 | engineering changes} | | details are to be further indexed by using the |

| HVIL | | | |
|-------------|--|--------------------|---|
| H01L 23/66 | | | |
| (continued) | indexing codes chosen from H01L 2223/66 | 24/06 | • • • {of a plurality of bonding areas} |
| | and subgroups | 24/07 | • • • {Structure, shape, material or disposition of the |
| 24/00 | | | bonding areas after the connecting process} |
| 24/00 | {Arrangements for connecting or disconnecting | 24/08 | • • • { of an individual bonding area} |
| | semiconductor or solid-state bodies; Methods or | 24/09 | {of a plurality of bonding areas} |
| | apparatus related thereto} | 24/10 | • • {Bump connectors (bumps on insulating |
| | <u>NOTES</u> | | substrates, e.g. chip carriers, H01L 23/49816); |
| | 1. This group <u>does not cover</u> : | | Manufacturing methods related thereto} |
| | details of semiconductor bodies or of electrodes | 24/11 | • • • {Manufacturing methods (for bumps on |
| | of devices provided for in group H01L 29/00, | 2.,,11 | insulating substrates H01L 21/4853)} |
| | which details are covered by that group; | 24/12 | • • • {Structure, shape, material or disposition of |
| | details peculiar to devices provided for in a | , 1_ | the bump connectors prior to the connecting |
| | single main group of groups H01L 31/00, | | process} |
| | H01L 33/00, H10K 30/00, H10K 50/00, | 24/13 | {of an individual bump connector} |
| | H10K 59/00, H10K 71/00, H10K 85/00, | 24/14 | • • • {of a plurality of bump connectors} |
| | H10K 99/00, H10N 10/00, H10N 30/00, | 24/15 | • • • Structure, shape, material or disposition of the |
| | H10N 35/00, H10N 50/00, H10N 52/00, | 24/13 | bump connectors after the connecting process} |
| | H10N 60/00, which details are covered by those | 24/16 | • • • { of an individual bump connector} |
| | groups. | 24/17 | {of a plurality of bump connectors} |
| | printed circuits, which are covered by groups | | |
| | <u>H05K 1/00</u> - <u>H05K 1/189;</u> | 24/18 | {High density interconnect [HDI] connectors; |
| | apparatus or manufacturing processes for | | Manufacturing methods related thereto |
| | printed circuits, which are covered by groups | | (interconnection structure between a plurality of |
| | <u>H05K 3/00</u> - <u>H05K 3/4685</u> ; | 24/10 | semiconductor chips <u>H01L 23/5389</u>)} |
| | manufacture or treatment of parts, which are | 24/19 | {Manufacturing methods of high density |
| | covered by group H01L 21/48 and subgroups | 24/20 | interconnect preforms} |
| | except <u>H01L 21/4885</u> - <u>H01L 21/4896</u> ; | 24/20 | • • • {Structure, shape, material or disposition of |
| | assemblies of semiconductor devices, which are | 24/22 | high density interconnect preforms} |
| | covered by groups <u>H01L 21/50</u> - <u>H01L 21/568</u> ; | 24/23 | • • • {Structure, shape, material or disposition of the |
| | applying interconnections to be used for | | high density interconnect connectors after the |
| | carrying current between separate components | | connecting process} |
| | within a device, which is covered by group | 24/24 | • • • • {of an individual high density interconnect |
| | H01L 21/768 and subgroups; | | connector} |
| | containers or seals, which are covered by | 24/25 | • • • {of a plurality of high density interconnect |
| | groups <u>H01L 23/02</u> - <u>H01L 23/10</u> ; | | connectors} |
| | mountings, which are covered by groups | 24/26 | • • {Layer connectors, e.g. plate connectors, solder or |
| | <u>H01L 23/12</u> - <u>H01L 23/15</u> and subgroups; | | adhesive layers; Manufacturing methods related |
| | arrangements for cooling, heating, | | thereto} |
| | ventilating or temperature compensation, | 24/27 | • • • {Manufacturing methods} |
| | which are covered by groups | 24/28 | {Structure, shape, material or disposition of |
| | <u>H01L 23/34</u> - <u>H01L 23/4735</u> ; | | the layer connectors prior to the connecting |
| | arrangements for conducting electric | | process} |
| | current, which are covered by groups | 24/29 | • • • {of an individual layer connector} |
| | <u>H01L 23/48</u> - <u>H01L 23/50</u> , and by groups | 24/30 | • • • { of a plurality of layer connectors} |
| | H01L 23/52 - H01L 23/5389; • structural electrical arrangements, which are | 24/31 | {Structure, shape, material or disposition of the |
| | <u> </u> | | layer connectors after the connecting process} |
| | covered by groups <u>H01L 23/58</u> - <u>H01L 23/66</u> ; • assemblies of semiconductor or other solid | 24/32 | • • • { of an individual layer connector} |
| | state devices, which are covered by groups | 24/33 | • • • { of a plurality of layer connectors} |
| | H01L 25/00 - H01L 25/18. | 24/34 | • • {Strap connectors, e.g. copper straps for |
| | 2. In this group the following indexing codes are | | grounding power devices; Manufacturing |
| | used: <u>H01L 24/00</u> , <u>H01L 2224/00</u> , <u>H01L 2924/00</u> , | | methods related thereto} |
| | and subgroups thereof | 24/35 | {Manufacturing methods} |
| | and subgroups thereof | 24/36 | • • {Structure, shape, material or disposition of |
| 24/01 | • {Means for bonding being attached to, or being | | the strap connectors prior to the connecting |
| | formed on, the surface to be connected, e.g. chip- | | process} |
| | to-package, die-attach, "first-level" interconnects; | 24/37 | • • • { of an individual strap connector } |
| | Manufacturing methods related thereto} | 24/38 | {of a plurality of strap connectors} |
| 24/02 | • • {Bonding areas (on insulating substrates, e.g. | 24/39 | • • • {Structure, shape, material or disposition of the |
| | chip carriers, <u>H01L 23/49816</u> , <u>H01L 23/49838</u> , | 4 7 /37 | strap connectors after the connecting process} |
| | H01L 23/5389); Manufacturing methods related | 24/40 | • • • { of an individual strap connector} |
| | thereto} | | |
| 24/03 | • • {Manufacturing methods} | 24/41 | • • • { of a plurality of strap connectors } |
| 24/04 | • • {Structure, shape, material or disposition of the | 24/42 | • • {Wire connectors; Manufacturing methods related |
| | bonding areas prior to the connecting process} | 24/12 | thereto} |
| 24/05 | • • • {of an individual bonding area} | 24/43 | • • • {Manufacturing methods} |
| 2 1/05 | (or an individual contains arou) | | |

| 24/44 | • • {Structure, shape, material or disposition of the wire connectors prior to the connecting process} | 24/82 | • • {by forming build-up interconnects at chip- level, e.g. for high density interconnects [HDI] (interconnection structure between a plurality of |
|--------|--|----------------|--|
| 24/45 | • • • { of an individual wire connector } | | semiconductor chips <u>H01L 23/5389</u>)} |
| 24/46 | • • • • {of a plurality of wire connectors} | 24/83 | • • {using a layer connector} |
| 24/47 | • • • (Structure, shape, material or disposition of the | 24/84 | • • {using a strap connector} |
| | wire connectors after the connecting process} | 24/85 | • • {using a wire connector (wire bonding in general |
| 24/48 | • • • { of an individual wire connector } | 24/96 | B23K 20/004)} |
| 24/49 | • • • { of a plurality of wire connectors } | 24/86 | • • {using tape automated bonding [TAB]} |
| 24/50 | {Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto (thin flexible metallic tape with or without). | 24/89 24/90 | • {using at least one connector not provided for in any of the groups H01L 24/81 - H01L 24/86} • {Methods for connecting semiconductor or solid |
| 24/63 | a film carrier H01L 23/49572, flexible insulating substrates H01L 23/4985, H01L 23/5387)} • {Connectors not provided for in any of the | 24/70 | state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using |
| 24/03 | groups <u>H01L 24/10</u> - <u>H01L 24/50</u> and subgroups; Manufacturing methods related thereto} | 24/91 | springs or clips} • {Methods for connecting semiconductor |
| 24/64 | • • • {Manufacturing methods} | 2-1/ / 1 | or solid state bodies including different |
| 24/65 | • • • {Structure, shape, material or disposition of the | | methods provided for in two or more of groups |
| | connectors prior to the connecting process} | 24/02 | H01L 24/80 - H01L 24/90} |
| 24/66 | • • • {of an individual connector} | 24/92 | • • {Specific sequence of method steps} |
| 24/67 | • • • { of a plurality of connectors } | 24/93 | • {Batch processes} |
| 24/68 | • • • {Structure, shape, material or disposition of the connectors after the connecting process} | 24/94 | {at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices} |
| 24/69 | • • • {of an individual connector} | 24/95 | • • {at chip-level, i.e. with connecting carried out |
| 24/70 | • • • { of a plurality of connectors } | 24/93 | on a plurality of singulated devices, i.e. on diced |
| 24/71 | {Means for bonding not being attached to, or not being formed on, the surface to be connected | | chips} |
| | (holders for supporting the complete device in operation $\frac{\text{H01L } 23/32}{\text{H01L } 23/32}$) | 24/96 | • { the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual |
| 24/72 | {Detachable connecting means consisting of mechanical auxiliary parts connecting the device, | | assemblies after connecting} |
| | e.g. pressure contacts using springs or clips} | 24/97 | • • • {the devices being connected to a common |
| 24/73 | • {Means for bonding being of different types provided for in two or more of groups <u>H01L 24/10</u> , | | substrate, e.g. interposer, said common substrate being separable into individual |
| | H01L 24/18, H01L 24/26, H01L 24/34, H01L 24/42, H01L 24/50, H01L 24/63, | 24/98 | assemblies after connecting } • {Methods for disconnecting semiconductor or solid- |
| | <u>H01L 24/71</u> } | | state bodies} |
| 24/74 | • {Apparatus for manufacturing arrangements for | 25/00 | Assemblies consisting of a plurality of |
| | connecting or disconnecting semiconductor or solid- | | individual semiconductor or other solid state |
| | state bodies} | | devices {; Multistep manufacturing processes |
| 24/741 | • • {Apparatus for manufacturing means for bonding, | | thereof}(devices consisting of a plurality of solid |
| 24/742 | e.g. connectors} {Apparatus for manufacturing bump | | state components formed in or on a common substrate <u>H01L 27/00</u> ; photovoltaic modules or arrays of |
| | connectors} | | photovoltaic cells <u>H01L 31/042</u> {; panels or arrays of |
| 24/743 | • • • {Apparatus for manufacturing layer | | photo electrochemical cells <u>H01G 9/2068</u> }) |
| 24/744 | connectors} {Apparatus for manufacturing strap | | NOTE |
| | connectors} | | {This group does not cover: |
| 24/745 | • • • {Apparatus for manufacturing wire connectors} | | assemblies of electronic memory devices |
| 24/75 | • • {Apparatus for connecting with bump connectors | | only, which are covered by <u>H10B 80/00</u>;assemblies of organic devices only, which |
| 04/7 | or layer connectors} | | are covered by groups H10K 19/00, |
| 24/76 | • • {Apparatus for connecting with build-up interconnects} | | <u>H10K 39/00</u> , <u>H10K 59/00</u> or <u>H10K 65/00</u> ; |
| 24/77 | • • {Apparatus for connecting with strap connectors} | | assemblies of electric solid-state devices only, which are covered by groups |
| 24/78 | • • {Apparatus for connecting with wire connectors} | | H10N 19/00, H10N 39/00, H10N 59/00, |
| 24/79 | • • {Apparatus for Tape Automated Bonding [TAB]} | | H10N 19/00, H10N 39/00, H10N 39/00, H10N 89/00.} |
| 24/799 | • • {Apparatus for disconnecting} | | 111011 02/00, 111011 12/00 01 111011 02/00.5 |
| 24/80 | • {Methods for connecting semiconductor or other | 25/03 | all the devices being of a type provided |
| | solid state bodies using means for bonding being | | for in the same subgroup of groups |
| | attached to, or being formed on, the surface to be | | <u>H01L 27/00</u> - <u>H01L 33/00</u> , or in a single subclass of |
| | connected} | | H10K, H10N, e.g. assemblies of rectifier diodes |
| 24/81 | • • {using a bump connector} | | |

| 25/04 | the devices not having separate containers | 25/0657 | {Stacked arrangements of devices} |
|---------|--|-----------------|---|
| | <u>WARNING</u> | | WARNING |
| | Group H01L 25/04 is impacted by reclassification into groups H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00. All groups listed in this Warning should be considered in order to perform a complete search. | | Group H01L 25/0657 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00. |
| 25/041 | • • • {the devices being of a type provided for in group H01L 31/00} | | All groups listed in this Warning should |
| 25/042 | • • • • { the devices being arranged next to each other (solar cells H01L 31/042)} | | be considered in order to perform a complete search. |
| 25/043 | • • • {Stacked arrangements of devices} | 25/07 | • • • the devices being of a type provided for in group <u>H01L 29/00</u> |
| 25/065 | • • • the devices being of a type provided for in group H01L 27/00 | | NOTE |
| | NOTE Group H01L 25/0652 takes precedence over groups H01L 25/0655 and H01L 25/0657 | 0.740.74 | Group H01L 25/071 takes precedence over groups H01L 25/072 - H01L 25/074 |
| | WARNING | 25/071 | • • • {the devices being arranged next and on each other, i.e. mixed assemblies} |
| | Group H01L 25/065 is impacted by | 25/072 | • • • { the devices being arranged next to each other } |
| | reclassification into groups <u>H10B 80/00</u> , <u>H10K 39/10</u> , <u>H10K 39/12</u> , <u>H10K 39/15</u> , | 25/073 | • • • {Apertured devices mounted on one or more rods passed through the apertures} |
| | H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, | 25/074 | • • • • {Stacked arrangements of non-apertured devices} |
| | H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00. | 25/075 | • • • the devices being of a type provided for in group <u>H01L 33/00</u> |
| | All groups listed in this Warning should be considered in order to perform a complete search. | 25/0753 | • • • { the devices being arranged next to each other } |
| | | 25/0756 | • • • {Stacked arrangements of devices} |
| 25/0652 | • • • • {the devices being arranged next and on each other, i.e. mixed assemblies} | 25/10 25/105 | the devices having separate containers{the devices being of a type provided for in |
| | <u>WARNING</u> | | group <u>H01L 27/00</u> } |
| | Group H01L 25/0652 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and | 25/11 | When classifying in group H01L 25/105, details of the assemblies are to be further indexed by using the indexing codes chosen from H01L 2225/1005 and subgroups the devices being of a type provided for in |
| | H10N 89/00. | | group <u>H01L 29/00</u> |
| | All groups listed in this Warning should be considered in order to perform a complete search. | | NOTE Group H01L 25/112 takes precedence over groups H01L 25/115 and H01L 25/117 |
| 25/0655 | • • • { the devices being arranged next to each other } | 25/112 | {Mixed assemblies} |
| | WARNING | 25/115 | • • • { the devices being arranged next to each other } |
| | Group H01L 25/0655 is impacted by reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 39/18, H10K 39/601, H10K 39/621, H10K 59/90, H10K 59/95, H10N 19/00, H10N 39/00, H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00. All groups listed in this Warning should be considered in order to perform a complete search. | 25/117 25/13 | {Stacked arrangements of devices} the devices being of a type provided for in group H01L 33/00 |

25/16 25/18 . the devices being of types provided for in . the devices being of types provided for in two or two or more different main groups of groups more different subgroups of the same main group H01L 27/00 - H01L 33/00, or in a single subclass of of groups H01L 27/00 - H01L 33/00, or in a single H10K, H10N, e.g. forming hybrid circuits subclass of H10K, H10N WARNING WARNING Group H01L 25/16 is impacted by Group H01L 25/18 is impacted by reclassification into groups H10B 80/00, reclassification into groups H10B 80/00, H10K 39/10, H10K 39/12, H10K 39/15, H10K 19/00, H10K 39/10, H10K 39/12, H10K 39/18, H10K 39/601, H10K 39/621, H10K 39/15, H10K 39/18, H10K 39/601, H10K 59/90, H10K 59/95, H10N 19/00, H10K 39/621, H10K 59/90, H10K 59/95, H10N 39/00, H10N 59/00, H10N 69/00, H10K 65/00, H10N 19/00, H10N 39/00, H10N 79/00 and H10N 89/00. H10N 59/00, H10N 69/00, H10N 79/00 and H10N 89/00. All groups listed in this Warning should be considered in order to perform a complete All groups listed in this Warning should be search. considered in order to perform a complete 25/162 . . {the devices being mounted on two or more 25/50 different substrates} • {Multistep manufacturing processes of assemblies consisting of devices, each device being of a type WARNING provided for in group H01L 27/00 or H01L 29/00 Group H01L 25/162 is impacted by (H01L 21/50 takes precedence) reclassification into groups H10B 80/00, 27/00 Devices consisting of a plurality of semiconductor H10K 39/10, H10K 39/12, H10K 39/15, or other solid-state components formed in or on H10K 39/18, H10K 39/601, H10K 39/621, a common substrate (details thereof H01L 23/00, H10K 59/90, H10K 59/95, H10N 19/00, H01L 29/00 - H10K 10/00; assemblies consisting of a H10N 39/00, H10N 59/00, H10N 69/00, plurality of individual solid state devices H01L 25/00) H10N 79/00 and H10N 89/00. All groups listed in this Warning should be NOTE considered in order to perform a complete In this group the last place priority rule is applied, search. i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in 25/165 • (Containers) the last appropriate place. **WARNING** 27/01 . comprising only passive thin-film or thick-film Group H01L 25/165 is impacted by elements formed on a common insulating substrate reclassification into groups H10B 80/00, {(passive two-terminal components without a H10K 39/10, H10K 39/12, H10K 39/15, potential-jump or surface barrier for integrated H10K 39/18, H10K 39/601, H10K 39/621, circuits, details thereof and multistep manufacturing H10K 59/90, H10K 59/95, H10N 19/00, processes therefor H01L 28/00)} H10N 39/00, H10N 59/00, H10N 69/00, 27/013 . . {Thick-film circuits} H10N 79/00 and H10N 89/00. 27/016 • • {Thin-film circuits} All groups listed in this Warning should be 27/02 . including semiconductor components specially considered in order to perform a complete adapted for rectifying, oscillating, amplifying or search. switching and having potential barriers; including integrated passive circuit elements having potential 25/167 • • {comprising optoelectronic devices, e.g. LED, barriers photodiodes } 27/0203 • • {Particular design considerations for integrated WARNING circuits } Group H01L 25/167 is impacted by 27/0207 • • • {Geometrical layout of the components, e.g. reclassification into groups H10B 80/00, computer aided design; custom LSI, semi-H10K 39/10, H10K 39/12, H10K 39/15, custom LSI, standard cell technique} H10K 39/18, H10K 39/601, H10K 39/621, • • • { adapted for requirements of temperature } 27/0211 H10K 59/90, H10K 59/95, H10N 19/00, 27/0214 • • • {for internal polarisation, e.g. I2L} H10N 39/00, H10N 59/00, H10N 69/00, . . . { of field effect structures} 27/0218 H10N 79/00 and H10N 89/00. 27/0222 • • • • Charge pumping, substrate bias

27/0225

27/0229

27/0233

27/0237

27/024

generation structures}

• • • { of bipolar structures }

[I2L]}

• • • Charge injection in static induction

• • • • {Integrated injection logic structures

• • • • {using vertical injector structures}

• • • • { using field effect injector structures }

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transistor logic structures [SITL]}

All groups listed in this Warning should be

considered in order to perform a complete

search.

| 27/0244 | • • • • • {I2L structures integrated in combination with analog structures} | 27/0652 {Vertical bipolar transistor in combination with diodes, or |
|---------|---|---|
| 27/0248 | • • • {for electrical or thermal protection, e.g. electrostatic discharge [ESD] protection} | capacitors, or resistors} 27/0658 {Vertical bipolar transistor in |
| 27/0251 | • • • • {for MOS devices} | combination with resistors or |
| 27/0255 | • • • {using diodes as protective elements} | capacitors} |
| 27/0259 | • • • • {using bipolar transistors as protective | 27/0664 {Vertical bipolar transistor in combination with diodes} |
| 27/0262 | elements} | 27/067 {Lateral bipolar transistor in |
| 21/0262 | NPN transistor, wherein each of said transistors has its base coupled to | combination with diodes, or capacitors, or resistors} |
| | the collector of the other transistor, | 27/0676 {comprising combinations of diodes, or |
| | e.g. silicon controlled rectifier [SCR] | capacitors or resistors} |
| | devices} | 27/0682 {comprising combinations of |
| 27/0266 | • • • • { using field effect transistors as protective | capacitors and resistors} |
| | elements} | 27/0688 {Integrated circuits having a three- |
| 27/027 | {specially adapted to provide an | dimensional layout} |
| | electrical current path other than the | 27/0694 {comprising components formed on |
| 27/0274 | field effect induced current path} | opposite sides of a semiconductor |
| 27/0274 | { involving a parasitic bipolar | substrate} |
| | transistor triggered by the electrical biasing of the gate electrode of | 27/07 the components having an active region in common |
| | the field effect transistor, e.g. gate | 27/0705 {comprising components of the field effect |
| | coupled transistors} | type} |
| 27/0277 | • • • • • • {involving a parasitic bipolar | 27/0711 {in combination with bipolar transistors |
| | transistor triggered by the local | and diodes, or capacitors, or resistors |
| | electrical biasing of the layer acting | 27/0716 {in combination with vertical bipolar |
| | as base of said parasitic bipolar | transistors and diodes, or capacitors, |
| | transistor} | or resistors} |
| 27/0281 | {field effect transistors in a "Darlington- | 27/0722 {in combination with lateral bipolar |
| | like" configuration} | transistors and diodes, or capacitors, |
| 27/0285 | {bias arrangements for gate electrode | or resistors} |
| | of field effect transistors, e.g. RC | 27/0727 {in combination with diodes, or |
| | networks, voltage partitioning circuits | capacitors or resistors} |
| 27/0288 | (H01L 27/0281 takes precedence)} {using passive elements as protective} | 27/0733 {in combination with capacitors only} |
| 21/0200 | elements, e.g. resistors, capacitors, | 27/0738 {in combination with resistors only} |
| | inductors, spark-gaps} | 27/0744 {without components of the field effect |
| 27/0292 | • • • • {using a specific configuration of | type} |
| | the conducting means connecting the | 27/075 {Bipolar transistors in combination with |
| | protective devices, e.g. ESD buses} | diodes, or capacitors, or resistors, e.g. lateral bipolar transistor, and vertical |
| 27/0296 | • • • • {involving a specific disposition of the | bipolar transistor, and resistor} |
| | protective devices} | 27/0755 {Vertical bipolar transistor in |
| 27/04 | • • the substrate being a semiconductor body | combination with diodes, or |
| 27/06 | • • • including a plurality of individual components | capacitors, or resistors} |
| | in a non-repetitive configuration | 27/0761 (Vertical bipolar transistor in |
| 27/0605 | {integrated circuits made of compound | combination with diodes only} |
| 25/0<11 | material, e.g. $A_{III}B_{V}$ | 27/0766 {with Schottky diodes only} |
| 27/0611 | { integrated circuits having a two- | 27/0772 {Vertical bipolar transistor in |
| | dimensional layout of components without a common active region} | combination with resistors only} |
| 27/0617 | • • • • {comprising components of the field-effect | 27/0777 (Vertical bipolar transistor in |
| 27/0017 | type (H01L 27/0251 takes precedence)} | combination with capacitors only} |
| 27/0623 | · · · · · {in combination with bipolar | 27/0783 {Lateral bipolar transistors in |
| 21/0023 | transistors} | combination with diodes, or |
| 27/0629 | • • • • • {in combination with diodes, or | capacitors, or resistors} |
| ,002/ | resistors, or capacitors} | 27/0788 {comprising combinations of diodes or capacitors or resistors} |
| 27/0635 | • • • • {in combination with bipolar transistors | 27/0794 {Combinations of capacitors and |
| | and diodes, or resistors, or capacitors} | resistors} |
| 27/0641 | • • • • { without components of the field effect | 27/08 including only semiconductor components of a |
| | type} | single kind |
| 27/0647 | {Bipolar transistors in combination with | 27/0802 {Resistors only} |
| | diodes, or capacitors, or resistors, e.g. | 27/0805 {Capacitors only} |
| | vertical bipolar transistor and bipolar | 27/0808 {Varactor diodes} |
| | lateral transistor and resistor} | , |
| | | |

| 27/0811 | {MIS diodes} | 27/101 {including resistors or capacitors only} |
|---------|---|---|
| 27/0814 | {Diodes only} | WARNING |
| 27/0817 | {Thyristors only} | |
| 27/082 | including bipolar components only | Group H01L 27/101 is impacted by |
| 27/0821 | {Combination of lateral and vertical | reclassification into group H10B 99/14. |
| | transistors only} | Groups <u>H01L 27/101</u> and <u>H10B 99/14</u> |
| 27/0823 | {including vertical bipolar transistors | should be considered in order to perform |
| 2770022 | only} | a complete search. |
| 27/0825 | • • • • • {Combination of vertical direct | 07/100 |
| 2770023 | transistors of the same conductivity type | 27/102 including bipolar components |
| | having different characteristics, (e.g. | <u>WARNING</u> |
| | Darlington transistors)} | Crown H01L 27/102 is immested by |
| 27/0826 | • • • • • {Combination of vertical | Group <u>H01L 27/102</u> is impacted by reclassification into group <u>H10B 99/00</u> . |
| | complementary transistors} | |
| 27/0828 | {Combination of direct and inverse | Groups H01L 27/102 and H10B 99/00 |
| 2770020 | vertical transistors} | should be considered in order to perform |
| 27/085 | including field-effect components only | a complete search. |
| 27/088 | the components being field-effect | 27/1021 {including diodes only} |
| 277000 | transistors with insulated gate | (2 ,, |
| 27/0883 | {Combination of depletion and | WARNING |
| 21/0003 | enhancement field effect transistors} | Group H01L 27/1021 is impacted by |
| 27/0886 | • • • • • { including transistors with a horizontal | reclassification into group H10B 99/16. |
| 2770000 | current flow in a vertical sidewall of | Groups <u>H01L 27/1021</u> and <u>H10B 99/16</u> |
| | a semiconductor body, e.g. FinFET, | should be considered in order to |
| | MuGFET} | perform a complete search. |
| 27/092 | complementary MIS field-effect | |
| 211072 | transistors | 27/1022 {including bipolar transistors} |
| 27/0921 | • • • • • • • • {Means for preventing a bipolar, e.g. | WARNING |
| 2770721 | thyristor, action between the different | |
| | transistor regions, e.g. Latchup | Group H01L 27/1022 is impacted by |
| | prevention} | reclassification into group H10B 99/00. |
| 27/0922 | (Combination of complementary | Groups <u>H01L 27/1022</u> and <u>H10B 99/00</u> |
| | transistors having a different | should be considered in order to |
| | structure, e.g. stacked CMOS, high- | perform a complete search. |
| | voltage and low-voltage CMOS} | 27/1027 {Thyristors} |
| 27/0924 | {including transistors with a | , |
| | horizontal current flow in a vertical | WARNING |
| | sidewall of a semiconductor body, | Group H01L 27/1027 is impacted |
| | e.g. FinFET, MuGFET} | by reclassification into groups |
| 27/0925 | {comprising an N-well only in the | H10B 10/10, H10B 12/10, H10B 20/10, |
| | substrate} | H10B 69/00 and H10B 99/20. |
| 27/0927 | {comprising a P-well only in the | All groups listed in this Warning should |
| | substrate} | be considered in order to perform a |
| 27/0928 | {comprising both N- and P- wells in | complete search. |
| | the substrate, e.g. twin-tub} | |
| 27/095 | the components being Schottky barrier | 27/1028 {Double base diodes} |
| | gate field-effect transistors | WARNING |
| 27/098 | the components being PN junction gate | |
| | field-effect transistors | Group H01L 27/1028 is impacted |
| 27/10 | including a plurality of individual components | by reclassification into groups H10B 10/10, H10B 12/10, H10B 20/10, |
| | in a repetitive configuration | |
| | WARNING | <u>H10B 69/00</u> and <u>H10B 99/20</u> . |
| | | All groups listed in this Warning should |
| | Group H01L 27/10 is impacted by | be considered in order to perform a |
| | reclassification into group H10B 99/10. | complete search. |
| | Groups H01L 27/10 and H10B 99/10 | 27/105 including field-effect components |
| | should be considered in order to perform a | |
| | complete search. | <u>NOTE</u> |
| | | In this group and its subgroups |
| | | classification is made in any appropriate |
| | | place |

place

| 22022 | | |
|---|--|---|
| H01L 27/105 (continued) | WARNING | 2027/11874 {Layout specification, i.e. inner core region} |
| | Group $\underline{H01L} \underline{27/105}$ is impacted by | 2027/11875 {Wiring region, routing} |
| | reclassification into group H10B 99/22. | 2027/11877 |
| | Groups <u>H01L 27/105</u> and <u>H10B 99/22</u> | delay} |
| | should be considered in order to perform | 2027/11879 {Data lines (buses)} |
| | a complete search. | 2027/11881 {Power supply lines} |
| 27/1055 | • • • {comprising charge coupled devices of the | 2027/11883 {Levels of metallisation} |
| | so-called bucket brigade type} | 2027/11885 {Two levels of metal} |
| 27/1057 | • • • • {comprising charge coupled devices | 2027/11887 {Three levels of metal} |
| | [CCD] or charge injection devices [CID]} | 2027/11888 {More than 3 levels of metal} |
| 27/118 | Masterslice integrated circuits | 2027/1189 {Latch-up prevention} |
| | • • • • {using bipolar technology} | 2027/11892 {Noise prevention (crosstalk)} |
| | • • • • {using field effect technology} | 2027/11894 {Radiation hardened circuits} |
| | {A3B5 or A3B6 gate arrays} | 27/11896 {using combined field effect/bipolar |
| | {CMOS gate arrays} | technology} |
| | {Microarchitecture} {Basic cell P to N transistor count} | 27/12 the substant being at the thorac accession due to |
| | | 27/12 the substrate being other than a semiconductor body, e.g. an insulating body |
| | | 27/1203 {the substrate comprising an insulating body |
| | | on a semiconductor body, e.g. SOI (three- |
| | | dimensional layout H01L 27/0688) |
| | • • • • • • • • • • • • • • • • • • • | 27/1207 {combined with devices in contact with the |
| | • • • • • {relative P to N transistor sizes} | semiconductor body, i.e. bulk/SOI hybrid |
| | • • • • • • {for current drive capability} | circuits} |
| 2027/11825 | • • • • • • { for delay time adaptation } | 27/1211 {combined with field-effect transistors with a |
| 2027/11827 | • • • • • • { for capacitive loading } | horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, |
| | • • • • • • {Isolation techniques} | MuGFET} |
| | • • • • • • • {FET isolation} | 27/1214 {comprising a plurality of TFTs formed on |
| | | a non-semiconducting substrate, e.g. driving |
| 2027/11835 | | |
| 2027/11033 | (Degree of specialisation for | circuits for AMLCDs} |
| | implementing specific functions} {Implementation of digital | WARNING |
| 2027/11837 | implementing specific functions} {Implementation of digital circuits} | WARNING Group H01L 27/1218 – H01L 27/1296 |
| 2027/11837 2027/11838 | implementing specific functions} {Implementation of digital circuits} {Implementation of memory functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. |
| 2027/11837 2027/11838 2027/1184 | implementing specific functions} {Implementation of digital circuits} {Implementation of memory functions} {Implementation of analog circuits} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in |
| 2027/11837 2027/11838 2027/1184 2027/11842 | implementing specific functions} {Implementation of digital circuits} {Implementation of memory functions} {Implementation of analog circuits} {Resistors and capacitors} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 | implementing specific functions} {Implementation of digital circuits} {Implementation of memory functions} {Implementation of analog circuits} {Resistors and capacitors} {Hybrid analog or digital} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 {with a particular composition or structure of the substrate} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/11848 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 {with a particular composition or structure of the substrate} 27/1222 {with a particular composition, shape or |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/11848 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 {with a particular composition or structure of the substrate} 27/1222 {with a particular composition, shape or crystalline structure of the active layer} 27/1225 {with semiconductor materials not belonging to the group IV of the periodic |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 2027/11855 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/1185 2027/11853 2027/11855 2027/11855 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/1185 2027/11853 2027/11855 2027/11855 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/1185 2027/11853 2027/11855 2027/11855 | implementing specific functions} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 2027/11857 2027/11857 2027/11859 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implementation of memory functions} Implementation of digital circuits analog circuits} Implementation of digital circuits analog circuits} Implementation of digital circuits} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout or thickness of the gate insulator in different |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 2027/11857 2027/11857 2027/11859 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implementation of memory functions} Implementation of digital circuitsions geometries} Implementation of digital circuitsion geometries} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout or thickness of the gate insulator in different devices} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 2027/11857 2027/11857 2027/11859 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implementation of memory functions} Implementation of digital circuits analog circuits} Implementation of digital circuits analog circuits} Implementation of digital circuits} | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout or thickness of the gate insulator in different devices} 27/124 { with a particular composition, shape or |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 2027/11855 2027/11857 2027/11857 2027/11861 2027/11862 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implements and capacitors} Implementation of memory functions and capacitors} Implementation of digital circuits analogs Implementation of memory functions analogs Implementation of digital circuits analogs Implementation of memory functions analogs Implementation of analogs Implementation | Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout or thickness of the gate insulator in different devices} 27/124 { with a particular composition, shape or layout of the wiring layers specially adapted |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/1185 2027/11853 2027/11855 2027/11857 2027/11857 2027/11861 2027/11862 2027/11864 2027/11866 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implements and capacitors} Implementation of analog circuits} Implementation of digital analog circuits} Implementation of digital circuits} Implementation of memory circuits} Implementation of analog circuits} Implementation | WARNING Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout or thickness of the gate insulator in different devices} 27/124 { with a particular composition, shape or |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/1185 2027/11853 2027/11855 2027/11857 2027/11857 2027/11861 2027/11862 2027/11864 2027/11866 2027/11868 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implementation of memory functions} Implementation of digital circuits functions functions} Implementation of digital circuits functions} Implementation of digital circuits functions generally functions generits} Implementation of digital circuits functions generits} Implementation of digital circuits functions functions generits functions generally functions generally functions generally functions function | Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 {with a particular composition or structure of the substrate} 27/1222 {with a particular composition, shape or crystalline structure of the active layer} 27/1225 {with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 {with different crystal properties within a device or between different devices} 27/1233 {with different thicknesses of the active layer in different devices} 27/124 {with a particular composition, shape, layout or thickness of the gate insulator in different devices} 27/124 {with a particular composition, shape or layout of the wiring layers specially adapted to the circuit arrangement, e.g. scanning lines in LCD pixel circuits (wiring structures per se H01L 23/52)} 27/1244 {for preventing breakage, peeling or short |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/1185 2027/11853 2027/11855 2027/11857 2027/11857 2027/11861 2027/11862 2027/11864 2027/11866 2027/11868 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implementation of memory functions} Implementation of digital circuits analog circuits} Implementation of digital circuits analog | Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 { with a particular composition or structure of the substrate} 27/1222 { with a particular composition, shape or crystalline structure of the active layer} 27/1225 { with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 { with different crystal properties within a device or between different devices} 27/1233 { with different thicknesses of the active layer in different devices} 27/1237 { with a different composition, shape, layout or thickness of the gate insulator in different devices} 27/124 { with a particular composition, shape or layout of the wiring layers specially adapted to the circuit arrangement, e.g. scanning lines in LCD pixel circuits (wiring structures per se H01L 23/52)} 27/1244 { for preventing breakage, peeling or short circuiting} |
| 2027/11837 2027/11838 2027/1184 2027/11842 2027/11844 2027/11846 2027/1185 2027/11851 2027/11853 2027/11855 2027/11857 2027/11857 2027/11861 2027/11862 2027/11864 2027/11868 2027/11868 2027/1187 | implementing specific functions} Implementation of digital circuits} Implementation of memory functions} Implementation of analog circuits} Implementation of memory functions} Implementation of memory functions} Implementation of digital circuits functions functions} Implementation of digital circuits functions} Implementation of digital circuits functions generally functions generits} Implementation of digital circuits functions generits} Implementation of digital circuits functions functions generits functions generally functions generally functions generally functions function | Group H01L 27/1218 – H01L 27/1296 are incomplete pending reclassification of documents from group H01L 27/1214. Groups H01L 27/1218 – H01L 27/1296 and H01L 27/1214 should be considered in order to perform a complete search. 27/1218 {with a particular composition or structure of the substrate} 27/1222 {with a particular composition, shape or crystalline structure of the active layer} 27/1225 {with semiconductor materials not belonging to the group IV of the periodic table, e.g. InGaZnO} 27/1229 {with different crystal properties within a device or between different devices} 27/1233 {with different thicknesses of the active layer in different devices} 27/124 {with a particular composition, shape, layout or thickness of the gate insulator in different devices} 27/124 {with a particular composition, shape or layout of the wiring layers specially adapted to the circuit arrangement, e.g. scanning lines in LCD pixel circuits (wiring structures per se H01L 23/52)} 27/1244 {for preventing breakage, peeling or short |

| 27/1251 | {comprising TFTs having a different | 27/14605 {Structural or functional details relating |
|----------|--|---|
| | architecture, e.g. top- and bottom gate TFTs} | to the position of the pixel elements, e.g. |
| 27/1255 | • • • {integrated with passive devices, e.g. | smaller pixel elements in the center of |
| | auxiliary capacitors} | the imager compared to pixel elements |
| 27/1259 | • • • • {Multistep manufacturing methods} | at the periphery} |
| 27/1262 | • • • • { with a particular formation, treatment or | 27/14607 {Geometry of the photosensitive area} |
| | coating of the substrate} | 27/14609 {Pixel-elements with integrated switching, |
| 27/1266 | • • • • • { the substrate on which the devices | control, storage or amplification elements |
| | are formed not being the final device | (scanning details of imagers (circuitry of |
| | substrate, e.g. using a temporary | solid-state image sensors <u>H04N 25/00</u>); |
| | substrate} | circuitry of imagers <u>H04N 25/70</u>)} |
| 27/127 | • • • • { with a particular formation, treatment | 27/1461 {characterised by the photosensitive |
| _,,, | or patterning of the active layer specially | area} |
| | adapted to the circuit arrangement} | 27/14612 {involving a transistor} |
| 27/1274 | {using crystallisation of amorphous | 27/14614 {having a special gate structure} |
| _,,,_,, | semiconductor or recrystallisation of | 27/14616 {characterised by the channel of |
| | crystalline semiconductor} | the transistor, e.g. channel having a |
| 27/1277 | • • • • • • { using a crystallisation promoting | doping gradient} |
| 21/12// | species, e.g. local introduction of Ni | 27/14618 {Containers} |
| | catalyst} | 27/1462 {Coatings} |
| 27/1281 | • • • • • • {by using structural features to | 27/14621 {Colour filter arrangements} |
| 27/1201 | control crystal growth, e.g. placement | |
| | of grain filters} | 27/14623 {Optical shielding} |
| 27/1285 | • • • • • • { using control of the annealing or | 27/14625 (Optical elements or arrangements |
| 27/1263 | irradiation parameters, e.g. using | associated with the device} |
| | different scanning direction or | 27/14627 {Microlenses} |
| | intensity for different transistors} | 27/14629 {Reflectors} |
| 27/1288 | • • • • {employing particular masking sequences | 27/1463 {Pixel isolation structures} |
| 27/1200 | or specially adapted masks, e.g. half-tone | 27/14632 {Wafer-level processed structures} |
| | mask} | 27/14634 {Assemblies, i.e. Hybrid structures} |
| 27/1292 | • • • • {using liquid deposition, e.g. printing} | 27/14636 {Interconnect structures} |
| 27/1296 | {adapted to increase the uniformity of | 27/14638 {Structures specially adapted for |
| 21/1290 | device parameters} | transferring the charges across the imager |
| 27/12 | | perpendicular to the imaging plane} |
| 27/13 | combined with thin-film or thick-film passive | 27/1464 {Back illuminated imager structures} |
| 27/14 | components | 27/14641 {Electronic components shared by two or |
| 27/14 | including semiconductor components sensitive to infrared radiation, light, electromagnetic radiation | more pixel-elements, e.g. one amplifier |
| | of shorter wavelength or corpuscular radiation | shared by two pixel elements} |
| | and specially adapted either for the conversion | 27/14643 {Photodiode arrays; MOS imagers} |
| | of the energy of such radiation into electrical | 27/14645 {Colour imagers} |
| | energy or for the control of electrical energy by | 27/14647 {Multicolour imagers having a stacked |
| | such radiation (radiation-sensitive components | pixel-element structure, e.g. npn, npnpn |
| | structurally associated with one or more electric | or MQW elements} |
| | light sources only <u>H01L 31/14</u> ; couplings of light | 27/14649 {Infrared imagers} |
| | guides with optoelectronic elements G02B 6/42) | 27/1465 {of the hybrid type} |
| 27/142 | Energy conversion devices (photovoltaic modules) | 27/14652 {Multispectral infrared imagers, having |
| _,,1.2 | or arrays of single photovoltaic cells comprising | a stacked pixel-element structure, e.g. |
| | bypass diodes integrated or directly associated | npn, npnpn or MQW structures} |
| | with the devices <u>H01L 31/0443</u> ; photovoltaic | 27/14654 {Blooming suppression} |
| | modules composed of a plurality of thin film | 27/14656 {Overflow drain structures} |
| | solar cells deposited on the same substrate | 27/14658 {X-ray, gamma-ray or corpuscular |
| | H01L 31/046) | radiation imagers (measuring X-, gamma- |
| 27/1421 | {comprising bypass diodes integrated or | or corpuscular radiation G01T 1/00)} |
| | directly associated with the device, e.g. bypass | 27/14659 {Direct radiation imagers structures} |
| | diode integrated or formed in or on the same | |
| | substrate as the solar cell} | 27/14661 {of the hybrid type} |
| 27/144 | Devices controlled by radiation | 27/14663 {Indirect radiation imagers, e.g. using |
| 27/1443 | • • • { with at least one potential jump or surface | luminescent members} |
| | barrier} | 27/14665 {Imagers using a photoconductor layer} |
| 27/1446 | • • { in a repetitive configuration } | 27/14667 {Colour imagers} |
| 27/146 | Imager structures | 27/14669 {Infrared imagers} |
| 27/14601 | {Structural or functional details thereof} | 27/1467 {of the hybrid type} |
| 27/14603 | {Special geometry or disposition of pixel- | 27/14672 {Blooming suppression} |
| 27/14003 | elements, address-lines or gate-electrodes | 27/14674 {Overflow drain structures} |
| | elements, address-lines of gate-electrodes | |

| 27/14676 | • • • • {X-ray, gamma-ray or corpuscular radiation imagers (measuring X-, gamma- | 28/22 | • • {with an active material comprising carbon, e.g. diamond or diamond-like carbon [DLC]} |
|----------|--|-------|---|
| 27/14678 | or corpuscular radiation <u>G01T 1/00</u>)} {Contact-type imagers} | 28/24 | • • { with an active material comprising a refractory, transition or noble metal, metal compound or |
| | • • • {Junction field effect transistor [JFET] | | metal alloy, e.g. silicides, oxides, nitrides} |
| 21/14079 | imagers; static induction transistor [SIT] | 28/26 | { with an active material comprising an organic conducting material, e.g. conducting polymers} |
| 27/14681 | • • • {Bipolar transistor imagers} | 28/40 | • {Capacitors} |
| | {Processes or apparatus peculiar to the | 28/55 | {capacitors} {with a dielectric comprising a perovskite |
| 27/14003 | manufacture or treatment of these devices | 26/33 | structure material } |
| | or parts thereof (not peculiar thereto | 28/56 | • • • {the dielectric comprising two or more layers, |
| 27/1/695 | H01L 21/00)} {Process for coatings or optical elements} | 28/30 | e.g. comprising buffer layers, seed layers, gradient layers} |
| | | 20/57 | |
| | {Wafer level processing} | 28/57 | • • • {comprising a barrier layer to prevent diffusion |
| | • • • • {MOS based technologies} | 20/50 | of hydrogen or oxygen} |
| 27/1469 | • • • • {Assemblies, i.e. hybrid integration} | 28/60 | • • {Electrodes} |
| 27/14692 | • • • • {Thin film technologies, e.g. amorphous, | 28/65 | • • • {comprising a noble metal or a noble metal |
| | poly, micro- or nanocrystalline silicon} | | oxide, e.g. platinum (Pt), ruthenium (Ru), |
| 27/14694 | • • • • {The active layers comprising only A _{III} B _V compounds, e.g. GaAs, InP} | | ruthenium dioxide (RuO_2), iridium (Ir), iridium dioxide (IrO_2)} |
| 27/14696 | {The active layers comprising only $A_{II}B_{VI}$ | 28/75 | • • {comprising two or more layers, e.g. |
| | compounds, e.g. CdS, ZnS, CdTe} | | comprising a barrier layer and a metal layer} |
| 27/14698 | • • • • {Post-treatment for the devices, e.g. | 28/82 | • • • {with an enlarged surface, e.g. formed by |
| 27/14070 | annealing, impurity-gettering, shor-circuit | | texturisation} |
| | elimination, recrystallisation} | 28/84 | • • • • {being a rough surface, e.g. using |
| 27/148 | • • • Charge coupled imagers {(individual charge | 20/0. | hemispherical grains} |
| 27/140 | coupled devices <u>H01L 29/765</u>)} | 28/86 | • • • • {having horizontal extensions} |
| 27/14007 | | 28/87 | • • • • {made by depositing layers, e.g. by |
| | • • • • {Structural or functional details thereof} | 20/07 | depositing alternating conductive and |
| 27/14812 | • • • • • {Special geometry or disposition of | | insulating layers} |
| | pixel-elements, address lines or gate- | 20/00 | |
| | electrodes} | 28/88 | • • • • {made by patterning layers, e.g. by etching |
| | • • • • • Optical shielding} | | conductive layers} |
| 27/14825 | {Linear CCD imagers} | 28/90 | • • • • {having vertical extensions} |
| 27/14831 | {Area CCD imagers} | 28/91 | • • • • {made by depositing layers, e.g. by |
| 27/14837 | • • • • {Frame-interline transfer} | | depositing alternating conductive and |
| 27/14843 | {Interline transfer} | | insulating layers} |
| 27/1485 | • • • • {Frame transfer} | 28/92 | • • • • {made by patterning layers, e.g. by etching |
| 27/14856 | {Time-delay and integration} | | conductive layers} |
| | {CID imagers} | 29/00 | Semiconductor devices specially adapted for |
| | {CCD or CID colour imagers} | 29/00 | rectifying, amplifying, oscillating or switching |
| | The state of the s | | and having potential barriers; Capacitors or |
| | {Infrared CCD or CID imagers} | | resistors having potential barriers, e.g. a PN- |
| | • • • • • {of the hybrid type} | | junction depletion layer or carrier concentration |
| 27/14887 | • • • • {Blooming suppression} | | layer; Details of semiconductor bodies or of |
| 27/14893 | • • • • {comprising a photoconductive layer | | electrodes thereof {; Multistep manufacturing |
| | deposited on the CCD structure} | | processes therefor} (H01L 31/00 - H01L 33/00, |
| 27/15 | including semiconductor components having | | H10K 10/00, H10N take precedence; details other |
| | potential barriers, specially adapted for light | | than of semiconductor bodies or of electrodes thereof |
| | emission | | H01L 23/00; devices consisting of a plurality of solid |
| 27/153 | • • {in a repetitive configuration, e.g. LED bars} | | state components formed in or on a common substrate |
| 27/156 | • • {two-dimensional arrays} | | H01L 27/00) |
| 28/00 | (Dagging two terminal components without a | | |
| 20/00 | {Passive two-terminal components without a potential-jump or surface barrier for integrated | | <u>NOTE</u> |
| | | | In this main group, classification is made both in |
| | circuits; Details thereof; Multistep manufacturing processes therefor (testing or measuring during | | groups <u>H01L 29/02</u> - <u>H01L 29/51</u> and in groups |
| | manufacture <u>H01L 22/00</u> ; integration methods | | H01L 29/66 - H01L 29/94 if both of these sets of |
| | H01L 21/70; integrated circuits H01L 27/00; two- | | groups are relevant. |
| | | | |
| | terminal components with a potential-jump or surface barrier <u>H01L 29/00</u> ; resistors in general <u>H01C</u> ; | 29/02 | Semiconductor bodies {; Multistep manufacturing |
| | | | processes therefor} |
| | inductors in general <u>H01F</u> ; capacitors in general | 29/04 | • characterised by their crystalline structure, e.g. |
| 00/10 | <u>H01G</u>)} | | polycrystalline, cubic or particular orientation |
| 28/10 | • {Inductors} | | of crystalline planes (characterised by physical |
| 28/20 | • {Resistors} | | imperfections <u>H01L 29/30</u>) |
| | | | • • • • • • • • • • • • • • • • • • • |

| 29/045 | • • • {by their particular orientation of crystalline | 29/0661 {specially adapted for altering the |
|---------|---|--|
| | planes} | breakdown voltage by removing |
| 29/06 | characterised by their shape; characterised by | semiconductor material at, or in the |
| | the shapes, relative sizes, or dispositions of the | neighbourhood of, a reverse biased junction, |
| | semiconductor regions {; characterised by the | e.g. by bevelling, moat etching, depletion |
| | concentration or distribution of impurities within | etching} |
| 2010-00 | semiconductor regions} | 29/0665 {the shape of the body defining a |
| 29/0603 | {characterised by particular constructional | nanostructure (nanotechnology <u>per se</u> |
| | design considerations, e.g. for preventing | <u>B82B</u>)} |
| | surface leakage, for controlling electric | 29/0669 {Nanowires or nanotubes (carbon |
| | field concentration or for internal isolations | nanotubes as material of solid-state device |
| | regions (isolation regions between components | active part <u>H10K 85/211</u>)} |
| | <u>H01L 21/76</u> ; design considerations for integrated circuits <u>H01L 27/00</u> ; | 29/0673 {oriented parallel to a substrate} |
| | geometrical design considerations for devices | 29/0676 (oriented perpendicular or at an angle to |
| | H01L 29/0657)} | a substrate} |
| 29/0607 | • • • {for preventing surface leakage or | 29/068 {comprising a junction} |
| 25/0007 | controlling electric field concentration} | 29/0684 {characterised by the shape, relative sizes or |
| 29/0611 | • • • • {for increasing or controlling the | dispositions of the semiconductor regions or |
| 29/0011 | breakdown voltage of reverse biased | junctions between the regions} |
| | devices (H01L 29/0661 takes precedence)} | 29/0688 {characterised by the particular shape of a |
| 29/0615 | • • • • {by the doping profile or the shape or | junction between semiconductor regions} |
| 27/0013 | the arrangement of the PN junction, | 29/0692 {Surface layout} |
| | or with supplementary regions, | 29/0696 {of cellular field-effect devices, e.g. |
| | e.g. junction termination extension | multicellular DMOS transistors or IGBTs} |
| | [JTE] (LDD or drain offset regions | 29/08 with semiconductor regions connected to |
| | H01L 29/7833)} | an electrode carrying current to be rectified, |
| 29/0619 | • • • • • { with a supplementary region doped | amplified or switched and such electrode being part of a semiconductor device which |
| | oppositely to or in rectifying contact | comprises three or more electrodes |
| | with the semiconductor containing | 29/0804 {Emitter regions of bipolar transistors} |
| | or contacting region, e.g. guard rings | 29/0808 {of lateral transistors} |
| | with PN or Schottky junction} | 29/0813 {On lateral transistors} |
| 29/0623 | • • • • • • • {Buried supplementary region, e.g. | structures } |
| | buried guard ring (multi-RESURF | 29/0817 {of heterojunction bipolar transistors |
| | <u>H01L 29/0634</u>)} | (H01L 29/7375 takes precedence) |
| 29/0626 | • • • • • { with a localised breakdown | 29/0821 {Collector regions of bipolar transistors} |
| | region, e.g. built-in avalanching | 29/0826 {Pedestal collectors} |
| | region (in self-protected thyristors | 29/083 {Anode or cathode regions of thyristors or |
| 20/062 | <u>H01L 29/7424</u>)} | gated bipolar-mode devices} |
| 29/063 | {Reduced surface field [RESURF] | 29/0834 {Anode regions of thyristors or gated |
| 20/0624 | pn-junction structures} | bipolar-mode devices, e.g. supplementary |
| 29/0634 | {Multiple reduced surface field (multi-RESURF) structures, | regions surrounding anode regions} |
| | e.g. double RESURF, charge | 29/0839 {Cathode regions of thyristors} |
| | compensation, cool, superjunction | 29/0843 {Source or drain regions of field-effect |
| | (SJ), 3D-RESURF, composite | devices} |
| | buffer (CB) structures} | 29/0847 {of field-effect transistors with insulated |
| 29/0638 | • • • • { for preventing surface leakage due to | gate (H01L 29/0653 takes precedence; |
| | surface inversion layer, e.g. with channel | with a passive supplementary region |
| | stopper (channel stoppers in combination | between source or drain and substrate |
| | with isolation region for integrated circuits | related to punch-through, capacity or |
| | H01L 21/762)} | isolation phenomena H01L 29/1079; with |
| 29/0642 | • • • • {Isolation within the component, i.e. internal | LDD or DDD structure H01L 29/7833; for |
| | isolation} | thin film transistors <u>H01L 29/78618</u>)} |
| 29/0646 | • • • • {PN junctions} | |
| 29/0649 | • • • • {Dielectric regions, e.g. SiO ₂ regions, air | |
| | gaps} | |
| 29/0653 | • • • • • {adjoining the input or output region of | |
| | a field-effect device, e.g. the source or | |
| | drain region} | |
| 29/0657 | • • {characterised by the shape of the body} | |
| | | |

| 29/0852 | • • • • • {of DMOS transistors} | 29/107 {Substrate region of field-effect devices} |
|----------|---|--|
| 27/0032 | | 29/107 {of field-effect transistors} |
| | WARNING | 29/1079 {with insulated gate} |
| | Groups <u>H01L 29/0852</u> – | |
| | H01L 29/0886 are incomplete | 29/1083 {with an inactive supplementary region, e.g. for preventing punch- |
| | pending reclassification | through, improving capacity effect or |
| | of documents from group | leakage current} |
| | H01L 29/0847 and H01L 29/7801. | 29/1087 {characterised by the contact structure |
| | Groups <u>H01L 29/0852</u> – | of the substrate region, e.g. for |
| | H01L 29/0886 and H01L 29/0847, | controlling or preventing bipolar |
| | H01L 29/7801 should be considered | effect} |
| | in order to perform a complete | 29/1091 {of charge coupled devices} |
| | search. | 29/1095 {Body region, i.e. base region, of |
| 20/0957 | (6) | DMOS transistors or IGBTs (cell layout |
| 29/0856 | {Source regions} | H01L 29/0696)} |
| 29/086 | [Impurity concentration or | 29/12 characterised by the materials of which they are |
| 20/0965 | distribution} | formed |
| 29/0865 | {Disposition} | 29/122 {Single quantum well structures (single |
| 29/0869 | | heterojunctions, couples of materials |
| 20/0072 | <u>H01L 29/0696</u>)} | H01L 29/165, H01L 29/205, H01L 29/225, |
| 29/0873 | {Drain regions} | <u>H01L 29/267</u>)} |
| 29/0878 | {Impurity concentration or | 29/125 {Quantum wire structures} |
| | distribution} | 29/127 {Quantum box structures} |
| 29/0882 | {Disposition} | 29/15 Structures with periodic or quasi periodic |
| 29/0886 | {Shape} | potential variation, e.g. multiple quantum |
| 29/0891 | {of field-effect transistors with Schottky | wells, superlattices (such structures applied |
| | gate} | for the control of light G02F 1/017, applied in |
| 29/0895 | {Tunnel injectors} | semiconductor lasers <u>H01S 5/34</u>) |
| 29/10 | with semiconductor regions connected to an | NOTE |
| | electrode not carrying current to be rectified, | |
| | amplified or switched and such electrode | Group H01L 29/15 takes precedence over |
| | being part of a semiconductor device which | groups <u>H01L 29/16</u> - <u>H01L 29/26</u> . |
| 20/1004 | comprises three or more electrodes | 29/151 {Compositional structures (H01L 29/157 and |
| 29/1004 | {Base region of bipolar transistors} | H01L 29/158 take precedence)} |
| 29/1008 | {of lateral transistors} | 29/152 {with quantum effects only in vertical |
| 29/1012 | {Base regions of thyristors (H01L 29/083 | direction, i.e. layered structures with |
| 29/1016 | takes precedence)} | quantum effects solely resulting from |
| | {Anode base regions of thyristors} | vertical potential variation} |
| 29/102 | {Cathode base regions of thyristors} | 29/154 {comprising at least one long range |
| 29/1025 | • • • {Channel region of field-effect devices} | structurally disordered material, e.g. |
| 29/1029 | • • • • {of field-effect transistors} | one-dimensional vertical amorphous |
| 29/1033 | {with insulated gate, e.g. characterised | superlattices} |
| | by the length, the width, the geometric | 29/155 (Comprising only semiconductor |
| | contour or the doping structure (with channel and gate aligned in the | materials (H01L 29/154 takes |
| | lengthwise direction H01L 29/42376; | precedence)} |
| | with buried channel <u>H01L 29/7838</u>)} | 29/157 {Doping structures, e.g. doping superlattices, |
| 29/1037 | • • • • • • • {and non-planar channel (resulting | nipi superlattices (delta doping in general |
| 27/1037 | from the gate electrode disposition, | <u>H01L 29/365</u>)} |
| | e.g. within a trench, H01L 29/42356)} | 29/158 {Structures without potential periodicity in |
| 29/1041 | • • • • • • { with a non-uniform doping structure | a direction perpendicular to a major surface |
| 25/1011 | in the channel region surface} | of the substrate, i.e. vertical direction, |
| 29/1045 | { the doping structure being parallel | e.g. lateral superlattices, lateral surface |
| 25/10:0 | to the channel length, e.g. DMOS | superlattices [LSS]} |
| | like} | 29/16 including, apart from doping materials or other |
| 29/105 | • • • • • { with vertical doping variation | impurities, only elements of Group IV of the Periodic Table |
| | (H01L 29/7827 takes precedence)} | |
| 29/1054 | • • • • • { with a variation of the composition, | 29/1602 {Diamond} |
| | e.g. channel with strained layer for | 29/1604 {Amorphous materials} |
| | increasing the mobility} | 29/1606 {Graphene} |
| 29/1058 | • • • • { with PN junction gate } | 29/1608 {Silicon carbide} |
| 29/1062 | {of charge coupled devices} | 29/161 including two or more of the elements |
| 29/1066 | {Gate region of field-effect devices with PN | provided for in group <u>H01L 29/16</u> {, e.g. |
| _2, 1000 | junction gate} | alloys (<u>H01L 29/1604</u> takes precedence)} |
| | , | |

| 29/165 | • • • • in different semiconductor regions {, e.g. heterojunctions} | 29/40114 {the electrodes comprising a conductor-insulator-conductor-insulator-semiconductor |
|----------|---|---|
| 29/167 | • • • • further characterised by the doping material {(H01L 29/1604 takes precedence)} | structure} 29/40117 {the electrodes comprising a charge-trapping |
| 29/18 | Selenium or tellurium only, apart from doping | insulator} |
| 2040- | materials or other impurities | 29/402 • • {Field plates} |
| 29/185 | • • • {Amorphous materials} | 29/404 {Multiple field plate structures} |
| 29/20 | including, apart from doping materials or other impurities, only $A_{III}B_V$ compounds | 29/405 • • • {Resistive arrangements, e.g. resistive or semi-insulating field plates} |
| 29/2003 | {Nitride compounds} | 29/407 {Recessed field plates, e.g. trench field plates, |
| 29/2006 | • • • {Amorphous materials} | buried field plates} |
| 29/201 | • • • (Third photos materials) • • • including two or more compounds {, e.g. | 29/408 • • { with an insulating layer with a particular |
| | alloys (<u>H01L 29/2006</u> takes precedence)} | dielectric or electrostatic property, e.g. with |
| 29/205 | • • • • in different semiconductor regions {, e.g. heterojunctions} | static charges or for controlling trapped charges or moving ions, or with a plate acting on the |
| 29/207 | further characterised by the doping material {(H01L 29/2006 takes precedence)} | insulator potential or the insulator charges, e.g. for controlling charges effect or potential |
| 29/22 | including, apart from doping materials or other impurities, only $A_{II}B_{VI}$ compounds | distribution in the insulating layer, or with a semi-insulating layer contacting directly the |
| 29/2203 | {Cd X compounds being one element | semiconductor surface} |
| 27/2203 | of the 6th group of the Periodic Table | 29/41 characterised by their shape, relative sizes or |
| | | dispositions |
| 20/2204 | (<u>H01L 29/2206</u> takes precedence)} | 29/413 {Nanosized electrodes, e.g. nanowire |
| 29/2206 | • • • {Amorphous materials} | electrodes comprising one or a plurality |
| 29/221 | including two or more compounds {, e.g. | of nanowires (nanosized carbon materials, |
| | alloys (<u>H01L 29/2206</u> takes precedence)} | e.g. carbon nanotubes, per se C01B 32/15; |
| 29/225 | • • • • in different semiconductor regions {, e.g. | transparent electrodes comprising carbon nano- |
| | heterojunctions} | tubes H10K 30/821, nanotechnology per se |
| 29/227 | further characterised by the doping material | <u>B82B</u>)} |
| | {(<u>H01L 29/2206</u> takes precedence)} | 29/417 carrying the current to be rectified, amplified or |
| 29/24 | including, apart from doping materials or | switched |
| | other impurities, only semiconductor materials | |
| | not provided for in groups H01L 29/16, | · · |
| | H01L 29/18, H01L 29/20, H01L 29/22 | transistors} |
| | (including organic materials H10K 99/00) | 29/41716 {Cathode or anode electrodes for thyristors} |
| 29/242 | $\cdot \cdot \cdot \cdot \{A_I B_{VI} \text{ or } A_I B_{VII} \text{ compounds, e.g. } Cu_2 O, Cu I \}$ | 29/41725 {Source or drain electrodes for field effect |
| | (H01L 29/247 takes precedence) | devices (with monocrystalline semiconductor |
| 29/245 | • • • • {Pb compounds, e.g. PbO (<u>H01L 29/247</u> | on source/drain region <u>H01L 29/0843</u>)} |
| 25/213 | takes precedence)} | 29/41733 • • • • { for thin film transistors with insulated |
| 29/247 | • • • {Amorphous materials} | gate} |
| 29/26 | (Amorphous materials) including, apart from doping materials or other | 29/41741 • • • • { for vertical or pseudo-vertical devices } |
| 29/20 | impurities, elements provided for in two or | NOTE |
| | more of the groups H01L 29/16, H01L 29/18, | |
| | H01L 29/20, H01L 29/22, H01L 29/24 {, e.g. | A pseudo-vertical device is a device |
| | alloys} | with the drain and source electrodes on |
| 20/262 | • <i>,</i> | the same main surface and where the |
| 29/263 | {Amorphous materials} | main current is vertical at least in a part |
| 29/267 | in different semiconductor regions {, | of its path |
| | e.g. heterojunctions (<u>H01L 29/263</u> takes | 20/4175 |
| | precedence)} | 29/4175 { for lateral devices where the connection |
| 29/30 | • characterised by physical imperfections; having | to the source or drain region is |
| | polished or roughened surface | done through at least one part of the |
| 29/32 | • • • the imperfections being within the | semiconductor substrate thickness, e.g. |
| | semiconductor body | with connecting sink or with via-hole} |
| 29/34 | the imperfections being on the surface | <u>NOTE</u> |
| 29/36 | characterised by the concentration or distribution | The sink on via hala leading to the |
| | of impurities {in the bulk material (within | The sink or via-hole leading to the |
| | semiconductor regions <u>H01L 29/06</u>)} | source or drain region is considered |
| 29/365 | {Planar doping, e.g. atomic-plane doping, | to form part of the source or drain |
| | delta-doping} | electrode |
| 29/40 | • Electrodes {; Multistep manufacturing processes | |
| | therefor} | |
| 29/401 | • • {Multistep manufacturing processes} | |
| 29/4011 | . (Mutastep manufacturing processes) (for data storage electrodes) | |
| | | |
| 29/40111 | • • • { the electrodes comprising a layer which is | |
| | used for its ferroelectric properties} | |

| 29/41758 {for lateral devices with structured layout for source or drain region, i.e. | 29/4236 {within a trench, e.g. trench gate electrode, groove gate electrode} |
|---|--|
| the source or drain region having | 29/42364 {characterised by the insulating |
| cellular, interdigitated or ring | layer, e.g. thickness or uniformity |
| structure or being curved or angular | (H01L 29/42324 and H01L 29/4234 |
| (H01L 29/41733 - H01L 29/4175 take | take precedence)} |
| precedence)} | 29/42368 {the thickness being non-uniform} |
| NOTE | 29/42372 {characterised by the conducting |
| Interdigitated structure means that at | layer, e.g. the length, the sectional |
| least one of the source or drain region | shape or the lay-out (<u>H01L 29/42324</u> |
| has two or more fingers | takes precedence)} |
| nas two or more impers | 29/42376 {characterised by the length or the |
| 29/41766 { with at least part of the source or | sectional shape} |
| drain electrode having contact below | 29/4238 {characterised by the surface lay- |
| the semiconductor surface, e.g. the | out} |
| source or drain electrode formed at least | 29/42384 {for thin film field effect transistors, |
| partially in a groove or with inclusions | e.g. characterised by the thickness or the shape of the insulator or the |
| of conductor inside the semiconductor | dimensions, the shape or the lay-out |
| (<u>H01L 29/41733</u> - <u>H01L 29/41758</u> take precedence)} | of the conductor} |
| 29/41775 {characterised by the proximity or the | 2029/42388 {characterised by the shape of the |
| relative position of the source or drain | insulating material} |
| electrode and the gate electrode, e.g. | 29/42392 [fully surrounding the channel, e.g. |
| the source or drain electrode separated | gate-all-around} |
| from the gate electrode by side-walls | 29/42396 {for charge coupled devices} |
| or spreading around or above the gate | 29/43 characterised by the materials of which they are |
| electrode} | formed |
| 29/41783 {Raised source or drain electrodes self | 29/432 {Heterojunction gate for field effect devices} |
| aligned with the gate} | 29/435 • • • {Resistive materials for field effect devices, |
| 29/41791 {for transistors with a horizontal current | e.g. resistive gate for MOSFET or MESFET} |
| flow in a vertical sidewall, e.g. FinFET, | 29/437 {Superconductor materials} |
| MuGFET} | 29/45 Ohmic electrodes |
| 29/423 not carrying the current to be rectified, | 29/452 {on AIII-BV compounds} |
| amplified or switched | 29/454 {on thin film AIII-BV compounds} |
| 29/42304 {Base electrodes for bipolar transistors} | 29/456 {on silicon} |
| 29/42308 {Gate electrodes for thyristors} | 29/458 { for thin film silicon, e.g. source or drain |
| 29/42312 {Gate electrodes for field effect devices} | electrode} |
| 29/42316 {for field-effect transistors} | 29/47 Schottky barrier electrodes {(H01L 29/435) |
| 29/4232 { with insulated gate} | takes precedence)} |
| 29/42324 | 29/475 {on AIII-BV compounds} |
| floating gate} | 29/49 Metal-insulator-semiconductor electrodes, |
| 29/42328 {with at least one additional gate | {e.g. gates of MOSFET (H01L 29/435 takes |
| other than the floating gate and the | precedence)} |
| control gate, e.g. program gate, erase gate or select gate} | <u>NOTE</u> |
| 29/42332 { with the floating gate formed by | This group <u>covers</u> also devices using any |
| two or more non connected parts, | other conductor material in place of metal |
| e.g. multi-particles flating gate} | other conductor material in place of metal |
| 29/42336 { with one gate at least partly | 29/4908 { for thin film semiconductor, e.g. gate of |
| formed in a trench} | TFT} |
| 29/4234 {Gate electrodes for transistors with | 29/4916 {the conductor material next to the insulator |
| charge trapping gate insulator} | being a silicon layer, e.g. polysilicon |
| 29/42344 { with at least one additional gate, | doped with boron, phosphorus or nitrogen |
| e.g. program gate, erase gate or | (<u>H01L 29/4908</u> , <u>H01L 29/4983</u> take |
| select gate} | precedence)} |
| 29/42348 {with trapping site formed by at | 29/4925 {with a multiple layer structure, e.g. |
| least two separated sites, e.g. multi- | several silicon layers with different crystal structure or grain arrangement (with only a |
| particles trapping site} | vertical doping structure or vertical doping |
| 29/42352 {with the gate at least partly formed | variation <u>H01L 29/4916</u>)} |
| in a trench} | 29/4933 { with a silicide layer contacting the |
| 29/42356 {Disposition, e.g. buried gate | silicon layer, e.g. Polycide gate (with |
| electrode (<u>H01L 29/42324</u> and <u>H01L 29/42324</u> take precedence) | a barrier layer between the silicide and |
| <u>H01L 29/4234</u> take precedence)} | silicon layers <u>H01L 29/4941</u>)} |
| | |

| 29/4941 | • • • • • { with a barrier layer between the silicon | 29/66045 {Field-effect transistors} |
|----------------------|---|---|
| | and the metal or metal silicide upper | 29/66053 {of devices having a semiconductor body |
| | layer, e.g. Silicide/TiN/Polysilicon} | comprising crystalline silicon carbide} |
| 29/495 | • • • {the conductor material next to the insulator being a simple metal, e.g. W, | 29/6606 { the devices being controllable only by |
| | Mo (H01L 29/4908, H01L 29/4983 take | variation of the electric current supplied or the electric potential applied, to one or more |
| | precedence)} | of the electrodes carrying the current to be |
| 29/4958 | • • • • {with a multiple layer structure} | rectified, amplified, oscillated or switched, |
| 29/4966 | • • • {the conductor material next to the insulator being a composite material, e.g. organic | e.g. two-terminal devices} 29/66068 { the devices being controllable only by |
| | material, TiN, MoSi ₂ (H01L 29/4908, | the electric current supplied or the electric |
| | H01L 29/4983 take precedence)} | potential applied, to an electrode which |
| 29/4975 | • • • • {being a silicide layer, e.g. TiSi ₂ } | does not carry the current to be rectified, |
| 29/4983 | • • • { with a lateral structure, e.g. a Polysilicon gate with a lateral doping variation or with a | amplified or switched, e.g. three-terminal devices} |
| | lateral composition variation or characterised | 29/66075 {of devices having semiconductor bodies |
| | by the sidewalls being composed of | comprising group 14 or group 13/15 |
| 20/4001 | conductive, resistive or dielectric material} | materials (comprising semiconducting carbon H01L 29/66015; comprising crystalline silicon |
| 29/4991 | {comprising an air gap} | carbide <u>H01L 29/66053</u>)} |
| | WARNING | 29/66083 {the devices being controllable only by |
| | Group H01L 29/4991 is incomplete | variation of the electric current supplied or |
| | pending reclassification of documents from group <u>H01L 29/4983</u> . | the electric potential applied, to one or more of the electrodes carrying the current to be |
| | Groups <u>H01L 29/4991</u> and | rectified, amplified, oscillated or switched, |
| | H01L 29/4983 should be considered in | e.g. two-terminal devices} |
| | order to perform a complete search. | 29/6609 {Diodes} 29/66098 {Breakdown diodes} |
| 29/51 | Insulating materials associated therewith | 29/66106 {Zener diodes} |
| | {(for MIS structures on thin film | 29/66113 {Avalanche diodes} |
| 29/511 | semiconductor <u>H01L 29/4908</u>)} {with a compositional variation, e.g. | 29/66121 {Multilayer diodes, e.g. PNPN diodes} |
| 27/311 | multilayer structures (H01L 29/516 takes | 29/66128 {Planar diodes} |
| | precedence)} | 29/66136 {PN junction diodes} 29/66143 {Schottky diodes} |
| 29/512 | • • • • • { the variation being parallel to the channel plane } | 29/66151 {Tunnel diodes (group 13/15 resonant |
| 29/513 | • • • • • { the variation being perpendicular to the | tunneling diodes H01L 29/66219)} |
| | channel plane} | 29/66159 {Transit time diodes, e.g. IMPATT, TRAPATT diodes} |
| 29/515 | • • • • {with cavities, e.g. containing a gas} | 29/66166 {Resistors with PN junction} |
| 29/516 29/517 | {with at least one ferroelectric layer} {the insulating material comprising a | 29/66174 {Capacitors with PN or Schottky junction, |
| 27/311 | metallic compound, e.g. metal oxide, metal | e.g. varactors (capacitors with PN |
| | silicate (<u>H01L 29/518</u> takes precedence)} | junction combined with MOS control H01L 29/66189)} |
| 29/518 | {the insulating material containing nitrogen, e.g. nitride, oxynitride, nitrogen- | 29/66181 {Conductor-insulator-semiconductor |
| | doped material } | capacitors, e.g. trench capacitors} |
| 29/66 | • Types of semiconductor device {; Multistep | 29/66189 (with PN junction, e.g. hybrid |
| | manufacturing processes therefor} | capacitors} 29/66196 { with an active layer made of a group |
| 29/66007 29/66015 | • {Multistep manufacturing processes}• • {of devices having a semiconductor body | 13/15 material} |
| 29/00013 | comprising semiconducting carbon, e.g. | 29/66204 {Diodes} |
| | diamond, diamond-like carbon, graphene} | 29/66212 {Schottky diodes} |
| 29/66022 | • • • • {the devices being controllable only by | 29/66219 { with a heterojunction, e.g. resonant tunneling diodes [RTD]} |
| | variation of the electric current supplied or the electric potential applied, to one or more | 29/66227 {the devices being controllable only by |
| | of the electrodes carrying the current to be | the electric current supplied or the electric |
| | rectified, amplified, oscillated or switched, | potential applied, to an electrode which does not carry the current to be rectified, |
| 29/6603 | e.g. two-terminal devices} {Diodes} | amplified or switched, e.g. three-terminal |
| 29/66037 | {the devices being controllable only by | devices} |
| | the electric current supplied or the electric | 29/66234 {Bipolar junction transistors [BJT]} |
| | potential applied, to an electrode which | 29/66242 {Heterojunction transistors [HBT] (with an active layer made of a group 13/15 |
| | does not carry the current to be rectified, amplified or switched, e.g. three-terminal | material <u>H01L 29/66318</u>)} |
| | devices} | |
| | | |

| 29/6625 | {Lateral transistors (<u>H01L 29/66242</u> and <u>H01L 29/66265</u> take precedence)} | 29/66446 { with an active layer made of a group 13/15 material, e.g. group 13/15 |
|-----------|---|---|
| 29/66257 | {Schottky transistors} | velocity modulation transistor [VMT], |
| 29/66265 | {Thin film bipolar transistors | group 13/15 negative resistance FET |
| | (<u>H01L 29/66242</u> takes precedence)} | [NERFET]} |
| 29/66272 | • • • • • {Silicon vertical transistors | 29/66454 {Static induction transistors [SIT], |
| | (<u>H01L 29/66242</u> , <u>H01L 29/66257</u> and | e.g. permeable base transistors |
| | <u>H01L 29/66265</u> take precedence)} | [PBT]} |
| 29/6628 | • • • • • {Inverse transistors} | 29/66462 { with a heterojunction interface |
| 29/66287 | • • • • • • { with a single crystalline emitter, | channel or gate, e.g. HFET, HIGFET, SISFET, HJFET, HEMT} |
| | collector or base including extrinsic, | 29/66469 { with one- or zero-dimensional |
| | link or graft base formed on the silicon substrate, e.g. by epitaxy, | channel, e.g. quantum wire field- |
| | recrystallisation, after insulating | effect transistors, in-plane gate |
| | device isolation (H01L 29/6628 takes | transistors [IPG], single electron |
| | precedence)} | transistors [SET], Coulomb |
| 29/66295 | • • • • • { with main current going through the | blockade transistors, striped channel |
| | whole silicon substrate, e.g. power | transistors} |
| 00/44000 | bipolar transistor} | 29/66477 {with an insulated gate, i.e. MISFET} 29/66484 {with multiple gate, at least one |
| 29/66303 | • • • • • • • (with multi-emitter, e.g. | 29/66484 {with multiple gate, at least one gate being an insulated gate |
| | interdigitated, multi-cellular or distributed emitter} | (H01L 29/66742 takes precedence) |
| 29/6631 | • • • • • • {with an active layer made of a group | 29/66492 { with a pocket or a lightly doped |
| 27/0031 | 13/15 material} | drain selectively formed at the side of |
| 29/66318 | • • • • • • {Heterojunction transistors} | the gate} |
| 29/66325 | • • • • {controlled by field-effect, e.g. insulated | 29/665 (using self aligned silicidation, i.e. |
| | gate bipolar transistors [IGBT]} | salicide (formation of conductive |
| 29/66333 | (Vertical insulated gate bipolar | layers comprising silicides |
| | transistors} | <u>H01L 21/28518</u>)} 29/66507 {providing different silicide |
| 29/6634 | • • • • • • {with a recess formed by etching | thicknesses on the gate and on |
| | in the source/emitter contact region | source or drain} |
| | (<u>H01L 29/66348</u> takes precedence; etching of semiconductor bodies | 29/66515 {using self aligned selective metal |
| | H01L 21/302)} | deposition simultaneously on the gate |
| 29/66348 | • • • • • • {with a recessed gate} | and on source or drain} |
| 29/66356 | • • • • {Gated diodes, e.g. field controlled diodes | 29/66522 {with an active layer made of a group |
| | [FCD], static induction thyristors [SITh], | 13/15 material (<u>H01L 29/66446</u> takes precedence)} |
| | field controlled thyristors [FCTh]} | 29/6653 {using the removal of at least part of |
| 29/66363 | {Thyristors} | spacer, e.g. disposable spacer} |
| 29/66371 | (structurally associated with another | 29/66537 {using a self aligned punch through |
| | device, e.g. built-in diode (making integrated circuits <u>H01L 21/82</u>)} | stopper or threshold implant under |
| 29/66378 | • • • • • • • { the other device being a controlling | the gate region (H01L 29/66606 takes |
| 27/00370 | field-effect device) | precedence)} |
| 29/66386 | {Bidirectional thyristors} | 29/66545 (using a dummy, i.e. replacement gate |
| 29/66393 | {Lateral or planar thyristors} | in a process wherein at least a part |
| 29/66401 | • • • • { with an active layer made of a group | of the final gate is self aligned to the dummy gate} |
| | 13/15 material} | 29/66553 {using inside spacers, permanent or |
| 29/66409 | • • • • {Unipolar field-effect transistors} | not} |
| 29/66416 | • • • • • {Static induction transistors [SIT] (with | 29/6656 {using multiple spacer layers, e.g. |
| | an active layer made of a group 13/15 material <u>H01L 29/66454</u>)} | multiple sidewall spacers} |
| 29/66424 | • • • • • • • {Permeable base transistors [PBT]} | 29/66568 {Lateral single gate silicon |
| 29/66431 | • • • • • • • (Fermicable base transfisters [FBT]) • • • • • • • (with a heterojunction interface | transistors} |
| 25/00/151 | channel or gate, e.g. HFET, HIGFET, | 29/66575 {where the source and drain or source and drain extensions |
| | SISFET, HJFET, HEMT (with an active | are self-aligned to the sides of |
| | layer made of a group 13/15 material | the gate (H01L 29/66606 takes |
| | H01L 29/66462)} | precedence)} |
| 29/66439 | • • • • • { with a one- or zero-dimensional | 29/66583 {with initial gate mask or |
| | channel, e.g. quantum wire FET, in- | masking layer complementary to |
| | plane gate transistor [IPG], single electron transistor [SET], striped | the prospective gate location, e.g. |
| | channel transistor, Coulomb blockade | with dummy source and drain |
| | transistor (with an active layer made of a | contacts} |
| | group 13/15 material <u>H01L 29/66469</u>)} | |
| | | |

| 29/6659 { with both | th lightly doped source 29/6 | 66719 {With a step of forming an |
|-----------------------------|---|---|
| | extensions and source | insulating sidewall spacer} |
| | self-aligned to the sides 29/6 te, e.g. lightly doped | 66727 { with a step of recessing the source electrode} |
| | | 66734 { with a step of recessing the gate |
| | drain [DDD] MOSFET} ng drain [D] and | electrode, e.g. to form a trench gate electrode} |
| | | 66742 {Thin film unipolar transistors} |
| | aneously, e.g. using 29/6 | 6675 (Amorphous silicon or polysilicon |
| | tation through the wings aped layer, or through a | transistors} |
| | ly shaped layer} | 66757 {Lateral single gate single channel transistors with non- |
| | source and drain | inverted structure, i.e. the |
| | mation strictly or dummy gate | channel layer is formed before the gate} |
| formation, | e.g. contact first 29/6 | 66765 {Lateral single gate single |
| technology precedence | (<u>H01L 29/66621</u> takes | channel transistors with inverted |
| * | e recessing step, e.g. | structure, i.e. the channel layer is formed after the gate} |
| using local | oxidation (making 29/6 | 66772 {Monocristalline silicon transistors |
| recessed ga H01L 29/60 | te LDMOS transistors | on insulating substrates, e.g. quartz |
| | ching to form a recess | substrates (H01L 29/66666 takes precedence; thin film FinFETs |
| at the gat | e location (etching | H01L 29/66795)} |
| of semico H01L 21 | onductor bodies 29/6 | (* ************************************ |
| 29/66628 {recessin | g the gate by forming 29/6 | transistors \ 66787 \ \ \ \ \ \ \ \ \ \ \ \ |
| | ystalline semiconductor at the source or drain | channel} |
| location } | 79/6 | 66795 {with a horizontal current |
| 29/66636 { with source | e or drain recessed by | flow in a vertical sidewall of a semiconductor body, e.g. FinFET, |
| etching or f and then re | irst recessed by etching | MuGFET} |
| | three or drain regions 29/6 | 66803 { with a step of doping the vertical sidewall, e.g. using tilted |
| | a Schottky barrier or a | or multi-angled implants} |
| conductor-i structure } | nsulator-semiconductor 29/6 | |
| 29/66651 {with a sing | gle crystalline channel | essentially the same shape as the semiconductor body, e.g. to |
| | he silicon substrate after levice isolation \ 20/6 | provide stability} |
| _ | metry in the channel | 66818 {the channel being thinned |
| direction, e. | g. lateral high-voltage | after patterning, e.g. sacrificial oxidation on fin } |
| | with drain offset region, and MISFETs \ 29/6 | 66825 { with a floating gate (<u>H01L 29/6684</u> |
| 29/66666 { Vertical tran | sistors (<u>H01L 29/66712</u> , 20/6 | takes precedence)} 6833 { with a charge trapping gate insulator, |
| | 42 take precedence)} | e.g. MNOS transistors} |
| | istors, i.e. MISFETs l accommodating body | ξ , |
| or base region | adjoining a drain drift | 6848 { with a Schottky gate, i.e. MESFET} 6856 { with an active layer made of a group |
| | g lateral high-voltage h channel well and drain | 13/15 material (<u>H01L 29/66446</u> takes |
| | H01L 29/66659)} | precedence)} |
| | vios transistors, i.e. | 66863 {Lateral single gate transistors} 66871 {Processes wherein the final gate |
| 29/66689 { with a s | ansistors} 29/0 tep of forming an | is made after the formation of |
| | g sidewall spacer | the source and drain regions in |
| | insulating material on a | the active layer, e.g. dummy-gate processes} |
| | H01L 21/02107)} tep of recessing the | 66878 {Processes wherein the final gate |
| source el | ectrode} | is made before the formation, e.g. activation anneal, of the source |
| | tep of recessing the gate | activation anneal, of the source and drain regions in the active |
| electrode gate elect | , e.g. to form a trench trode} | layer} |
| 29/66712 {Vertical D | MOS transistors, i.e. 29/6 | 66886 {Lateral transistors with two or more independent gates} |
| VDMOS tra | ansistors} | 66893 {with a PN junction gate, i.e. JFET} |
| | | |

| 29/66901 29/66909 | {with a PN homojunction gate}{Vertical transistors, e.g. tecnetrons} | 29/7325 | • • • • • • • • • • • • • • • • • • • |
|----------------------|---|-------------------|---|
| 29/66916 29/66924 | | 29/7327 | peripheral surface of the body, e.g. mesa planar transistor} |
| | 13/15 material (<u>H01L 29/66446</u> takes precedence)} | 29/7327 29/735 | {Inverse vertical transistors} Lateral transistors |
| 29/66931 | • • • • • {BJT-like unipolar transistors, e.g. hot | 29/737 | Hetero-junction transistors |
| 27/00751 | electron transistors [HET], metal base | 29/7371 | {Vertical transistors} |
| | transistors [MBT], resonant tunneling | 29/7373 | • • • • • • {having a two-dimensional base, |
| | transistor [RTT], bulk barrier transistor | | e.g. modulation-doped base, |
| | [BBT], planar doped barrier transistor | | inversion layer base, delta-doped |
| | [PDBT], charge injection transistor | | base} |
| 29/66939 | [CHINT]} {with an active layer made of a group | 29/7375 | • • • • • • • • • • • • • • • • • • • |
| 27/00737 | 13/15 material} | | elements of group IV, e.g. |
| 29/66946 | {Charge transfer devices} | | amorphous silicon, alloys |
| 29/66954 | • • • • { with an insulated gate } | | comprising group IV elements} |
| 29/66962 | , | 29/7376 | • • • • • • • • • • • • • • • • • • • |
| 29/66969 | • • • {of devices having semiconductor bodies | 29/7378 | (comprising lattice mismatched |
| | not comprising group 14 or group 13/15 materials (comprising selenium or tellurium | | active layers, e.g. SiGe strained layer transistors} |
| | in uncombined form other than as impurities | 29/739 | • • • • controlled by field-effect, {e.g. bipolar |
| | in semiconductor bodies of other materials, | | static induction transistors [BSIT] |
| | comprising cuprous oxide or cuprous iodide | | (unijunction transistors <u>H01L 29/705</u>)} |
| 29/66977 | H01L 21/02365)} • • {Quantum effect devices, e.g. using quantum | 29/7391 | {Gated diode structures} |
| 29/00911 | reflection, diffraction or interference effects, i.e. | 29/7392 | • • • • • • { with PN junction gate, e.g. field controlled thyristors (FCTh), static |
| | Bragg- or Aharonov-Bohm effects} | | induction thyristors (SITh)} |
| 29/66984 | • • {Devices using spin polarized carriers} | 29/7393 | {Insulated gate bipolar mode transistors, |
| 29/66992 | • • {controllable only by the variation of applied | 20/2004 | i.e. IGBT; IGT; COMFET} |
| | heat (controllable by IR radiation H01L 31/00; measuring quantity of heat G01K 17/00)} | 29/7394 | • • • • • • (on an insulating layer or substrate, e.g. thin film device or device |
| 29/68 | • controllable by only the electric current supplied, | | isolated from the bulk substrate |
| | or only the electric potential applied, to an | | (H01L 29/7398 takes precedence) |
| | electrode which does not carry the current to be | 29/7395 | • • • • • • {Vertical transistors, e.g. vertical |
| 29/685 | rectified, amplified or switched {Hi-Lo semiconductor devices, e.g. memory} | | IGBT} |
| 29/003 | devices} | | <u>NOTE</u> |
| 29/70 | Bipolar devices | | The transistor is called vertical if |
| 29/705 | • • • {Double base diodes} | | the emitter and the collector are |
| 29/72 | Transistor-type devices, i.e. able to | | not on the same main surface or, if they are on the same main surface, |
| | continuously respond to applied control signals | | at least a part of the main current |
| 29/73 | Bipolar junction transistors | | has a component substantially not |
| 29/7302 | {structurally associated with other | | parallel to the main surface |
| | devices (assemblies of devices | 29/7396 | • • • • • • { with a non planar surface, e.g. |
| | H01L 25/00; integrated circuits | | with a non planar gate or with a |
| 29/7304 | H01L 27/00; IGBT H01L 29/7393)} {the device being a resistive | | trench or recess or pillar in the |
| 29/1304 | element, e.g. ballasting resistor | | surface of the emitter, base or collector region for improving |
| | (transistors integrated with resistors | | current density or short circuiting |
| | <u>H01L 27/075</u>)} | | the emitter and base regions |
| 29/7306 | • • • • • {Point contact transistors} | 4 | (H01L 29/7398 takes precedence) |
| 29/7308 | {Schottky transistors} | 29/7397 | |
| 29/7311 29/7313 | {Tunnel transistors} {Avalanche transistors} | | a slanted or vertical surface or formed in a groove, e.g. trench |
| 29/7313 | {Avaianche transistors} {Transistors with hook collector} | | gate IGBT} |
| 29/7317 | {Bipolar thin film transistors} | 29/7398 | • • • • • • { with both emitter and collector |
| 29/732 | Vertical transistors | . · | contacts in the same substrate side} |
| 29/7322 | • • • • • {having emitter-base and base- | 29/74 | Thyristor-type devices, e.g. having four-zone regenerative action {(two-terminal thyristors |
| | collector junctions leaving at the same surface of the body, e.g. planar | | H01L 29/87)} |
| | transistor} | | |
| | | | |

| 29/7404 | • • • • { structurally associated with at least one other device (assemblies <u>H01L 25/00</u> ; integrated circuits <u>H01L 27/00</u>)} | 29/778 with two-dimensional charge carrier gas channel, e.g. HEMT {; with two-dimensional charge-carrier layer formed at |
|--------------------|---|--|
| 29/7408 | • • • • { the device being a capacitor or a resistor } | a heterojunction interface (<u>H01L 29/803</u> takes precedence)} |
| 29/7412 | • • • • { the device being a diode } | 29/7781 { with inverted single heterostructure, |
| 29/7416 | {the device being an antiparallel | i.e. with active layer formed on top of wide bandgap layer, e.g. IHEMT} |
| | diode, e.g. RCT (shorted anode structures enabling reverse conduction | 29/7782 {with confinement of carriers by at least |
| | H01L 29/0834)} | two heterojunctions, e.g. DHHEMT, |
| 29/742 | {the device being a field effect transistor | quantum well HEMT, DHMODFET} |
| | (for turn-on or turn-off by field effect | 29/7783 {using III-V semiconductor material} |
| 20/7/24 | <u>H01L 29/745, H01L 29/749</u>)} | 29/7784 {with delta or planar doped |
| 29/7424 | {having a built-in localised breakdown/ breakover region, e.g. self-protected | donor layer (<u>H01L 29/7785</u> takes precedence)} |
| | against destructive spontaneous, e.g. | 29/7785 {with more than one donor layer} |
| | voltage breakover, firing} | 29/7786 (with direct single heterostructure, i.e. |
| 29/7428 | {having an amplifying gate structure, e.g. cascade (Darlington) configuration} | with wide bandgap layer formed on top of active layer, e.g. direct single |
| 29/7432 | • • • • {Asymmetrical thyristors (with a particular | heterostructure MIS-like HEMT} |
| 2777 132 | shorted anode structure H01L 29/0834)} | 29/7787 { with wide bandgap charge-carrier |
| 29/7436 | {Lateral thyristors} | supplying layer, e.g. direct single |
| 29/744 | Gate-turn-off devices | heterostructure MODFET} |
| 29/745 | • • • • with turn-off by field effect | 29/7788 {Vertical transistors} |
| 29/7455 | • • • • • {produced by an insulated gate | 29/7789 { the two-dimensional charge carrier gas being at least partially not parallel |
| 29/747 | structure } Bidirectional devices, e.g. triacs | to a main surface of the semiconductor |
| 29/749 | with turn-on by field effect | body} |
| 29/76 | • • • Unipolar devices {, e.g. field effect transistors} | 29/78 with field effect produced by an insulated |
| 29/7606 | • • • {Transistor-like structures, e.g. hot electron | gate {(H01L 29/7725, H01L 29/775, H01L 29/778 take precedence)} |
| | transistor [HET]; metal base transistor | 29/7801 {DMOS transistors, i.e. MISFETs with |
| 20/7612 | [MBT]} | a channel accommodating body or base |
| 29/7613 | • • • • { Single electron transistors; Coulomb blockade devices (H01L 29/7888 takes | region adjoining a drain drift region |
| | precedence)} | (lateral high-voltage MISFETs with |
| 29/762 | Charge transfer devices | channel well and drain offset region H01L 29/7835)} |
| 29/765 | Charge-coupled devices {(peripheral | 29/7802 {Vertical DMOS transistors, i.e. |
| | circuits for CCD storage devices G11C 19/285)} | VDMOS transistors} |
| 29/768 | with field effect produced by an | 29/7803 {structurally associated with at |
| | insulated gate | least one other device (assemblies H01L 25/00; integrated circuits |
| 29/76808 | • • • • • {Input structures} | H01L 27/00)} |
| 29/76816 | , | WARNING |
| 29/76825 | {Structures for regeneration, refreshing, leakage compensation or | |
| | the like | Groups <u>H01L 29/7803</u> – <u>H01L 29/7808</u> are incomplete |
| 29/76833 | , | pending reclassification |
| 29/76841 | {Two-Phase CCD} | of documents from group |
| 29/7685 | • • • • • • {Three-Phase CCD} | <u>H01L 29/7802</u> . |
| 29/76858 | , | Groups <u>H01L 29/7803</u> |
| 29/76866 | , | - <u>H01L 29/7808</u> and |
| 29/76875 | · · · · · · · · · · · · · · · · · · · | H01L 29/7802 should be considered in order to perform a |
| 29/76883 | , | complete search. |
| 29/76891 29/772 | {Four-Phase CCD} Field effect transistors | · |
| 29/7722 | • • • • {using static field induced regions, e.g. | 29/7804 {the other device being a pn-junction diode} |
| · · · | SIT, PBT} | 29/7805 |
| 29/7725 | • • • • { with delta-doped channel (<u>H01L 29/778</u> | diode} |
| 20/7727 | takes precedence)} | 29/7806 {the other device being a |
| 29/7727 | VMT | Schottky barrier diode} |
| 29/775 | • • • • with one dimensional charge carrier gas | 29/7808 {the other device being a breakdown diode, e.g. Zener |
| | channel, e.g. quantum wire FET | diode} |
| | | |

| 29/7809 | {having both source and drain contacts on the same surface, i.e. Up-Drain VDMOS transistors} | 29/7826 | | { with voltage or current sensing structure, e.g. emulator section, overcurrent sensing cell} |
|---------|--|---------------------|-------------|--|
| 29/781 | {Inverted VDMOS transistors, i.e. Source-Down VDMOS transistors} | 29/7827 | | {Vertical transistors (H01L 29/7802, H01L 29/78642 take precedence)} |
| 29/7811 | {with an edge termination structure (guard regions per se H01L 29/0619; field plates per se | 29/7828 | | • {without inversion channel, e.g. vertical ACCUFETs, normally-on vertical MISFETs} |
| | H01L 29/402)} WARNING Group H01L 29/7811 | 29/783 | | {comprising a gate to body connection, i.e. bulk dynamic threshold voltage MOSFET (for thin film transistors |
| | is incomplete pending reclassification of documents from group H01L 29/7802. | 29/7831 | | H01L 29/78612, H01L 29/78696)} {with multiple gate structure (FinFETs or MuGFETs H01L 29/7855, thin film transistors H01L 29/78645)} |
| | Groups H01L 29/7811 and H01L 29/7802 should be considered in order to perform a | 29/7832 | • • • • • • | • {the structure comprising a MOS gate and at least one non-MOS gate, e.g. JFET or MESFET gate} |
| 29/7812 | complete search. {with a substrate comprising an insulating layer, e.g. SOI-VDMOS | 29/7833 | • • • • • | {with lightly doped drain or source extension, e.g. LDD MOSFET's; DDD MOSFET's (for thin film transistors |
| 29/7813 | transistors} {with trench gate electrode, e.g. UMOS transistors (trench gate | 29/7834 | | H01L 29/78618)}{with a non-planar structure, e.g. the gate or the source or the drain being non-planar} |
| 29/7815 | electrodes per se H01L 29/4236)} {with voltage or current sensing | | | NOTE |
| | structure, e.g. emulator section, overcurrent sensing cell} WARNING | | | Field oxide sunken in the substrate and not filling a groove is not an element characterising a non- |
| | Group <u>H01L 29/7815</u> | | | planar structure |
| | is incomplete pending reclassification of documents from group H01L 29/7802. | 29/7835 | | {with asymmetrical source and drain regions, e.g. lateral high-voltage MISFETs with drain offset region, extended drain MISFETs} |
| | Groups H01L 29/7815 and H01L 29/7802 should be considered in order to perform a complete search. | 29/7836 | | • {with a significant overlap between the lightly doped extension and the gate electrode (H01L 29/7834, H01L 29/7835 take precedence)} |
| 29/7816 | Lateral DMOS transistors, i.eDMOS transistors} | 29/7838 | | {without inversion channel, e.g. buried channel lateral MISFETs, normally-on |
| 29/7817 | {structurally associated with at least one other device (assemblies | | | lateral MISFETs, depletion-mode lateral MISFETs} |
| | <u>H01L 25/00;</u> integrated circuits <u>H01L 27/00</u>)} | 29/7839 29/78391 | | {with Schottky drain or source contact} {the gate comprising a layer which is |
| 29/7818 | • {the other device being a pn- junction diode} | | | used for its ferroelectric properties} |
| 29/7819 | • • {in antiparallel, e.g. freewheel | 29/7841 | | {with floating body, e.g. programmable transistors} |
| 29/782 | diode } . {the other device being a Schottky barrier diode } | 29/7842 | • • • • • • | {means for exerting mechanical stress on the crystal lattice of the channel |
| 29/7821 | • {the other device being a breakdown diode, e.g. Zener | | | region, e.g. using a flexible substrate (variation of the composition of the channel <u>H01L 29/1054</u>)} |
| 29/7823 | diode} {with an edge termination | 29/7843 | • • • • • • | {the means being an applied insulating layer} |
| | structure (guard regions per se H01L 29/0619; field plates per se | 29/7845 | | • {the means being a conductive material, e.g. silicided S/D or Gate} |
| 29/7824 | H01L 29/402)} {with a substrate comprising an insulating layer, e.g. SOI-LDMOS | 29/7846 | • • • • • • | • {the means being located in the lateral device isolation region, e.g. STI} |
| 29/7825 | transistors} {with trench gate electrode | 29/7847 | • • • • • | {using a memorization technique, e.g. re-crystallization under strain, bonding on a substrate having |
| | (trench gate electrodes <u>per se</u> <u>H01L 29/4236</u>)} | | | a thermal expansion coefficient different from the one of the region} |

| 29/7848 | • • • • • {the means being located in the source/drain region, e.g. SiGe source and drain} | 29/78621 {with LDD structure or an extension or an offset region or characterised by the doping |
|----------------------------------|---|--|
| 29/7849 | • • • • • {the means being provided under the channel} | profile} 29/78624 { the source and the drain |
| 29/785 | ••••• {having a channel with a horizontal current flow in a vertical sidewall of a semiconductor body, e.g. FinFET, MuGFET} | regions being asymmetrical } 29/78627 { with a significant overlap between the lightly doped drain and the gate electrode, |
| 29/7851 29/7853 | {with the body tied to the substrate} {the body having a non-rectangular crossection} | e.g. GOLDD} 2029/7863 {with an LDD consisting of more than one lightly |
| 29/7854 29/7855 29/7856 | {with rounded corners} {with at least two independent gates} {with an non-uniform gate, e.g. | doped zone or having a non-homogeneous dopant distribution, e.g. graded LDD} |
| 29/1830 | varying doping structure, shape or composition on different sides of | 29/78633 { with a light shield} 29/78636 { with supplementary region or |
| | the fin, or different gate insulator thickness or composition on opposing fin sides (H01L 29/7855 takes | layer for improving the flatness of the device} 29/78639 {with a drain or source connected} |
| | precedence)} | to a bulk conducting substrate} |
| 2029/7857 | • • • • • • {of the accumulation type} | 29/78642 {Vertical transistors} |
| 2029/7858 | having contacts specially adapted | 29/78645 {with multiple gate} |
| | to the FinFET geometry, e.g. wrap- around contacts} | 29/78648 { arranged on opposing sides of the channel } |
| 29/786 | with a channel being at least partly | 29/78651 {Silicon transistors (H01L 29/78606 - H01L 29/78645 |
| | a thin film (transistors having only the source or the drain region on an insulator layer <u>H01L</u> 29/0653; thin film | take precedence)} 29/78654 {Monocrystalline silicon transistors} |
| | FinFETs H01L 29/785)} | 29/78657 {SOS transistors} |
| | NOTE | 29/7866 {Non-monocrystalline silicon |
| | | transistors } |
| | In groups | transistors} 29/78663 {Amorphous silicon transistors} |
| | In groups <u>H01L 29/78651</u> - <u>H01L 29/78696</u> , the materials specified for the | 29/78663 {Amorphous silicon transistors} 29/78666 {with normal-type structure, |
| | <u>H01L 29/78651</u> - <u>H01L 29/78696</u> , | 29/78663 |
| 29/78603 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region {characterised by the insulating substrate or support (H01L 29/78657) | 29/78663 |
| 29/78603 29/78606 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region {characterised by the insulating substrate or support (H01L 29/78657 takes precedence)} | 29/78663 |
| | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region Characterised by the insulating substrate or support (H01L 29/78657 takes precedence) With supplementary region or layer in the thin film or in the insulated | 29/78663 |
| | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region {characterised by the insulating substrate or support (H01L 29/78657 takes precedence)} {with supplementary region or layer | 29/78663 |
| 29/78606 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region Characterised by the insulating substrate or support (H01L 29/78657) takes precedence) With supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence) | 29/78663 |
| | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region • {characterised by the insulating substrate or support (H01L 29/78657 takes precedence)} • {with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)} • {for preventing leakage current (H01L 29/78618 takes | 29/78663 {Amorphous silicon transistors} 29/78666 {with normal-type structure, e.g. with top gate} 29/78669 {with inverted-type structure, e.g. with bottom gate} 29/78672 {Polycrystalline or microcrystalline silicon transistor} 29/78675 {with normal-type structure, e.g. with top gate} 29/78678 {with inverted-type structure, e.g. with bottom gate} 29/78681 . {having a semiconductor body comprising A _{III} B _V or A _{II} B _{VI} or A _{IV} B _{VI} semiconductor materials, or Se or Te} 29/78684 . {having a semiconductor body |
| 29/78606 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region {characterised by the insulating substrate or support (H01L 29/78657 takes precedence)} {with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)} {for preventing leakage current (H01L 29/78618 takes precedence)} {for preventing the kink- or the | 29/78663 {Amorphous silicon transistors} 29/78666 {with normal-type structure, e.g. with top gate} 29/78669 {with inverted-type structure, e.g. with bottom gate} 29/78672 {Polycrystalline or microcrystalline silicon transistor} 29/78675 {with normal-type structure, e.g. with top gate} 29/78678 {with inverted-type structure, e.g. with bottom gate} 29/78681 {having a semiconductor body comprising A _{III} B _V or A _{II} B _{VI} or A _{IV} B _{VI} semiconductor materials, or Se or Te} 29/78684 {having a semiconductor body comprising semiconductor materials of Group IV not being silicon, |
| 29/78606 29/78609 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region • • • {characterised by the insulating substrate or support (H01L 29/78657 takes precedence)} • • • {with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)} • • • • {for preventing leakage current (H01L 29/78618 takes precedence)} | 29/78663 |
| 29/78606 29/78609 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region Characterised by the insulating substrate or support (H01L 29/78657) takes precedence) With supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence) For preventing leakage current (H01L 29/78618 takes precedence) For preventing the kink- or the snapback effect, e.g. discharging the minority carriers of the channel region for preventing bipolar effect} | 29/78663 |
| 29/78606 29/78609 29/78612 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region (characterised by the insulating substrate or support (H01L 29/78657 takes precedence)) (with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)) (for preventing leakage current (H01L 29/78618 takes precedence)) (for preventing the kink- or the snapback effect, e.g. discharging the minority carriers of the channel region for preventing bipolar effect) (with a body contact) (characterised by the drain or | 29/78663 |
| 29/78606 29/78609 29/78612 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region (characterised by the insulating substrate or support (H01L 29/78657 takes precedence)) (with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)) (for preventing leakage current (H01L 29/78618 takes precedence)) (for preventing the kink- or the snapback effect, e.g. discharging the minority carriers of the channel region for preventing bipolar effect) (with a body contact) (characterised by the drain or the source properties, e.g. the doping structure, the composition, the sectional shape or the | 29/78663 |
| 29/78606 29/78609 29/78612 | H01L 29/78651 - H01L 29/78696, the materials specified for the transistors are the material of the channel region (characterised by the insulating substrate or support (H01L 29/78657 takes precedence)) (with supplementary region or layer in the thin film or in the insulated bulk substrate supporting it for controlling or increasing the safety of the device (H01L 29/78642, H01L 29/78645 take precedence)) (for preventing leakage current (H01L 29/78618 takes precedence)) (for preventing the kink- or the snapback effect, e.g. discharging the minority carriers of the channel region for preventing bipolar effect) (characterised by the drain or the source properties, e.g. the doping structure, the composition, | 29/78663 |

| 29/7869 | 96 {characterised by the structure of the | 29/812 | with a Schottky gate {(<u>H01L 29/7725</u> , |
|---------|---|----------|--|
| | channel, e.g. multichannel, transverse | | <u>H01L 29/775</u> , <u>H01L 29/778</u> , |
| | or longitudinal shape, length or width, | | H01L 29/806 take precedence; |
| | doping structure, or the overlap or | | with Schottky contact on top of |
| | alignment between the channel and | | heterojunction gate <u>H01L 29/802</u>)} |
| | the gate, the source or the drain, or | 29/8122 | {Vertical transistors (SIT, PBT |
| | the contacting structure of the channel | | <u>H01L 29/7722</u>)} |
| | (H01L 29/78612 takes precedence; transistors having a drain offset | 29/8124 | • • • • • {with multiple gate} |
| | region or a lightly doped drain [LDD] | 29/8126 | {Thin film MESFET's} |
| | H01L 29/78621)} | 29/8128 | • • • • { with recessed gate } |
| 29/788 | with floating gate {(H01L 29/78391 | 29/82 | controllable by variation of the magnetic field |
| 27/100 | takes precedence)} | 20/04 | applied to the device |
| 29/7881 | | 29/84 | controllable by variation of applied mechanical |
| | two possible levels of programmation | 20/97 | force, e.g. of pressure |
| | (<u>H01L 29/7888</u> takes precedence)} | 29/86 | controllable only by variation of the electric current supplied, or only the electric potential |
| 29/7882 | 2 (charging by injection of carriers | | applied, to one or more of the electrodes carrying |
| | through a conductive insulator, e.g. | | the current to be rectified, amplified, oscillated or |
| | Poole-Frankel conduction} | | switched |
| 29/7883 | (| 29/8605 | Resistors with PN junctions |
| | e.g. Fowler-Nordheim tunnelling} | 29/861 | Diodes |
| 29/7884 | (& &) , | 29/8611 | • • • {Planar PN junction diodes} |
| 29/7885 | · · | 29/8613 | {Mesa PN junction diodes} |
| | channel} | 29/8615 | {Hi-lo semiconductor devices, e.g. memory |
| 29/7886 | | 25,0010 | devices} |
| | avalanche breakdown of a PN | 29/8616 | {Charge trapping diodes} |
| 20/5005 | junction, e.g. FAMOS} | 29/8618 | {Diodes with bulk potential barrier, e.g. |
| 29/7887 | () | | Camel diodes, Planar Doped Barrier diodes, |
| | than two possible different levels of programmation} | | Graded bandgap diodes} |
| 29/7888 | | 29/862 | Point contact diodes |
| 27/1000 | 8 {Transistors programmable by two single electrons} | 29/864 | Transit-time diodes, e.g. IMPATT, |
| 29/7889 | | | TRAPATT diodes |
| 27/100 | having source and drain not in the | 29/866 | Zener diodes |
| | same horizontal plane} | 29/868 | PIN diodes |
| 29/792 | with charge trapping gate insulator, e.g. | 29/87 | Thyristor diodes, e.g. Shockley diodes, |
| | MNOS-memory transistors | | break-over diodes |
| 29/7923 | 3 {Programmable transistors with more | 29/872 | Schottky diodes |
| | than two possible different levels of | 29/8725 | • • • • {of the trench MOS barrier type [TMBS]} |
| | programmation} | 29/88 | Tunnel-effect diodes |
| 29/7926 | , | 29/882 | {Resonant tunneling diodes, i.e. RTD, |
| | having source and drain not in the | 20/005 | RTBD} |
| 20/00 | same horizontal plane} | 29/885 | Esaki diodes |
| 29/80 | • • • • with field effect produced by a PN or other rectifying junction gate {, i.e. potential- | 29/92 | Capacitors having potential barriers |
| | jump barrier} | 29/93 | Variable capacitance diodes, e.g. varactors |
| 29/802 | • • • • • { with heterojunction gate, e.g. | 29/94 | Metal-insulator-semiconductors, e.g. MOS |
| 27/002 | transistors with semiconductor layer | 29/945 | · · · · {Trench capacitors} |
| | acting as gate insulating layer, MIS- | 31/00 | Semiconductor devices sensitive to infrared |
| | like transistors (H01L 29/806 takes | | radiation, light, electromagnetic radiation of |
| | precedence; with one dimensional | | shorter wavelength or corpuscular radiation |
| | electron gas H01L 29/775; with | | and specially adapted either for the conversion |
| | dimensional electron gas <u>H01L 29/778</u>)} | | of the energy of such radiation into electrical |
| 29/803 | • • • • • • • Programmable transistors, e.g. with | | energy or for the control of electrical energy by |
| 00/07 | charge-trapping quantum well} | | such radiation; Processes or apparatus specially adapted for the manufacture or treatment thereof |
| 29/806 | • • • • • {with Schottky drain or source contact} | | or of parts thereof; Details thereof (H10K 30/00 |
| 29/808 | with a PN junction gate {, e.g. PN | | takes precedence; devices consisting of a plurality of |
| | homojunction gate (<u>H01L 29/7725</u> , | | solid state components formed in, or on, a common |
| | <u>H01L 29/775, H01L 29/778,</u> <u>H01L 29/806</u> take precedence)} | | substrate, other than combinations of radiation- |
| 29/8083 | | | sensitive components with one or more electric light |
| 27/0003 | H01L 29/7722)} | | sources, <u>H01L 27/00</u>) |
| 29/8086 | | 31/02 | . Details |
| | | 31/02002 | • • {Arrangements for conducting electric current to |
| | | | or from the device in operations} |
| | | | |

| 31/02005 {for device characterised by at least one | 31/02327 {the optical elements being integrated or being |
|--|--|
| potential jump barrier or surface barrier} | directly associated to the device, e.g. back |
| 31/02008 {for solar cells or solar cell modules} | reflectors (optical coatings <u>H01L 31/0216</u>)} |
| 31/0201 {comprising specially adapted module | 31/0236 • • Special surface textures |
| bus-bar structures} | 31/02363 { of the semiconductor body itself, e.g. textured |
| 31/02013 {comprising output lead wires elements} | active layers} |
| 31/02016 • • {Circuit arrangements of general character for the | 31/02366 {of the substrate or of a layer on the substrate, |
| devices} | e.g. textured ITO/glass substrate or superstrate, textured polymer layer on glass substrate} |
| 31/02019 {for devices characterised by at least one potential jump barrier or surface barrier} | 31/024 • Arrangements for cooling, heating, ventilating |
| 31/02021 {for solar cells (electrical connection means, | or temperature compensation (for photovoltaic |
| e.g. junction boxes, specially adapted for | devices H01L 31/052) |
| structural association with photovoltaic | 31/0248 • characterised by their semiconductor bodies |
| modules <u>H02S 40/34</u>)} | 31/0256 characterised by the material |
| 31/02024 {Position sensitive and lateral effect | 31/0264 Inorganic materials |
| photodetectors; Quadrant photodiodes} | 31/0272 Selenium or tellurium |
| 31/02027 {for devices working in avalanche mode} | 31/02725 {characterised by the doping material} |
| 31/0203 Containers; Encapsulations {, e.g. encapsulation | 31/028 including, apart from doping material or |
| of photodiodes}(for photovoltaic devices | other impurities, only elements of Group IV |
| H01L 31/048; for organic photosensitive devices | of the Periodic Table |
| H10K 30/80) 31/0216 . Coatings (H01L 31/041 takes precedence) | 31/0284 {comprising porous silicon as part of the active layer(s) (porous silicon as |
| 31/02161 {for devices characterised by at least one | antireflective layer for photodiodes |
| potential jump barrier or surface barrier} | H01L 31/0216; for solar cells |
| 31/02162 {for filtering or shielding light, e.g. | <u>H01L 31/02168</u>)} |
| multicolour filters for photodetectors} | 31/0288 characterised by the doping material |
| 31/02164 {for shielding light, e.g. light blocking | 31/0296 including, apart from doping material or |
| layers, cold shields for infrared detectors} | other impurities, only $A_{II}B_{VI}$ compounds, e.g. |
| 31/02165 {using interference filters, e.g. multilayer | CdS, ZnS, HgCdTe |
| dielectric filters (interference filters | 31/02963 {characterised by the doping material} |
| G02B 5/28)} 31/02167 {for solar cells} | 31/02966 {including ternary compounds, e.g. HgCdTe} |
| 31/02168 {the coatings being antireflective or | 31/0304 including, apart from doping materials or |
| having enhancing optical properties for the | other impurities, only $A_{III}B_V$ compounds |
| solar cells} | 31/03042 {characterised by the doping material} |
| 31/0224 Electrodes | 31/03044 {comprising a nitride compounds, e.g. |
| 31/022408 { for devices characterised by at least one | GaN} |
| potential jump barrier or surface barrier} | 31/03046 {including ternary or quaternary |
| 31/022416 {comprising ring electrodes} | compounds, e.g. GaAlAs, InGaAs, |
| 31/022425 {for solar cells} | InGaAsP} |
| 31/022433 {Particular geometry of the grid contacts} | 31/03048 {comprising a nitride compounds, e.g. InGaN} |
| 31/022441 {Electrode arrangements specially adapted for back-contact solar cells} | 31/0312 including, apart from doping materials or |
| 31/02245 {for metallisation wrap-through [MWT] | other impurities, only $A_{IV}B_{IV}$ compounds, |
| type solar cells} | e.g. SiC |
| 31/022458 {for emitter wrap-through [EWT] type | 31/03125 {characterised by the doping material} |
| solar cells, e.g. interdigitated emitter- | 31/032 including, apart from doping |
| base back-contacts} | materials or other impurities, only |
| 31/022466 • • • { made of transparent conductive layers, e.g. | compounds not provided for in groups |
| TCO, ITO layers} | H01L 31/0272 - H01L 31/0312 |
| 31/022475 {composed of indium tin oxide [ITO]} | 31/0321 {characterised by the doping material (H01L 31/0323, H01L 31/0325 take |
| 31/022483 {composed of zinc oxide [ZnO]} | precedence)} |
| 31/022491 {composed of a thin transparent metal layer, | 31/0322 {comprising only A _I B _{III} C _{VI} chalcopyrite |
| e.g. gold} 31/0232 . Optical elements or arrangements associated with | compounds, e.g. Cu In Se ₂ , Cu Ga Se ₂ , Cu |
| the device (H01L 31/0236 takes precedence; for | In Ga Se ₂ } |
| photovoltaic cells <u>H01L 31/054</u> ; for photovoltaic | 31/0323 {characterised by the doping material} |
| modules <u>H02S 40/20</u>) | 31/0324 {comprising only $A_{IV}B_{VI}$ or $A_{II}B_{IV}C_{VI}$ |
| 31/02322 {comprising luminescent members, e.g. | chalcogenide compounds, e.g. Pb Sn Te} |
| fluorescent sheets upon the device} | 31/0325 {characterised by the doping material} |
| 31/02325 {the optical elements not being integrated nor | 31/0326 {comprising A _I B _{II} C _{IV} D _{VI} kesterite compounds, e.g. Cu ₂ ZnSnSe ₄ , Cu ₂ ZnSnS4} |
| being directly associated with the device} | 31/0327 {characterised by the doping material} |
| | 51/0527 • • • • Characterised by the doping material |

| 31/0328 including, apart from doping materials or | 31/03921 {including only elements of Group IV of the |
|--|---|
| other impurities, semiconductor materials provided for in two or more of groups H01L 31/0272 - H01L 31/032 | Periodic Table } 31/03923 {including A _I B _{III} C _{VI} compound materials, e.g. CIS, CIGS} |
| 31/0336 in different semiconductor regions, e.g. Cu ₂ X/CdX hetero- junctions, X being an | 31/03925 {including A _{II} B _{VI} compound materials, e.g. CdTe, CdS} |
| element of Group VI of the Periodic Table | 31/03926 {comprising a flexible substrate} |
| 31/03365 {comprising only Cu ₂ X / CdX heterojunctions, X being an element of | 31/03928 {including A _I B _{III} C _{VI} compound, e.g. CIS, CIGS deposited on metal or polymer foils} |
| Group VI of the Periodic Table} | 31/04 • adapted as photovoltaic [PV] conversion devices |
| 2031/0344 {Organic materials} 31/0352 characterised by their shape or by the shapes, | (testing thereof during manufacture {H01L 22/00}; |
| relative sizes or disposition of the semiconductor | testing thereof after manufacture <u>H02S 50/10</u>) |
| regions | 31/041 • Provisions for preventing damage caused by corpuscular radiation, e.g. for space applications |
| 31/035209 {comprising a quantum structures} | 31/042 • PV modules or arrays of single PV cells |
| 31/035218 • • • {the quantum structure being quantum dots} | (supporting structures for PV modules |
| 31/035227 • • • { the quantum structure being quantum | H02S 20/00) |
| wires, or nanorods (carbon nanotubes | 31/043 Mechanically stacked PV cells |
| H10K 85/211)} | 31/044 including bypass diodes (bypass diodes in the |
| 31/035236 {Superlattices; Multiple quantum well | junction box <u>H02S 40/34</u>) |
| structures} | 31/0443 comprising bypass diodes integrated or |
| 31/035245 • • • {characterised by amorphous semiconductor layers} | directly associated with the devices, e.g. |
| 31/035254 • • • • {including, apart from doping materials or | bypass diodes integrated or formed in or on the same substrate as the photovoltaic cells |
| other impurities, only elements of Group | 31/0445 including thin film solar cells, e.g. single thin |
| IV of the Periodic Table, e.g. Si-SiGe | film a-Si, CIS or CdTe solar cells |
| superlattices} | 31/046 PV modules composed of a plurality of |
| 31/035263 {Doping superlattices, e.g. nipi superlattices} | thin film solar cells deposited on the same |
| 31/035272 {characterised by at least one potential jump | substrate |
| barrier or surface barrier} | 31/0463 characterised by special patterning |
| 31/035281 • • • {Shape of the body} | methods to connect the PV cells in a |
| 31/03529 {Shape of the potential jump barrier or | module, e.g. laser cutting of the conductive |
| surface barrier} | or active layers |
| 31/036 • characterised by their crystalline structure or | 31/0465 comprising particular structures for the electrical interconnection of adjacent PV |
| particular orientation of the crystalline planes 31/0368 including polycrystalline semiconductors | cells in the module (H01L 31/0463 takes |
| (H01L 31/0392 takes precedence) | precedence) |
| 31/03682 {including only elements of Group IV of the | 31/0468 comprising specific means for obtaining |
| Periodic Table} | partial light transmission through the |
| 31/03685 {including microcrystalline silicon, uc-Si} | module, e.g. partially transparent thin film |
| 31/03687 {including microcrystalline $A_{\text{IV}}B_{\text{IV}}$ alloys, | solar modules for windows |
| e.g. uc-SiGe, uc-SiC} | 31/047 PV cell arrays including PV cells having multiple vertical junctions or multiple V- |
| 31/0376 including amorphous semiconductors | groove junctions formed in a semiconductor |
| (H01L 31/0392 takes precedence) | substrate |
| 31/03762 • • • { including only elements of Group IV of the Periodic Table} | 31/0475 PV cell arrays made by cells in a planar, |
| 31/03765 {including $A_{IV}B_{IV}$ compounds or alloys, | e.g. repetitive, configuration on a single |
| e.g. SiGe, SiC} | semiconductor substrate; PV cell microarrays |
| 31/03767 {presenting light-induced characteristic | (PV modules composed of a plurality of thin |
| variations, e.g. Staebler-Wronski effect} | film solar cells deposited on the same substrate H01L 31/046) |
| 31/0384 including other non-monocrystalline materials, | 31/048 Encapsulation of modules |
| e.g. semiconductor particles embedded in | 31/0481 {characterised by the composition of the |
| an insulating material (<u>H01L 31/0392</u> takes | encapsulation material} |
| precedence) | 31/0488 {Double glass encapsulation, e.g. |
| 31/03845 {comprising semiconductor nanoparticles embedded in a semiconductor matrix (in | photovoltaic cells arranged between front and rear glass sheets} |
| insulating matrix <u>H01L 31/0384</u>)} | 31/049 Protective back sheets |
| 31/0392 including thin films deposited on metallic | 2.2.2.2 |
| or insulating substrates {; characterised by | |
| specific substrate materials or substrate features or by the presence of intermediate layers, | |
| e.g. barrier layers, on the substrate (textured | |
| substrates H01L 31/02366)} | |
| | |

| 31/05 | PV cells inside the PV module, e.g. series connection of PV cells (electrodes | 31/0682 {back-junction, i.e. rearside emitter, solar cells, e.g. interdigitated base-emitter regions back-junction cells} |
|-------------------|---|---|
| | <u>H01L 31/0224</u> ; electrical interconnection of thin film solar cells formed on a common | 31/0684 {double emitter cells, e.g. bifacial solar cells} |
| | substrate <u>H01L 31/046</u> ; particular structures for electrical interconnecting of adjacent thin film solar cells in the module <u>H01L 31/0465</u> ; | 31/0687 Multiple junction or tandem solar cells 31/06875 {inverted grown metamorphic [IMM] multiple junction solar cells, e.g. III-V |
| | electrical interconnection means specially adapted for electrically connecting two or more PV modules H02S 40/36) | compounds inverted metamorphic multi- junction cells} |
| 31/0504 | • • • {specially adapted for series or parallel connection of solar cells in a module} | 31/0693 the devices including, apart from doping material or other impurities, only A _{III} B _V compounds, e.g. GaAs or InP solar cells |
| 31/0508 | • • • • { the interconnection means having a particular shape } | 31/07 the potential barriers being only of the Schottky type |
| 31/0512 | • • • • { made of a particular material or composition of materials } | 31/072 the potential barriers being only of the PN heterojunction type |
| 31/0516 | • • • • { specially adapted for interconnection of back-contact solar cells } | 31/0725 Multiple junction or tandem solar cells 31/073 comprising only A _{II} B _{VI} compound |
| 31/052 | Cooling means directly associated or integrated with the PV cell, e.g. integrated Peltier elements | semiconductors, e.g. CdS/CdTe solar cells 31/0735 comprising only A _{III} B _V compound |
| | for active cooling or heat sinks directly associated with the PV cells (cooling means in combination | semiconductors, e.g. GaAs/AlGaAs or InP/GaInAs solar cells |
| 31/0521 | with the PV module H02S 40/42) • • {using a gaseous or a liquid coolant, e.g. air flow ventilation, water circulation} | 31/074 comprising a heterojunction with an element of Group IV of the Periodic Table, e.g. ITO/Si, GaAs/Si or CdTe/Si solar cells |
| 31/0525 | associated with the PV cell, e.g. integrated | 31/0745 comprising a $A_{IV}B_{IV}$ heterojunction, e.g. Si/Ge, SiGe/Si or Si/SiC solar cells |
| 31/053 | Seebeck elements • Energy storage means directly associated or integrated with the PV cell, e.g. a capacitor | 31/0747 comprising a heterojunction of crystalline and amorphous materials, e.g. heterojunction with intrinsic thin layer |
| | integrated with a PV cell (energy storage means associated with the PV module <u>H02S 40/38</u>) | 31/0749 including a A _I B _{III} C _{VI} compound, e.g. CdS/ CulnSe ₂ [CIS] heterojunction solar cells |
| 31/054 | Optical elements directly associated or integrated with the PV cell, e.g. light-reflecting means or light-concentrating means | 31/075 the potential barriers being only of the PIN type, e.g. amorphous silicon PIN solar cells |
| 31/0543 | {comprising light concentrating means of the refractive type, e.g. lenses} | 31/076 Multiple junction or tandem solar cells 31/077 the devices comprising monocrystalline or |
| 31/0547 | {comprising light concentrating means of the reflecting type, e.g. parabolic mirrors, | polycrystalline materials 31/078 including different types of potential barriers |
| 21/05/0 | concentrators using total internal reflection} | provided for in two or more of groups H01L 31/062 - H01L 31/075 |
| 31/0549 31/055 | dichroic mirrors} | 31/08 • in which radiation controls flow of current through the device, e.g. photoresistors |
| 31/033 | different wavelength by the optical element directly associated or integrated with the | 31/085 {the device being sensitive to very short wavelength, e.g. X-ray, Gamma-rays} |
| | PV cell, e.g. by using luminescent material, fluorescent concentrators or up-conversion | 31/09 . Devices sensitive to infrared, visible or ultraviolet radiation (<u>H01L 31/101</u> takes precedence) |
| | arrangements | 31/095 {comprising amorphous semiconductors} |
| 31/056 | the light-reflecting means being of the back surface reflector [BSR] type | 31/10 characterised by potential barriers, e.g. phototransistors |
| 31/06 | characterised by potential barriers | 31/101 Devices sensitive to infrared, visible or |
| 31/061 | the potential barriers being of the point-contact | ultraviolet radiation |
| 31/062 | type (<u>H01L 31/07</u> takes precedence) the potential barriers being only of the metal- | 31/1013 { devices sensitive to two or more wavelengths, e.g. multi-spectrum radiation |
| 31/065 | insulator-semiconductor type the potential barriers being only of the graded | detection devices} 31/1016 {comprising transparent or semitransparent devices} |
| | gap type | devices} 31/102 characterised by only one potential barrier |
| 31/068 | the potential barriers being only of the | 31/102 |
| | PN homojunction type, e.g. bulk silicon PN homojunction solar cells or thin film | contact type} |
| | polycrystalline silicon PN homojunction solar cells | 31/103 the potential barrier being of the PN homojunction type |
| | | |

| 31/1032 | {the devices comprising active layers | 31/12 | · structurally associated with, e.g. formed in or on |
|---------|--|---------|---|
| | formed only by A _{II} B _{VI} compounds, e.g. | | a common substrate with, one or more electric |
| | HgCdTe IR photodiodes} | | light sources, e.g. electroluminescent light |
| 31/1035 | • • • • • { the devices comprising active layers | | sources, and electrically or optically coupled |
| | formed only by $A_{III}B_V$ compounds} | | thereto (semiconductor devices with at least |
| 31/1037 | • • • • • {the devices comprising active layers | | one potential barrier or surface barrier adapted |
| | formed only by $A_{IV}B_{VI}$ compounds} | | for light emission H01L 33/00; amplifiers |
| 31/105 | • • • • the potential barrier being of the PIN type | | using electroluminescent element and photocell H03F 17/00; electroluminescent light sources per se |
| 31/1055 | • • • • • { the devices comprising amorphous | | H05B 33/00) |
| | materials of Group IV of the Periodic | 31/125 | • • {Composite devices with photosensitive elements |
| | Table} | 31/123 | and electroluminescent elements within one |
| 31/107 | the potential barrier working in avalanche | | single body} |
| 24/40== | mode, e.g. avalanche photodiodes | 31/14 | the light source or sources being controlled by |
| 31/1075 | • • • • • (in which the active layers, e.g. | 01/11 | the semiconductor device sensitive to radiation, |
| | absorption or multiplication layers, form an heterostructure, e.g. SAM structure} | | e.g. image converters, image amplifiers or image |
| 21/100 | | | storage devices |
| 31/108 | • • • • the potential barrier being of the Schottky | 31/141 | • • • {the semiconductor device sensitive to |
| 31/1085 | type {the devices being of the Metal- | | radiation being without a potential-jump barrier |
| 31/1003 | Semiconductor-Metal [MSM] Schottky | | or surface barrier} |
| | barrier type} | 31/143 | • • • { the light source being a semiconductor |
| 31/109 | the potential barrier being of the PN | | device with at least one potential-jump |
| 31/10/ | heterojunction type | | barrier or surface barrier, e.g. light emitting |
| 31/11 | • • • characterised by two potential barriers, e.g. | | diode} |
| 31/11 | bipolar phototransistors | 31/145 | • • • {the semiconductor device sensitive to |
| 31/1105 | {the device being a bipolar | | radiation being characterised by at least one |
| 01/1100 | phototransistor} | 24/44= | potential-jump barrier or surface barrier} |
| 31/111 | characterised by at least three potential | 31/147 | the light sources and the devices sensitive |
| | barriers, e.g. photothyristors | | to radiation all being semiconductor devices |
| 31/1113 | {the device being a photothyristor} | 21/152 | characterised by potential barriers |
| 31/1116 | • • • • { of the static induction type } | 31/153 | formed in, or on, a common substrate |
| 31/112 | characterised by field-effect operation, e.g. | 31/16 | . • the semiconductor device sensitive to radiation |
| | junction field-effect phototransistor | 21/161 | being controlled by the light source or sources • • {Semiconductor device sensitive to radiation} |
| 31/1121 | {Devices with Schottky gate} | 31/161 | without a potential-jump or surface barrier, e.g. |
| 31/1122 | {the device being a CCD device} | | photoresistors} |
| 31/1123 | • • • • • {the device being a photo MESFET} | 31/162 | • • • {the light source being a semiconductor |
| 31/1124 | {Devices with PN homojunction gate} | 31/102 | device with at least one potential-jump |
| 31/1125 | {the device being a CCD device} | | barrier or surface barrier, e.g. a light emitting |
| 31/1126 | {the device being a field-effect | | diode} |
| | phototransistor} | 31/164 | • • • {Optical potentiometers} |
| 31/1127 | {Devices with PN heterojunction gate} | 31/165 | • • • {the semiconductor sensitive to radiation being |
| 31/1128 | • • • • • {the device being a CCD device} | | characterised by at least one potential-jump or |
| 31/1129 | • • • • • { the device being a field-effect | | surface barrier} |
| | phototransistor} | 31/167 | the light sources and the devices sensitive |
| 31/113 | being of the conductor-insulator- | | to radiation all being semiconductor devices |
| | semiconductor type, e.g. metal-insulator- | | characterised by potential barriers |
| | semiconductor field-effect transistor | 31/173 | • • • formed in, or on, a common substrate |
| 31/1133 | • • • • • { the device being a conductor-insulator- | 31/18 | Processes or apparatus specially adapted for the |
| | semiconductor diode or a CCD device} | | manufacture or treatment of these devices or of |
| 31/1136 | • • • • • { the device being a metal-insulator- | | parts thereof |
| | semiconductor field-effect transistor} | 31/1804 | • • {comprising only elements of Group IV of the |
| 31/115 | Devices sensitive to very short wavelength, e.g. | | Periodic Table} |
| | X-rays, gamma-rays or corpuscular radiation | 31/1808 | • • {including only Ge} |
| 31/117 | • • • of the bulk effect radiation detector type, | 31/1812 | • • • {including only $A_{IV}B_{IV}$ alloys, e.g. $SiGe$ } |
| | e.g. Ge-Li compensated PIN gamma-ray | 31/1816 | • • • • {Special manufacturing methods for |
| 01///== | detectors | | microcrystalline layers, e.g. uc-SiGe, uc- |
| 31/1175 | {Li compensated PIN gamma-ray | | SiC} |
| 21/11 | detectors} | 31/182 | {Special manufacturing methods for |
| 31/118 | of the surface barrier or shallow PN junction | | polycrystalline Si, e.g. Si ribbon, poly Si |
| | detector type, e.g. surface barrier alpha- | 21/1024 | ingots, thin films of polycrystalline Si} |
| 21/1105 | particle detectors (of the shallow PN junction detector type) | 31/1824 | {Special manufacturing methods for |
| 31/1185 | {of the shallow PN junction detector type} | 21/1920 | $ \begin{aligned} & \text{microcrystalline Si, uc-Si} \\ & \bullet & \text{ {the active layers comprising only } A_{II}B_{VI} \end{aligned} $ |
| 31/119 | characterised by field-effect operation, e.g. MIS type detectors | 31/1828 | compounds, e.g. CdS, ZnS, CdTe} |
| | with type detectors | | compounds, e.g. Cub, Zhb, CuTe |

| 31/1832 | • • • {comprising ternary compounds, e.g. Hg Cd | 33/0025 | {comprising only $A_{III}B_V$ compounds} |
|-------------------|---|---------|---|
| | Te} | 33/0029 | {comprising only $A_{II}B_{VI}$ compounds} |
| 31/1836 | • • • {comprising a growth substrate not being an | 33/0033 | • • {having Schottky barriers} |
| | $A_{II}B_{VI}$ compound} | 33/0037 | • • {having a MIS barrier layer} |
| 31/184 | {the active layers comprising only $A_{\text{III}}B_{\text{V}}$ | 33/0041 | {characterised by field-effect operation} |
| | compounds, e.g. GaAs, InP} | 33/0045 | • • {the devices being superluminescent diodes} |
| 31/1844 | • • • {comprising ternary or quaternary compounds, | 33/005 | • {Processes} |
| | e.g. Ga Al As, In Ga As P} | 33/0054 | • • {for devices with an active region comprising |
| 31/1848 | • • • {comprising nitride compounds, e.g. InGaN, | | only group IV elements} |
| | InGaAlN} | 33/0058 | • • • {comprising amorphous semiconductors} |
| 31/1852 | • • • {comprising a growth substrate not being an | 33/0062 | • • { for devices with an active region comprising |
| | $A_{III}B_V$ compound} | 22,0002 | only III-V compounds} |
| 31/1856 | • • {comprising nitride compounds, e.g. GaN} | 33/0066 | • • • {with a substrate not being a III-V compound} |
| 31/186 | • • {Particular post-treatment for the devices, e.g. | 33/007 | • • • {comprising nitride compounds} |
| | annealing, impurity gettering, short-circuit | 33/0075 | • • • {comprising nitride compounds} |
| | elimination, recrystallisation} | 33/0083 | • • {for devices with an active region comprising |
| 31/1864 | {Annealing} | 33/0003 | only II-VI compounds} |
| 31/1868 | • • • {Passivation} | 33/0087 | • • • {with a substrate not being a II-VI compound} |
| 31/1872 | {Recrystallisation} | 33/0091 | |
| 31/1876 | • • {Particular processes or apparatus for batch | 33/0091 | • {for devices with an active region comprising only IV-VI compounds} |
| | treatment of the devices} | 22/0002 | |
| 31/188 | {Apparatus specially adapted for automatic | 33/0093 | • • {Wafer bonding; Removal of the growth |
| | interconnection of solar cells in a module} | 22/0005 | substrate} |
| 31/1884 | • • {Manufacture of transparent electrodes, e.g. TCO, | 33/0095 | {Post-treatment of devices, e.g. annealing, recrystallisation or short-circuit elimination} |
| | ITO} | 22/02 | • |
| 31/1888 | • • • {methods for etching transparent electrodes} | 33/02 | • characterised by the semiconductor bodies |
| 31/1892 | • • {methods involving the use of temporary, | 33/025 | • • {Physical imperfections, e.g. particular |
| 01,10,2 | removable substrates} | | concentration or distribution of impurities} |
| 31/1896 | • • • {for thin-film semiconductors} | 33/04 | • • with a quantum effect structure or superlattice, |
| 31/20 | such devices or parts thereof comprising | 22/07 | e.g. tunnel junction |
| 31/20 | amorphous semiconductor materials | 33/06 | within the light emitting region, e.g. quantum |
| 31/202 | {including only elements of Group IV of the | 22/00 | confinement structure or tunnel barrier |
| 01,202 | Periodic Table} | 33/08 | • with a plurality of light emitting regions, e.g. |
| 31/204 | • • • { including $A_{IV}B_{IV}$ alloys, e.g. SiGe, SiC} | | laterally discontinuous light emitting layer |
| 31/204 | Particular processes or apparatus for | | or photoluminescent region integrated within |
| 31/200 | continuous treatment of the devices, e.g. roll-to | | the semiconductor body (<u>H01L 27/15</u> takes |
| | roll processes, multi-chamber deposition} | 22/10 | precedence) |
| 31/208 | • • • {Particular post-treatment of the devices, e.g. | 33/10 | • with a light reflecting structure, e.g. |
| 31,200 | annealing, short-circuit elimination} | 22/105 | semiconductor Bragg reflector |
| | | 33/105 | • • { with a resonant cavity structure } |
| 33/00 | Semiconductor devices having potential barriers | 33/12 | • with a stress relaxation structure, e.g. buffer layer |
| | specially adapted for light emission; Processes or | 33/14 | • • with a carrier transport control structure, e.g. |
| | apparatus specially adapted for the manufacture | | highly-doped semiconductor layer or current- |
| | or treatment thereof or of parts thereof; Details | 22/145 | blocking structure |
| | thereof (H10K 50/00 takes precedence; devices | 33/145 | • • • {with a current-blocking structure} |
| | consisting of a plurality of semiconductor components | 33/16 | • with a particular crystal structure or orientation, |
| | formed in or on a common substrate and including | | e.g. polycrystalline, amorphous or porous |
| | semiconductor components having potential barriers, | 33/18 | within the light emitting region |
| | specially adapted for light emission <u>H01L 27/15</u> ; | | <u>NOTE</u> |
| | semiconductor lasers <u>H01S 5/00</u>) | | |
| | <u>NOTES</u> | | When classifying in this group, classification is also made in group |
| | 1. This group <u>covers</u> light-emitting diodes [LED] or | | H01L 33/26 or one of its subgroups in order |
| | superluminescent diodes [SLD], which emit visible | | to identify the chemical composition of the |
| | light, infrared [IR] light or ultraviolet [UV] light. | | light emitting region |
| | 2. In this group, the first place priority rule is applied, | | ng.w vwg region |
| | i.e. at each hierarchical level, in the absence of an | 33/20 | with a particular shape, e.g. curved or truncated |
| | indication to the contrary, classification is made in | | substrate |
| | the first appropriate place. | 33/22 | Roughened surfaces, e.g. at the interface |
| | | | between epitaxial layers |
| 33/0004 | • {Devices characterised by their operation} | 33/24 | • • of the light emitting region, e.g. non-planar |
| 33/0008 | • • {having p-n or hi-lo junctions} | | junction |
| 33/0012 | • • {p-i-n devices} | 33/26 | Materials of the light emitting region |
| | · · · (p i ii de vices) | | • • Materials of the light elimiting region |
| 33/0016 | • • {having at least two p-n junctions} | 33/28 | containing only elements of Group II and |
| 33/0016 33/002 | · · | | |

| 33/285 | • • • {characterised by the doping materials} | 33/645 | • • • {the elements being electrically controlled, e.g. |
|--------|---|------------|---|
| 33/30 | containing only elements of Group III and | | Peltier elements} |
| | Group V of the Periodic Table | 33/647 | • • • {the elements conducting electric current to or |
| 33/305 | • • • {characterised by the doping materials} | | from the semiconductor body} |
| 33/32 | containing nitrogen | 33/648 | • • • {the elements comprising fluids, e.g. heat- |
| 33/325 | • • • • {characterised by the doping materials} | | pipes} |
| 33/34 | containing only elements of Group IV of the | 2221/00 | Draggggg or apparatus adapted for the |
| | Periodic Table | 2221/00 | Processes or apparatus adapted for the manufacture or treatment of semiconductor or |
| 33/343 | • • • {characterised by the doping materials} | | solid state devices or of parts thereof covered by |
| 33/346 | • • • {containing porous silicon} | | H01L 21/00 |
| 33/36 | characterised by the electrodes | 2221/10 | Applying interconnections to be used for carrying |
| 33/38 | • • with a particular shape | | current between separate components within a |
| 33/382 | • • • {the electrode extending partially in or entirely | | device |
| | through the semiconductor body} | 2221/1005 | Formation and after-treatment of dielectrics |
| 33/385 | • • • {the electrode extending at least partially onto a | 2221/101 | Forming openings in dielectrics |
| | side surface of the semiconductor body} | | for dual damascene structures |
| 33/387 | • • • {with a plurality of electrode regions in direct | | Pre-forming the dual damascene structure |
| | contact with the semiconductor body and being | | in a resist layer |
| | electrically interconnected by another electrode | 2221/1026 | the via being formed by burying a |
| 22/40 | layer} | | sacrificial pillar in the dielectric and |
| 33/40 | . Materials therefor | | removing the pillar |
| 33/405 | {Reflective materials} | 2221/1031 | Dual damascene by forming vias in the |
| 33/42 | Transparent materials | | via-level dielectric prior to deposition of |
| 33/44 | • characterised by the coatings, e.g. passivation layer | | the trench-level dielectric |
| 22/46 | or anti-reflective coating | 2221/1036 | Dual damascene with different via-level |
| 33/46 | Reflective coating, e.g. dielectric Bragg reflector | | and trench-level dielectrics |
| 33/465 | • • { with a resonant cavity structure } | | the dielectric comprising air gaps |
| 33/48 | characterised by the semiconductor body packages | 2221/1047 | the air gaps being formed by pores in the |
| | <u>NOTE</u> | | dielectric |
| | This group covers elements in intimate contact | | Formation of thin functional dielectric layers |
| | with the semiconductor body or integrated with | | in via holes or trenches |
| | the package | 2221/1063 | Sacrificial or temporary thin dielectric |
| 22/102 | (6) | 2221/10/0 | films in openings in a dielectric |
| 33/483 | • • {Containers} | | Formation and after-treatment of conductors |
| 33/486 | • • {adapted for surface mounting} | | Barrier, adhesion or liner layers |
| 33/50 | Wavelength conversion elements | 2221/10/8 | Multiple stacked thin films not being formed |
| 33/501 | • • {characterised by the materials, e.g. binder} | 2221/1004 | in openings in dielectrics |
| 33/502 | • • • {Wavelength conversion materials} | 2221/1084 | • • Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. |
| 33/504 | {Elements with two or more wavelength | | seed layers |
| 22/505 | conversion materials} | 2221/1089 | Stacks of seed layers |
| 33/505 | • • {characterised by the shape, e.g. plate or foil} | | Conducting structures comprising nanotubes or |
| 33/507 | • • • {the elements being in intimate contact | 2221/1074 | nanowires |
| | with parts other than the semiconductor body or integrated with parts other than the | 2221/67 | Apparatus for handling semiconductor or electric |
| | semiconductor body} | 2221/07 | solid state devices during manufacture or treatment |
| 33/508 | • • • {having a non-uniform spatial arrangement | | thereof; Apparatus for handling wafers during |
| 33/300 | or non-uniform concentration, e.g. patterned | | manufacture or treatment of semiconductor |
| | wavelength conversion layer, wavelength | | or electric solid state devices or components; |
| | conversion layer with a concentration gradient | | Apparatus not specifically provided for elsewhere |
| | of the wavelength conversion material} | 2221/683 | for supporting or gripping |
| 33/52 | Encapsulations | | using temporarily an auxiliary support |
| 33/54 | having a particular shape | 2221/68309 | Auxiliary support including alignment aids |
| 33/56 | Materials, e.g. epoxy or silicone resin | 2221/68313 | Auxiliary support including a cavity for |
| 33/58 | Optical field-shaping elements | | storing a finished device, e.g. IC package, |
| 33/60 | Reflective elements | | or a partly finished device, e.g. die, during |
| 33/62 | Arrangements for conducting electric current to | 2221/62216 | manufacturing or mounting |
| | or from the semiconductor body, e.g. lead-frames, | 2221/68318 | |
| | wire-bonds or solder balls | | facilitating the separation of a device or |
| 33/64 | • Heat extraction or cooling elements | 2221/69222 | wafer from the auxiliary support |
| 33/641 | • • {characterized by the materials} | 2221/08322 | facilitating the selective separation of |
| 33/642 | • • {characterized by the shape} | | some of a plurality of devices from the |
| 33/644 | • • • {in intimate contact or integrated with parts of | | auxiliary support |
| | the device other than the semiconductor body} | | 7 |
| | | | |

| 2221/6836 . involving stretching of the auxiliary apport post dicing a part of the auxiliary apport post dicing a support post dicing a part of the auxiliary apport post dicing apport and auxiliary apport during the manufacture of self-supporting substrates are used as a support during the manufacture of self-supporting substrates are used as a support during the manufacture of self-supporting substrates are used as a support during the manufacture of self-supporting substrates are used as a support during manufacture of the theorem of interconnect technic body to be used as a support diced chips prior to mounting apport the substrate apport the dead of both up for more apport to the technic during manufacture of interconnect technic body body the substrate apport to device or water when forming bonding and Holl. 24013. when forming in the finished device or water when forming bonding and Holl. 24013. when forming in the manufacture of advice or water or water of the auxiliary support tremaining in the finished device or water when forming in the finished | 2221/69227 | | | |
|--|--|--|--|--|
| substrate 2221/6836 involving strutching of the auxiliary support post dicing 2221/6836 sused to support during the manufacture of self supporting substrates 2221/6837 sused as a support during the manufacture of self supporting substrates 2221/6838 instrained sused to support during the manufacture of self supporting substrates 2221/6839 sused as a support during the manufacture of interconnect decist or build up manufacturing of active devices 2221/6839 sused as a support dired chips prior to mounting 2221/6839 sused as a support dired chips prior to mounting 2221/6839 sused as a support dired chips prior to mounting 2221/6836 sused in a transfer process involving transfer 2221/6836 sused in a transfer process involving at handle substrate without use of an intermediate handle substrate of the sused in support device or wafer when forming before a device or wafer when forming plant advice or wafer when forming plant of the calculary support remaining robring bump connectors Hottle 2421/s when forming plant connectors Hottle 2421/s when forming bump connectors Hottle 2421/s when forming bump connectors Hottle 2421/s when forming plant connectors Hottle 2421/s when forming bump | | | 2223/6622 | |
| 221/6836 . involving streeching of the auxiliary guested size of a device or wafer ware guide by the second of the auxiliary support during the manufacture of self-supporting substrates self-supporting substrates are support during the manufacture of self-supporting substrates are support during the manufacture of self-supporting substrates are support during build up manufacturing of active devices parts to manufacturing of active devices and support during another them to manufacturing of active devices and support during another them to manufacturing of active devices and support during another them to manufacturing of active devices and support during another them to manufacturing of active devices and support during another them during substrate and substrate anotations and substrate and substrate and substrate and substrate | 2221/68331 | | | * |
| ### Support post dicing was as used to a store or wafer was regular to the part of the par | | | 2223/6627 | |
| 2221/6838 | 2221/68336 | | | - |
| wafer self-entropy of the manufacture of self-entropy of the collapse of self-entropy of self-entropy of the collapse of self-entropy of self- | | | 2223/6633 | _ |
| 2221/68385 . u.ucd as a support during the manufacture of self-supporting substrates self-support diversity for devices well support diversity for a device of which plays another self-support diversity from morting in the finished bandle substrate without use of an intermediate handle substrate process involving at least two transfer speces, it. including an intermediate handle substrate without use of an intermediate handle substrate process involving at least two transfer spece, it. including an intermediate handle substrate process involving at least two transfer spece, it. including an intermediate handle substrate of forming bound posts BDL 24:33 when forming bump connectors HDL 24:11 when forming bump connectors HDL 24:21 when forming bump connectors HDL 24:22 when for separating the auxiliary support from a device or wafer for separating the auxiliary support from a device or wafer for separating the auxiliary support from a device or wafer was the search of separating the auxiliary support from a device or wafer was the search of separating the search of search with the search of search with the search of search with the search of search was the device of search with the search of search with the s | 2221/6834 | - | 2222/5522 | * * |
| self supporting substrates used as a support during build up munificituring of active devices 2221/68359 used as a support during manufacture of interconnect decision broid up layers 2221/68363 used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an intermediate handle substrate 2221/68368 used in a transfer process involving at least two transfer steps, is, including an intermediate handle substrate 2221/68372 used to support a device or wafer when forming placetrical connections thereto (when forming bump connecturs Holl, 24/61; when forming bump connecturs Holl, 24/61; when forming in pure connectors Holl, 24/61; when for | | | | |
| 2221/68359 | 2221/68345 | | 2223/6644 | |
| manufacturing of active devices 1 used to support died chips prior to mounting 1 used as a support died chips prior to mounting 1 used as a support died chips prior to mounting 1 used as a support died chips prior to mounting 1 used as a support died chips prior to mounting 1 used as a support died chips prior to mounting 1 used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate 1 used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate 1 used to support a device or wafer when forming honding pads H011_2401; when forming layer connectors H011_2427) 2 used to support a device or wafer when forming layer connectors H011_2427; when forming layer connectors H | 2221/6925 | ** * | 2222/665 | |
| 2221/68359 | 2221/0833 | | | |
| 2221/68369 | 2221/68354 | • | 2223/0033 | |
| interconnect decals or build up layers used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an intermediate handle substrate 2221/68368 . used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate 2221/68372 . used to apport a device or wafer when forming bonding pash BIUL 24/21; when forming bonding pash BIUL 24/21; when forming layer connectors BIUL 24/27; when form | | | 2222/6661 | |
| 2221/68363 used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an intermediate handle substrate used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate used to support a device or wafer forming bonding pads HOII, 24(32) when forming bonding pads HOII, 24(32) when forming layer connectors HOII, 24(11); when forming layer connectors HOII, 24(12) and the forming in the finished device or vafer Details of chemical or physical process used for separating the auxiliary support from a device or wafer Separation by peeling using peeling wedge or knife or bar 2221/68399 using peeling wedge or knife or bar 2221/68399 using peeling wedge or knife or bar 2222/3/54442 comprising peling wedge or knife or bar 2222/3/5443 comprising glabanumeric information e.g. symbols using peeling wedge or knife or bar 2222/3/54442 comprising non digital, non alphanumeric information e.g. symbols using peeling wedge or knife or bar 2222/3/54443 comprising mon digital, non alphanumeric information e.g. symbols comprising pondigital information, e.g. bar codes, data matrix comprising pondigital information e.g. symbols using peeling wedge or knife or bar 2223/54444 for electrical read out comprising pondigital information e.g. symbols comprising pondigital information e.g. symbols using peeling wedge or knife or bar 2223/54448 Located on chip prior to dicing comprising or pondigital information e.g. symbols using peeling wedge comprising pondigital informat | 2221/06559 | | 2223/0001 | |
| directly from an origin substrate to a target substrate without use of an intermediate handle substrate and the substrate area to used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate area to used to support a device or wafer when forming bomid ponder boding pads HDIL 24/03; when forming bomid ponder boding and substrate with passive components only (integrated circuits for an antigory before the auxiliary member 1223/6683). 2223/6831 . Details relating passive components only (integrated circuit for for attenue, passive components only (integrated circuit for for attenue, passive components only (integrated circuit for for att | 2221/68363 | | 2223/6666 | |
| substrate without use of an intermediate handles substrate 221/68368 used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate 2221/68372 used to support a device or wafer when forming bonding pads HDIL 24/03 when forming bonding pads HDIL 24/03 when forming bonding pads HDIL 24/02 point forming layer connectors HDIL 24/11; when forming layer connectors HDIL 24/12 when forming layer connectors the auxiliary support from a device or wafer or separating the auxiliary support from a device or wafer and evice or wafer used to separating the auxiliary support from a device or wafer and the substrate and the substr | 2221/00303 | | | |
| handle substrate used to a framefor process involving at least two transfer steps, i.e. including an intermediate handle substrate 2221/68372 used to support a device or wafer when forming bump connectors HOIL 24/11; when forming hump connectors HOIL 24/12/12/12/12/12/12/12/12/12/12/12/12/12/ | | · · · · · · · · · · · · · · · · · · · | 2223/00/2 | |
| 2221/68378 used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate | | | | |
| intermediate handle substrate 2221/68372 | 2221/68368 | used in a transfer process involving at | | |
| 2221/68372 used to support a device or wafer when forming bedectrical connections thereto (when forming bump connectors HDL 24/11; when forming layer connectors HDL 24/27) 2221/68377 with parts of the auxiliary support remaining in the finished device in the finished device or wafer device or wafer device or wafer separating the auxiliary support from a device or wafer separating the auxiliary support from a device or wafer separating the semiconductor or other solid state devices covered by the group Holl 23/00 state devices device on the group Holl 23/00 state body state | | | | H01L 27/01) |
| forming electrical connections thereto (when forming bonding pands bolling, 2404); when forming bonding pands bolling, 2404 billing, 2223/6683 for monolithic microwave integrated circuit [MMIC] 2223/66837 . with parts of the auxiliary support remaining in the finished device in the finished device of resparating the auxiliary support from a device or wafer 2221/68381 . Details of chemical or physical process used for separating the auxiliary support from a device or wafer 2221/68395 using peeling wedge or knife or bar 2223/68395 using peeling wedge or knife or bar 2223/5444 state devices covered by the group H01L 23/00 state devices covered by the group H01L 23/00 (and methods related thereto as covered by the group H01L 23/00 (and methods re | | intermediate handle substrate | 2223/6677 | |
| forming bomp connectors H01L 24/02?) 2221/68377 with parts of the auxiliary support remaining in the finished device in the finished device or wafer 2221/68381 Details of chemical or physical process used for separating the auxiliary support from a device or wafer 2221/68393 Separation by peeling 2221/68395 using peeling wedge or knife or bar 2221/68395 using peeling wedge or knife or bar 2221/68395 using peeling wedge or knife or bar 2221/68396 using peeling wedge or knife or bar 2222/364406 Comprising alphanumeric information state devices covered by the group H01L 23/00 that a matrix information, e.g. bar codes, data matrix information, e.g. symbols information information | 2221/68372 | | | |
| Comprising burner connectors Holl. 24/17 2223/6683 | | | | |
| forming layer connectors Holl. 24/27) 2221/68377 with parts of the auxiliary support remaining in the finished device 2221/68381 Details of chemical or physical process used for separating the auxiliary support from a device or wafer 2221/6838 Separation by peeling 2221/6839 using peeling wedge or knife or bar 2221/68395 using peeling wedge or knife or bar 2221/68395 using peeling wedge or knife or bar 2223/5444 . Marks applied to semiconductor or other solid state devices covered by the group Holl. 23/00 tate devices covered by the group Holl. 23/00 attaining a digital information expression of the solid state devices covered by the group Holl. 23/00 (and the solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices covered by the group Holl. 23/00 (based on a solid state devices on other so | | | 2223/6683 | _ |
| 2221/68381 with parts of the auxiliary support remaining in the finished device in the finished device or wafer 2221/68382 Details of chemical or physical process used for separating the auxiliary support from a device or wafer 2221/68383 | | | | |
| in the finished device Details of chemical or physical process used for separating the auxiliary support from a device or wafer 2221/68386 | 2221/69277 | | 2223/6688 | |
| 2221/6838 Details of chemical or physical process used for separating the auxiliary support from a device or wafer | 2221/08377 | | 2222/5504 | - |
| for separating the auxiliary support from a device or wafer device or wafer are vafer or wafer separating to yeeling 2221/6839 Separation by peeling 2221/6839 using peeling wedge or knife or bar 2223/5440 using peeling wedge or knife or other solid state devices covered by the group Holl. 23/00 | 2221/68381 | | 2223/6694 | |
| device or wafer 2221/68396 Separation by peeling 2221/68395 using peeling wedge or knife or bar 2221/68395 using peeling wheel 2223/00 Details relating to semiconductor or other solid state devices covered by the group H011_23/00 2223/544 Marks applied to semiconductor devices or parts 2223/54406 comprising digital information e.g. bar codes, data matrix 2223/5441 comprising digital information, e.g. bar codes, data matrix 2223/5442 comprising non digital, non alphanumeric information, e.g. symbols information, e.g. symbols 2223/5444 Comprising non digital information 2223/5444 Cortain ing identification or tracking information 2223/5444 for electrical read out 2223/5444 Located in a dummy or reference die 2223/5445 Located in a dummy or reference die 2223/5446 Located in a dummy or reference die 2223/5447 for use after dicing 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, norches, lot number 2223/5449 Peripheral marks on wafers, e.g. orientation flats, norches, lot number 2223/5449 Impedance arrangements 2223/5449 Impedance arrangements 2223/5449 Located on package parts, e.g. orientation flats, norches, lot number 2223/5449 | 2221/06361 | | | frequency semiconductor device nousing |
| 2221/68396 Separation by peeling 2221/68395 using peeling wedge or knife or bar 2221/68395 using peeling wedge or knife or bar 2223/500 Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 2223/544 . Marks applied to semiconductor devices or parts 2223/54406 comprising alphanumeric information 2223/54413 . comprising digital information, e.g. bar codes, data matrix 2223/5442 . for alignment 2223/5442 . for alignment 2223/5443 . comprising non digital, non alphanumeric information e.g. symbols 2223/5443 . containing identification or tracking information 2223/54442 . for alignment 2223/5443 . containing identification or tracking information 2223/54443 for use prior to dicing 2223/54446 Wireless electrical read out 2223/5445 . Located in scribe lines 2223/5446 . Located in scribe lines 2223/5446 . Located in a dummy or reference die 2223/5446 . Located in a dummy or reference die 2223/5446 . Located on chip prior to dicing and remaining on high after dicing 2223/5448 . Located on hip prior to dicing and remaining on high after dicing 2223/5448 . Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/5449 . Impedance arrangements for semiconductor devices not otherwise provided for 2224/0218 . Multilayer auxiliary member 2223/661 Wire connections 2224/0218 . Material of the auxiliary member 2223/6611 Wire connections 2224/0219 . Material of the auxiliary member 2223/6611 Wire connections 2224/0219 . Material of the auxiliary member | | | 2224/00 | Indexing scheme for arrangements for connecting |
| 2221/6839 using peeling wedge or knife or bar 2221/68395 using peeling wheel 2223/000 Details relating to semiconductor or other solid state devices covered by the group Holl 23/00 to detail relating to semiconductor or other solid state devices covered by the group Holl 23/00 to detail relating to semiconductor devices or parts 2223/54406 comprising alphanumeric information 2223/54413 comprising digital information, e.g. bar codes, data matrix 2223/54422 comprising non digital, non alphanumeric information e.g. symbols 2223/54426 for alignment 2223/54433 . containing identification or tracking information 2223/54444 for electrical read out 2224/02125 | 2221/68386 | | | |
| 2223/64395 using peeling wheel 2224/01 | | | | bodies and methods related thereto as covered by |
| Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 2223/54440 . Marks applied to semiconductor devices or parts 2223/544013 . comprising alphanumeric information data matrix 2223/54421 . comprising digital information, e.g. bar codes, data matrix 2223/54422 . comprising non digital, non alphanumeric information, e.g. symbols 2223/54425 . for alignment 2223/54443 . containing identification or tracking information 2223/54444 Wireless electrical read out 2223/54445 . for use prior to dicing 2223/54446 . Located in scribe lines 2223/5446 . Located in dumny or reference die 2223/5447 . Located on chip prior to dicing and remaining on chip after dicing 2223/5448 . Located on package parts, e.g. encapsulation, leads, package substrate 2223/5449 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/5449 . Structural electrical arrangements for semiconductor 2223/661 . High-frequency electrical connections 2224/0218 . Means for bonding area fattache do, or being formed on, the surface to be connected, e.g. chip-toto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto | | • • • • • danie pecinie wedge of kinte of bar | | |
| state devices covered by the group H01L 23/00 2223/5444 | | | 2224/04 | H01L 24/00 |
| 2223/5444 | 2221/68395 | using peeling wheel | 2224/01 | H01L 24/00 • Means for bonding being attached to, or being |
| 2223/54406 comprising alphanumeric information 2223/54413 . comprising digital information, e.g. bar codes, data matrix 2223/5442 comprising non digital, non alphanumeric information, e.g. symbols 2223/54426 for alignment 2223/54433 containing identification or tracking information 2223/54444 for electrical read out 2223/54444 Wireless electrical read out 2223/54445 Wireless electrical read out 2223/54446 Wireless electrical read out 2223/54446 Located in scribe lines 2223/5446 Located in scribe lines 2223/5446 Located in a dummy or reference die 2223/54473 . for use after dicing 2223/5448 . Located in a dummy or reference die 2223/5448 . Located on chip prior to dicing and remaining on chip after dicing 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/5449 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/5449 . Impedance arrangements 2223/540 . Impedance arrangements 2223/560 High-frequency electrical connections 2224/0218 Shape of the auxiliary member 2223/6605 High-frequency electrical connections 2224/0218 . Shape of the auxiliary member 2224/0219 . Material of the auxiliary member 2224/0219 Material of the auxiliary member 2224/0219 Multilayer auxiliary member 2224/0219 Wire connections | 2221/68395 | Details relating to semiconductor or other solid | 2224/01 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip- |
| 2223/54413 . comprising digital information, e.g. bar codes, data matrix 2223/5442 . comprising non digital, non alphanumeric information, e.g. symbols 2223/54426 . for alignment 2223/54433 . containing identification or tracking information 2223/54444 for electrical read out 2223/54445 Wireless electrical read out 2223/54445 Wireless electrical read out 2223/54446 Located in scribe lines 2223/5446 Located in scribe lines 2223/54473 . for use after dicing 2223/5446 Located in a dummy or reference die 2223/54473 . for use after dicing 2223/5448 . Located on chip prior to dicing and remaining on chip after dicing 2223/5448 . Located on package parts, e.g. encapsulation, leads, package substrate 2223/5449 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/5449 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/660 . High-frequency electrical connections 2224/0218 . Material of the auxiliary member 2224/0217 . Alignment aids 2224/0218 . Structure of the auxiliary member 2224/0217 . Alignment aids 2224/0218 . Structure of the auxiliary member 2224/0218 . Structure of the auxiliary member 2224/0217 . Alignment aids 2224/0218 . Structure of the auxiliary member 2224/0219 . Multilayer auxiliary member 2224/0219 . Multilayer auxiliary member 2224/0219 . Multilayer auxiliary member 2224/0219 . Material of the auxiliary member | 2221/68395 2223/00 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 | 2224/01 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; |
| data matrix 2223/5442 comprising non digital, non alphanumeric information, e.g. symbols 2223/54426 for alignment 2223/54433 containing identification or tracking information 2223/54444 for electrical read out 2223/54446 Wireless electrical read out 2223/54446 Wireless electrical read out 2223/54446 Wireless electrical read out 2223/54453 . for use prior to dicing 2224/02126 Collar structures 2224/0213 Alignment aids 2223/5446 Located in scribe lines 2224/0213 Flow barrier 2223/5446 Located in a dummy or reference die 2223/54473 . for use after dicing 2224/0214 Structure of the auxiliary member 2223/54473 . for use after dicing 2224/0214 Structure of the auxiliary member 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2224/0215 Material of the auxiliary member 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/54493 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/660 High-frequency adaptations 2223/660 High-frequency electrical connections 2224/0215 Shape of the auxiliary member 2223/6605 High-frequency electrical connections 2224/0216 Collar structures 2224/0217 Alignment aids 2224/0217 Alignment aids 2224/0218 Structure of the auxiliary member 2224/0218 Structure of the auxiliary member 2224/0219 Multilayer auxiliary member 2224/0605 High-frequency electrical connections 2224/0219 Sange of the auxiliary member 2224/0605 Reinforcing structures 2224/0219 Sange of the auxiliary member 2224/0219 S | 2221/68395 2223/00 2223/544 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts | | H01L 24/00 • Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto |
| 2223/5442 . comprising non digital, non alphanumeric information, e.g. symbols 2223/54426 . for alignment 2223/54426 . for alignment 2223/54433 . containing identification or tracking information 2223/5444 . for electrical read out 2223/54446 Wireless electrical read out 2223/54445 Wireless electrical read out 2223/54453 . for use prior to dicing 2223/54453 . for use prior to dicing 2223/5446 . Located in scribe lines 2224/0213 . Alignment aids 2223/5446 . Located in a dummy or reference die 2223/5446 . Located in a dummy or reference die 2223/54473 . for use after dicing 2224/0214 . Structure of the auxiliary member 2223/5448 . Located on chip prior to dicing and remaining on chip after dicing 2224/0214 . Multilayer auxiliary member 2223/5448 . Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/5493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/540 . Peripheral marks on wafers for semiconductor devices not otherwise provided for 2224/0217 . Alignment aids 2224/0217 . Alignment aids 2224/0218 . Structure of the auxiliary member 2223/64 . Impedance arrangements 2224/0217 . Alignment aids 2224/0217 . Alignment aids 2224/0217 . Alignment aids 2224/0218 . Structure of the auxiliary member 2223/66 . High-frequency adaptations 2224/0218 . Structure of the auxiliary member 2223/660 . High-frequency electrical connections 2224/0219 . Material of the auxiliary member 2223/6601 . Wire connections 2224/0219 . Material of the auxiliary member 2223/6611 . Wire connections 2224/0219 . Material of the auxiliary member 2223/6611 . Wire connections 2224/0219 . Material of the auxiliary member 2223/6611 . Wire connections | 2221/68395 2223/00 2223/544 2223/54406 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information | | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related |
| information, e.g. symbols 2223/54426 . for alignment 2223/544433 . containing identification or tracking information 2223/54444 for electrical read out 2223/54444 Wireless electrical read out 2223/54445 Wireless electrical read out 2223/54445 Wireless electrical read out 2223/5445 Located in scribe lines 2223/5446 Located in scribe lines 2223/5446 Located in a dummy or reference die 2223/5446 Located in a dummy or reference die 2223/5446 Located on chip prior to dicing and remaining on chip after dicing 2223/54473 . for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2224/0214 Multilayer auxiliary member 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54489 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/5493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/540 . Impedance arrangements for semiconductor devices not otherwise provided for 2223/66 . High-frequency adaptations 2223/660 . High-frequency electrical connections 2223/6601 Wire connections 2224/0219 . Material of the auxiliary member 2223/6601 Wire connections 2224/0219 . Shape of the auxiliary member 2223/621 Structure of the auxiliary member 2224/0215 Reinforcing structures 2224/0216 Collar structures 2224/0217 Alignment aids 2224/0217 Alignment aids 2224/0218 Structure of the auxiliary member 2224/0218 Structure of the auxiliary member 2224/0218 Shape of the auxiliary member | 2221/68395 2223/00 2223/544 2223/54406 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, | 2224/02 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto |
| 2223/54426 for alignment 2223/54443 containing identification or tracking information 2223/54444 for electrical read out 2223/54446 Wireless electrical read out 2223/544453 for use prior to dicing 2223/54453 for use prior to dicing 2223/5446 Located in scribe lines 2223/5446 Located in scribe lines 2223/5446 Located in scribe lines 2223/5446 Located in a dummy or reference die 2223/5446 Located in a dummy or reference die 2223/54473 . for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/66 High-frequency adaptations 2223/6605 High-frequency electrical connections 2224/021 Wire connections 2224/021 inside the bonding area 2224/02125 Reinforcing structures 2224/0214 Structure of the auxiliary member 2224/0214 Multilayer auxiliary member 2224/0215 Material of the auxiliary member 2224/0216 Collar structures 2224/0216 Material of the auxiliary member 2224/0217 Alignment aids 2224/0217 Alignment aids 2224/0217 Flow barrier 2224/0218 Structure of the auxiliary member 2224/0219 Material of the auxiliary member 2224/0218 Shape of the auxiliary member 2224/0219 Material of the auxiliary member | 2221/68395 2223/00 2223/544 2223/54406 2223/54413 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix | 2224/02 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. |
| 2223/54443 containing identification or tracking information 2223/54444 for electrical read out 2223/54446 Wireless electrical read out 2223/54453 for use prior to dicing 2223/5446 Located in scribe lines 2223/54473 for use after dicing 2223/54473 for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/549 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/66 Impedance arrangements 2223/660 High-frequency adaptations 2223/6601 Wire connections 2224/021 inside the bonding area 2224/02125 Reinforcing structures 2224/0213 Alignment aids 2224/0214 Structure of the auxiliary member 2224/0215 Material of the auxiliary member 2224/0216 Collar structures 2224/0217 Alignment aids 2224/0217 Alignment aids 2224/0218 Structure of the auxiliary member 2224/0218 Shape of the auxiliary member 2224/0218 Structure of the auxiliary member 2224/0218 Structure of the auxiliary member 2224/0218 Shape of the auxiliary member 2224/0218 Shape of the auxiliary member 2224/0218 Shape of the auxiliary member 2224/0219 Multilayer auxiliary member 2224/0219 Shape of the auxiliary member 2224/0219 Shape of the auxiliary member | 2221/68395 2223/00 2223/544 2223/54406 2223/54413 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric | 2224/02 2224/0212 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers |
| 2223/54446 for electrical read out 2223/54446 Wireless electrical read out 2223/54445 Wireless electrical read out 2223/54445 Collar structures 2224/0213 Alignment aids 2223/5446 Located in scribe lines 2223/5446 Located in a dummy or reference die 2223/54473 for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/66 High-frequency adaptations 2223/6605 High-frequency electrical connections 2224/0219 Reinforcing structures 2224/0215 Collar structures 2224/0216 Collar structures 2224/0217 Alignment aids 2224/0217 Alignment aids 2224/0217 | 2223/00 2223/544 2223/54406 2223/54413 2223/5442 | using peeling wheel Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 . Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols | 2224/02 2224/0212 2224/02122 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body |
| 2223/54446 Wireless electrical read out 2223/54453 for use prior to dicing 2223/5446 Located in scribe lines 2223/54466 Located in a dummy or reference die 2223/54473 for use after dicing 2223/54473 for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/660 Impedance arrangements 2223/6605 High-frequency adaptations 2223/6611 Wire connections 2224/021 Collar structures 2224/0219 Collar structures 2224/0219 | 2223/00 2223/544 2223/54406 2223/54413 2223/5442 2223/54426 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment | 2224/02 2224/0212 2224/02122 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body |
| 2223/54453 for use prior to dicing 2223/54466 Located in scribe lines 2223/54466 Located in a dummy or reference die 2223/54473 for use after dicing 2223/54487 Located on chip prior to dicing and remaining on chip after dicing 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/66 . High-frequency adaptations 2223/6605 . High-frequency electrical connections 2223/6611 Wire connections 2224/022 . Protective coating, i.e. protective bond- | 2223/00 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54433 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information | 2224/02 2224/0212 2224/02122 2224/02123 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body inside the bonding area |
| 2223/5446 Located in scribe lines 2223/54466 Located in a dummy or reference die 2223/54473 for use after dicing 2223/54473 for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2223/5448 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/64 . Impedance arrangements 2223/66 High-frequency adaptations 2223/6605 High-frequency electrical connections 2224/021 Wire connections 2224/022 Protective coating, i.e. protective bond- | 2223/68395 2223/00 2223/544 2223/54406 2223/54413 2223/54426 2223/54433 2223/54444 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out | 2224/02 2224/0212 2224/02122 2224/02123 2224/02125 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body inside the bonding area Reinforcing structures |
| 2223/54473 . for use after dicing 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2223/64 . Impedance arrangements 2223/66 High-frequency adaptations 2223/6605 High-frequency electrical connections 2224/021 Multilayer auxiliary member 2224/02145 Shape of the auxiliary member 2224/02165 Reinforcing structures 2224/02166 Collar structures 2224/0217 Alignment aids 2224/0217 Flow barrier 2224/0218 Structure of the auxiliary member 2224/0218 Multilayer auxiliary member 2224/0218 Multilayer auxiliary member 2224/0219 Material of the auxiliary member 2224/0219 | 2223/68395 2223/00 2223/544 2223/54406 2223/54413 2223/5442 2223/54426 2223/54433 2223/54444 2223/54446 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out Wireless electrical read out | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02126 2224/0213 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body |
| 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2224/0215 | 2223/544 2223/544 2223/54406 2223/54413 2223/5442 2223/54426 2223/54433 2223/54444 2223/54446 2223/54453 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out Wireless electrical read out | 2224/0212 2224/02122 2224/02122 2224/02125 2224/02126 2224/0213 2224/02135 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body Reinforcing structures Reinforcing structures Collar structures Alignment aids Flow barrier |
| 2223/5448 Located on chip prior to dicing and remaining on chip after dicing 2224/0215 | 2223/544 2223/544 2223/54406 2223/54413 2223/5442 2223/54426 2223/54433 2223/54446 2223/54453 2223/5446 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02126 2224/0213 2224/02135 2224/0214 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body Reinforcing structures Reinforcing structures Reinforcing structures Alignment aids Flow barrier Structure of the auxiliary member |
| on chip after dicing 2224/0215 Material of the auxiliary member 2223/54486 Located on package parts, e.g. encapsulation, leads, package substrate 2224/02165 Reinforcing structures 2224/02165 Collar structures 2224/0217 Alignment aids 2224/0217 Alignment aids 2224/0217 Flow barrier 2223/58 . Structural electrical arrangements for semiconductor devices not otherwise provided for 2224/0218 Structure of the auxiliary member 2223/64 . Impedance arrangements 2224/0218 Multilayer auxiliary member 2223/66 High-frequency adaptations 2224/0218 Shape of the auxiliary member 2223/661 Wire connections 2224/0219 Material of the auxiliary member 2223/661 Protective coating, i.e. protective bond- | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54446 2223/54444 2223/54446 2223/5446 2223/5446 2223/5446 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02126 2224/0213 2224/02135 2224/0214 2224/02141 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body Reinforcing structures Reinforcing structures Alignment aids Flow barrier Structure of the auxiliary member Multilayer auxiliary member |
| leads, package substrate 2224/02165 Reinforcing structures 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2224/02166 Collar structures 2224/0217 Alignment aids 2224/0217 Flow barrier 2224/0218 Structure of the auxiliary member 2223/64 . Impedance arrangements 2224/0218 Multilayer auxiliary member 2223/66 High-frequency adaptations 2224/0218 Shape of the auxiliary member 2223/6605 High-frequency electrical connections 2224/0219 Material of the auxiliary member 2223/6611 Wire connections 2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/5446 2223/5446 2223/54466 2223/54473 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/02141 2224/02141 2224/02145 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers being formed on the semiconductor or solid-state body inside the bonding area Reinforcing structures Collar structures Alignment aids Flow barrier Structure of the auxiliary member Multilayer auxiliary member Shape of the auxiliary member |
| 2223/54493 . Peripheral marks on wafers, e.g. orientation flats, notches, lot number 2224/0217 | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/5446 2223/5446 2223/54466 2223/54473 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located on chip prior to dicing and remaining | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/02141 2224/02145 2224/0215 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Being formed on the semiconductor or |
| notches, lot number 2224/0217 Alignment aids Structural electrical arrangements for semiconductor devices not otherwise provided for 2224/0218 Structure of the auxiliary member 2223/64 . Impedance arrangements 2224/02181 Multilayer auxiliary member 2223/66 High-frequency adaptations 2224/02185 Shape of the auxiliary member 2223/6605 High-frequency electrical connections 2224/0219 Material of the auxiliary member 2223/6611 Wire connections 2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/54406 2223/54406 2223/54413 2223/54426 2223/54433 2223/54446 2223/54446 2223/54466 2223/54473 2223/5448 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/02141 2224/02145 2224/0215 2224/0215 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Reinforcing structures Reinforcing structures Reinforcing structures Rignment aids Rignment aids Rignment aids Rignment auxiliary member Multilayer auxiliary member Material of the auxiliary member Material of the auxiliary member Material of the auxiliary member |
| 2223/58 Structural electrical arrangements for semiconductor devices not otherwise provided for 2224/0218 Structure of the auxiliary member 2223/64 | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54433 2223/54446 2223/54446 2223/54466 2223/54473 2223/5448 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out while the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/0214 2224/0215 2224/0215 2224/0215 2224/02163 2224/02165 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Being formed on the semiconductor or |
| devices not otherwise provided for 2224/0218 Structure of the auxiliary member 2223/64 . Impedance arrangements 2224/02181 Multilayer auxiliary member 2223/66 High-frequency adaptations 2224/02185 Shape of the auxiliary member 2223/6605 High-frequency electrical connections 2224/0219 Material of the auxiliary member 2223/6611 Wire connections 2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54433 2223/54446 2223/54446 2223/54466 2223/54473 2223/5448 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out which is electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/0214 2224/02141 2224/0215 2224/02163 2224/02165 2224/02166 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Being formed on the semiconductor or |
| 2223/64. Impedance arrangements2224/02181 Multilayer auxiliary member2223/66 High-frequency adaptations2224/02185 Shape of the auxiliary member2223/6605 High-frequency electrical connections2224/0219 Material of the auxiliary member2223/6611 Wire connections2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/54446 2223/54466 2223/54466 2223/54473 2223/5448 2223/5448 2223/54486 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/0214 2224/02141 2224/0215 2224/02163 2224/02165 2224/02166 2224/0217 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Being formed on the semiconductor or |
| 2223/66 High-frequency adaptations2224/02185 Shape of the auxiliary member2223/6605 High-frequency electrical connections2224/0219 Material of the auxiliary member2223/6611 Wire connections2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/54446 2223/54466 2223/54466 2223/54473 2223/5448 2223/5448 2223/54486 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number Structural electrical arrangements for semiconductor | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02135 2224/0213 2224/0214 2224/02141 2224/02145 2224/0215 2224/02163 2224/02165 2224/0217 2224/0217 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Being formed on the semiconductor or |
| 2223/6605 High-frequency electrical connections 2224/0219 Material of the auxiliary member 2223/6611 Wire connections 2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/54406 2223/54406 2223/54413 2223/54426 2223/54446 2223/54446 2223/54446 2223/54466 2223/54466 2223/54473 2223/5448 2223/54486 2223/54486 2223/54486 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number Structural electrical arrangements for semiconductor devices not otherwise provided for | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02135 2224/0213 2224/0214 2224/02141 2224/02145 2224/0215 2224/02163 2224/02166 2224/0217 2224/0217 2224/0217 2224/0218 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Reinforcing structures Reinforcing structures Reinforcing structures Rignment aids |
| 2223/6611 Wire connections 2224/022 Protective coating, i.e. protective bond- | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/54446 2223/5446 2223/54466 2223/54473 2223/54486 2223/54486 2223/54493 2223/54493 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number Structural electrical arrangements for semiconductor devices not otherwise provided for Impedance arrangements | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02135 2224/0213 2224/0214 2224/0214 2224/02145 2224/0215 2224/02163 2224/02166 2224/0217 2224/0217 2224/0218 2224/0218 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Reinforcing structures Reinforcing structures Reinforcing structures Right and Structure of the auxiliary member Multilayer auxiliary member Material of the auxiliary member Material of the auxiliary member Reinforcing structures Right and Structures |
| === // · == // · · · · · · · · · · · · · | 2223/544 2223/54406 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/54446 2223/54466 2223/54473 2223/54486 2223/54486 2223/54493 2223/54493 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number Structural electrical arrangements for semiconductor devices not otherwise provided for Impedance arrangements High-frequency adaptations | 2224/0212 2224/02122 2224/02123 2224/02125 2224/02135 2224/0213 2224/0214 2224/0214 2224/0214 2224/0215 2224/02163 2224/02165 2224/0217 2224/0217 2224/02181 2224/02181 2224/02185 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Being formed on the semiconductor or solid-state body Being formed on the semiconductor or |
| 2225/0010 · · · · Vertical connections, e.g. vias through coating | 2223/544 2223/54406 2223/54406 2223/54413 2223/54426 2223/54433 2223/54446 2223/54446 2223/54453 2223/54466 2223/54473 2223/5448 2223/54486 2223/54493 2223/54493 2223/54493 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number Structural electrical arrangements for semiconductor devices not otherwise provided for Impedance arrangements High-frequency adaptations | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/0214 2224/0214 2224/0215 2224/02163 2224/02165 2224/02166 2224/0217 2224/0217 2224/0218 2224/0218 2224/02181 2224/02185 2224/0219 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Left being formed on the semiconductor or solid-state body Le |
| | 2223/544 2223/544 2223/54406 2223/54413 2223/54426 2223/54426 2223/54443 2223/54446 2223/54446 2223/54466 2223/54473 2223/5448 2223/5448 2223/5448 2223/54493 2223/54493 2223/66 2223/6605 2223/6611 | Details relating to semiconductor or other solid state devices covered by the group H01L 23/00 Marks applied to semiconductor devices or parts comprising alphanumeric information comprising digital information, e.g. bar codes, data matrix comprising non digital, non alphanumeric information, e.g. symbols for alignment containing identification or tracking information for electrical read out for use prior to dicing Located in scribe lines Located in a dummy or reference die for use after dicing Located on chip prior to dicing and remaining on chip after dicing Located on package parts, e.g. encapsulation, leads, package substrate Peripheral marks on wafers, e.g. orientation flats, notches, lot number Structural electrical arrangements for semiconductor devices not otherwise provided for Impedance arrangements High-frequency adaptations High-frequency electrical connections | 2224/0212 2224/02122 2224/02123 2224/02125 2224/0213 2224/0213 2224/0214 2224/0214 2224/0214 2224/0215 2224/02163 2224/02165 2224/02166 2224/0217 2224/0217 2224/0218 2224/0218 2224/02181 2224/02185 2224/0219 | H01L 24/00 Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chipto-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto Bonding areas; Manufacturing methods related thereto Auxiliary members for bonding areas, e.g. spacers Left being formed on the semiconductor or solid-state body Le |

| 2224/02205 Structure of the protective coating | 2224/031 Manufacture and pre-treatment of the |
|---|---|
| 2224/02206 Multilayer protective coating | bonding area preform |
| 2224/0221 Shape of the protective coating | 2224/0311 Shaping |
| 2224/02215 Material of the protective coating | 2224/0312 Applying permanent coating |
| 2224/02233 not in direct contact with the bonding area | 2224/033 by local deposition of the material of the |
| 2224/02235 Reinforcing structures | bonding area |
| 2224/0224 Alignment aids | 2224/0331 in liquid form |
| 2224/02245 Flow barrier | 2224/03312 Continuous flow, e.g. using a |
| 2224/0225 Structure of the auxiliary member | microsyringe, a pump, a nozzle or |
| · | extrusion |
| 2224/02251 Multilayer auxiliary member | 2224/03318 by dispensing droplets |
| 2224/02255 Shape of the auxiliary member | 2224/0332 Screen printing, i.e. using a stencil |
| 2224/0226 Material of the auxiliary member | 2224/0333 in solid form |
| 2224/023 Redistribution layers [RDL] for bonding areas | 2224/03332 using a powder |
| 2224/0231 Manufacturing methods of the redistribution | 2224/03334 using a product |
| layers | |
| 2224/02311 Additive methods | 2224/034 by blanket deposition of the material of the |
| 2224/02313 Subtractive methods | bonding area |
| 2224/02315 Self-assembly processes | 2224/0341 in liquid form |
| 2224/02317 by local deposition | 2224/03416 Spin coating |
| 2224/02319 by using a preform | 2224/03418 Spray coating |
| 2224/02321 Reworking | 2224/0342 Curtain coating |
| 2224/0233 Structure of the redistribution layers | 2224/03422 by dipping, e.g. in a solder bath (hot- |
| 2224/02331 Multilayer structure | dipping <u>C23C 2/00</u>) |
| 2224/02333 being a bump | 2224/03424 Immersion coating, e.g. in a solder bath |
| 2224/02335 Free-standing redistribution layers | (immersion processes <u>C23C 2/00</u>) |
| | 2224/03426 Chemical solution deposition [CSD], i.e. |
| 2224/0235 Shape of the redistribution layers | using a liquid precursor |
| 2224/02351 comprising interlocking features | 2224/03428 Wave coating |
| 2224/0236 Shape of the insulating layers therebetween | 2224/0343 in solid form |
| 2224/0237 Disposition of the redistribution layers | 2224/03436 Lamination of a preform, e.g. foil, sheet |
| 2224/02371 connecting the bonding area on a surface | or layer |
| of the semiconductor or solid-state body | 2224/03438 the preform being at least partly pre- |
| with another surface of the semiconductor | patterned |
| or solid-state body | 2224/0344 by transfer printing |
| 2224/02372 connecting to a via connection in the | 2224/03442 using a powder |
| semiconductor or solid-state body | 2224/03444 in gaseous form |
| 2224/02373 Layout of the redistribution layers | 2224/0345 Physical vapour deposition [PVD], e.g. |
| 2224/02375 Top view | evaporation, or sputtering |
| 2224/02377 Fan-in arrangement | 2224/03452 Chemical vapour deposition [CVD], e.g. |
| 2224/02379 Fan-out arrangement | laser CVD |
| 2224/02381 Side view | 2224/0346 Plating |
| 2224/0239 Material of the redistribution layers | |
| 2224/024 Material of the insulating layers | 2224/03462 Electroplating |
| therebetween | 2224/03464 Electroless plating |
| 2224/03 Manufacturing methods | 2224/03466 Conformal deposition, i.e. blanket |
| 2224/03001 Involving a temporary auxiliary member not | deposition of a conformal layer on a |
| forming part of the manufacturing apparatus, | patterned surface |
| e.g. removable or sacrificial coating, film or | 2224/0347 using a lift-off mask |
| substrate | 2224/03472 Profile of the lift-off mask |
| 2224/03002 for supporting the semiconductor or solid- | 2224/03474 Multilayer masks |
| state body | 2224/0348 Permanent masks, i.e. masks left in the |
| 2224/03003 for holding or transferring a preform | finished device, e.g. passivation layers |
| 2224/03005 for aligning the bonding area, e.g. marks, | 2224/035 by chemical or physical modification of a |
| spacers | pre-existing or pre-deposited material |
| 2224/03009 for protecting parts during manufacture | 2224/03502 Pre-existing or pre-deposited material |
| 2224/03011 Involving a permanent auxiliary member, i.e. | 2224/03505 Sintering |
| a member which is left at least partly in the | 2224/0351 Anodisation |
| finished device, e.g. coating, dummy feature | 2224/03515 Curing and solidification, e.g. of a |
| 2224/03013 for holding or confining the bonding area, | photosensitive material |
| e.g. solder flow barrier | 2224/0352 Self-assembly, e.g. self-agglomeration of |
| 2224/03015 for aligning the bonding area, e.g. marks, | the material in a fluid |
| spacers | 2224/03522 Auxiliary means therefor, e.g. for self- |
| 2224/03019 for protecting parts during the process | assembly activation |
| 222-703017 for protecting parts during the process | · |

| 2224-03524 with special adaptation of the surface of the body to be connected or of an arxiliary substrate, e.g. surface shape specially adapted for the scale-assembly pracess 2224-03555 Selective modification 2224-03552 using a laser or a focussed ion beam properties of a pattern defined by a laser trace in a phore-sensitive resin and the provised material (treatment of parts prof to assembly of the devices 10011-21/48) 2224-0362 Mechanical treatment, e.g. polishing, grinding 2224-03612 by playsical or chemical etching 2224-03614 by chemical etching 2224-03616 Chemical meatment, e.g. polishing, grinding 2224-03616 by physical means only 2224-03616 Chemical mental machinal process, e.g. of a photosensitive conductive resin to beam [FIB] 2224-0362 Photolithography is considered to be material, e.g. of a photosensitive conductive resin to beam [FIB] 2224-0363 using a laser or a focused ion beam [FIB] 2224-0373 involving monitoring, e.g. in-sim under a monitoring, e.g. in-sim under a phore-sensitive conductor (SDI), e.g. and conductor of the sense individual parts of the sense in part of the phore in parts of the sense in part of the parts of the | 2224/02524 | 2224/02002 |
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| Coating Coat | | |
| 2224/03821 | | |
| 2224/03822 by dipping, e.g. in a solder bath 2224/03823 Immersion coating, e.g. in a solder bath 2224/03824 Chemical solution deposition [CSD], i.e. using a liquid precursor 2224/03825 Plating, e.g. electroplating, electroless plating 2224/03826 Physical vapour deposition [PVD], e.g. evaporation, or sputtering 2224/03827 Chemical vapour deposition [CVD], e.g. laser CVD 2224/03828 Applying flux 2224/03829 Applying a precursor material 2224/03829 Applying a precursor material 2224/03831 Reworking, e.g. shaping (reflowing H0IL 2224/03849) 2224/0384 involving a mechanical process, e.g. etching the bonding area 2224/0384 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/03849 Reflowing 2224/0399 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/03023 the whole internal layer potruding 2224/05023 the whole internal layer potruding | E Company | |
| 2224/03823 | * * * | · |
| 2224/03824 . Chemical solution deposition [CSD], i.e. using a liquid precursor . Plating, e.g. electroplating, electroless plating . Physical vapour deposition [PVD], e.g. evaporation, or sputtering . Physical vapour deposition [CVD], e.g. laser CVD . Shape . Physical vapour deposition [CVD], e.g. laser CVD . Physical vapour deposition [CVD], e.g | | |
| using a liquid precursor 2224/03825 . Plating, e.g. electroplating, electroless plating 2224/03826 . Physical vapour deposition [PVD], e.g. evaporation, or sputtering 2224/03827 . Chemical vapour deposition [CVD], e.g. laser CVD 2224/03828 . Applying flux 2224/03829 . Applying a precursor material 2224/03830 . Reworking, e.g. shaping (reflowing H01L 2224/03849) 2224/03831 . involving a chemical process, e.g. etching the bonding area planarising the bonding area encontrolled cooling 2224/03848 . Thermal treatments, e.g. annealing, controlled cooling 2224/03849 . Reflowing 2224/03901 . with repetition of the same manufacturing step 2224/03901 . with repetition of the same manufacturing step 2224/05022 . the online area integrally formed with a semiconductor or solid-state body, e.g. 2224/05009 . Bonding area integrally formed with a via connection of the semiconductor or solid-state body. 2224/0501 . Shape 2224/0501 . Shape 2224/05011 . comprising apertures or cavities 2224/05012 . in top view 2224/05013 . being rectangular 2224/05014 . being square 2224/05015 . being circular or elliptic 2224/05016 . in side view 2224/05017 . comprising protrusions or indentations 2224/05018 . being a conformal layer on a patterned surface 2224/05019 . being a non conformal layer on a patterned surface 2224/0502 . Disposition 2224/0502 . Disposition 2224/0502 . the internal layer potruding | | |
| 2224/03825 Plating, e.g. electroplating, electroless plating 2224/03826 Physical vapour deposition [PVD], e.g. evaporation, or sputtering 2224/03827 Chemical vapour deposition [CVD], e.g. laser CVD 2224/03828 Applying flux 2224/03829 Applying a precursor material 2224/03829 Applying a Reworking, e.g. shaping (reflowing H01L 2224/03849) 2224/03831 Photology a chemical process, e.g. etching the bonding area etching area etching the bonding area etching area etching the bonding area etching a | 2224/03824 Chemical solution deposition [CSD], i.e. | |
| plating semiconductor or solid-state body, e.g. e.g. evaporation, or sputtering 2224/03827 Chemical vapour deposition [CVD], e.g. laser CVD State Polying flux 2224/03828 Applying flux 2224/03829 Applying a precursor material 2224/0501 Comprising apertures or cavities 2224/0383 Reworking, e.g. shaping (reflowing H01L 2224/03849) Remical process, e.g. etching the bonding area 2224/05014 being square etching the bonding area 2224/05015 being circular or elliptic 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/0509 Nethods of manufacturing bonding area step 2224/0501 | | |
| 2224/03826 . Physical vapour deposition [PVD], e.g. evaporation, or sputtering 2224/03827 . Chemical vapour deposition [CVD], e.g. laser CVD 2224/03828 . Applying flux 2224/03829 . Applying a precursor material 2224/03831 . Reworking, e.g. shaping (reflowing H0IL 2224/03849) 2224/03831 . involving a chemical process, e.g. etching the bonding area etching the bonding area etching the bonding area planarising the bonding area planarising the bonding area planarising the bonding area etching the declarations 2224/03848 . Thermal treatments, e.g. annealing, controlled cooling 2224/03849 . Reflowing 2224/03849 . Reflowing 2224/03849 . Reflowing 2224/03849 . Reflowing 2224/03901 . with repetition of the same manufacturing step 2224/03901 . with repetition of the same manufacturing step 2224/03901 . with repetition of the same manufacturing step 2224/05023 . the internal layer portruding | 2224/03825 Plating, e.g. electroplating, electroless | · · · · · · · · · · · · · · · · · · · |
| 2224/03827 . Chemical vapour deposition [CVD], e.g. laser CVD 2224/03828 . Applying flux 2224/03829 . Applying a precursor material 2224/03831 . Reworking, e.g. shaping (reflowing H01L 2224/03849) 2224/03831 . involving a chemical process, e.g. etching the bonding area etching the bonding area etching the bonding area 2224/05015 . being circular or elliptic 2224/0384 . involving a mechanical process, e.g. planarising the bonding area 2224/05016 . in side view planarising the bonding area 2224/03848 . Thermal treatments, e.g. annealing, controlled cooling 2224/03849 . Reflowing 2224/0399 . Reflowing 2224/0399 . Reflowing a specific sequence of method steps sep 2224/03901 . with repetition of the same manufacturing step 2224/05023 . the whole internal layer portruding | 1 0 | • |
| 2224/03827 Chemical vapour deposition [CVD], e.g. laser CVD 2224/03828 . Applying flux 2224/03829 . Applying a precursor material 2224/0383 . Reworking, e.g. shaping (reflowing H01L 2224/03849) 2224/03831 . involving a chemical process, e.g. etching the bonding area 2224/03841 . involving a mechanical process, e.g. planarising the bonding area 2224/03842 . involving a mechanical process, e.g. planarising the bonding area 2224/03845 . Chemical mechanical polishing [CMP] 2224/03848 . Thermal treatments, e.g. annealing, controlled cooling 2224/03849 . Reflowing 2224/03901 . Reflowing a pecific sequence of method steps 2224/03901 . with repetition of the same manufacturing step 2224/03901 . with repetition of the same manufacturing step 2224/03903 . the whole internal layer portruding | | - |
| laser CVD 2224/03828 . Applying flux 2224/03829 . Applying a precursor material 2224/0383 . Reworking, e.g. shaping (reflowing H01L 2224/03849) 2224/03831 . involving a chemical process, e.g. etching the bonding area 2224/0384 . involving a mechanical process, e.g. planarising the bonding area 2224/03845 . Chemical mechanical polishing [CMP] 2224/03848 . Thermal treatments, e.g. annealing, controlled cooling 2224/03849 . Reflowing 2224/03849 . Reflowing 2224/03849 . With repetition of the same manufacturing step 2224/03901 . with repetition of the same manufacturing step 2224/03901 . with repetition of the same manufacturing step 2224/05022 . the internal layer portruding | | |
| 2224/03828 . Applying flux 2224/05011 | | |
| 2224/03829 . Applying a precursor material 2224/0383 . Reworking, e.g. shaping (reflowing H01L 2224/03849) 2224/05012 . in top view 2224/03831 . involving a chemical process, e.g. 2224/05013 . being rectangular 2224/05014 . being square 2224/05015 . being circular or elliptic 2224/0384 . involving a mechanical process, e.g. 2224/05015 . in side view 2224/05016 . in side view 2224/05017 . comprising protrusions or 2224/03845 . Chemical mechanical polishing [CMP] 2224/03848 . Thermal treatments, e.g. annealing, 2224/05018 . being a conformal layer on a 2224/05019 . being a non conformal layer on a 2224/05019 . being a non conformal layer on a 2224/05010 . bein | | • |
| 2224/0383 Reworking, e.g. shaping (reflowing H01L 2224/03849) | | |
| H01L 2224/03849) 2224/03831 involving a chemical process, e.g. etching the bonding area 2224/05015 being rectangular 2224/05015 being square 2224/05015 being circular or elliptic 2224/05016 in side view planarising the bonding area 2224/05017 comprising protrusions or indentations 2224/03845 Chemical mechanical polishing [CMP] 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/03901 . Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 . with repetition of the same manufacturing step 2224/05023 the internal layer potruding | | |
| 2224/03831 involving a chemical process, e.g. etching the bonding area 2224/0384 involving a mechanical process, e.g. planarising the bonding area 2224/05015 being square 2224/05016 in side view planarising the bonding area 2224/05017 comprising protrusions or indentations 2224/03845 Chemical mechanical polishing [CMP] 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/03901 . Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/05023 the internal layer being at least partially embedded in the surface 2224/05023 the whole internal layer protruding | 2224/0383 Reworking, e.g. shaping (reflowing | - |
| etching the bonding area 2224/05015 being circular or elliptic 2224/0384 involving a mechanical process, e.g. planarising the bonding area 2224/05016 in side view comprising protrusions or indentations 2224/03845 Chemical mechanical polishing [CMP] 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/0390 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/05023 the whole internal layer protruding | <u>H01L 2224/03849</u>) | |
| 2224/03844 involving a mechanical process, e.g. planarising the bonding area planarising the bonding area 2224/05017 comprising protrusions or indentations indentations 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/05018 being a conformal layer on a patterned surface 2224/03849 Reflowing 2224/05019 being a non conformal layer on a patterned surface 2224/03901 With repetition of the same manufacturing step 2224/05023 the internal layer being at least partially embedded in the surface 2224/05023 the whole internal layer protruding | 2224/03831 involving a chemical process, e.g. | |
| planarising the bonding area 2224/03845 Chemical mechanical polishing [CMP] 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/0390 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/05023 the whole internal layer protruding | etching the bonding area | |
| 2224/03845 Chemical mechanical polishing [CMP] 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/039 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/03902 with repetition of the same manufacturing step 2224/05023 the whole internal layer protruding | 2224/0384 involving a mechanical process, e.g. | 2224/05016 in side view |
| 2224/03848 Thermal treatments, e.g. annealing, controlled cooling 2224/03849 Reflowing 2224/0390 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/05023 being a conformal layer on a patterned surface 2224/05019 being a non conformal layer on a patterned surface 2224/05020 Disposition 2224/05021 the internal layer being at least partially embedded in the surface 2224/05023 the whole internal layer protruding | planarising the bonding area | 2224/05017 comprising protrusions or |
| controlled cooling patterned surface 2224/03849 Reflowing 2224/05019 being a non conformal layer on a 2224/039 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/0502 Disposition 2224/03901 with repetition of the same manufacturing step 2224/05023 the whole internal layer protruding | 2224/03845 Chemical mechanical polishing [CMP] | indentations |
| 2224/03849 Reflowing 2224/039 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/03901 with repetition of the same manufacturing step 2224/03902 the internal layer being at least partially embedded in the surface 2224/05023 the whole internal layer protruding | 2224/03848 Thermal treatments, e.g. annealing, | |
| 2224/039 Methods of manufacturing bonding areas involving a specific sequence of method steps 2224/0502 Disposition 2224/0502 the internal layer being at least partially embedded in the surface step 2224/05023 the whole internal layer protruding | controlled cooling | |
| involving a specific sequence of method steps 2224/0502 Disposition 2224/05022 the internal layer being at least partially embedded in the surface step 2224/05023 the whole internal layer protruding | 2224/03849 Reflowing | |
| involving a specific sequence of method steps 2224/0502 Disposition 2224/05022 the internal layer being at least partially embedded in the surface step 2224/05023 the whole internal layer protruding | | |
| 2224/03901 with repetition of the same manufacturing step partially embedded in the surface 2224/05023 the whole internal layer protruding | | |
| step 2224/05023 the whole internal layer protruding | steps | |
| | 2224/03901 with repetition of the same manufacturing | · · · |
| 2224/03902 Multiple masking steps from the surface | * | • |
| | 2224/03902 Multiple masking steps | from the surface |

| 2224/05024 the internal layer being disposed on a redistribution layer on the | 2224/05117 the principal constituent melting at a temperature of greater than or |
|--|---|
| semiconductor or solid-state body 2224/05025 the internal layer being disposed on a via connection of the semiconductor | equal to 400°C and less than 950°C 2224/05118 Zinc [Zn] as principal constituent 2224/0512 Antimony [Sb] as principal |
| or solid-state body 2224/05026 the internal layer being disposed in a | constituent 2224/05123 Magnesium [Mg] as principal |
| recess of the surface 2224/05027 the internal layer extending out of | constituent 2224/05124 Aluminium [Al] as principal |
| an opening 2224/05073 Single internal layer | constituent 2224/05138 the principal constituent melting |
| 2224/05075 Plural internal layers | at a temperature of greater than |
| 2224/05076 being mutually engaged together, e.g. through inserts | or equal to 950°C and less than 1550°C |
| 2224/05078 being disposed next to each other, e.g. side-to-side arrangements | 2224/05139 Silver [Ag] as principal constituent |
| 2224/0508 being stacked | 2224/05144 Gold [Au] as principal |
| 2224/05082 Two-layer arrangements | constituent |
| 2224/05083 Three-layer arrangements | 2224/05147 Copper [Cu] as principal constituent |
| 2224/05084 Four-layer arrangements | 2224/05149 Manganese [Mn] as principal |
| 2224/05085 with additional elements, e.g. vias arrays, interposed between the | constituent 2224/05155 Nickel [Ni] as principal |
| stacked layers | constituent |
| 2224/05086 Structure of the additional element | 2224/05157 Cobalt [Co] as principal constituent |
| 2224/05087 being a via with at least a lining layer | 2224/0516 Iron [Fe] as principal constituent |
| 2224/05088 Shape of the additional element | 2224/05163 the principal constituent melting |
| 2224/05089 Disposition of the additional element | at a temperature of greater than 1550°C |
| 2224/0509 of a single via | 2224/05164 Palladium [Pd] as principal |
| 2224/05091 at the center of the internal | constituent |
| layers | 2224/05166 Titanium [Ti] as principal constituent |
| 2224/05092 at the periphery of the internal layers | 2224/05169 Platinum [Pt] as principal constituent |
| 2224/05093 of a plurality of vias | 2224/0517 Zirconium [Zr] as principal |
| 2224/05094 at the center of the internal layers | constituent |
| 2224/05095 at the periphery of the internal layers | 2224/05171 Chromium [Cr] as principal constituent |
| 2224/05096 Uniform arrangement, i.e. array | 2224/05172 Vanadium [V] as principal constituent |
| 2224/05097 Random arrangement | 2224/05173 Rhodium [Rh] as principal |
| 2224/05098 Material of the additional | constituent 2224/05176 Ruthenium [Ru] as principal |
| element | constituent |
| 2224/05099 Material 2224/051 with a principal constituent of | 2224/05178 Iridium [Ir] as principal constituent |
| the material being a metal or a metalloid, e.g. boron [B], silicon | 2224/05179 Niobium [Nb] as principal constituent |
| [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and | 2224/0518 Molybdenum [Mo] as principal |
| polonium [Po], and alloys thereof | constituent |
| 2224/05101 the principal constituent melting at a temperature of less than 400°C | 2224/05181 Tantalum [Ta] as principal constituent |
| 2224/05105 Gallium [Ga] as principal constituent | 2224/05183 Rhenium [Re] as principal constituent |
| 2224/05109 Indium [In] as principal constituent | 2224/05184 Tungsten [W] as principal constituent |
| 2224/05111 Tin [Sn] as principal constituent | 2224/05186 with a principal constituent of the |
| 2224/05113 Bismuth [Bi] as principal | material being a non metallic, non metalloid inorganic material |
| constituent Thellium [TI] or principal | 2224/05187 Ceramics, e.g. crystalline carbides, |
| 2224/05114 Thallium [TI] as principal constituent | nitrides or oxides (glass ceramics H01L 2224/05188) |
| 2224/05116 Lead [Pb] as principal constituent | |

| 2224/05188 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/05238 the principal constituent melting at a temperature of greater than or equal to 950°C |
|---|---|
| 2224/0519 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, | and less than 1550°C 2224/05239 Silver [Ag] as principal |
| epoxy 2224/05191 The principal constituent being an | constituent 2224/05244 Gold [Au] as principal |
| elastomer, e.g. silicones, isoprene, neoprene | constituent 2224/05247 Copper [Cu] as principal |
| 2224/05193 with a principal constituent of the material being a solid | constituent 2224/05249 Manganese [Mn] as |
| not provided for in groups H01L 2224/051 - H01L 2224/05191, e.g. allotropes of carbon, fullerene, | principal constituent 2224/05255 Nickel [Ni] as principal |
| graphite, carbon-nanotubes, diamond 2224/05194 with a principal constituent | constituent 2224/05257 Cobalt [Co] as principal constituent |
| of the material being a liquid not provided for in groups | 2224/0526 Iron [Fe] as principal constituent |
| <u>H01L 2224/051 - H01L 2224/05191</u> 2224/05195 with a principal constituent | 2224/05263 the principal constituent melting at a temperature of |
| of the material being a gas not provided for in groups | greater than 1550°C 2224/05264 Palladium [Pd] as principal |
| H01L 2224/051 - H01L 2224/05191 2224/05198 with a principal constituent of the | constituent 2224/05266 Titanium [Ti] as principal |
| material being a combination of two or more materials in the form of a | constituent 2224/05269 Platinum [Pt] as principal |
| matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, | constituent 2224/0527 Zirconium [Zr] as principal |
| foams 2224/05199 Material of the matrix | constituent |
| 2224/052 with a principal constituent of the material being a metal or a | 2224/05271 |
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic | 2224/05272 Vanadium [V] as principal constituent |
| [As], antimony [Sb], tellurium [Te] and polonium [Po], and | 2224/05273 Rhodium [Rh] as principal constituent |
| alloys thereof 2224/05201 the principal constituent | 2224/05276 Ruthenium [Ru] as principal constituent |
| melting at a temperature of less than 400°C | 2224/05278 Iridium [Ir] as principal constituent |
| 2224/05205 Gallium [Ga] as principal constituent | 2224/05279 Niobium [Nb] as principal constituent |
| 2224/05209 Indium [In] as principal constituent | 2224/0528 Molybdenum [Mo] as principal constituent |
| 2224/05211 Tin [Sn] as principal constituent | 2224/05281 Tantalum [Ta] as principal constituent |
| 2224/05213 Bismuth [Bi] as principal constituent | 2224/05283 Rhenium [Re] as principal constituent |
| 2224/05214 Thallium [Tl] as principal constituent | 2224/05284 Tungsten [W] as principal constituent |
| 2224/05216 Lead [Pb] as principal constituent | 2224/05286 with a principal constituent of the material being a non metallic, |
| 2224/05217 the principal constituent melting at a temperature of | non metalloid inorganic material 2224/05287 Ceramics, e.g. crystalline |
| greater than or equal to 400°C and less than 950°C | carbides, nitrides or oxides (glass ceramics |
| 2224/05218 Zinc [Zn] as principal constituent | H01L 2224/05288) 2224/05288 Glasses, e.g. amorphous |
| 2224/0522 Antimony [Sb] as principal constituent | oxides, nitrides or fluorides 2224/0529 with a principal constituent of |
| 2224/05223 Magnesium [Mg] as principal constituent | the material being a polymer, e.g. polyester, phenolic based |
| 2224/05224 Aluminium [Al] as principal constituent | polymer, epoxy |
| Combitation | |

| 2224/05291 The principal constituent being | 2224/05349 Manganese [Mn] as |
|---|---|
| an elastomer, e.g. silicones, | principal constituent |
| isoprene, neoprene | 2224/05355 Nickel [Ni] as principal |
| 2224/05293 with a principal constituent of the material being a solid | constituent 2224/05357 Cobalt [Co] as principal |
| not provided for in groups | constituent |
| H01L 2224/052 - H01L 2224/05291, | 2224/0536 Iron [Fe] as principal |
| e.g. allotropes of carbon, fullerene, graphite, carbon- | constituent |
| nanotubes, diamond | 2224/05363 the principal constituent melting at a temperature of |
| 2224/05294 with a principal constituent | greater than 1550°C |
| of the material being a liquid not provided for in groups | 2224/05364 Palladium [Pd] as |
| H01L 2224/052 - H01L 2224/05291 | principal constituent 2224/05366 Titanium [Ti] as principal |
| 2224/05295 with a principal constituent | constituent |
| of the material being a gas | 2224/05369 Platinum [Pt] as principal |
| not provided for in groups H01L 2224/052 - H01L 2224/05291 | constituent |
| 2224/05298 Fillers | 2224/0537 Zirconium [Zr] as principal constituent |
| 2224/05299 Base material | 2224/05371 |
| 2224/053 with a principal constituent of the material being a metal | principal constituent |
| or a metalloid, e.g. boron [B], | 2224/05372 Vanadium [V] as principal constituent |
| silicon [Si], germanium [Ge], | 2224/05373 Rhodium [Rh] as principal |
| arsenic [As], antimony [Sb], tellurium [Te] and polonium | constituent |
| [Po], and alloys thereof | 2224/05376 Ruthenium [Ru] as |
| 2224/05301 the principal constituent | principal constituent 2224/05378 Iridium [Ir] as principal |
| melting at a temperature of | constituent |
| less than 400°C | 2224/05379 Niobium [Nb] as principal |
| constituent | constituent |
| 2224/05309 Indium [In] as principal | 2224/0538 Molybdenum [Mo] as principal constituent |
| constituent 2224/05311 Tin [Sn] as principal | 2224/05381 Tantalum [Ta] as principal |
| constituent | constituent |
| 2224/05313 Bismuth [Bi] as principal | 2224/05383 Rhenium [Re] as principal constituent |
| constituent 2224/05314 Thallium [Tl] as principal | 2224/05384 Tungsten [W] as principal |
| constituent | constituent |
| 2224/05316 Lead [Pb] as principal | 2224/05386 with a principal constituent of the material being a non |
| constituent | metallic, non metalloid |
| 2224/05317 the principal constituent melting at a temperature | inorganic material |
| of greater than or equal to | 2224/05387 Ceramics, e.g. crystalline carbides, nitrides or |
| 400°C and less than 950°C | oxides (glass ceramics |
| 2224/05318 Zinc [Zn] as principal constituent | H01L 2224/05388) |
| 2224/0532 Antimony [Sb] as | 2224/05388 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| principal constituent | 2224/0539 with a principal constituent of |
| 2224/05323 Magnesium [Mg] as principal constituent | the material being a polymer, |
| 2224/05324 Aluminium [Al] as | e.g. polyester, phenolic based |
| principal constituent | polymer, epoxy 2224/05391 The principal constituent |
| 2224/05338 the principal constituent | being an elastomer, e.g. |
| melting at a temperature of greater than or equal to | silicones, isoprene, neoprene |
| 950°C and less than 1550°C | 2224/05393 with a principal constituent of the material being a solid |
| 2224/05339 Silver [Ag] as principal | not provided for in groups |
| constituent 2224/05344 Gold [Au] as principal | <u>H01L 2224/053</u> - <u>H01L 2224/05391</u> , |
| constituent | e.g. allotropes of carbon, fullerene, graphite, carbon- |
| 2224/05347 Copper [Cu] as principal | nanotubes, diamond |
| constituent | |

| | ncipal constituent erial being a liquid | 2224/05457 | | • • | • • | | Cobalt [Co] as principal constituent |
|-------------------------|--|-------------|-------|-----|-----|-------|---|
| | led for in groups 4/053 - H01L 2224/05391 | 2224/0546 | | | | | Iron [Fe] as principal constituent |
| | ncipal constituent | 2224/05463 | | | | | the principal constituent |
| | erial being a gas | | | | | | melting at a temperature of |
| not provid | led for in groups | | | | | | greater than 1550°C |
| H01L 222 | <u>4/053</u> - <u>H01L 2224/05391</u> | 2224/05464 | | | | | • • Palladium [Pd] as |
| 2224/05398 with a prin | ncipal constituent | | | | | | principal constituent |
| | erial being a | 2224/05466 | | | | | |
| | on of two or more | | | | | | constituent |
| | in the form of | 2224/05469 | | | | | Platinum [Pt] as principal |
| | vith a filler, i.e. | | | | | | constituent |
| | brid material, e.g. | 2224/0547 | | | | | Zirconium [Zr] as |
| | d structures, foams | | | | | | principal constituent |
| 2224/05399 Coating mate | | 2224/05471 | | | | | Chromium [Cr] as |
| 2224/054 with a prin | erial being a metal | | | | | | principal constituent |
| | loid, e.g. boron [B], | 2224/05472 | | | | | |
| |], germanium [Ge], | | | | | | constituent |
| | as], antimony [Sb], | 2224/05473 | | • • | • • | | |
| | [Te] and polonium | 2224/0545 | | | | | constituent |
| | alloys thereof | 2224/05476 | | • • | • • | | Ruthenium [Ru] as |
| 2224/05401 the princ | | 2224/05479 | | | | | principal constituent |
| | at a temperature of | 2224/03478 | | • • | • • | | Iridium [Ir] as principal constituent |
| less than | | 2224/05470 | | | | | Niobium [Nb] as principal |
| 2224/05405 Galliu | | 2224/03479 | | • • | • • | | constituent |
| | ituent | 2224/0548 | | | | | Molybdenum [Mo] as |
| 2224/05409 Indiu | 1 | 222 1/03 10 | | • • | • • | | principal constituent |
| | ituent | 2224/05481 | | | | | |
| 2224/05411 | | | | | | | constituent |
| 2224/05413 Bismi | | 2224/05483 | | | | | Rhenium [Re] as principal |
| const | | | | | | | constituent |
| 2224/05414 Thall: | | 2224/05484 | | | | | 2 1 1 |
| | ituent | | | | | | constituent |
| 2224/05416 Lead | [Pb] as principal | 2224/05486 | | | • • | | r |
| const | ituent | | | | | | of the material being a non metallic, non metalloid |
| 2224/05417 the princ | | | | | | | inorganic material |
| | at a temperature | 2224/05487 | | | | | _ |
| | er than or equal to | 2224/03407 | • • • | • • | • • | • • • | carbides, nitrides or |
| | and less than 950°C | | | | | | oxides (glass ceramics |
| 2224/05418 Zinc | | | | | | | H01L 2224/05488) |
| | ituent | 2224/05488 | | | | | · Glasses, e.g. amorphous |
| 2224/0542 Antin | ipal constituent | | | | | | oxides, nitrides or fluorides |
| 2224/05423 Magn | - | 2224/0549 | | | | | |
| | ipal constituent | | | | | | the material being a polymer, |
| 2224/05424 Alum | - | | | | | | e.g. polyester, phenolic based |
| | ipal constituent | 2224/05491 | | | | | polymer, epoxy The principal constituent |
| | cipal constituent | 2224/03491 | • • • | • • | • • | | being an elastomer, e.g. |
| | at a temperature | | | | | | silicones, isoprene, neoprene |
| | er than or equal to | 2224/05493 | | | | | |
| | and less than 1550°C | | | | | | of the material being a solid |
| 2224/05439 Silver | | | | | | | not provided for in groups |
| | ituent | | | | | | <u>H01L 2224/054</u> - <u>H01L 2224/05491</u> , |
| 2224/05444 | [Au] as principal ituent | | | | | | e.g. allotropes of carbon, |
| 2224/05447 Copp | | | | | | | fullerene, graphite, carbon- |
| | • | 2224/05404 | | | | | nanotubes, diamond |
| 2224/05449 Mang | | 2224/05494 | | • • | • • | • • • | with a principal constituent of the material being a liquid |
| | ipal constituent | | | | | | not provided for in groups |
| 2224/05455 Nicke | - | | | | | | H01L 2224/054 - H01L 2224/05491 |
| const | | | | | | | |
| | | | | | | | |

| 2224/05495 with a principal constituent of the material being a gas | 2224/05578 being disposed next to each other, e.g. side-to-side arrangements |
|---|--|
| not provided for in groups | 2224/0558 being stacked |
| | 2224/05582 Two-layer coating |
| 2224/05498 with a principal constituent | 2224/05583 Three-layer coating |
| of the material being a | 2224/05584 Four-layer coating |
| combination of two or more | 2224/05599 Material |
| materials in the form of | 2224/056 with a principal constituent of |
| a matrix with a filler, i.e. | the material being a metal or a |
| being a hybrid material, e.g. | metalloid, e.g. boron [B], silicon |
| segmented structures, foams | [Si], germanium [Ge], arsenic [As], |
| 2224/05499 Shape or distribution of the fillers | antimony [Sb], tellurium [Te] and |
| 2224/0554 External layer | polonium [Po], and alloys thereof |
| 2224/05541 Structure | 2224/05601 the principal constituent melting at |
| 2224/05546 Dual damascene structure | a temperature of less than 400°C |
| 2224/05547 comprising a core and a coating | 2224/05605 Gallium [Ga] as principal |
| 2224/05548 Bonding area integrally formed | constituent |
| with a redistribution layer on the | 2224/05609 Indium [In] as principal |
| semiconductor or solid-state body | constituent |
| 2224/0555 Shape | 2224/05611 Tin [Sn] as principal constituent |
| 2224/05551 comprising apertures or cavities | 2224/05613 Bismuth [Bi] as principal |
| 2224/05552 in top view | constituent |
| 2224/05553 being rectangular | 2224/05614 Thallium [Tl] as principal |
| 2224/05554 being square 2224/05555 being circular or elliptic | constituent 2224/05616 Lead [Pb] as principal constituent |
| 2224/05556 in side view | 2224/05617 the principal constituent melting |
| 2224/05557 comprising protrusions or | at a temperature of greater than or |
| indentations | equal to 400°C and less than 950°C |
| 2224/05558 conformal layer on a patterned | 2224/05618 Zinc [Zn] as principal constituent |
| surface | 2224/0562 Antimony [Sb] as principal |
| 2224/05559 non conformal layer on a patterned | constituent |
| surface | 2224/05623 Magnesium [Mg] as principal |
| 2224/0556 Disposition | constituent |
| 2224/05561 On the entire surface of the internal | 2224/05624 Aluminium [Al] as principal |
| layer | constituent |
| 2224/05562 On the entire exposed surface of the | 2224/05638 the principal constituent melting |
| internal layer | at a temperature of greater than |
| 2224/05563 Only on parts of the surface of the | or equal to 950°C and less than 1550°C |
| internal layer | 2224/05639 Silver [Ag] as principal |
| 2224/05564 Only on the bonding interface of the bonding area | constituent |
| 2224/05565 Only outside the bonding interface | 2224/05644 Gold [Au] as principal |
| of the bonding area | constituent |
| 2224/05566 Both on and outside the bonding | 2224/05647 Copper [Cu] as principal |
| interface of the bonding area | constituent |
| 2224/05567 the external layer being at least | 2224/05649 Manganese [Mn] as principal |
| partially embedded in the surface | constituent |
| 2224/05568 the whole external layer protruding | 2224/05655 Nickel [Ni] as principal |
| from the surface | constituent |
| 2224/05569 the external layer being disposed | 2224/05657 Cobalt [Co] as principal |
| on a redistribution layer on the | constituent |
| semiconductor or solid-state body | 2224/0566 Iron [Fe] as principal constituent |
| 2224/0557 the external layer being disposed on a | 2224/05663 the principal constituent melting |
| via connection of the semiconductor or solid-state body | at a temperature of greater than 1550°C |
| | 2224/05664 Palladium [Pd] as principal |
| 2224/05571 the external layer being disposed in a recess of the surface | constituent |
| 2224/05572 the external layer extending out of | 2224/05666 Titanium [Ti] as principal |
| an opening | constituent |
| 2224/05573 Single external layer | 2224/05669 Platinum [Pt] as principal |
| 2224/05575 Plural external layers | constituent |
| 2224/05576 being mutually engaged together, e.g. | 2224/0567 Zirconium [Zr] as principal |
| through inserts | constituent |

| 2224/05671 Chromium [Cr] as principal constituent | 2224/05701 the principal constituent melting at a temperature of less |
|---|---|
| 2224/05672 Vanadium [V] as principal constituent | than 400°C 2224/05705 Gallium [Ga] as principal |
| 2224/05673 Rhodium [Rh] as principal constituent | constituent 2224/05709 Indium [In] as principal |
| 2224/05676 Ruthenium [Ru] as principal | constituent |
| constituent 2224/05678 Iridium [Ir] as principal | 2224/05711 Tin [Sn] as principal constituent |
| constituent 2224/05679 Niobium [Nb] as principal | 2224/05713 Bismuth [Bi] as principal constituent |
| constituent 2224/0568 Molybdenum [Mo] as principal | 2224/05714 Thallium [Tl] as principal constituent |
| constituent 2224/05681 Tantalum [Ta] as principal | 2224/05716 Lead [Pb] as principal constituent |
| constituent | 2224/05717 the principal constituent |
| 2224/05683 Rhenium [Re] as principal constituent | melting at a temperature of greater than or equal to 400°C and less than 950°C |
| 2224/05684 Tungsten [W] as principal constituent | 2224/05718 Zinc [Zn] as principal |
| 2224/05686 with a principal constituent of the material being a non metallic, non | constituent 2224/0572 Antimony [Sb] as principal |
| metalloid inorganic material | constituent |
| 2224/05687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics | 2224/05723 Magnesium [Mg] as principal constituent |
| <u>H01L 2224/05688</u>) 2224/05688 Glasses, e.g. amorphous oxides, | 2224/05724 Aluminium [Al] as principal constituent |
| nitrides or fluorides | 2224/05738 the principal constituent |
| 2224/0569 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, | melting at a temperature of greater than or equal to 950°C and less than 1550°C |
| epoxy | 2224/05739 Silver [Ag] as principal |
| 2224/05691 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene | constituent 2224/05744 Gold [Au] as principal constituent |
| 2224/05693 with a principal constituent of the material being a solid | 2224/05747 Copper [Cu] as principal constituent |
| not provided for in groups H01L 2224/056 - H01L 2224/05691, | 2224/05749 Manganese [Mn] as |
| e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | principal constituent 2224/05755 Nickel [Ni] as principal constituent |
| 2224/05694 with a principal constituent of the material being a liquid | 2224/05757 Cobalt [Co] as principal constituent |
| not provided for in groups H01L 2224/056 - H01L 2224/05691 | 2224/0576 Iron [Fe] as principal constituent |
| 2224/05695 with a principal constituent of the material being a gas | 2224/05763 the principal constituent |
| not provided for in groups | melting at a temperature of greater than 1550°C |
| <u>H01L 2224/056</u> - <u>H01L 2224/05691</u> 2224/05698 with a principal constituent of the | 2224/05764 Palladium [Pd] as principal constituent |
| material being a combination of two or more materials in the form of a | 2224/05766 Titanium [Ti] as principal constituent |
| matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, | 2224/05769 Platinum [Pt] as principal constituent |
| foams 2224/05699 Material of the matrix | 2224/0577 Zirconium [Zr] as principal |
| 2224/057 with a principal constituent of the material being a metal or a | constituent 2224/05771 Chromium [Cr] as principal |
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic | constituent 2224/05772 Vanadium [V] as principal |
| [As], antimony [Sb], tellurium | constituent 2224/05773 Rhodium [Rh] as principal |
| [Te] and polonium [Po], and alloys thereof | constituent |
| | 2224/05776 Ruthenium [Ru] as principal constituent |

| 2224/05778 Iridium [Ir] as principal constituent | 2224/05816 Lead [Pb] as principal constituent |
|--|--|
| 2224/05779 Niobium [Nb] as principal constituent | 2224/05817 the principal constituent melting at a temperature |
| 2224/0578 Molybdenum [Mo] as principal constituent | of greater than or equal to 400°C and less than 950°C |
| 2224/05781 Tantalum [Ta] as principal constituent | 2224/05818 Zinc [Zn] as principal constituent |
| 2224/05783 Rhenium [Re] as principal constituent | 2224/0582 Antimony [Sb] as principal constituent |
| 2224/05784 Tungsten [W] as principal constituent | 2224/05823 Magnesium [Mg] as principal constituent |
| 2224/05786 with a principal constituent of the material being a non metallic, | 2224/05824 Aluminium [Al] as principal constituent |
| non metalloid inorganic material 2224/05787 Ceramics, e.g. crystalline | 2224/05838 the principal constituent melting at a temperature |
| carbides, nitrides or oxides (glass ceramics | of greater than or equal to 950°C and less than 1550°C |
| <u>H01L 2224/05788</u>) 2224/05788 Glasses, e.g. amorphous | 2224/05839 Silver [Ag] as principal constituent |
| oxides, nitrides or fluorides 2224/0579 with a principal constituent of | 2224/05844 Gold [Au] as principal constituent |
| the material being a polymer, e.g. polyester, phenolic based | 2224/05847 Copper [Cu] as principal constituent |
| polymer, epoxy 2224/05791 The principal constituent being | 2224/05849 Manganese [Mn] as principal constituent |
| an elastomer, e.g. silicones, isoprene, neoprene | 2224/05855 Nickel [Ni] as principal constituent |
| 2224/05793 with a principal constituent of the material being a solid | 2224/05857 Cobalt [Co] as principal constituent |
| not provided for in groups H01L 2224/057 - H01L 2224/05791, | 2224/0586 Iron [Fe] as principal constituent |
| e.g. allotropes of carbon, | Constituent |
| fullerene, graphite, carbon- | 2224/05863 the principal constituent melting at a temperature of |
| fullerene, graphite, carbon- nanotubes, diamond 2224/05794 with a principal constituent | melting at a temperature of greater than 1550°C 2224/05864 Palladium [Pd] as |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 with a principal constituent of the material being a liquid not provided for in groups | melting at a temperature of greater than 1550°C |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 with a principal constituent of the material being a liquid not provided for in groups H01L 2224/0579 - H01L 2224/05791 2224/05795 with a principal constituent | melting at a temperature of greater than 1550°C 2224/05864 Palladium [Pd] as principal constituent |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05795 with a principal constituent of the material being a gas not provided for in groups | melting at a temperature of greater than 1550°C 2224/05864 |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal constituent 2224/05879 . Niobium [Nb] as principal |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal constituent 2224/05879 . Niobium [Nb] as principal constituent 2224/05889 . Molybdenum [Mo] as |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05795 . with a principal constituent of the material being a gas not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05798 . Fillers 2224/05799 . Base material 2224/0580 . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/05801 . the principal constituent melting at a temperature of less than 400°C 2224/05805 . Gallium [Ga] as principal constituent 12224/05809 . Indium [In] as principal | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal constituent 2224/05879 . Niobium [Nb] as principal constituent |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05795 . with a principal constituent of the material being a gas not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05798 . Fillers 2224/05799 . Base material 2224/058 . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/05801 . the principal constituent melting at a temperature of less than 400°C 2224/05805 . Gallium [Ga] as principal constituent 2224/05809 . Indium [In] as principal constituent 2224/05811 . Tin [Sn] as principal | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal constituent 2224/05879 . Niobium [Nb] as principal constituent 2224/0588 . Molybdenum [Mo] as principal constituent |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05795 . with a principal constituent of the material being a gas not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05798 . Fillers 2224/05799 . Base material 2224/058 . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/05801 . the principal constituent melting at a temperature of less than 400°C 2224/05805 . Gallium [Ga] as principal constituent 2224/05809 . Indium [In] as principal constituent 2224/05811 . Tin [Sn] as principal constituent 2224/05813 . Bismuth [Bi] as principal | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal constituent 2224/05879 . Niobium [Nb] as principal constituent 2224/05881 . Molybdenum [Mo] as principal constituent 2224/05883 . Rhenium [Re] as principal constituent 2224/05883 . Rhenium [Re] as principal constituent |
| fullerene, graphite, carbonnanotubes, diamond 2224/05794 . with a principal constituent of the material being a liquid not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05795 . with a principal constituent of the material being a gas not provided for in groups H01L 2224/057 - H01L 2224/05791 2224/05798 . Fillers 2224/05799 . Base material 2224/058 . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/05801 . the principal constituent melting at a temperature of less than 400°C 2224/05805 . Gallium [Ga] as principal constituent 2224/05809 . Indium [In] as principal constituent 2224/05811 . Tin [Sn] as principal constituent 2224/05811 . Tin [Sn] as principal constituent | melting at a temperature of greater than 1550°C 2224/05864 . Palladium [Pd] as principal constituent 2224/05866 . Titanium [Ti] as principal constituent 2224/05869 . Platinum [Pt] as principal constituent 2224/0587 . Zirconium [Zr] as principal constituent 2224/05871 . Chromium [Cr] as principal constituent 2224/05872 . Vanadium [V] as principal constituent 2224/05873 . Rhodium [Rh] as principal constituent 2224/05876 . Ruthenium [Ru] as principal constituent 2224/05878 . Iridium [Ir] as principal constituent 2224/05879 . Niobium [Nb] as principal constituent 2224/0588 . Molybdenum [Mo] as principal constituent 2224/05881 . Tantalum [Ta] as principal constituent 2224/05883 . Rhenium [Re] as principal |

| 2224/05886 | with a principal constituent of the material being a non metallic, non metalloid | 2224/05917 the principal constituent melting at a temperature of greater than or equal to |
|------------|---|---|
| 2224/05887 | inorganic material Ceramics, e.g. crystalline carbides, nitrides or | 400°C and less than 950°C 2224/05918 Zinc [Zn] as principal constituent |
| 2224/05888 | oxides (glass ceramics <u>H01L 2224/05888</u>) • Glasses, e.g. amorphous | 2224/0592 Antimony [Sb] as principal constituent |
| | oxides, nitrides or fluorides with a principal constituent of | 2224/05923 Magnesium [Mg] as principal constituent |
| 2224/0589 | the material being a polymer, e.g. polyester, phenolic based | 2224/05924 Aluminium [Al] as principal constituent |
| 2224/05901 | polymer, epoxy The principal constituent | 2224/05938 the principal constituent melting at a temperature |
| 2224/05891 | being an elastomer, e.g. silicones, isoprene, neoprene | of greater than or equal to 950°C and less than 1550°C |
| 2224/05893 | with a principal constituent of the material being a solid | 2224/05939 Silver [Ag] as principal constituent |
| | not provided for in groups H01L 2224/058 - H01L 2224/0589 | 2224/05944 Gold [Au] as principal constituent |
| | e.g. allotropes of carbon, fullerene, graphite, carbon- | constituent |
| 2224/05894 | nanotubes, diamond with a principal constituent | 2224/05949 Manganese [Mn] as principal constituent |
| | of the material being a liquid not provided for in groups | 2224/05955 Nickel [Ni] as principal constituent |
| 2224/05895 | H01L 2224/058 - H01L 2224/0589 with a principal constituent | constituent |
| | of the material being a gas not provided for in groups | 2224/0596 Iron [Fe] as principal constituent 2224/05963 the principal constituent |
| 2224/05898 | <u>H01L 2224/058</u> - <u>H01L 2224/0589</u> with a principal constituent | melting at a temperature of greater than 1550°C |
| | of the material being a combination of two or more | 2224/05964 Palladium [Pd] as principal constituent |
| | materials in the form of a matrix with a filler, i.e. | 2224/05966 |
| 2224/05000 | being a hybrid material, e.g. segmented structures, foams | 2224/05969 Platinum [Pt] as principal constituent |
| 2224/05899 | Coating material with a principal constituent | 2224/0597 Zirconium [Zr] as principal constituent |
| | of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], | 2224/05971 Chromium [Cr] as principal constituent |
| | arsenic [As], antimony [Sb], tellurium [Te] and polonium | 2224/05972 Vanadium [V] as principal constituent |
| 2224/05901 | [Po], and alloys thereof | 2224/05973 Rhodium [Rh] as principal constituent |
| 222,00501 | melting at a temperature of less than 400°C | 2224/05976 Ruthenium [Ru] as principal constituent |
| 2224/05905 | Gallium [Ga] as principal constituent | 2224/05978 Iridium [Ir] as principal constituent |
| 2224/05909 | Indium [In] as principal constituent | 2224/05979 Niobium [Nb] as principal constituent |
| 2224/05911 | Tin [Sn] as principal constituent | 2224/0598 Molybdenum [Mo] as principal constituent |
| 2224/05913 | | 2224/05981 Tantalum [Ta] as principal constituent |
| 2224/05914 | Thallium [T1] as principal constituent | 2224/05983 Rhenium [Re] as principal constituent |
| 2224/05916 | Lead [Pb] as principal constituent | 2224/05984 Tungsten [W] as principal constituent |

| 2224/05986 with a principal constituent of the material being a non | 2224/06137 with specially adapted redistribution layers [RDL] |
|---|---|
| metallic, non metalloid inorganic material | 2224/06138 being disposed in a single wiring level, i.e. planar layout |
| 2224/05987 Ceramics, e.g. crystalline carbides, nitrides or | 2224/06139 being disposed in different wiring levels, i.e. resurf layout |
| oxides (glass ceramics <u>H01L 2224/05988</u>) | 2224/0614 Circular array, i.e. array with radial symmetry |
| 2224/05988 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/06141 being uniform, i.e. having a uniform pitch across the array |
| 2224/0599 with a principal constituent of | 2224/06142 being non uniform, i.e. having a |
| the material being a polymer, e.g. polyester, phenolic based | non uniform pitch across the array 2224/06143 with a staggered arrangement, e.g. |
| polymer, epoxy 2224/05991 The principal constituent | depopulated array 2224/06144 covering only portions of the |
| being an elastomer, e.g. silicones, isoprene, neoprene | surface to be connected |
| 2224/05993 with a principal constituent | 2224/06145 Covering only the peripheral area of the surface to be connected, |
| of the material being a solid not provided for in groups | i.e. peripheral arrangements |
| <u>H01L 2224/059</u> - <u>H01L 2224/0599</u> e.g. allotropes of carbon, | 2224/06146 Covering only the central area of the surface to be connected, i.e. central arrangements |
| fullerene, graphite, carbon- nanotubes, diamond | 2224/06147 with specially adapted |
| 2224/05994 with a principal constituent | redistribution layers [RDL] 2224/06148 being disposed in a single wiring |
| of the material being a liquid not provided for in groups | level, i.e. planar layout |
| <u>H01L 2224/059</u> - <u>H01L 2224/0599</u> 2224/05995 with a principal constituent | 2224/06149 being disposed in different wiring levels, i.e. resurf layout |
| of the material being a gas | 2224/0615 Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral |
| not provided for in groups H01L 2224/059 - H01L 2224/0599 | symmetry symmetry |
| 2224/05998 with a principal constituent | 2224/06151 being uniform, i.e. having a uniform pitch across the array |
| of the material being a combination of two or more | 2224/06152 being non uniform, i.e. having a |
| materials in the form of a matrix with a filler, i.e. | non uniform pitch across the array 2224/06153 with a staggered arrangement, e.g. |
| being a hybrid material, e.g. | depopulated array |
| segmented structures, foams 2224/05999 Shape or distribution of the fillers | 2224/06154 covering only portions of the surface to be connected |
| 2224/06 of a plurality of bonding areas | 2224/06155 Covering only the peripheral area |
| 2224/0601 Structure | of the surface to be connected, i.e. peripheral arrangements |
| 2224/0603 Bonding areas having different sizes, e.g. different heights or widths | 2224/06156 Covering only the central area of |
| 2224/0605 Shape | the surface to be connected, i.e. central arrangements |
| 2224/06051 Bonding areas having different shapes 2224/061 Disposition | 2224/06157 with specially adapted |
| 2224/06102 the bonding areas being at different | redistribution layers [RDL] 2224/06158 being disposed in a single wiring |
| heights 2224/0612 Layout | level, i.e. planar layout |
| 2224/0613 Square or rectangular array | 2224/06159 being disposed in different wiring levels, i.e. resurf layout |
| 2224/06131 being uniform, i.e. having a uniform pitch across the array | 2224/0616 Random array, i.e. array with no |
| 2224/06132 being non uniform, i.e. having a | symmetry 2224/06163 with a staggered arrangement |
| non uniform pitch across the array 2224/06133 with a staggered arrangement, e.g. | 2224/06164 covering only portions of the surface to be connected |
| depopulated array | 2224/06165 Covering only the peripheral area |
| 2224/06134 covering only portions of the surface to be connected | of the surface to be connected, i.e. peripheral arrangements |
| 2224/06135 Covering only the peripheral area of the surface to be connected, | 2224/06166 Covering only the central area of |
| i.e. peripheral arrangements | the surface to be connected, i.e. central arrangements |
| 2224/06136 Covering only the central area of the surface to be connected, i.e. | 2224/06167 with specially adapted |
| central arrangements | redistribution layers [RDL] |

| 2224/06168 being disposed in a single wiring level, i.e. planar layout | 2224/08135 the bonding area connecting between different semiconductor or solid-state |
|--|---|
| 2224/06169 being disposed in different wiring levels, i.e. resurf layout | bodies, i.e. chip-to-chip 2224/08137 the bodies being arranged next |
| 2224/06177 Combinations of arrays with different layouts | to each other, e.g. on a common substrate |
| 2224/06179 Corner adaptations, i.e. disposition of | 2224/08145 the bodies being stacked |
| the bonding areas at the corners of the semiconductor or solid-state body | 2224/08146 the bonding area connecting to a via connection in the body |
| 2224/0618 being disposed on at least two different sides of the body, e.g. dual array | 2224/08147 the bonding area connecting to a bonding area disposed in a recess |
| 2224/06181 On opposite sides of the body | of the surface of the body |
| 2224/06182 with specially adapted redistribution layers [RDL] | 2224/08148 the bonding area connecting to a bonding area protruding from the |
| 2224/06183 On contiguous sides of the body | surface of the body |
| 2224/06187 with specially adapted | 2224/08151 the bonding area connecting between |
| redistribution layers [RDL] | a semiconductor or solid-state body and an item not being a |
| 2224/06188 being disposed in a single wiring level, i.e. planar layout | semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive |
| 2224/06189 being disposed in different | 2224/08153 the body and the item being |
| wiring levels, i.e. resurf layout | arranged next to each other, e.g. on |
| 2224/065 Material | a common substrate |
| 2224/06505 Bonding areas having different materials | 2224/08155 the item being non-metallic, e.g. |
| 2224/0651 Function | being an insulating substrate with |
| 2224/06515 Bonding areas having different functions | or without metallisation 2224/0816 the bonding area connecting to |
| 2224/06517 including bonding areas providing | a pin of the item |
| primarily mechanical bonding | 2224/08163 the bonding area connecting to |
| 2224/06519 including bonding areas providing | a potential ring of the item |
| primarily thermal dissipation 2224/07 Structure, shape, material or disposition of the | 2224/08165 the bonding area connecting to a via metallisation of the item |
| bonding areas after the connecting process | 2224/08167 the bonding area connecting |
| 2224/08 of an individual bonding area | to a bonding area disposed in |
| 2224/0801 Structure | a recess of the surface of the |
| 2224/0805 Shape | item |
| 2224/08052 in top view | 2224/08168 the bonding area connecting to |
| 2224/08053 being non uniform along the bonding area | a bonding area protruding from the surface of the item |
| 2224/08054 being rectangular | 2224/08175 the item being metallic |
| 2224/08055 being square | 2224/08183 the bonding area connecting to |
| 2224/08056 being circular or elliptic | a potential ring of the item |
| 2224/08057 in side view | 2224/08187 the bonding area connecting |
| 2224/08058 being non uniform along the bonding area | to a bonding area disposed in a recess of the surface of the |
| 2224/08059 comprising protrusions or | item |
| indentations | 2224/08188 the bonding area connecting to |
| 2224/0807 of bonding interfaces, e.g. interlocking features | a bonding area protruding from the surface of the item |
| 2224/081 Disposition | 2224/08195 the item being a discrete passive |
| 2224/08111 the bonding area being disposed in a | component |
| recess of the surface of the body | 2224/08197 the bonding area connecting |
| 2224/08112 the bonding area being at least partially embedded in the surface of the body | to a bonding area disposed in a recess of the surface of the |
| 2224/08113 the whole bonding area protruding from the surface of the body | item 2224/08198 the bonding area connecting to |
| 2224/0812 the bonding area connecting directly to another bonding area, i.e. connectorless | a bonding area protruding from the surface of the item |
| bonding, e.g. bumpless bonding | 2224/08221 the body and the item being stacked |
| 2224/08121 the connected bonding areas being not | 2224/08225 the item being non-metallic, |
| aligned with respect to each other 2224/08123 the bonding area connecting directly | e.g. insulating substrate with or without metallisation |
| to at least two bonding areas | 2224/0823 the bonding area connecting to |
| to at least two boliding areas | a pin of the item |

| 2224/08233 the bonding area connecting to a potential ring of the item | 2224/09135 Covering only the peripheral area of the surface to be connected, |
|---|--|
| 2224/08235 the bonding area connecting to a via metallisation of the item | i.e. peripheral arrangements 2224/0914 Circular array, i.e. array with radial |
| 2224/08237 the bonding area connecting | symmetry |
| to a bonding area disposed in a recess of the surface of the | 2224/09142 being non uniform, i.e. having a non uniform pitch across the array |
| item | 2224/09143 with a staggered arrangement |
| 2224/08238 the bonding area connecting to a bonding area protruding from | 2224/09144 covering only portions of the surface to be connected |
| the surface of the item | 2224/09145 Covering only the peripheral area |
| 2224/08245 the item being metallic | of the surface to be connected, |
| 2224/08253 the bonding area connecting to | i.e. peripheral arrangements |
| a potential ring of the item | 2224/0915 Mirror array, i.e. array having only |
| 2224/08257 the bonding area connecting to a bonding area disposed in | a reflection symmetry, i.e. bilateral symmetry |
| a recess of the surface of the | 2224/09151 being uniform, i.e. having a |
| item | uniform pitch across the array |
| 2224/08258 the bonding area connecting to | 2224/09152 being non uniform, i.e. having a |
| a bonding area protruding from | non uniform pitch across the array |
| the surface of the item | 2224/09153 with a staggered arrangement, e.g. |
| 2224/08265 the item being a discrete passive | depopulated array |
| component | 2224/09154 covering only portions of the |
| 2224/08267 the bonding area connecting | surface to be connected |
| to a bonding area disposed in | 2224/09155 Covering only the peripheral area |
| a recess of the surface of the item | of the surface to be connected, i.e. peripheral arrangements |
| 2224/08268 the bonding area connecting to | 2224/09156 Covering only the central area of |
| a bonding area protruding from the surface of the item | the surface to be connected, i.e. central arrangements |
| 2224/085 Material | 2224/0916 Random array, i.e. array with no |
| 2224/08501 at the bonding interface | symmetry |
| 2224/08502 comprising an eutectic alloy | 2224/09163 with a staggered arrangement |
| 2224/08503 comprising an intermetallic compound | 2224/09164 covering only portions of the surface to be connected |
| 2224/08505 outside the bonding interface | 2224/09165 Covering only the peripheral area |
| 2224/08506 comprising an eutectic alloy | of the surface to be connected, |
| 2224/09 of a plurality of bonding areas | i.e. peripheral arrangements |
| 2224/0901 Structure | 2224/09177 Combinations of arrays with different |
| 2224/0903 Bonding areas having different sizes, | layouts |
| e.g. different diameters, heights or | 2224/09179 Corner adaptations, i.e. disposition of |
| widths | the bonding areas at the corners of the |
| 2224/0905 Shape | semiconductor or solid-state body |
| 2224/09051 Bonding areas having different shapes | 2224/0918 being disposed on at least two different |
| 2224/09055 of their bonding interfaces | sides of the body, e.g. dual array |
| 2224/091 Disposition | 2224/09181 On opposite sides of the body |
| 2224/09102 the bonding areas being at different | 2224/09183 On contiguous sides of the body |
| heights | 2224/095 Material |
| 2224/09103 on the semiconductor or solid-state | 2224/09505 Bonding areas having different materials |
| body | 2224/0951 Function |
| 2224/09104 outside the semiconductor or solid- state body | 2224/09515 Bonding areas having different functions |
| 2224/0912 Layout (layout of bonding areas prior to the connecting process | 2224/09517 including bonding areas providing primarily mechanical support |
| H01L 2224/0612) | 2224/09519 including bonding areas providing |
| 2224/0913 Square or rectangular array | primarily thermal dissipation |
| 2224/09132 being non uniform, i.e. having a | 2224/10 Bump connectors; Manufacturing methods related |
| non uniform pitch across the array | thereto |
| 2224/09133 with a staggered arrangement, e.g. depopulated array | 2224/1012 • • • Auxiliary members for bump connectors, e.g. spacers |
| 2224/09134 covering only portions of the | 2224/10122 being formed on the semiconductor or solid- |
| surface to be connected | state body to be connected |
| | 2224/10125 Reinforcing structures |
| | 2224/10126 Bump collar |

| 2224/10135 Alignment aids | 2224/1144 by transfer printing |
|---|--|
| 2224/10145 Flow barriers | 2224/11442 using a powder |
| 2224/10152 being formed on an item to be connected not | 2224/11444 in gaseous form |
| being a semiconductor or solid-state body | 2224/1145 Physical vapour deposition [PVD], e.g. |
| 2224/10155 Reinforcing structures | evaporation, or sputtering |
| 2224/10156 Bump collar | 2224/11452 Chemical vapour deposition [CVD], e.g. |
| 2224/10165 Alignment aids | laser CVD |
| 2224/10175 Flow barriers | 2224/1146 Plating |
| 2224/101/3 How barriers 2224/11 Manufacturing methods | 2224/11462 Electroplating |
| 2224/11001 Involving a temporary auxiliary member not | 2224/11464 Electrophating |
| forming part of the manufacturing apparatus, | 2224/11466 Conformal deposition, i.e. blanket |
| e.g. removable or sacrificial coating, film or substrate | deposition of a conformal layer on a patterned surface |
| 2224/11002 for supporting the semiconductor or solid- | 2224/1147 using a lift-off mask |
| state body | 2224/11472 Profile of the lift-off mask |
| 2224/11003 for holding or transferring the bump | 2224/11474 Multilayer masks |
| preform | 2224/1148 Permanent masks, i.e. masks left in the |
| 2224/11005 for aligning the bump connector, e.g. | finished device, e.g. passivation layers |
| marks, spacers | 2224/115 by chemical or physical modification of a |
| 2224/11009 for protecting parts during manufacture | pre-existing or pre-deposited material |
| 2224/11011 Involving a permanent auxiliary member, i.e. | 2224/11502 Pre-existing or pre-deposited material |
| a member which is left at least partly in the | 2224/11505 Sintering |
| finished device, e.g. coating, dummy feature | 2224/1151 Anodisation |
| 2224/11013 for holding or confining the bump | 2224/11515 Curing and solidification, e.g. of a |
| connector, e.g. solder flow barrier | photosensitive bump material |
| 2224/11015 for aligning the bump connector, e.g. | 2224/1152 Self-assembly, e.g. self-agglomeration of |
| marks, spacers | the bump material in a fluid |
| 2224/11019 for protecting parts during the process | 2224/11522 Auxiliary means therefor, e.g. for self- |
| 2224/111 Manufacture and pre-treatment of the bump | assembly activation |
| connector preform | 2224/11524 with special adaptation of the surface |
| 2224/1111 Shaping | or of an auxiliary substrate, e.g. surface |
| 2224/1112 Applying permanent coating | shape specially adapted for the self- |
| 2224/113 by local deposition of the material of the | assembly process |
| bump connector | 2224/11526 involving the material of the bonding |
| 2224/1131 in liquid form | area, e.g. bonding pad or under bump |
| 2224/11312 Continuous flow, e.g. using a | metallisation [UBM] |
| microsyringe, a pump, a nozzle or extrusion | 2224/1155 Selective modification |
| | 2224/11552 using a laser or a focussed ion beam |
| 2224/11318 by dispensing droplets | [FIB] |
| 2224/1132 Screen printing, i.e. using a stencil | 2224/11554 Stereolithography, i.e. solidification of a pattern defined by a laser trace in |
| 2224/1133 in solid form | a photosensitive resin |
| 2224/11332 using a powder | 2224/116 by patterning a pre-deposited material |
| 2224/11334 using preformed bumps | (treatment of parts prior to assembly of the |
| 2224/1134 Stud bumping, i.e. using a wire-bonding apparatus | devices <u>H01L 21/48</u>) |
| 2224/114 by blanket deposition of the material of the | 2224/11602 Mechanical treatment, e.g. polishing, |
| bump connector | grinding |
| 2224/1141 in liquid form | 2224/1161 Physical or chemical etching |
| 2224/11416 Spin coating | 2224/11612 by physical means only |
| 2224/11418 Spray coating | 2224/11614 by chemical means only |
| 2224/1142 Curtain coating | 2224/11616 Chemical mechanical polishing [CMP] |
| 2224/11422 by dipping, e.g. in a solder bath (hot- | 2224/11618 with selective exposure, development |
| dipping C23C 2/00) | and removal of a photosensitive bump |
| 2224/11424 Immersion coating, e.g. in a solder bath (immersion processes C23C 2/00) | material, e.g. of a photosensitive conductive resin |
| 2224/11426 Chemical solution deposition [CSD], i.e. | 2224/1162 using masks |
| using a liquid precursor | 2224/11622 Photolithography |
| 2224/11428 Wave coating | 2224/1163 using a laser or a focused ion beam [FIB] |
| 2224/1143 in solid form | 2224/11632 Ablation by means of a laser or focused |
| 2224/11436 Lamination of a preform, e.g. foil, sheet | ion beam [FIB] |
| or layer | 2224/117 involving monitoring, e.g. feedback loop |
| 2224/11438 the preform being at least partly pre- | 2224/118 Post-treatment of the bump connector |
| patterned | - |
| | |

| 2224/1181 Cleaning, e.g. oxide removal step, | 2224/1301 Shape |
|--|--|
| desmearing | 2224/13011 comprising apertures or cavities, e.g. |
| 2224/1182 Applying permanent coating, e.g. in-situ | hollow bump |
| coating | 2224/13012 in top view |
| 2224/11821 Spray coating | 2224/13013 being rectangular or square |
| 2224/11822 by dipping, e.g. in a solder bath 2224/11823 Immersion coating, e.g. in a solder bath | 2224/13014 being circular or elliptic |
| 2224/11824 Chemical solution deposition [CSD], i.e. | 2224/13015 comprising protrusions or indentations |
| using a liquid precursor | 2224/13016 in side view |
| 2224/11825 Plating, e.g. electroplating, electroless | 2224/13017 being non uniform along the bump |
| plating | connector |
| 2224/11826 Physical vapour deposition [PVD], e.g. evaporation, or sputtering | 2224/13018 comprising protrusions or indentations |
| 2224/11827 Chemical vapour deposition [CVD], e.g. laser CVD | 2224/13019 at the bonding interface of the bump connector, i.e. on the |
| 2224/1183 Reworking, e.g. shaping (reflowing | surface of the bump connector |
| <u>H01L 2224/11849</u>) | 2224/1302 Disposition |
| 2224/11831 involving a chemical process, e.g. etching the bump connector | 2224/13021 the bump connector being disposed in a recess of the surface |
| 2224/1184 involving a mechanical process, e.g. planarising the bump connector | 2224/13022 the bump connector being at least partially embedded in the surface |
| 2224/11845 Chemical mechanical polishing [CMP] | 2224/13023 the whole bump connector protruding |
| 2224/11848 Thermal treatments, e.g. annealing, | from the surface |
| controlled cooling 2224/11849 Reflowing | 2224/13024 the bump connector being disposed on a redistribution layer on the |
| 2224/119 Methods of manufacturing bump connectors | semiconductor or solid-state body |
| involving a specific sequence of method | 2224/13025 the bump connector being disposed on |
| steps | a via connection of the semiconductor or solid-state body |
| 2224/11901 with repetition of the same manufacturing step | 2224/13026 relative to the bonding area, e.g. bond |
| 2224/11902 Multiple masking steps | pad, of the semiconductor or solid- |
| 2224/11903 using different masks | state body |
| 2224/11906 with modification of the same mask | 2224/13027 the bump connector being offset |
| 2224/1191 Forming a passivation layer after forming the bump connector | with respect to the bonding area, e.g. bond pad |
| 2224/11912 the bump being used as a mask for | 2224/13028 the bump connector being disposed on at least two separate bonding |
| patterning other parts [2224/11914 the under bump metallisation [UBM] | areas, e.g. bond pads |
| being used as a mask for patterning other | 2224/13075 Plural core members |
| parts | 2224/13076 being mutually engaged together, e.g. |
| 2224/11916 a passivation layer being used as a mask | through inserts |
| for patterning other parts 2224/12 Structure, shape, material or disposition of | 2224/13078 being disposed next to each other, e.g. side-to-side arrangements |
| the bump connectors prior to the connecting | 2224/1308 being stacked |
| process | 2224/13082 Two-layer arrangements |
| 2224/12105 Bump connectors formed on an | 2224/13083 Three-layer arrangements |
| encapsulation of the semiconductor or | 2224/13084 Four-layer arrangements |
| solid-state body, e.g. bumps on chip-scale packages | 2224/13099 Material |
| 2224/13 of an individual bump connector | 2224/131 with a principal constituent of the material being a metal or a |
| 2224/13001 Core members of the bump connector | metalloid, e.g. boron [B], silicon |
| 2224/13005 Structure | [Si], germanium [Ge], arsenic [As], |
| 2224/13006 Bump connector larger than the | antimony [Sb], tellurium [Te] and |
| underlying bonding area, e.g. than the | polonium [Po], and alloys thereof |
| under bump metallisation [UBM] 2224/13007 Bump connector smaller than the | 2224/13101 the principal constituent melting at a temperature of less than 400°C |
| underlying bonding area, e.g. than the | 2224/13105 Gallium [Ga] as principal |
| under bump metallisation [UBM] | constituent |
| 2224/13008 Bump connector integrally formed | 2224/13109 Indium [In] as principal |
| with a redistribution layer on the | constituent |
| semiconductor or solid-state body | 2224/13111 Tin [Sn] as principal constituent |
| 2224/13009 Bump connector integrally formed with a via connection of the | 2224/13113 Bismuth [Bi] as principal constituent |
| semiconductor or solid-state body | Constituent |
| | |

| | nstituent | 2224/13187 | • • • • • • | Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics 1011 2224/(2188)) |
|--------------------------------|--|------------|-------------|--|
| 2224/13116 Le 2224/13117 the p | | 2224/13188 | | H01L 2224/13188) Glasses, e.g. amorphous oxides, nitrides or fluorides |
| equal 2224/13118 Zii 2224/1312 | I to 400°C and less than 950°C nc [Zn] as principal constituent | 2224/1319 | | with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy |
| 2224/13123 | agnesium [Mg] as principal nstituent | 2224/13191 | | • The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/13138 the p at a t | uminium [AI] as principal nstituent rincipal constituent melting emperature of greater than ual to 950°C and less than | 2224/13193 | | with a principal constituent of the material being a solid not provided for in groups H01L 2224/131 - H01L 2224/13191, e.g. allotropes of carbon, fullerene, |
| 2224/13139 Sil | ver [Ag] as principal nstituent | 2224/13194 | | graphite, carbon-nanotubes, diamond with a principal constituent of the material being a liquid |
| 2224/13144 | nstituent | | | not provided for in groups H01L 2224/131 - H01L 2224/13191 |
| | nstituent | 2224/13195 | | with a principal constituent of the material being a gas not provided for in groups |
| 2224/13155 Ni | nstituent ckel [Ni] as principal nstituent | 2224/13198 | | H01L 2224/131 - H01L 2224/13191 with a principal constituent of the |
| 2224/13157 Co | obalt [Co] as principal nstituent | | | material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid |
| | rincipal constituent melting emperature of greater than | 2224/13199 | | material, e.g. segmented structures, foams Material of the matrix |
| 1550 2224/13164 Pa con | | 2224/132 | • • • • • • | • • with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon |
| 2224/13166 Tit con 2224/13169 | nstituent | | | [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium |
| CO | nstituent reonium [Zr] as principal | 2224/13201 | | [Te] and polonium [Po], and alloys thereof the principal constituent |
| 2224/13171 | nstituent nromium [Cr] as principal | | | melting at a temperature of less than 400°C |
| 2224/13172 Va | nstituent madium [V] as principal nstituent | 2224/13205 | | Gallium [Ga] as principal constituent Indium [In] as principal |
| 2224/13173 Rh | | 2224/13211 | | constituent |
| | nstituent | 2224/13213 | • • • • • • | |
| | dium [Ir] as principal nstituent obium [Nb] as principal | 2224/13214 | | constituent Thallium [TI] as principal constituent |
| 2224/1318 Mo | nstituent olybdenum [Mo] as principal | 2224/13216 | • • • • • • | Lead [Pb] as principal constituent |
| 2224/13181 Ta | nstituent .ntalum [Ta] as principal nstituent | 2224/13217 | | melting at a temperature of greater than or equal to 400°C |
| 2224/13183 Rh | nenium [Re] as principal nstituent | 2224/13218 | . | and less than 950°C |
| | nstituent | 2224/1322 | • • • • • • | • 1 |
| | principal constituent of the all being a non metallic, non all inorganic material | 2224/13223 | • • • • • • | constituent Magnesium [Mg] as principal constituent |

| 2224/13224 Aluminium [Al] as principal constituent | 2224/13291 The principal constituent being an elastomer, e.g. silicones, |
|---|---|
| 2224/13238 the principal constituent melting at a temperature of greater than or equal to 950°C | isoprene, neoprene 2224/13293 with a principal constituent of the material being a solid |
| and less than 1550°C 2224/13239 Silver [Ag] as principal | not provided for in groups H01L 2224/132 - H01L 2224/13291, |
| constituent 2224/13244 Gold [Au] as principal constituent | e.g. allotropes of carbon, fullerene, graphite, carbon- nanotubes, diamond |
| 2224/13247 Copper [Cu] as principal | 2224/13294 with a principal constituent of the material being a liquid |
| constituent 2224/13249 Manganese [Mn] as principal constituent | not provided for in groups <u>H01L 2224/132</u> - <u>H01L 2224/13291</u> |
| 2224/13255 Nickel [Ni] as principal constituent | 2224/13295 with a principal constituent of the material being a gas |
| 2224/13257 Cobalt [Co] as principal constituent | not provided for in groups H01L 2224/132 - H01L 2224/13291 |
| 2224/1326 Iron [Fe] as principal | 2224/13298 Fillers |
| constituent | 2224/13299 Base material |
| 2224/13263 the principal constituent | 2224/133 with a principal constituent |
| melting at a temperature of greater than 1550°C | of the material being a metal or a metalloid, e.g. boron [B], |
| 2224/13264 Palladium [Pd] as principal constituent | silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], |
| 2224/13266 Titanium [Ti] as principal constituent | tellurium [Te] and polonium [Po], and alloys thereof |
| 2224/13269 Platinum [Pt] as principal constituent | 2224/13301 the principal constituent melting at a temperature of |
| 2224/1327 Zirconium [Zr] as principal constituent | less than 400°C |
| 2224/13271 Chromium [Cr] as principal | constituent Indian III as principal |
| constituent 2224/13272 Vanadium [V] as principal | 2224/13309 Indium [In] as principal constituent |
| constituent | 2224/13311 Tin [Sn] as principal constituent |
| 2224/13273 Rhodium [Rh] as principal constituent | 2224/13313 Bismuth [Bi] as principal constituent |
| 2224/13276 Ruthenium [Ru] as principal constituent | 2224/13314 Thallium [Tl] as principal |
| 2224/13278 Iridium [Ir] as principal | constituent 2224/13316 Lead [Pb] as principal |
| constituent 2224/13279 Niobium [Nb] as principal | constituent 2224/13317 the principal constituent |
| constituent 2224/1328 Molybdenum [Mo] as | melting at a temperature |
| principal constituent | of greater than or equal to 400°C and less than 950°C |
| 2224/13281 Tantalum [Ta] as principal constituent | 2224/13318 Zinc [Zn] as principal constituent |
| 2224/13283 Rhenium [Re] as principal constituent | 2224/1332 Antimony [Sb] as |
| 2224/13284 Tungsten [W] as principal | principal constituent 2224/13323 Magnesium [Mg] as |
| constituent 2224/13286 with a principal constituent of the material being a non metallic, | principal constituent 2224/13324 Aluminium [Al] as |
| non metalloid inorganic material | principal constituent |
| 2224/13287 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics | 2224/13338 the principal constituent melting at a temperature of greater than or equal to |
| H01L 2224/13288) | 950°C and less than 1550°C |
| 2224/13288 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/13339 Silver [Ag] as principal constituent |
| 2224/1329 with a principal constituent of | 2224/13344 Gold [Au] as principal constituent |
| the material being a polymer, | 2224/13347 Copper [Cu] as principal |
| e.g. polyester, phenolic based polymer, epoxy | constituent |

| 2224/12240 | | 2224/12224 | ta ta a second |
|---------------|--|-----------------|---|
| 2224/13349 | principal constituent | 2224/13394 | with a principal constituent of the material being a liquid |
| 2224/13355 | | | not provided for in groups H01L 2224/133 - H01L 2224/13391 |
| 2224/13357 | | 2224/13395 | with a principal constituent |
| | constituent | | of the material being a gas |
| 2224/1336 | Iron [Fe] as principal constituent | | not provided for in groups <u>H01L 2224/133</u> - <u>H01L 2224/13391</u> |
| 2224/13363 | | 2224/13398 | with a principal constituent of the material being a |
| | melting at a temperature of greater than 1550°C | | combination of two or more |
| 2224/13364 | 9 | | materials in the form of |
| 222 1/13301 | principal constituent | | a matrix with a filler, i.e. |
| 2224/13366 | Titanium [Ti] as principal constituent | | being a hybrid material, e.g. segmented structures, foams |
| 2224/13369 | | 2224/13399 | Coating material |
| 222 1/1330) | constituent | 2224/134 | T T |
| 2224/1337 | Zirconium [Zr] as | | of the material being a metal |
| | principal constituent | | or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], |
| 2224/13371 | | | arsenic [As], antimony [Sb], |
| 2224/13372 | principal constituent | | tellurium [Te] and polonium |
| 2224/13372 | constituent | | [Po], and alloys thereof |
| 2224/13373 | | 2224/13401 | |
| | constituent | | melting at a temperature of less than 400°C |
| 2224/13376 | | 2224/13405 | |
| 2224/13378 | principal constituent | | constituent |
| 222 11 133 70 | constituent | 2224/13409 | Indium [In] as principal constituent |
| 2224/13379 | | 2224/13411 | |
| 2224/1229 | constituent | | constituent |
| 2224/1338 | , Molybdenum [Mo] as principal constituent | 2224/13413 | |
| 2224/13381 | | 2224/13414 | constituent |
| | constituent | 2224/13414 | Thallium [Tl] as principal constituent |
| 2224/13383 | Rhenium [Re] as principal constituent | 2224/13416 | |
| 2224/13384 | | | constituent |
| 2224/13304 | constituent | 2224/13417 | 1 1 |
| 2224/13386 | | | melting at a temperature of greater than or equal to |
| | of the material being a non | | 400°C and less than 950°C |
| | metallic, non metalloid inorganic material | 2224/13418 | Zinc [Zn] as principal |
| 2224/13387 | _ | | constituent |
| 2224/1330/ | carbides, nitrides or | 2224/1342 | Antimony [Sb] as principal constituent |
| | oxides (glass ceramics | 2224/13423 | |
| | H01L 2224/13388) | 2224/13423 | principal constituent |
| 2224/13388 | oxides, nitrides or fluorides | 2224/13424 | |
| 2224/1339 | | | principal constituent |
| 2224/1337 | the material being a polymer, | 2224/13438 | |
| | e.g. polyester, phenolic based | | melting at a temperature of greater than or equal to |
| | polymer, epoxy | | 950°C and less than 1550°C |
| 2224/13391 | being an elastomer, e.g. | 2224/13439 | Silver [Ag] as principal |
| | silicones, isoprene, neoprene | | constituent |
| 2224/13393 | • • | 2224/13444 | |
| | of the material being a solid | 2224/13447 | constituent Copper [Cu] as principal |
| | not provided for in groups | | constituent |
| | <u>H01L 2224/133</u> - <u>H01L 2224/1339</u> e.g. allotropes of carbon, | , 2224/13449 | |
| | fullerene, graphite, carbon- | | principal constituent |
| | nanotubes, diamond | 2224/13455 | |
| | | | constituent |

| 2224/13457 Cobalt [Co] as principal | 2224/13495 with a principal constituent |
|--|--|
| constituent | of the material being a gas |
| 2224/1346 Iron [Fe] as principal constituent | not provided for in groups H01L 2224/134 - H01L 2224/13491 |
| 2224/13463 the principal constituent | 2224/13498 with a principal constituent |
| melting at a temperature of | of the material being a |
| greater than 1550°C | combination of two or more materials in the form of |
| 2224/13464 Palladium [Pd] as principal constituent | a matrix with a filler, i.e. |
| 2224/13466 Titanium [Ti] as principal | being a hybrid material, e.g. |
| constituent | segmented structures, foams |
| 2224/13469 Platinum [Pt] as principal | 2224/13499 Shape or distribution of the fillers |
| constituent | 2224/1354 Coating 2224/13541 Structure |
| 2224/1347 Zirconium [Zr] as principal constituent | 2224/1355 Shape |
| 2224/13471 | 2224/13551 being non uniform |
| principal constituent | 2224/13552 comprising protrusions or |
| 2224/13472 Vanadium [V] as principal | indentations |
| constituent 2224/13473 Rhodium [Rh] as principal | 2224/13553 at the bonding interface of the bump connector, i.e. on the |
| constituent | surface of the bump connector |
| 2224/13476 Ruthenium [Ru] as | 2224/1356 Disposition |
| principal constituent | 2224/13561 On the entire surface of the core, i.e. |
| 2224/13478 Iridium [Ir] as principal | integral coating |
| constituent 2224/13479 Niobium [Nb] as principal | 2224/13562 On the entire exposed surface of the core |
| constituent | 2224/13563 Only on parts of the surface of the |
| 2224/1348 Molybdenum [Mo] as | core, i.e. partial coating |
| principal constituent | 2224/13564 Only on the bonding interface of |
| 2224/13481 Tantalum [Ta] as principal constituent | the bump connector 2224/13565 Only outside the bonding interface |
| 2224/13483 Rhenium [Re] as principal | of the bump connector |
| constituent | 2224/13566 Both on and outside the bonding |
| 2224/13484 Tungsten [W] as principal | interface of the bump connector |
| constituent | 2224/1357 Single coating layer 2224/13575 Plural coating layers |
| 2224/13486 with a principal constituent of the material being a non | 2224/13576 being mutually engaged together, e.g. |
| metallic, non metalloid | through inserts |
| inorganic material | 2224/13578 being disposed next to each other, e.g. |
| 2224/13487 Ceramics, e.g. crystalline carbides, nitrides or | side-to-side arrangements |
| oxides (glass ceramics | 2224/1358 being stacked 2224/13582 Two-layer coating |
| <u>H01L 2224/13488</u>) | 2224/13583 Three-layer coating |
| 2224/13488 Glasses, e.g. amorphous | 2224/13584 Four-layer coating |
| oxides, nitrides or fluorides 2224/1349 with a principal constituent of | 2224/13599 Material |
| the material being a polymer, | 2224/136 with a principal constituent of |
| e.g. polyester, phenolic based | the material being a metal or a metalloid, e.g. boron [B], silicon |
| polymer, epoxy | [Si], germanium [Ge], arsenic [As], |
| 2224/13491 The principal constituent being an elastomer, e.g. | antimony [Sb], tellurium [Te] and |
| silicones, isoprene, neoprene | polonium [Po], and alloys thereof 2224/13601 the principal constituent melting at |
| 2224/13493 with a principal constituent | a temperature of less than 400°C |
| of the material being a solid not provided for in groups | 2224/13605 Gallium [Ga] as principal |
| not provided for in groups H01L 2224/134 - H01L 2224/134 | 91. constituent |
| e.g. allotropes of carbon, | 2224/13609 Indium [In] as principal constituent |
| fullerene, graphite, carbon- | 2224/13611 Tin [Sn] as principal constituent |
| nanotubes, diamond 2224/13494 with a principal constituent | 2224/13613 Bismuth [Bi] as principal |
| of the material being a liquid | constituent |
| not provided for in groups | 2224/13614 Thallium [Tl] as principal constituent |
| <u>H01L 2224/134</u> - <u>H01L 2224/134</u> | 2224/13616 Lead [Pb] as principal constituent |
| | 222 // 13010 Load [1 0] as principal constituent |

| 2224/13617 the principal constituent melting at a temperature of greater than or | 2224/13688 Glasses, e.g. amorphous oxides, nitrides or fluorides |
|--|--|
| equal to 400°C and less than 950°C 2224/13618 Zinc [Zn] as principal constituent | 2224/1369 with a principal constituent of the material being a polymer, e.g. |
| 2224/1362 Antimony [Sb] as principal constituent | polyester, phenolic based polymer, epoxy |
| 2224/13623 Magnesium [Mg] as principal constituent | 2224/13691 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/13624 Aluminium [Al] as principal constituent | 2224/13693 with a principal constituent |
| 2224/13638 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C | of the material being a solid not provided for in groups H01L 2224/136 - H01L 2224/13691, e.g. allotropes of carbon, fullerene, |
| 2224/13639 Silver [Ag] as principal constituent | graphite, carbon-nanotubes, diamond 2224/13694 with a principal constituent |
| 2224/13644 Gold [Au] as principal constituent | of the material being a liquid not provided for in groups |
| 2224/13647 Copper [Cu] as principal | <u>H01L 2224/136</u> - <u>H01L 2224/13691</u> |
| constituent 2224/13649 Manganese [Mn] as principal | 2224/13695 with a principal constituent of the material being a gas |
| constituent | not provided for in groups H01L 2224/136 - H01L 2224/13691 |
| 2224/13655 Nickel [Ni] as principal constituent | 2224/13698 with a principal constituent of the |
| 2224/13657 Cobalt [Co] as principal constituent | material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid |
| 2224/1366 Iron [Fe] as principal constituent | material, e.g. segmented structures, |
| 2224/13663 the principal constituent melting at a temperature of greater than 1550°C | foams 2224/13699 Material of the matrix |
| 2224/13664 Palladium [Pd] as principal constituent | 2224/137 with a principal constituent of the material being a metal or a |
| 2224/13666 Titanium [Ti] as principal constituent | metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium |
| 2224/13669 Platinum [Pt] as principal constituent | [As], antimony [30], tentrium [Te] and polonium [Po], and alloys thereof |
| 2224/1367 Zirconium [Zr] as principal constituent | 2224/13701 the principal constituent |
| 2224/13671 Chromium [Cr] as principal constituent | melting at a temperature of less than 400°C |
| 2224/13672 Vanadium [V] as principal | 2224/13705 Gallium [Ga] as principal constituent |
| constituent 2224/13673 Rhodium [Rh] as principal | 2224/13709 Indium [In] as principal constituent |
| constituent 2224/13676 Ruthenium [Ru] as principal | 2224/13711 Tin [Sn] as principal constituent |
| constituent 2224/13678 Iridium [Ir] as principal | 2224/13713 Bismuth [Bi] as principal constituent |
| constituent 2224/13679 Niobium [Nb] as principal | 2224/13714 Thallium [TI] as principal constituent |
| constituent 2224/1368 Molybdenum [Mo] as principal | 2224/13716 Lead [Pb] as principal constituent |
| constituent 2224/13681 Tantalum [Ta] as principal | 2224/13717 the principal constituent |
| constituent | melting at a temperature of greater than or equal to 400°C |
| 2224/13683 Rhenium [Re] as principal constituent | and less than 950°C 2224/13718 Zinc [Zn] as principal |
| 2224/13684 Tungsten [W] as principal constituent | constituent 2224/1372 Antimony [Sb] as principal |
| 2224/13686 with a principal constituent of the material being a non metallic, non | constituent |
| metalloid inorganic material | 2224/13723 Magnesium [Mg] as principal constituent |
| 2224/13687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/13688) | 2224/13724 Aluminium [Al] as principal constituent |

| 2224/13738 the principal constituent melting at a temperature of | 2224/13791 The principal constituent being an elastomer, e.g. silicones, |
|--|--|
| greater than or equal to 950°C and less than 1550°C | isoprene, neoprene 2224/13793 with a principal constituent |
| 2224/13739 Silver [Ag] as principal | of the material being a solid |
| constituent 2224/13744 Gold [Au] as principal | not provided for in groups H01L 2224/137 - H01L 2224/13791, |
| constituent | e.g. allotropes of carbon, |
| 2224/13747 Copper [Cu] as principal constituent | fullerene, graphite, carbon- nanotubes, diamond |
| 2224/13749 Manganese [Mn] as | 2224/13794 with a principal constituent |
| principal constituent 2224/13755 Nickel [Ni] as principal | of the material being a liquid not provided for in groups |
| constituent | H01L 2224/137 - H01L 2224/13791 |
| 2224/13757 Cobalt [Co] as principal constituent | 2224/13795 with a principal constituent of the material being a gas |
| 2224/1376 Iron [Fe] as principal | not provided for in groups H01L 2224/137 - H01L 2224/13791 |
| constituent | 2224/13798 Fillers |
| 2224/13763 the principal constituent | 2224/13799 Base material |
| melting at a temperature of | 2224/138 with a principal constituent |
| greater than 1550°C 2224/13764 Palladium [Pd] as principal | of the material being a metal |
| constituent | or a metalloid, e.g. boron [B], |
| 2224/13766 Titanium [Ti] as principal | silicon [Si], germanium [Ge], |
| constituent | arsenic [As], antimony [Sb], |
| 2224/13769 Platinum [Pt] as principal | tellurium [Te] and polonium [Po], and alloys thereof |
| constituent 2224/1377 Zirconium [Zr] as principal | 2224/13801 the principal constituent |
| constituent | melting at a temperature of |
| 2224/13771 Chromium [Cr] as principal | less than 400°C |
| constituent 2224/13772 Vanadium [V] as principal | constituent |
| constituent | 2224/13809 Indium [In] as principal constituent |
| 2224/13773 Rhodium [Rh] as principal constituent | 2224/13811 Tin [Sn] as principal |
| 2224/13776 Ruthenium [Ru] as principal | constituent |
| constituent | 2224/13813 Bismuth [Bi] as principal constituent |
| 2224/13778 Iridium [Ir] as principal constituent | 2224/13814 Thallium [Tl] as principal |
| 2224/13779 Niobium [Nb] as principal | constituent 2224/13816 Lead [Pb] as principal |
| constituent Makeh denom [Makeh] and | constituent |
| 2224/1378 Molybdenum [Mo] as principal constituent | 2224/13817 the principal constituent |
| 2224/13781 Tantalum [Ta] as principal | melting at a temperature of greater than or equal to |
| constituent | 400°C and less than 950°C |
| 2224/13783 Rhenium [Re] as principal constituent | 2224/13818 Zinc [Zn] as principal constituent |
| 2224/13784 Tungsten [W] as principal | 2224/1382 Antimony [Sb] as |
| constituent 2224/13786 with a principal constituent of | principal constituent |
| the material being a non metallic, | 2224/13823 Magnesium [Mg] as principal constituent |
| non metalloid inorganic material | 2224/13824 Aluminium [Al] as |
| 2224/13787 Ceramics, e.g. crystalline carbides, nitrides or | principal constituent |
| oxides (glass ceramics | 2224/13838 the principal constituent |
| <u>H01L 2224/13788</u>) | melting at a temperature of greater than or equal to |
| 2224/13788 Glasses, e.g. amorphous | 950°C and less than 1550°C |
| oxides, nitrides or fluorides 2224/1379 with a principal constituent of | 2224/13839 Silver [Ag] as principal |
| the material being a polymer, | constituent |
| e.g. polyester, phenolic based | 2224/13844 Gold [Au] as principal constituent |
| polymer, epoxy | 2224/13847 Copper [Cu] as principal |
| | constituent |
| | |

| 2224/13849 | principal constituent | 2224/13894 | with a principal constituent of the material being a liquid not provided for in groups H01L 2224/138 - H01L 2224/13891 |
|------------|--|------------|---|
| 2224/13857 | Cobalt [Co] as principal constituentIron [Fe] as principal | 2224/13895 | with a principal constituent of the material being a gas not provided for in groups |
| 2224/13863 | constituent the principal constituent melting at a temperature of greater than 1550°C | 2224/13898 | of the material being a combination of two or more |
| 2224/13864 | principal constituent | | materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. |
| 2224/13869 | constituentPlatinum [Pt] as principal constituent | 2224/13899 | with a principal constituent |
| 2224/1387 | principal constituent | | of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], |
| 2224/13872 | constituent | 2224/13901 | tellurium [Te] and polonium [Po], and alloys thereof |
| 2224/13873 | constituent Ruthenium [Ru] as | 2224/13905 | melting at a temperature of less than 400°C |
| 2224/13878 | principal constituent Iridium [Ir] as principal constituent | 2224/13909 | constituent |
| 2224/13879 | constituent | 2224/13911 | Tin [Sn] as principal constituent |
| 2224/13881 | principal constituent Tantalum [Ta] as principal constituent | 2224/13913 | constituent |
| 2224/13883 | constituent | 2224/13916 | Lead [Pb] as principal constituent |
| 2224/13886 | constituent with a principal constituent of the material being a non | 2224/13917 | melting at a temperature of greater than or equal to 400°C and less than 950°C |
| 2224/13887 | metallic, non metalloid inorganic material • Ceramics, e.g. crystalline | 2224/13918 | Zinc [Zn] as principal constituent |
| | carbides, nitrides or oxides (glass ceramics H01L 2224/13888) | 2224/13923 | principal constituent |
| 2224/13888 | • Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/13924 | |
| 2224/1389 | with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy | 2224/13938 | |
| 2224/13891 | • The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene | 2224/13939 | Silver [Ag] as principal constituent |
| 2224/13893 | • • | 2224/13944 | constituent |
| | e.g. allotropes of carbon, fullerene, graphite, carbon- | 2224/13949 | Manganese [Mn] as principal constituent |
| | nanotubes, diamond | 2224/13955 | |

| 2224/13957 | Cobalt [Co] as principal constituent | 2224/13995 | of the material being a gas |
|--------------|---|---------------------------------------|---|
| 2224/1396 | Iron [Fe] as principal constituent | | not provided for in groups H01L 2224/139 - H01L 2224/13991 |
| 2224/13963 | • the principal constituent melting at a temperature of greater than 1550°C | 2224/13998 | of the material being a combination of two or more |
| 2224/13964 | Palladium [Pd] as principal constituent | | materials in the form of a matrix with a filler, i.e. |
| 2224/13966 | Titanium [Ti] as principal constituent | | being a hybrid material, e.g. segmented structures, foams |
| 2224/13969 | Platinum [Pt] as principal constituent | 2224/13999 | |
| 2224/1397 | Zirconium [Zr] as principal constituent | 2224/1401 Structure 2224/1403 Bump of | connectors having different sizes |
| 2224/13971 | Chromium [Cr] as | | ferent diameters, heights or |
| 2224/13972 | principal constituent Vanadium [V] as principal | 2224/1405 Shape | |
| | constituent | 2224/14051 Bump o | connectors having different |
| 2224/13973 | Rhodium [Rh] as principal constituent | shapes 2224/141 Disposition | on |
| 2224/13976 | Ruthenium [Ru] as | 2224/14104 relative | to the bonding areas, e.g. bond |
| 2224/13978 | principal constituent . Iridium [Ir] as principal | pads, o body | f the semiconductor or solid-state |
| | constituent | 2224/1411 the b | |
| 2224/13979 | Niobium [Nb] as principal constituent | 2224/1412 Layout | ast one common bonding area |
| 2224/1398 | | 2224/1413 Squa | re or rectangular array |
| 2224/13981 | principal constituent . Tantalum [Ta] as principal | 2224/14131 be un | ing uniform, i.e. having a iform pitch across the array |
| 2224/13983 | constituent . Rhenium [Re] as principal | 2224/14132 be | ing non uniform, i.e. having a n uniform pitch across the array |
| | constituent | 2224/14133 wi | |
| 2224/13984 | constituent | 2224/14134 co | |
| 2224/13986 | with a principal constituent of the material being a non | 2224/14135 | rface to be connected |
| | metallic, non metalloid inorganic material | | of the surface to be connected, i.e. peripheral arrangements |
| 2224/13987 | · Ceramics, e.g. crystalline | 2224/14136 | Covering only the central area of |
| | carbides, nitrides or oxides (glass ceramics | | the surface to be connected, i.e. central arrangements |
| 2224/13988 | <u>H01L 2224/13988</u>) • Glasses, e.g. amorphous | 2224/1414 Circu symr | |
| 2224/13/00 | oxides, nitrides or fluorides | 2224/14141 be | • |
| 2224/1399 | | | iform pitch across the array |
| | the material being a polymer, e.g. polyester, phenolic based | | ing non uniform, i.e. having a n uniform pitch across the array |
| 2224/13991 | polymer, epoxy The principal constituent | | th a staggered arrangement, e.g. populated array |
| 222 (/13)))1 | being an elastomer, e.g. silicones, isoprene, neoprene | 2224/14144 | |
| 2224/13993 | with a principal constituent | 2224/14145 | Covering only the peripheral area |
| | of the material being a solid not provided for in groups | | of the surface to be connected, i.e. peripheral arrangements |
| | <u>H01L 2224/139</u> - <u>H01L 2224/1399</u> e.g. allotropes of carbon, | 2227/17170 | Covering only the central area of the surface to be connected, i.e. |
| | fullerene, graphite, carbon- nanotubes, diamond | | central arrangements |
| 2224/13994 | with a principal constituent | | or array, i.e. array having only lection symmetry, i.e. bilateral |
| | of the material being a liquid not provided for in groups | symr | metry |
| | H01L 2224/139 - H01L 2224/1399 | | ing uniform, i.e. having a iform pitch across the array |

| 2224/14152 being non uniform, i.e. having a | 2224/1607 of bonding interfaces, e.g. interlocking |
|--|--|
| non uniform pitch across the array | features |
| 2224/14153 with a staggered arrangement, e.g. | 2224/161 Disposition |
| depopulated array 2224/14154 covering only portions of the | 2224/16104 relative to the bonding area, e.g. bond pad |
| surface to be connected | 2224/16105 the bump connector connecting |
| 2224/14155 Covering only the peripheral area | bonding areas being not aligned with |
| of the surface to be connected, | respect to each other |
| i.e. peripheral arrangements 2224/14156 Covering only the central area of | 2224/16106 the bump connector connecting one bonding area to at least two respective |
| the surface to be connected, i.e. | bonding areas |
| central arrangements | 2224/16108 the bump connector not being |
| 2224/1416 Random layout, i.e. layout with no | orthogonal to the surface |
| symmetry 2224/14163 with a staggered arrangement | 2224/16111 the bump connector being disposed in a recess of the surface |
| 2224/14164 covering only portions of the | 2224/16112 the bump connector being at least |
| surface to be connected | partially embedded in the surface |
| 2224/14165 Covering only the peripheral area | 2224/16113 the whole bump connector protruding |
| of the surface to be connected, i.e. peripheral arrangements | from the surface |
| 2224/14166 Covering only the central area of | 2224/1613 the bump connector connecting within a semiconductor or solid-state body, i.e. |
| the surface to be connected, i.e. | connecting two bonding areas on the |
| central arrangements | same semiconductor or solid-state body |
| 2224/14177 Combinations of arrays with different | 2224/16135 the bump connector connecting between different semiconductor or solid-state |
| layouts 2224/14179 Corner adaptations, i.e. disposition of | bodies, i.e. chip-to-chip |
| the bump connectors at the corners of | 2224/16137 the bodies being arranged next to each |
| the semiconductor or solid-state body | other, e.g. on a common substrate |
| 2224/1418 being disposed on at least two different | 2224/16141 the bodies being arranged on opposite |
| sides of the body, e.g. dual array 2224/14181 On opposite sides of the body | sides of a substrate, e.g. mirror arrangements |
| 2224/14183 On contiguous sides of the body | 2224/16145 the bodies being stacked |
| 2224/145 Material | 2224/16146 the bump connector connecting |
| 2224/14505 Bump connectors having different | to a via connection in the |
| materials | semiconductor or solid-state body 2224/16147 the bump connector connecting to a |
| 2224/1451 Function 2224/14515 Bump connectors having different | bonding area disposed in a recess of |
| functions | the surface |
| 2224/14517 including bump connectors providing | 2224/16148 the bump connector connecting to |
| primarily mechanical bonding | a bonding area protruding from the surface |
| 2224/14519 including bump connectors providing primarily thermal dissipation | 2224/16151 the bump connector connecting between |
| 2224/15 Structure, shape, material or disposition of the | a semiconductor or solid-state body and |
| bump connectors after the connecting process | an item not being a semiconductor or |
| 2224/16 of an individual bump connector | solid-state body, e.g. chip-to-substrate, chip-to-passive |
| 2224/1601 Structure | 2224/16153 the body and the item being arranged |
| 2224/16012 relative to the bonding area, e.g. bond pad | next to each other, e.g. on a common |
| 2224/16013 the bump connector being larger than | substrate |
| the bonding area, e.g. bond pad | 2224/16155 the item being non-metallic, e.g. being an insulating substrate with |
| 2224/16014 the bump connector being smaller | or without metallisation |
| than the bonding area, e.g. bond pad 2224/1605 Shape | 2224/16157 the bump connector connecting |
| 2224/16052 in top view | to a bond pad of the item |
| 2224/16054 being rectangular or square | 2224/1616 the bump connector connecting to a pin of the item |
| 2224/16055 being circular or elliptic | 2224/16163 the bump connector connecting |
| 2224/16056 comprising protrusions or | to a potential ring of the item |
| indentations 2224/16057 in side view | 2224/16165 the bump connector connecting |
| 2224/16058 being non uniform along the bump | to a via metallisation of the item 2224/16167 the bump connector connecting |
| connector | to a bonding area disposed in a |
| 2224/16059 comprising protrusions or | recess of the surface of the item |
| indentations | |

| 2224/1637 the tiem being metallic component to a potential ring of the item being metallic component to a potential ring of the item being metallic component to a potential ring of the item being area disposed in a recess of the surface of the item to a bonding area disposed in a recess of the surface of the item to a bonding area protroung to a protroung to a protroung to a bonding area protroung to a protroung to a bonding area protroung to a bonding area protroung to a | 2224/16168 the bump connector connecting | 2224/16501 at the bonding interface |
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| 2224/16258 | | |
| 2224/16258 | | |
| to a bonding area protruding from the surface of the item 2224/1626 | | |
| from the surface of the item 2224/1626 | | 2224/17145 Covering only the peripheral area |
| between the body and an opposite side of the item with respect to the body 2224/16265 | | * |
| opposite side of the item with respect to the body 2224/16265 | 2224/1626 the bump connector connecting | |
| 2224/16265 | | |
| 2224/16265 | | |
| component 2224/16267 | | |
| 2224/16267 | - | |
| recess of the surface of the item 2224/16268 | | |
| 2224/16268 the bump connector connecting to a bonding area protruding from the surface of the item 2224/17152 being non uniform, i.e. having a non uniform pitch across the array with a staggered arrangement, e.g. | | |
| to a bonding area protruding from the surface of the item 1. It is builty connector connecting non uniform pitch across the array with a staggered arrangement, e.g. | | The state of the s |
| from the surface of the item 2224/17153 with a staggered arrangement, e.g. | | |
| demonstrate demonstrate de autoris | | |
| | | depopulated array |

| 2224/17154 covering only portions of the | 2224/2401 Structure |
|--|---|
| surface to be connected | 2224/24011 Deposited, e.g. MCM-D type |
| 2224/17155 Covering only the peripheral area | 2224/2402 Laminated, e.g. MCM-L type |
| of the surface to be connected, | 2224/2405 Shape |
| i.e. peripheral arrangements | 2224/24051 Conformal with the semiconductor or |
| 2224/17156 Covering only the central area of | solid-state device |
| the surface to be connected, i.e. | 2224/241 Disposition |
| central arrangements | - |
| 2224/1716 Random layout, i.e. layout with no | 2224/24101 Connecting bonding areas at the same |
| symmetry | height |
| 2224/17163 with a staggered arrangement | 2224/24105 Connecting bonding areas at different |
| 2224/17164 covering only portions of the | heights |
| surface to be connected | 2224/2413 Connecting within a semiconductor or |
| 2224/17165 Covering only the peripheral area | solid-state body |
| of the surface to be connected, | 2224/24135 Connecting between different |
| i.e. peripheral arrangements | semiconductor or solid-state bodies, i.e. |
| 2224/17166 Covering only the central area of | chip-to-chip |
| the surface to be connected, i.e. | 2224/24137 the bodies being arranged next to each |
| central arrangements | other, e.g. on a common substrate |
| 2224/17177 Combinations of arrays with different | 2224/24141 the bodies being arranged on opposite |
| layouts | sides of a substrate, e.g. mirror |
| · · · · · · · · · · · · · · · · · · · | arrangements |
| 2224/17179 Corner adaptations, i.e. disposition of | 2224/24145 the bodies being stacked |
| the bump connectors at the corners of the semiconductor or solid-state body | 2224/24146 the HDI interconnect connecting |
| • | to the same level of the lower |
| 2224/1718 being disposed on at least two different | semiconductor or solid-state body |
| sides of the body, e.g. dual array | at which the upper semiconductor |
| 2224/17181 On opposite sides of the body | or solid-state body is mounted |
| 2224/17183 On contiguous sides of the body | 2224/24147 the HDI interconnect not |
| 2224/175 Material | connecting to the same level |
| 2224/17505 Bump connectors having different | of the lower semiconductor or |
| materials | solid-state body at which the |
| 2224/1751 Function | upper semiconductor or solid- |
| 2224/17515 Bump connectors having different | state body is mounted, e.g. the |
| functions | upper semiconductor or solid-state |
| 2224/17517 including bump connectors providing | body being mounted in a cavity |
| primarily mechanical support | or on a protrusion of the lower |
| 2224/17519 including bump connectors providing | semiconductor or solid-state body |
| primarily thermal dissipation | 2224/24151 Connecting between a semiconductor or |
| 2224/18 . High density interconnect [HDI] connectors; | solid-state body and an item not being a |
| Manufacturing methods related thereto | semiconductor or solid-state body, e.g. |
| 2224/19 Manufacturing methods of high density | chip-to-substrate, chip-to-passive |
| interconnect preforms | 2224/24153 the body and the item being arranged |
| 2224/20 Structure, shape, material or disposition of high | next to each other, e.g. on a common |
| density interconnect preforms | substrate |
| 2224/21 of an individual HDI interconnect | 2224/24155 the item being non-metallic, e.g. |
| 2224/2101 Structure | insulating substrate with or without |
| 2224/2105 Shape | metallisation |
| 2224/211 Disposition | 2224/24175 the item being metallic |
| 2224/214 Connecting portions | 2224/24195 the item being a discrete passive |
| T - | component |
| 2224/215 Material | 2224/24221 the body and the item being stacked |
| 2224/22 of a plurality of HDI interconnects | 2224/24225 the item being non-metallic, e.g. |
| 2224/2201 Structure | insulating substrate with or without |
| 2224/2205 Shape | metallisation |
| 2224/221 Disposition | 2224/24226 the HDI interconnect connecting |
| 2224/224 Connecting portions | to the same level of the item |
| 2224/225 Material | at which the semiconductor or |
| 2224/22505 HDI interconnects having different | solid-state body is mounted, e.g. |
| materials | the item being planar |
| 2224/23 Structure, shape, material or disposition of the | |
| high density interconnect connectors after the | |
| connecting process | |
| 2224/24 of an individual high density interconnect | |
| | |
| connector | |

| 2224/24227 the LIDI intergorment not | 2224/2541 the connecting partians being steeled |
|---|--|
| 2224/24227 the HDI interconnect not | 2224/2541 the connecting portions being stacked |
| connecting to the same level of the item at which the | 2224/2543 the connecting portions being staggered |
| semiconductor or solid-state | 2224/255 Material |
| body is mounted, e.g. the | 2224/26 Layer connectors, e.g. plate connectors, solder or |
| semiconductor or solid-state | adhesive layers; Manufacturing methods related |
| body being mounted in a cavity | thereto |
| or on a protrusion of the item | 2224/2612 Auxiliary members for layer connectors, e.g. |
| 2224/24245 the item being metallic | spacers |
| 2224/24246 the HDI interconnect connecting | 2224/26122 being formed on the semiconductor or solid- |
| to the same level of the item | state body to be connected |
| at which the semiconductor or | 2224/26125 Reinforcing structures |
| solid-state body is mounted, e.g. | 2224/26135 Alignment aids |
| the item being planar | 2224/26145 Flow barriers |
| 2224/24247 the HDI interconnect not | 2224/26152 being formed on an item to be connected not |
| connecting to the same level | being a semiconductor or solid-state body |
| of the item at which the | 2224/26155 Reinforcing structures |
| semiconductor or solid-state | 2224/26165 Alignment aids |
| body is mounted, e.g. the | 2224/26175 Flow barriers |
| semiconductor or solid-state | 2224/27 Manufacturing methods |
| body being mounted in a cavity | 2224/27001 Involving a temporary auxiliary member not |
| or on a protrusion of the item | forming part of the manufacturing apparatus, |
| 2224/24265 the item being a discrete passive | e.g. removable or sacrificial coating, film or |
| component | substrate |
| 2224/244 Connecting portions | 2224/27002 for supporting the semiconductor or solid- |
| 2224/245 Material | state body |
| 2224/2499 Auxiliary members for HDI interconnects, | 2224/27003 for holding or transferring the layer |
| e.g. spacers, alignment aids | preform |
| 2224/24991 being formed on the semiconductor or | 2224/27005 for aligning the layer connector, e.g. |
| solid-state body to be connected | marks, spacers |
| 2224/24992 Flow barrier | 2224/27009 for protecting parts during manufacture |
| 2224/24996 being formed on an item to be connected | 2224/27011 Involving a permanent auxiliary member, i.e. |
| not being a semiconductor or solid-state | a member which is left at least partly in the |
| body | finished device, e.g. coating, dummy feature |
| 2224/24997 Flow barrier | 2224/27013 for holding or confining the layer |
| 2224/24998 Reinforcing structures, e.g. ramp-like | connector, e.g. solder flow barrier |
| support | 2224/27015 for aligning the layer connector, e.g. |
| 2224/25 of a plurality of high density interconnect | marks, spacers |
| connectors | 2224/27019 for protecting parts during the process |
| 2224/2501 Structure | 2224/271 Manufacture and pre-treatment of the layer |
| 2224/2505 Shape | connector preform |
| 2224/251 Disposition | 2224/2711 Shaping |
| 2224/25105 Connecting at different heights | 2224/2712 Applying permanent coating |
| 2224/2511 the connectors being bonded to at least | 2224/273 by local deposition of the material of the |
| one common bonding area | layer connector |
| 2224/25111 the connectors connecting two | 2224/2731 in liquid form |
| common bonding areas | 2224/27312 Continuous flow, e.g. using a |
| 2224/25112 the connectors connecting a common | microsyringe, a pump, a nozzle or |
| bonding area on the semiconductor or | extrusion |
| solid-state body to different bonding | 2224/27318 by dispensing droplets |
| areas outside the body | 2224/2732 Screen printing, i.e. using a stencil |
| 2224/25113 the connectors connecting different | 2224/2733 in solid form |
| bonding areas on the semiconductor | 2224/27332 using a powder |
| or solid-state body to a common | 2224/27334 using preformed layer |
| bonding area outside the body | 2224/274 by blanket deposition of the material of the |
| 2224/2512 Layout | layer connector |
| 2224/25171 Fan-out arrangements | 2224/2741 in liquid form |
| 2224/25174 Stacked arrangements | 2224/27416 Spin coating |
| 2224/25175 Parallel arrangements | 2224/27418 Spray coating |
| 2224/25177 Combinations of a plurality of | 2224/2742 Curtain coating |
| arrangements | 2224/27422 by dipping, e.g. in a solder bath (hot- |
| 2224/2518 being disposed on at least two different | dipping <u>C23C 2/00</u>) |
| sides of the body, e.g. dual array | 2224/27424 Immersion coating, e.g. in a solder bath |
| 2224/254 Connecting portions | (immersion processes C23C 2/00) |
| | |

| 2224/27426 Chemical solution deposition [CSD], i.e. | 2224/2763 using a laser or a focused ion beam [FIB] |
|--|--|
| using a liquid precursor | 2224/27632 Ablation by means of a laser or focused |
| 2224/27428 Wave coating | ion beam [FIB] |
| 2224/2743 in solid form | 2224/277 involving monitoring, e.g. feedback loop |
| 2224/27436 Lamination of a preform, e.g. foil, sheet | 2224/278 Post-treatment of the layer connector |
| or layer 2224/27438 the preform being at least partly pre- | 2224/2781 Cleaning, e.g. oxide removal step, desmearing |
| patterned | 2224/2782 Applying permanent coating, e.g. in-situ |
| 2224/2744 by transfer printing | coating |
| 2224/27442 using a powder | 2224/27821 Spray coating |
| 2224/27444 in gaseous form | 2224/27822 by dipping, e.g. in a solder bath |
| 2224/2745 Physical vapour deposition [PVD], e.g. | 2224/27823 Immersion coating, e.g. in a solder bath |
| evaporation, or sputtering | 2224/27824 Chemical solution deposition [CSD], i.e. |
| 2224/27452 Chemical vapour deposition [CVD], e.g. | using a liquid precursor |
| laser CVD | 2224/27825 Plating, e.g. electroplating, electroless |
| 2224/2746 Plating | plating |
| 2224/27462 Electroplating | 2224/27826 Physical vapour deposition [PVD], e.g. |
| 2224/27464 Electroless plating | evaporation, or sputtering |
| 2224/27466 Conformal deposition, i.e. blanket | 2224/27827 Chemical vapour deposition [CVD], e.g. |
| deposition of a conformal layer on a | laser CVD |
| patterned surface | 2224/2783 Reworking, e.g. shaping (reflowing |
| 2224/2747 using a lift-off mask | H01L 2224/27849) |
| 2224/27472 Profile of the lift-off mask | 2224/27831 involving a chemical process, e.g. |
| 2224/27474 Multilayer masks | etching the layer connector |
| 2224/2748 Permanent masks, i.e. masks left in the finished device, e.g. passivation layers | 2224/2784 involving a mechanical process, e.g. planarising the layer connector |
| 2224/275 by chemical or physical modification of a | 2224/27845 Chemical mechanical polishing [CMP] |
| pre-existing or pre-deposited material | 2224/27848 Thermal treatments, e.g. annealing, |
| 2224/27502 Pre-existing or pre-deposited material | controlled cooling |
| 2224/27505 Sintering | 2224/27849 Reflowing |
| 2224/2751 Anodisation | 2224/279 Methods of manufacturing layer connectors |
| 2224/27515 Curing and solidification, e.g. of a | involving a specific sequence of method |
| photosensitive layer material | steps 2224/27901 with repetition of the same manufacturing |
| 2224/2752 Self-assembly, e.g. self-agglomeration of | step |
| the layer material in a fluid | 2224/27902 Multiple masking steps |
| 2224/27522 Auxiliary means therefor, e.g. for self- | 2224/27903 using different masks |
| assembly activation 2224/27524 with special adaptation of the surface | 2224/27906 with modification of the same mask |
| or of an auxiliary substrate, e.g. surface | 2224/2791 Forming a passivation layer after forming |
| shape specially adapted for the self- | the layer connector |
| assembly process | 2224/27912 the layer being used as a mask for |
| 2224/27526 involving the material of the bonding | patterning other parts |
| area, e.g. bonding pad | 2224/27916 a passivation layer being used as a mask |
| 2224/2755 Selective modification | for patterning other parts |
| 2224/27552 using a laser or a focussed ion beam | 2224/28 Structure, shape, material or disposition of the |
| [FIB] | layer connectors prior to the connecting process |
| 2224/27554 Stereolithography, i.e. solidification | 2224/28105 Layer connectors formed on an encapsulation |
| of a pattern defined by a laser trace in | of the semiconductor or solid-state body, e.g. |
| a photosensitive resin | layer connectors on chip-scale packages |
| 2224/276 by patterning a pre-deposited material | 2224/29 of an individual layer connector |
| (treatment of parts prior to assembly of the | 2224/29001 Core members of the layer connector |
| devices H01L 21/48) | 2224/29005 Structure |
| 2224/27602 Mechanical treatment, e.g. polishing, | 2224/29006 Layer connector larger than the |
| grinding 2224/2761 Physical or chamical atching | underlying bonding area |
| 2224/2761 Physical or chemical etching 2224/27612 by physical means only | 2224/29007 Layer connector smaller than the underlying bonding area |
| 2224/27614 by physical means only | 2224/29008 Layer connector integrally formed |
| 2224/27616 by chemical means only 2224/27616 Chemical mechanical polishing [CMP] | with a redistribution layer on the |
| 2224/27618 with selective exposure, development and | semiconductor or solid-state body |
| removal of a photosensitive layer material, | 2224/29009 Layer connector integrally formed |
| e.g. of a photosensitive conductive resin | with a via connection of the |
| 2224/2762 using masks | semiconductor or solid-state body |
| 2224/27622 Photolithography | 2224/2901 Shape |
| | • |

| 2224/29011 comprising apertures or cavities | 2224/29109 Indium [In] as principal |
|---|---|
| 2224/29012 in top view | constituent |
| 2224/29013 being rectangular or square | 2224/29111 Tin [Sn] as principal constituent |
| 2224/29014 being circular or elliptic | 2224/29113 Bismuth [Bi] as principal |
| 2224/29015 comprising protrusions or | constituent |
| indentations | 2224/29114 Thallium [Tl] as principal |
| 2224/29016 in side view | constituent |
| 2224/29017 being non uniform along the layer | 2224/29116 Lead [Pb] as principal constituent |
| connector | 2224/29117 the principal constituent melting |
| 2224/29018 comprising protrusions or | at a temperature of greater than or |
| indentations | equal to 400°C and less than 950°C |
| 2224/29019 at the bonding interface of the | 2224/29118 Zinc [Zn] as principal constituent |
| layer connector, i.e. on the | 2224/2912 Antimony [Sb] as principal |
| surface of the layer connector | constituent |
| 2224/2902 Disposition | 2224/29123 Magnesium [Mg] as principal |
| 2224/29021 the layer connector being disposed | constituent |
| in a recess of the surface (embedded | 2224/29124 Aluminium [Al] as principal |
| layer connector <u>H01L 2224/29022</u>) | constituent |
| 2224/29022 the layer connector being at least | 2224/29138 the principal constituent melting |
| partially embedded in the surface | at a temperature of greater than or equal to 950°C and less than |
| 2224/29023 the whole layer connector protruding from the surface | 1550°C |
| | 2224/29139 Silver [Ag] as principal |
| 2224/29024 the layer connector being disposed on a redistribution layer on the | constituent |
| semiconductor or solid-state body | 2224/29144 Gold [Au] as principal |
| 2224/29025 the layer connector being disposed on | constituent |
| a via connection of the semiconductor | 2224/29147 Copper [Cu] as principal |
| or solid-state body | constituent |
| 2224/29026 relative to the bonding area, e.g. bond | 2224/29149 Manganese [Mn] as principal |
| pad, of the semiconductor or solid- | constituent |
| state body | 2224/29155 Nickel [Ni] as principal |
| 2224/29027 the layer connector being offset | constituent |
| with respect to the bonding area, | 2224/29157 Cobalt [Co] as principal |
| e.g. bond pad | constituent |
| 2224/29028 the layer connector being disposed | 2224/2916 Iron [Fe] as principal constituent |
| on at least two separate bonding areas, e.g. bond pads | 2224/29163 the principal constituent melting |
| 2224/29034 the layer connector covering | at a temperature of greater than 1550°C |
| only portions of the surface to be | 2224/29164 Palladium [Pd] as principal |
| connected | constituent |
| 2224/29035 covering only the peripheral area of | 2224/29166 Titanium [Ti] as principal |
| the surface to be connected | constituent |
| 2224/29036 covering only the central area of the | 2224/29169 Platinum [Pt] as principal |
| surface to be connected | constituent |
| 2224/29075 Plural core members | 2224/2917 Zirconium [Zr] as principal |
| 2224/29076 being mutually engaged together, e.g. | constituent |
| through inserts | 2224/29171 Chromium [Cr] as principal |
| 2224/29078 being disposed next to each other, e.g. | constituent |
| | |
| side-to-side arrangements | 2224/29172 Vanadium [V] as principal |
| 2224/2908 being stacked | 2224/29172 Vanadium [V] as principal constituent |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent 2224/29179 Niobium [Nb] as principal |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent 2224/29179 |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/29101 the principal constituent melting at | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent 2224/29179 |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/29101 the principal constituent melting at a temperature of less than 400°C | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent 2224/29179 Niobium [Nb] as principal constituent 2224/2918 |
| 2224/2908 being stacked 2224/29082 Two-layer arrangements 2224/29083 Three-layer arrangements 2224/29084 Four-layer arrangements 2224/29099 Material 2224/291 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof 2224/29101 the principal constituent melting at | 2224/29172 Vanadium [V] as principal constituent 2224/29173 Rhodium [Rh] as principal constituent 2224/29176 Ruthenium [Ru] as principal constituent 2224/29178 Iridium [Ir] as principal constituent 2224/29179 Niobium [Nb] as principal constituent 2224/2918 |

| 2224/29184 Tungsten [W] as principal constituent | 2224/29218 Zinc [Zn] as principal constituent |
|--|--|
| 2224/29186 with a principal constituent of the material being a non metallic, non | 2224/2922 Antimony [Sb] as principal constituent |
| metalloid inorganic material 2224/29187 Ceramics, e.g. crystalline carbides, | 2224/29223 Magnesium [Mg] as principal constituent |
| nitrides or oxides (glass ceramics H01L 2224/29188) | 2224/29224 Aluminium [Al] as principal constituent |
| 2224/29188 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/29238 the principal constituent melting at a temperature of |
| 2224/2919 with a principal constituent of the material being a polymer, e.g. | greater than or equal to 950°C and less than 1550°C |
| polyester, phenolic based polymer, epoxy | 2224/29239 Silver [Ag] as principal constituent |
| 2224/29191 The principal constituent being an | 2224/29244 Gold [Au] as principal |
| elastomer, e.g. silicones, isoprene, neoprene | constituent 2224/29247 Copper [Cu] as principal |
| 2224/29193 with a principal constituent | constituent |
| of the material being a solid not provided for in groups | 2224/29249 Manganese [Mn] as principal constituent |
| <u>H01L 2224/291</u> - <u>H01L 2224/29191</u> , e.g. allotropes of carbon, fullerene, | 2224/29255 Nickel [Ni] as principal |
| graphite, carbon-nanotubes, diamond | constituent 2224/29257 Cobalt [Co] as principal |
| 2224/29194 with a principal constituent | constituent |
| of the material being a liquid not provided for in groups | 2224/2926 Iron [Fe] as principal constituent |
| <u>H01L 2224/291</u> - <u>H01L 2224/29191</u> | 2224/29263 the principal constituent |
| 2224/29195 with a principal constituent of the material being a gas | melting at a temperature of greater than 1550°C |
| not provided for in groups H01L 2224/291 - H01L 2224/29191 | 2224/29264 Palladium [Pd] as principal |
| 2224/29198 with a principal constituent of the | constituent 2224/29266 Titanium [Ti] as principal |
| material being a combination of two or more materials in the form of a | constituent |
| matrix with a filler, i.e. being a hybrid | 2224/29269 Platinum [Pt] as principal constituent |
| material, e.g. segmented structures, foams | 2224/2927 Zirconium [Zr] as principal |
| 2224/29199 Material of the matrix | constituent [2224/29271] Chromium [Cr] as principal |
| 2224/292 with a principal constituent of the material being a metal or a | constituent |
| metalloid, e.g. boron [B], silicon | 2224/29272 Vanadium [V] as principal constituent |
| [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium | 2224/29273 Rhodium [Rh] as principal |
| [Te] and polonium [Po], and | constituent |
| alloys thereof 2224/29201 the principal constituent | 2224/29276 Ruthenium [Ru] as principal constituent |
| melting at a temperature of less | 2224/29278 Iridium [Ir] as principal constituent |
| than 400°C | 2224/29279 Niobium [Nb] as principal |
| constituent | constituent Malada danna FMalaa |
| 2224/29209 Indium [In] as principal constituent | 2224/2928 Molybdenum [Mo] as principal constituent |
| 2224/29211 Tin [Sn] as principal constituent | 2224/29281 Tantalum [Ta] as principal constituent |
| 2224/29213 Bismuth [Bi] as principal | 2224/29283 Rhenium [Re] as principal |
| constituent 2224/29214 Thallium [TI] as principal | constituent 2224/29284 Tungsten [W] as principal |
| constituent 2224/29216 Lead [Pb] as principal | constituent 2224/29286 with a principal constituent of |
| constituent | the material being a non metallic, |
| 2224/29217 the principal constituent melting at a temperature of | non metalloid inorganic material 2224/29287 Ceramics, e.g. crystalline |
| greater than or equal to 400°C | carbides, nitrides or |
| and less than 950°C | oxides (glass ceramics H01L 2224/29288) |
| | |

| 2224/29288 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/29339 Silver [Ag] as principal constituent |
|--|--|
| 2224/2929 with a principal constituent of the material being a polymer, | 2224/29344 Gold [Au] as principal constituent |
| e.g. polyester, phenolic based polymer, epoxy | 2224/29347 Copper [Cu] as principal constituent |
| 2224/29291 The principal constituent being an elastomer, e.g. silicones, | 2224/29349 Manganese [Mn] as principal constituent |
| isoprene, neoprene 2224/29293 with a principal constituent | 2224/29355 Nickel [Ni] as principal constituent |
| of the material being a solid not provided for in groups | 2224/29357 Cobalt [Co] as principal constituent |
| H01L 2224/292 - H01L 2224/29291, e.g. allotropes of carbon, | 2224/2936 Iron [Fe] as principal constituent |
| fullerene, graphite, carbon- nanotubes, diamond 2224/29294 with a principal constituent | 2224/29363 the principal constituent melting at a temperature of |
| of the material being a liquid | greater than 1550°C 2224/29364 Palladium [Pd] as |
| not provided for in groups H01L 2224/292 - H01L 2224/29291 | principal constituent 2224/29366 Titanium [Ti] as principal |
| 2224/29295 with a principal constituent of the material being a gas | constituent 2224/29369 Platinum [Pt] as principal |
| not provided for in groups H01L 2224/292 - H01L 2224/29291 | constituent 2224/2937 Zirconium [Zr] as |
| 2224/29298 Fillers 2224/29299 Base material | principal constituent |
| 2224/293 with a principal constituent | 2224/29371 |
| of the material being a metal or a metalloid, e.g. boron [B], | 2224/29372 Vanadium [V] as principal constituent |
| silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], | 2224/29373 Rhodium [Rh] as principal constituent |
| tellurium [Te] and polonium [Po], and alloys thereof | 2224/29376 Ruthenium [Ru] as principal constituent |
| 2224/29301 the principal constituent melting at a temperature of less than 400°C | 2224/29378 Iridium [Ir] as principal constituent |
| 2224/29305 Gallium [Ga] as principal | 2224/29379 Niobium [Nb] as principal constituent |
| constituent 2224/29309 Indium [In] as principal constituent | 2224/2938 Molybdenum [Mo] as principal constituent |
| 2224/29311 Tin [Sn] as principal | 2224/29381 Tantalum [Ta] as principal constituent |
| constituent 2224/29313 Bismuth [Bi] as principal | 2224/29383 Rhenium [Re] as principal constituent |
| constituent 2224/29314 Thallium [Tl] as principal | 2224/29384 Tungsten [W] as principal constituent |
| constituent 2224/29316 Lead [Pb] as principal | 2224/29386 with a principal constituent of the material being a non |
| constituent 2224/29317 the principal constituent | metallic, non metalloid inorganic material |
| melting at a temperature of greater than or equal to | 2224/29387 Ceramics, e.g. crystalline |
| 400°C and less than 950°C 2224/29318 Zinc [Zn] as principal | carbides, nitrides or oxides (glass ceramics |
| constituent 2224/2932 Antimony [Sb] as | H01L 2224/29388) 2224/29388 Glasses, e.g. amorphous |
| principal constituent 2224/29323 Magnesium [Mg] as | oxides, nitrides or fluorides 2224/2939 with a principal constituent of |
| principal constituent | the material being a polymer, e.g. polyester, phenolic based |
| 2224/29324 Aluminium [Al] as principal constituent | polymer, epoxy 2224/29391 The principal constituent |
| 2224/29338 the principal constituent melting at a temperature | being an elastomer, e.g. silicones, isoprene, neoprene |
| of greater than or equal to 950°C and less than 1550°C | sincones, isopicie, icopicie |
| | |

| 2224/29393 with a principal constit of the material being a | |
|---|---|
| not provided for in group | |
| H01L 2224/293 - H01I | |
| e.g. allotropes of carbo | n, 2224/29455 Nickel [Ni] as principal |
| fullerene, graphite, carb | |
| nanotubes, diamond | 2224/29457 Cobalt [Co] as principal |
| 2224/29394 with a principal constit of the material being a | 1 1 |
| not provided for in gro | |
| H01L 2224/293 - H01I | |
| 2224/29395 with a principal constit | uent melting at a temperature of |
| of the material being a | greater than 1550°C |
| not provided for in grov H01L 2224/293 - H01I | 2224/20201 2224/29404 I alladiulii [i uj as |
| 2224/29398 with a principal constit | principal constituent |
| of the material being a | 2224/29400 · · · · · · · · · · · · · · · Ittalium [11] as principal |
| combination of two or | more constituent constituent Platinum [Pt] as principal |
| materials in the form of | constituent |
| a matrix with a filler, i. | e. 7224/2047 7iroonium [7r] oo |
| being a hybrid material segmented structures, f | , e.g. |
| 2224/29399 Coating material | 2224/29471 Chromium [Cr] as |
| 2224/294 with a principal constit | uent principal constituent |
| of the material being a | metal 2224/29472 · · · · · · · · · Vanadium [V] as principal |
| or a metalloid, e.g. boro | |
| silicon [Si], germanium | [GC], |
| arsenic [As], antimony tellurium [Te] and polo | [50], |
| [Po], and alloys thereof | |
| 2224/29401 the principal constitu | ent 2224/29478 Iridium [Ir] as principal |
| melting at a temperat | ture of constituent |
| less than 400°C | 2224/29479 Niobium [Nb] as principal constituent |
| 2224/29405 Gallium [Ga] as proceeds the constituent | 2224/2948 Molybdenum [Mo] as |
| 2224/29409 Indium [In] as prir | |
| constituent | 2224/29481 Tantalum [Ta] as principal |
| 2224/29411 Tin [Sn] as princip | oal constituent |
| constituent | 2224/29483 Rhenium [Re] as principal constituent |
| 2224/29413 Bismuth [Bi] as pr constituent | incipal constituent 2224/29484 Tungsten [W] as principal |
| 2224/29414 Thallium [Tl] as p | |
| constituent | 2224/29486 with a principal constituent |
| 2224/29416 Lead [Pb] as princ | ipal of the material being a non |
| constituent | metallic, non metalloid inorganic material |
| 2224/29417 the principal constitu | Cit |
| melting at a temperat of greater than or equ | tare |
| 400°C and less than | 11 (1 |
| 2224/29418 Zinc [Zn] as princi | ipal <u>H01L 2224/29488</u>) |
| constituent | 2224/29488 Glasses, e.g. amorphous |
| 2224/2942 Antimony [Sb] as | oxides, nitrides or fluorides |
| principal constitue | 1 |
| 2224/29423 Magnesium [Mg] principal constitue | as |
| 2224/29424 Aluminium [Al] as | polymer, epoxy |
| principal constitue | nt 2224/29491 The principal constituent |
| 2224/29438 the principal constitu | being an elastomer, e.g. |
| melting at a temperal | 2224/20402 |
| of greater than or equ 950°C and less than | -f4h |
| 2224/29439 Silver [Ag] as prin | cipal not provided for in groups |
| constituent | H01L 2224/294 - H01L 2224/29491, |
| 2224/29444 Gold [Au] as prince | e.g. allotropes of carbon, fullerene, graphite, carbon- |
| constituent | nanotubes, diamond |
| | nanomous, aminona |

| 2224/29494 with a principal constituent | 2224/29614 | • • Thallium [Tl] as principal |
|--|------------|--|
| of the material being a liquid not provided for in groups | 2224/20616 | constituent |
| | 2224/29616 | • Lead [Pb] as principal constituent |
| <u>H01L 2224/294</u> - <u>H01L 2224/29491</u> 2224/29495 with a principal constituent | 2224/2961/ | |
| of the material being a gas | | at a temperature of greater than or equal to 400°C and less than 950°C |
| not provided for in groups | 2224/20618 | . Zinc [Zn] as principal constituent |
| H01L 2224/294 - H01L 2224/29491 | | Antimony [Sb] as principal |
| 2224/29498 with a principal constituent | | constituent |
| of the material being a | 2224/29623 | |
| combination of two or more | | constituent |
| materials in the form of | 2224/29624 | |
| a matrix with a filler, i.e. | | constituent |
| being a hybrid material, e.g. | 2224/29638 | . the principal constituent melting |
| segmented structures, foams | | at a temperature of greater than |
| 2224/29499 Shape or distribution of the fillers | | or equal to 950°C and less than |
| 2224/2954 Coating | | 1550°C |
| 2224/29541 Structure | 2224/29639 | |
| 2224/2955 Shape | | constituent |
| 2224/29551 being non uniform | 2224/29644 | 2 3 1 1 |
| 2224/29552 comprising protrusions or indentations | | constituent |
| | 2224/29647 | 11 2 3 1 1 |
| 2224/29553 at the bonding interface of the layer connector, i.e. on the | 2224/20740 | constituent |
| surface of the layer connector | 2224/29649 | Manganese [Mn] as principal constituent |
| 2224/2956 Disposition | 2224/20655 | |
| 2224/29561 On the entire surface of the core, i.e. | 2224/29655 | Nickel [Ni] as principal constituent |
| integral coating | 2224/29657 | |
| 2224/29562 On the entire exposed surface of the | 2224/29037 | constituent |
| core | 2224/2966 | |
| 2224/29563 Only on parts of the surface of the | | • the principal constituent melting |
| core, i.e. partial coating | 2224/29003 | at a temperature of greater than |
| 2224/29564 Only on the bonding interface of | | 1550°C |
| the layer connector | 2224/29664 | Palladium [Pd] as principal |
| 2224/29565 Only outside the bonding interface | | constituent |
| of the layer connector | 2224/29666 | Titanium [Ti] as principal |
| 2224/29566 Both on and outside the bonding | | constituent |
| interface of the layer connector | 2224/29669 | Platinum [Pt] as principal |
| 2224/2957 Single coating layer | | constituent |
| 2224/29575 Plural coating layers | 2224/2967 | |
| 2224/29576 being mutually engaged together, e.g. | | constituent |
| through inserts | 2224/29671 | |
| 2224/29578 being disposed next to each other, e.g. | 2224/20772 | constituent |
| side-to-side arrangements | 2224/29672 | |
| 2224/2958 being stacked 2224/29582 Two-layer coating | 2224/20673 | constituent . Rhodium [Rh] as principal |
| 2224/29583 Three-layer coating | 2224/29673 | constituent |
| 2224/29584 Four-layer coating | 2224/29676 | |
| 2224/29599 Material | 2224/29070 | constituent |
| 2224/296 with a principal constituent of | 2224/29678 | |
| the material being a metal or a | | constituent |
| metalloid, e.g. boron [B], silicon | 2224/29679 | Niobium [Nb] as principal |
| [Si], germanium [Ge], arsenic [As], | | constituent |
| antimony [Sb], tellurium [Te] and | 2224/2968 | Molybdenum [Mo] as principal |
| polonium [Po], and alloys thereof | | constituent |
| 2224/29601 the principal constituent melting at | 2224/29681 | Tantalum [Ta] as principal |
| a temperature of less than 400°C | | constituent |
| 2224/29605 Gallium [Ga] as principal | 2224/29683 | |
| constituent | | constituent |
| 2224/29609 Indium [In] as principal | 2224/29684 | 0 1 |
| constituent | | constituent |
| 2224/29611 Tin [Sn] as principal constituent | 2224/29686 | with a principal constituent of the |
| 2224/29613 Bismuth [Bi] as principal | | material being a non metallic, non |
| constituent | | metalloid inorganic material |

| 2224/29687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics | 2224/29724 Aluminium [Al] as principal constituent |
|---|---|
| H01L 2224/29688) 2224/29688 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/29738 the principal constituent melting at a temperature of greater than or equal to 950°C |
| 2224/2969 with a principal constituent of the material being a polymer, e.g. | and less than 1550°C 2224/29739 Silver [Ag] as principal constituent |
| polyester, phenolic based polymer, epoxy 2224/29691 The principal constituent being an | 2224/29744 Gold [Au] as principal constituent |
| elastomer, e.g. silicones, isoprene, neoprene | 2224/29747 Copper [Cu] as principal constituent |
| 2224/29693 with a principal constituent of the material being a solid not provided for in groups | 2224/29749 Manganese [Mn] as principal constituent |
| H01L 2224/296 - H01L 2224/29691, e.g. allotropes of carbon, fullerene, | 2224/29755 Nickel [Ni] as principal constituent |
| graphite, carbon-nanotubes, diamond | 2224/29757 Cobalt [Co] as principal constituent |
| 2224/29694 with a principal constituent of the material being a liquid | 2224/2976 Iron [Fe] as principal constituent |
| not provided for in groups <u>H01L 2224/296</u> - <u>H01L 2224/29691</u> 2224/29695 with a principal constituent | 2224/29763 the principal constituent melting at a temperature of |
| 2224/29695 with a principal constituent of the material being a gas not provided for in groups | greater than 1550°C 2224/29764 Palladium [Pd] as principal constituent |
| H01L 2224/296 - H01L 2224/29691 2224/29698 with a principal constituent of the | 2224/29766 Titanium [Ti] as principal constituent |
| material being a combination of two or more materials in the form of a | 2224/29769 Platinum [Pt] as principal constituent |
| matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, | 2224/2977 Zirconium [Zr] as principal constituent |
| foams 2224/29699 Material of the matrix | 2224/29771 Chromium [Cr] as principal constituent |
| 2224/297 with a principal constituent of the material being a metal or a | 2224/29772 Vanadium [V] as principal constituent |
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic | 2224/29773 Rhodium [Rh] as principal constituent |
| [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | 2224/29776 Ruthenium [Ru] as principal constituent |
| 2224/29701 the principal constituent melting at a temperature of less | 2224/29778 Iridium [Ir] as principal constituent |
| than 400°C 2224/29705 Gallium [Ga] as principal | 2224/29779 Niobium [Nb] as principal constituent |
| constituent | 2224/2978 Molybdenum [Mo] as principal constituent |
| 2224/29709 Indium [In] as principal constituent | 2224/29781 Tantalum [Ta] as principal constituent |
| 2224/29711 Tin [Sn] as principal constituent | 2224/29783 Rhenium [Re] as principal constituent |
| 2224/29713 Bismuth [Bi] as principal constituent | 2224/29784 Tungsten [W] as principal constituent |
| 2224/29714 Thallium [Tl] as principal constituent | 2224/29786 with a principal constituent of |
| 2224/29716 Lead [Pb] as principal constituent | the material being a non metallic, non metalloid inorganic material |
| 2224/29717 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C | 2224/29787 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/29788) |
| 2224/29718 Zinc [Zn] as principal constituent | 2224/29788 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/2972 Antimony [Sb] as principal constituent | 2224/2979 with a principal constituent of the material being a polymer, |
| 2224/29723 Magnesium [Mg] as principal constituent | e.g. polyester, phenolic based polymer, epoxy |

| 2224/29791 The principal constituent being | 2224/29849 Manganese [Mn] as |
|--|---|
| an elastomer, e.g. silicones, | principal constituent |
| isoprene, neoprene 2224/29793 with a principal constituent | 2224/29855 Nickel [Ni] as principal constituent |
| of the material being a solid | 2224/29857 Cobalt [Co] as principal |
| not provided for in groups | constituent |
| H01L 2224/297 - H01L 2224/29791, e.g. allotropes of carbon, | 2224/2986 Iron [Fe] as principal constituent |
| fullerene, graphite, carbon- | 2224/29863 the principal constituent |
| nanotubes, diamond | melting at a temperature of |
| 2224/29794 with a principal constituent of the material being a liquid | greater than 1550°C |
| not provided for in groups | 2224/29864 Palladium [Pd] as principal constituent |
| <u>H01L 2224/297</u> - <u>H01L 2224/29791</u> | 2224/29866 Titanium [Ti] as principal |
| 2224/29795 with a principal constituent of the material being a gas | constituent |
| not provided for in groups | 2224/29869 Platinum [Pt] as principal constituent |
| H01L 2224/297 - H01L 2224/29791 | 2224/2987 Zirconium [Zr] as |
| 2224/29798 Fillers 2224/29799 Base material | principal constituent |
| 2224/298 with a principal constituent | 2224/29871 |
| of the material being a metal | principal constituent 2224/29872 Vanadium [V] as principal |
| or a metalloid, e.g. boron [B], | constituent |
| silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], | 2224/29873 Rhodium [Rh] as principal |
| tellurium [Te] and polonium | constituent 2224/29876 Ruthenium [Ru] as |
| [Po], and alloys thereof | principal constituent |
| 2224/29801 the principal constituent melting at a temperature of | 2224/29878 Iridium [Ir] as principal |
| less than 400°C | constituent 2224/29879 Niobium [Nb] as principal |
| 2224/29805 Gallium [Ga] as principal constituent | constituent |
| 2224/29809 Indium [In] as principal | 2224/2988 Molybdenum [Mo] as |
| constituent | principal constituent 2224/29881 Tantalum [Ta] as principal |
| 2224/29811 Tin [Sn] as principal constituent | constituent |
| 2224/29813 Bismuth [Bi] as principal | 2224/29883 Rhenium [Re] as principal |
| constituent | constituent 2224/29884 Tungsten [W] as principal |
| 2224/29814 Thallium [Tl] as principal constituent | constituent |
| 2224/29816 Lead [Pb] as principal | 2224/29886 with a principal constituent |
| constituent | of the material being a non metallic, non metalloid |
| 2224/29817 the principal constituent melting at a temperature | inorganic material |
| of greater than or equal to | 2224/29887 Ceramics, e.g. crystalline carbides, nitrides or |
| 400°C and less than 950°C | oxides (glass ceramics |
| 2224/29818 Zinc [Zn] as principal constituent | H01L 2224/29888) |
| 2224/2982 Antimony [Sb] as | 2224/29888 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| principal constituent | 2224/2989 with a principal constituent of |
| 2224/29823 Magnesium [Mg] as principal constituent | the material being a polymer, |
| 2224/29824 Aluminium [Al] as | e.g. polyester, phenolic based polymer, epoxy |
| principal constituent | 2224/29891 The principal constituent |
| 2224/29838 the principal constituent melting at a temperature | being an elastomer, e.g. |
| of greater than or equal to | silicones, isoprene, neoprene 2224/29893 with a principal constituent |
| 950°C and less than 1550°C | of the material being a solid |
| 2224/29839 Silver [Ag] as principal constituent | not provided for in groups |
| 2224/29844 Gold [Au] as principal | H01L 2224/298 - H01L 2224/29891, e.g. allotropes of carbon, |
| constituent | fullerene, graphite, carbon- |
| 2224/29847 Copper [Cu] as principal constituent | nanotubes, diamond |
| Constituent | |

| 2224/29894 with a principal constituent of the material being a liquid | 2224/29957 | Cobalt [Co] as principal constituent |
|--|---------------|---|
| not provided for in groups H01L 2224/298 - H01L 2224/298 | | Iron [Fe] as principal constituent |
| 2224/29895 with a principal constituent | | e principal constituent |
| of the material being a gas | | elting at a temperature of |
| not provided for in groups | | eater than 1550°C |
| <u>H01L 2224/298</u> - <u>H01L 2224/298</u> | 2 2224/29964 | Palladium [Pd] as |
| 2224/29898 with a principal constituent | | principal constituent |
| of the material being a | - | Titanium [Ti] as principal |
| combination of two or more | | constituent |
| materials in the form of | 2224/29969 | Platinum [Pt] as principal |
| a matrix with a filler, i.e. | | constituent |
| being a hybrid material, e.g. | 2224/2997 | Zirconium [Zr] as |
| segmented structures, foams | 1 | principal constituent |
| 2224/29899 Coating material | 2224/29971 | Chromium [Cr] as |
| 2224/299 with a principal constituent | 1 | principal constituent |
| of the material being a metal | 2224/29972 | Vanadium [V] as principal |
| or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], | | constituent |
| arsenic [As], antimony [Sb], | | Rhodium [Rh] as principal |
| tellurium [Te] and polonium | | constituent |
| [Po], and alloys thereof | 2224/29976 | |
| 2224/29901 the principal constituent | - | principal constituent |
| melting at a temperature of | 2224/29978 | |
| less than 400°C | | constituent |
| 2224/29905 Gallium [Ga] as principal | | Niobium [Nb] as principal |
| constituent | | constituent |
| 2224/29909 Indium [In] as principal | | Molybdenum [Mo] as |
| constituent | | principal constituent |
| 2224/29911 Tin [Sn] as principal | | Tantalum [Ta] as principal constituent |
| constituent | | Rhenium [Re] as principal |
| 2224/29913 Bismuth [Bi] as principal | | constituent |
| constituent | | Tungsten [W] as principal |
| 2224/29914 Thallium [Tl] as principal | | constituent |
| constituent | | a principal constituent |
| 2224/29916 Lead [Pb] as principal | | e material being a non |
| constituent | | llic, non metalloid |
| 2224/29917 the principal constituent | | ganic material |
| melting at a temperature of greater than or equal to | 2224/29987 Ce | ramics, e.g. crystalline |
| 400°C and less than 950°C | car | rbides, nitrides or |
| 2224/29918 Zinc [Zn] as principal | | ides (glass ceramics |
| constituent | | <u>)1L 2224/29988</u>) |
| 2224/2992 Antimony [Sb] as | | asses, e.g. amorphous |
| principal constituent | | ides, nitrides or fluorides |
| 2224/29923 Magnesium [Mg] as | | a principal constituent of |
| principal constituent | | naterial being a polymer, |
| 2224/29924 Aluminium [Al] as | | polyester, phenolic based mer, epoxy |
| principal constituent | | e principal constituent |
| 2224/29938 the principal constituent | | ing an elastomer, e.g. |
| melting at a temperature | | icones, isoprene, neoprene |
| of greater than or equal to | | a principal constituent |
| 950°C and less than 1550°C | | e material being a solid |
| 2224/29939 Silver [Ag] as principal | | rovided for in groups |
| constituent | <u>H011</u> | <u>L 2224/299</u> - <u>H01L 2224/29991</u> , |
| 2224/29944 Gold [Au] as principal | | allotropes of carbon, |
| constituent | | rene, graphite, carbon- |
| 2224/29947 Copper [Cu] as principal | | tubes, diamond |
| constituent Manganese [Mn] es | | a principal constituent |
| 2224/29949 Manganese [Mn] as principal constituent | | e material being a liquid |
| 2224/29955 Nickel [Ni] as principal | • | rovided for in groups 2 2224/299 - H01L 2224/29991 |
| constituent | <u>H011</u> | <u>. 4444/499</u> - <u>NUIL 4444/49991</u> |
| Constituent | | |

| 2224/29995 with a principal constituent of the material being a gas | 2224/30154 covering only portions of the surface to be connected |
|---|---|
| not provided for in groups <u>H01L 2224/299</u> - <u>H01L 2224/2999</u> | · · · · · · · · · · · · · · · · · · · |
| 2224/29998 with a principal constituent | i.e. peripheral arrangements |
| of the material being a | 2224/30156 Covering only the central area of |
| combination of two or more materials in the form of | the surface to be connected, i.e. central arrangements |
| a matrix with a filler, i.e. | 2224/3016 Random layout, i.e. layout with no |
| being a hybrid material, e.g. | symmetry |
| segmented structures, foams | 2224/30163 with a staggered arrangement |
| 2224/29999 Shape or distribution of the fillers | 2224/30164 covering only portions of the |
| 2224/30 of a plurality of layer connectors | surface to be connected |
| 2224/3001 Structure | 2224/30165 Covering only the peripheral area |
| 2224/3003 Layer connectors having different sizes, | of the surface to be connected, |
| e.g. different heights or widths | i.e. peripheral arrangements |
| 2224/30051 Layer connectors having different | 2224/30166 Covering only the central area of the surface to be connected, i.e. |
| shapes | central arrangements |
| 2224/301 Disposition | 2224/30177 Combinations of arrays with different |
| 2224/30104 relative to the bonding areas, e.g. bond | layouts |
| pads, of the semiconductor or solid-state | 2224/30179 Corner adaptations, i.e. disposition of |
| body | the layer connectors at the corners of |
| 2224/3011 the layer connectors being bonded to | the semiconductor or solid-state body |
| at least one common bonding area | 2224/3018 being disposed on at least two different sides of the body, e.g. dual array |
| 2224/3012 Layout | 2224/30181 On opposite sides of the body |
| 2224/3013 Square or rectangular array 2224/30131 being uniform, i.e. having a | 2224/30183 On contiguous sides of the body |
| uniform pitch across the array | 2224/305 Material |
| 2224/30132 being non uniform, i.e. having a | 2224/30505 Layer connectors having different |
| non uniform pitch across the array | materials |
| 2224/30133 with a staggered arrangement, e.g. | 2224/3051 Function |
| depopulated array | 2224/30515 Layer connectors having different |
| 2224/30134 covering only portions of the | functions |
| surface to be connected | 2224/30517 including layer connectors providing |
| 2224/30135 Covering only the peripheral area of the surface to be connected, | primarily mechanical bonding 2224/30519 including layer connectors providing |
| i.e. peripheral arrangements | primarily thermal dissipation |
| 2224/30136 Covering only the central area of | 2224/31 • • • Structure, shape, material or disposition of the |
| the surface to be connected, i.e. | layer connectors after the connecting process |
| central arrangements | 2224/32 of an individual layer connector |
| 2224/3014 Circular array, i.e. array with radial | 2224/3201 Structure |
| symmetry 2224/30141 being uniform, i.e. having a | 2224/32012 relative to the bonding area, e.g. bond |
| uniform pitch across the array | pad |
| 2224/30142 being non uniform, i.e. having a | 2224/32013 the layer connector being larger than the bonding area, e.g. bond pad |
| non uniform pitch across the array | 2224/32014 the layer connector being smaller than |
| 2224/30143 covering only portions of the | the bonding area, e.g. bond pad |
| surface to be connected | 2224/3205 Shape |
| 2224/30145 Covering only the peripheral area | 2224/32052 in top view |
| of the surface to be connected, i.e. peripheral arrangements | 2224/32053 being non uniform along the layer |
| 2224/30146 Covering only the central area of | connector |
| the surface to be connected, i.e. | 2224/32054 being rectangular or square |
| central arrangements | 2224/32055 being circular or elliptic 2224/32056 comprising protrusions or |
| 2224/3015 Mirror array, i.e. array having only | indentations |
| a reflection symmetry, i.e. bilateral | 2224/32057 in side view |
| symmetry 2224/30151 being uniform, i.e. having a | 2224/32058 being non uniform along the layer |
| uniform pitch across the array | connector |
| 2224/30152 being non uniform, i.e. having a | 2224/32059 comprising protrusions or |
| non uniform pitch across the array | indentations |
| 2224/30153 with a staggered arrangement, e.g. | 2224/3207 of bonding interfaces, e.g. interlocking features |
| depopulated array | 2224/321 Disposition |
| | • • • • • Disposition |

| 2224/32104 relative to the bonding area, e.g. bond pad | 2224/32187 the layer connector connecting to a bonding area disposed in a |
|--|---|
| 2224/32105 the layer connector connecting bonding areas being not aligned with respect to each other | recess of the surface of the item 2224/32188 the layer connector connecting to a bonding area protruding from |
| 2224/32106 the layer connector connecting one bonding area to at least two respective bonding areas | the surface of the item 2224/32195 the item being a discrete passive component |
| 2224/32111 the layer connector being disposed in a recess of the surface | 2224/32197 the layer connector connecting to a bonding area disposed in a recess of the surface of the item |
| 2224/32112 the layer connector being at least partially embedded in the surface | 2224/32198 the layer connector connecting to |
| 2224/32113 the whole layer connector protruding from the surface | a bonding area protruding from the surface of the item |
| 2224/3213 the layer connector connecting within a semiconductor or solid-state body, i.e. | 2224/32221 the body and the item being stacked 2224/32225 the item being non-metallic, e.g. |
| connecting two bonding areas on the same semiconductor or solid-state body | insulating substrate with or without metallisation |
| 2224/32135 the layer connector connecting between different semiconductor or solid-state | 2224/32227 the layer connector connecting to a bond pad of the item |
| bodies, i.e. chip-to-chip | 2224/3223 the layer connector connecting to |
| 2224/32137 the bodies being arranged next to each other, e.g. on a common substrate | a pin of the item 2224/32233 the layer connector connecting to |
| 2224/32141 the bodies being arranged on opposite | a potential ring of the item |
| sides of a substrate, e.g. mirror arrangements | 2224/32235 the layer connector connecting to a via metallisation of the item |
| 2224/32145 the bodies being stacked | 2224/32237 the layer connector connecting |
| 2224/32146 the layer connector connecting to a via connection in the semiconductor or solid-state body | to a bonding area disposed in a recess of the surface of the item 2224/32238 the layer connector connecting to |
| 2224/32147 the layer connector connecting to a bonding area disposed in a recess of | a bonding area protruding from the surface of the item |
| the surface 2224/32148 the layer connector connecting to a | 2224/3224 the layer connector connecting between the body and an |
| bonding area protruding from the surface | opposite side of the item with respect to the body |
| 2224/32151 the layer connector connecting between | 2224/32245 the item being metallic |
| a semiconductor or solid-state body and an item not being a semiconductor or | 2224/32253 the layer connector connecting to a potential ring of the item |
| solid-state body, e.g. chip-to-substrate, chip-to-passive | 2224/32257 the layer connector connecting |
| 2224/32153 the body and the item being arranged | to a bonding area disposed in a recess of the surface of the item |
| next to each other, e.g. on a common substrate | 2224/32258 the layer connector connecting to |
| 2224/32155 the item being non-metallic, e.g. | a bonding area protruding from the surface of the item |
| being an insulating substrate with or without metallisation | 2224/3226 the layer connector connecting between the body and an |
| 2224/32157 the layer connector connecting to a bond pad of the item | opposite side of the item with respect to the body |
| 2224/3216 the layer connecting to a pin of the item | 2224/32265 the item being a discrete passive |
| 2224/32163 the layer connector connecting to a potential ring of the item | component 2224/32267 the layer connector connecting to a bonding area disposed in a |
| 2224/32165 the layer connector connecting to | recess of the surface of the item |
| a via metallisation of the item 2224/32167 the layer connector connecting | 2224/32268 the layer connector connecting to a bonding area protruding from |
| to a bonding area disposed in a recess of the surface of the item | the surface of the item 2224/325 Material |
| 2224/32168 the layer connector connecting to | 2224/32501 at the bonding interface |
| a bonding area protruding from | 2224/32502 comprising an eutectic alloy |
| the surface of the item 2224/32175 the item being metallic | 2224/32503 comprising an intermetallic compound |
| 2224/32183 the layer connector connecting to | 2224/32505 outside the bonding interface, e.g. in the |
| a potential ring of the item | bulk of the layer connector |

| 2224/32506 comprising an eutectic alloy 2224/32507 comprising an intermetallic compound | 2224/33165 Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements |
|---|---|
| 2224/33 of a plurality of layer connectors 2224/3301 Structure | 2224/33177 Combinations of arrays with different layouts |
| 2224/3303 Layer connectors having different sizes, e.g. different heights or widths | 2224/33179 Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body |
| 2224/3305 Shape 2224/33051 Layer connectors having different | 2224/3318 being disposed on at least two different sides of the body, e.g. dual array |
| shapes 2224/33055 of their bonding interfaces | 2224/33181 On opposite sides of the body |
| 2224/331 Disposition | 2224/33183 On contiguous sides of the body |
| 2224/33104 relative to the bonding areas, e.g. bond | 2224/335 Material |
| pads | 2224/33505 Layer connectors having different |
| 2224/33106 the layer connectors being bonded to | materials |
| at least one common bonding area | 2224/3351 Function |
| 2224/33107 the layer connectors connecting two common bonding areas | 2224/33515 Layer connectors having different functions |
| 2224/3312 Layout (layout of layer connectors prior to the connecting process | 2224/33517 including layer connectors providing primarily mechanical support |
| H01L 2224/3012) | 2224/33519 including layer connectors providing |
| 2224/3313 Square or rectangular array | primarily thermal dissipation 2224/34 • Strap connectors, e.g. copper straps for grounding |
| 2224/33132 being non uniform, i.e. having a non uniform pitch across the array | power devices; Manufacturing methods related thereto |
| 2224/33133 with a staggered arrangement, e.g. | 2224/35 Manufacturing methods |
| depopulated array 2224/33134 covering only portions of the | 2224/35001 Involving a temporary auxiliary member not |
| surface to be connected 2224/33135 Covering only the peripheral area | forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or |
| of the surface to be connected, | substrate |
| i.e. peripheral arrangements | 2224/351 Pre-treatment of the preform connector |
| 2224/3314 Circular array, i.e. array with radial | 2224/3512 Applying permanent coating, e.g. in-situ coating |
| symmetry | 2224/35125 Plating, e.g. electroplating, electroless |
| 2224/33142 being non uniform, i.e. having a non uniform pitch across the array | plating |
| 2224/33143 with a staggered arrangement | 2224/352 Mechanical processes |
| 2224/33144 covering only portions of the | 2224/3521 Pulling |
| surface to be connected | 2224/355 Modification of a pre-existing material |
| 2224/33145 Covering only the peripheral area | 2224/3551 Sintering |
| of the surface to be connected, | 2224/3552 Anodisation |
| i.e. peripheral arrangements | 2224/357 Involving monitoring, e.g. feedback loop |
| 2224/3315 Mirror array, i.e. array having only | 2224/358 Post-treatment of the connector |
| a reflection symmetry, i.e. bilateral | 2224/3581 Cleaning, e.g. oxide removal step, |
| symmetry | desmearing |
| 2224/33151 being uniform, i.e. having a uniform pitch across the array | 2224/3582 Applying permanent coating, e.g. in-situ coating |
| 2224/33152 being non uniform, i.e. having a | 2224/35821 Spray coating |
| non uniform pitch across the array | 2224/35822 Dip coating |
| 2224/33153 with a staggered arrangement, e.g. | 2224/35823 Immersion coating, e.g. solder bath |
| depopulated array 2224/33154 covering only portions of the | 2224/35824 Chemical solution deposition [CSD], i.e. |
| surface to be connected | using a liquid precursor 2224/35825 Plating, e.g. electroplating, electroless |
| 2224/33155 Covering only the peripheral area of the surface to be connected, | plating |
| i.e. peripheral arrangements | 2224/35826 Physical vapour deposition [PVD], e.g. evaporation, sputtering |
| 2224/33156 Covering only the central area of the surface to be connected, i.e. | 2224/35827 Chemical vapour deposition [CVD], e.g. |
| central arrangements | laser CVD 2224/3583 Reworking |
| 2224/3316 Random layout, i.e. layout with no | 2224/35831 with a chemical process, e.g. with |
| symmetry 2224/33163 with a staggered arrangement | etching of the connector |
| 2224/33164 covering only portions of the | 2224/35847 with a mechanical process, e.g. with |
| surface to be connected | flattening of the connector |

| 2224/35848 Thermal treatments, e.g. annealing, | 2224/37147 Copper [Cu] as principal |
|---|--|
| controlled cooling | constituent |
| 2224/35985 Methods of manufacturing strap connectors involving a specific sequence of method | 2224/37149 Manganese [Mn] as principal constituent |
| steps | 2224/37155 Nickel [Ni] as principal |
| 2224/35986 with repetition of the same manufacturing | constituent |
| Step 2224/26 Structure shape material or disposition of the | 2224/37157 Cobalt [Co] as principal constituent |
| 2224/36 • • • Structure, shape, material or disposition of the strap connectors prior to the connecting process | 2224/3716 Iron [Fe] as principal constituent |
| 2224/37 of an individual strap connector | 2224/37163 the principal constituent melting |
| 2224/37001 Core members of the connector | at a temperature of greater than |
| 2224/37005 Structure | 1550°C |
| 2224/3701 Shape | 2224/37164 Palladium [Pd] as principal |
| 2224/37011 comprising apertures or cavities | constituent |
| 2224/37012 Cross-sectional shape | 2224/37166 Titanium [Ti] as principal constituent |
| 2224/37013 being non uniform along the | 2224/37169 Platinum [Pt] as principal |
| connector 2224/3702 Disposition | constituent |
| 2224/37025 Plural core members | 2224/3717 Zirconium [Zr] as principal |
| 2224/37026 being mutually engaged together, e.g. | constituent |
| through inserts | 2224/37171 Chromium [Cr] as principal |
| 2224/37028 Side-to-side arrangements | constituent |
| 2224/3703 Stacked arrangements | 2224/37172 Vanadium [V] as principal |
| 2224/37032 Two-layer arrangements | constituent Physician [Ph.] of principal |
| 2224/37033 Three-layer arrangements | 2224/37173 Rhodium [Rh] as principal constituent |
| 2224/37034 Four-layer arrangements | 2224/37176 Ruthenium [Ru] as principal |
| 2224/37099 Material | constituent |
| 2224/371 with a principal constituent of the material being a metal or a | 2224/37178 Iridium [Ir] as principal |
| metalloid, e.g. boron [B], silicon | constituent |
| [Si], germanium [Ge], arsenic [As], | 2224/37179 Niobium [Nb] as principal constituent |
| antimony [Sb], tellurium [Te] and | 2224/3718 Molybdenum [Mo] as principal |
| polonium [Po], and alloys thereof | constituent |
| 2224/37101 the principal constituent melting at a temperature of less than 400°C | 2224/37181 Tantalum [Ta] as principal |
| 2224/37105 Gallium [Ga] as principal | constituent |
| constituent | 2224/37183 Rhenium [Re] as principal |
| 2224/37109 Indium [In] as principal | constituent |
| constituent | 2224/37184 Tungsten [W] as principal constituent |
| 2224/37111 Tin [Sn] as principal constituent | 2224/37186 with a principal constituent of the |
| 2224/37113 Bismuth [Bi] as principal | material being a non metallic, non |
| constituent 2224/37114 Thallium [Tl] as principal | metalloid inorganic material |
| constituent | 2224/37187 Ceramics, e.g. crystalline carbides, |
| 2224/37116 Lead [Pb] as principal constituent | nitrides or oxides (glass ceramics |
| 2224/37117 the principal constituent melting | H01L 2224/37188) 2224/37188 Glasses, e.g. amorphous oxides, |
| at a temperature of greater than or | nitrides or fluorides |
| equal to 400°C and less than 950°C | 2224/3719 with a principal constituent of |
| 2224/37118 Zinc [Zn] as principal constituent | the material being a polymer, e.g. |
| 2224/3712 Antimony [Sb] as principal constituent | polyester, phenolic based polymer, |
| 2224/37123 Magnesium [Mg] as principal | epoxy |
| constituent | 2224/37191 The principal constituent being an |
| 2224/37124 Aluminium [Al] as principal | elastomer, e.g. silicones, isoprene, neoprene |
| constituent | 2224/37193 with a principal constituent |
| 2224/37138 the principal constituent melting | of the material being a solid |
| at a temperature of greater than | not provided for in groups |
| or equal to 950°C and less than 1550°C | <u>H01L 2224/371</u> - <u>H01L 2224/37191</u> , |
| 2224/37139 Silver [Ag] as principal | e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond |
| constituent | grapinic, caroon-nanotuoes, diamond |
| 2224/37144 Gold [Au] as principal | |

constituent

| 2224/37194 with a principal constituent | 2224/3726 Iron [Fe] as principal |
|---|---|
| of the material being a liquid | constituent |
| not provided for in groups <u>H01L 2224/371</u> - <u>H01L 2224/37191</u> | 2224/37263 the principal constituent melting at a temperature of |
| 2224/37195 with a principal constituent of the material being a gas | greater than 1550°C 2224/37264 Palladium [Pd] as principal |
| not provided for in groups | constituent |
| <u>H01L 2224/371</u> - <u>H01L 2224/37191</u> 2224/37198 with a principal constituent of the | 2224/37266 Titanium [Ti] as principal constituent |
| material being a combination of two or more materials in the form of a | 2224/37269 Platinum [Pt] as principal constituent |
| matrix with a filler, i.e. being a hybrid | 2224/3727 Zirconium [Zr] as principal |
| material, e.g. segmented structures, foams | constituent 2224/37271 Chromium [Cr] as principal |
| 2224/37199 Material of the matrix 2224/372 with a principal constituent of | constituent |
| the material being a metal or a | 2224/37272 Vanadium [V] as principal constituent |
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic | 2224/37273 Rhodium [Rh] as principal constituent |
| [As], antimony [Sb], tellurium [Te] and polonium [Po], and | 2224/37276 Ruthenium [Ru] as principal |
| alloys thereof | constituent 2224/37278 Iridium [Ir] as principal |
| 2224/37201 the principal constituent melting at a temperature of less | constituent |
| than 400°C | 2224/37279 Niobium [Nb] as principal constituent |
| 2224/37205 Gallium [Ga] as principal constituent | 2224/3728 Molybdenum [Mo] as principal constituent |
| 2224/37209 Indium [In] as principal constituent | 2224/37281 Tantalum [Ta] as principal |
| 2224/37211 Tin [Sn] as principal constituent | constituent 2224/37283 Rhenium [Re] as principal |
| 2224/37213 Bismuth [Bi] as principal | constituent 2224/37284 Tungsten [W] as principal |
| constituent [2224/37214] Thallium [Tl] as principal | constituent |
| constituent | 2224/37286 with a principal constituent of the material being a non metallic, |
| 2224/37216 Lead [Pb] as principal constituent | non metalloid inorganic material 2224/37287 Ceramics, e.g. crystalline |
| 2224/37217 the principal constituent melting at a temperature of | carbides, nitrides or |
| greater than or equal to 400°C | oxides (glass ceramics H01L 2224/37288) |
| and less than 950°C 2224/37218 Zinc [Zn] as principal | 2224/37288 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| constituent 2224/3722 Antimony [Sb] as principal | 2224/3729 with a principal constituent of |
| constituent | the material being a polymer, e.g. polyester, phenolic based |
| 2224/37223 Magnesium [Mg] as principal constituent | polymer, epoxy |
| 2224/37224 Aluminium [Al] as principal constituent | 2224/37291 The principal constituent being an elastomer, e.g. silicones, |
| 2224/37238 the principal constituent | isoprene, neoprene 2224/37293 with a principal constituent |
| melting at a temperature of greater than or equal to 950°C | of the material being a solid |
| and less than 1550°C | not provided for in groups <u>H01L 2224/372</u> - <u>H01L 2224/37291</u> , |
| 2224/37239 Silver [Ag] as principal constituent | e.g. allotropes of carbon, fullerene, graphite, carbon- |
| 2224/37244 Gold [Au] as principal constituent | nanotubes, diamond 2224/37294 with a principal constituent |
| 2224/37247 Copper [Cu] as principal | of the material being a liquid |
| constituent 2224/37249 Manganese [Mn] as | not provided for in groups <u>H01L 2224/372</u> - <u>H01L 2224/37291</u> |
| principal constituent 2224/37255 Nickel [Ni] as principal | 2224/37295 with a principal constituent of the material being a gas |
| constituent | not provided for in groups |
| 2224/37257 Cobalt [Co] as principal constituent | <u>H01L 2224/372 - H01L 2224/37291</u> 2224/37298 Fillers |
| | |

| 2224/37299 Bas | se material | 2224/37371 | Chromium [Cr] as |
|----------------|---|------------|---|
| 2224/373 w | vith a principal constituent | | principal constituent |
| | of the material being a metal or a metalloid, e.g. boron [B], | 2224/37372 | Vanadium [V] as principal constituent |
| | ilicon [Si], germanium [Ge], | 2224/37373 | |
| a | rsenic [As], antimony [Sb], | | constituent |
| | ellurium [Te] and polonium Po], and alloys thereof | 2224/37376 | |
| 2224/37301 | | 2224/37378 | principal constituent . Iridium [Ir] as principal |
| | melting at a temperature of | 2224/3/3/0 | constituent |
| 2224/27205 | less than 400°C | 2224/37379 | r |
| 2224/37305 | constituent | 2224/3738 | constituent Molybdenum [Mo] as |
| 2224/37309 | | 2224/3/30 | principal constituent |
| 2224/27211 | constituent | 2224/37381 | 2 3 1 1 |
| 2224/37311 | constituent | 2224/37383 | constituent . Rhenium [Re] as principal |
| 2224/37313 | | 2224/3/363 | constituent |
| 2224/27214 | constituent | 2224/37384 | 0 1 1 |
| 2224/37314 | constituent | 2224/37386 | constituent |
| 2224/37316 | | 2224/3/360 | of the material being a non |
| 2224/27217 | constituent | | metallic, non metalloid |
| 2224/37317 | the principal constituent melting at a temperature | 2224/37387 | inorganic material Ceramics, e.g. crystalline |
| | of greater than or equal to | 2224/3/307 | carbides, nitrides or |
| 2224/37318 | 400°C and less than 950°C | | oxides (glass ceramics |
| 2224/3/310 | constituent | 2224/37388 | <u>H01L 2224/37388</u>) • Glasses, e.g. amorphous |
| 2224/3732 | | | oxides, nitrides or fluorides |
| 2224/37323 | principal constituent | 2224/3739 | with a principal constituent of |
| 2224/3/323 | principal constituent | | the material being a polymer, e.g. polyester, phenolic based |
| 2224/37324 | | | polymer, epoxy |
| 2224/37338 | principal constituent | 2224/37391 | • The principal constituent being an elastomer, e.g. |
| 2224/3/330 | melting at a temperature | | silicones, isoprene, neoprene |
| | of greater than or equal to | 2224/37393 | with a principal constituent |
| 2224/37339 | 950°C and less than 1550°C Silver [Ag] as principal | | of the material being a solid not provided for in groups |
| | constituent | | <u>H01L 2224/373</u> - <u>H01L 2224/37391</u> , |
| 2224/37344 | Gold [Au] as principal constituent | | e.g. allotropes of carbon, fullerene, graphite, carbon- |
| 2224/37347 | | | nanotubes, diamond |
| | constituent | 2224/37394 | with a principal constituent |
| 2224/37349 | Manganese [Mn] as principal constituent | | of the material being a liquid not provided for in groups |
| 2224/37355 | | | <u>H01L 2224/373</u> - <u>H01L 2224/37391</u> |
| | constituent | 2224/37395 | with a principal constituent |
| 2224/37357 | Cobalt [Co] as principal constituent | | of the material being a gas not provided for in groups |
| 2224/3736 | | | H01L 2224/373 - H01L 2224/37391 |
| | constituent | 2224/37398 | with a principal constituent of the material being a |
| 2224/37363 | the principal constituent melting at a temperature of | | combination of two or more |
| | greater than 1550°C | | materials in the form of |
| 2224/37364 | | | a matrix with a filler, i.e. being a hybrid material, e.g. |
| 2224/37366 | principal constituent Titanium [Ti] as principal | | segmented structures, foams |
| 2227/3/300 | constituent | 2224/37399 | oating material |
| 2224/37369 | | | |
| 2224/3737 | constituent Zirconium [Zr] as | | |
| | principal constituent | | |
| | | | |

| 2224/374 with a principal constituent of the material being a metal | 2224/37471 |
|---|---|
| or a metalloid, e.g. boron [B], | 2224/37472 Vanadium [V] as principal |
| silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], | constituent 2224/37473 Rhodium [Rh] as principal |
| tellurium [Te] and polonium [Po], and alloys thereof | constituent |
| 2224/37401 the principal constituent | 2224/37476 Ruthenium [Ru] as principal constituent |
| melting at a temperature of less than 400°C | 2224/37478 Iridium [Ir] as principal constituent |
| 2224/37405 Gallium [Ga] as principal | 2224/37479 Niobium [Nb] as principal |
| constituent 2224/37409 Indium [In] as principal | constituent 2224/3748 Molybdenum [Mo] as |
| constituent 2224/37411 Tin [Sn] as principal | principal constituent |
| constituent | 2224/37481 Tantalum [Ta] as principal constituent |
| 2224/37413 Bismuth [Bi] as principal constituent | 2224/37483 Rhenium [Re] as principal constituent |
| 2224/37414 Thallium [Tl] as principal constituent | 2224/37484 Tungsten [W] as principal constituent |
| 2224/37416 Lead [Pb] as principal | 2224/37486 with a principal constituent |
| constituent 2224/37417 the principal constituent | of the material being a non metallic, non metalloid |
| melting at a temperature of greater than or equal to | inorganic material |
| 400°C and less than 950°C | 2224/37487 Ceramics, e.g. crystalline carbides, nitrides or |
| 2224/37418 Zinc [Zn] as principal constituent | oxides (glass ceramics H01L 2224/37488) |
| 2224/3742 Antimony [Sb] as principal constituent | 2224/37488 Glasses, e.g. amorphous |
| 2224/37423 Magnesium [Mg] as | oxides, nitrides or fluorides 2224/3749 with a principal constituent of |
| principal constituent 2224/37424 Aluminium [Al] as | the material being a polymer, e.g. polyester, phenolic based |
| principal constituent | polymer, epoxy |
| 2224/37438 the principal constituent melting at a temperature | 2224/37491 The principal constituent being an elastomer, e.g. |
| of greater than or equal to 950°C and less than 1550°C | silicones, isoprene, neoprene 2224/37493 with a principal constituent |
| 2224/37439 Silver [Ag] as principal | of the material being a solid |
| constituent 2224/37444 Gold [Au] as principal | not provided for in groups <u>H01L 2224/374</u> - <u>H01L 2224/37491</u> , |
| constituent 2224/37447 Copper [Cu] as principal | e.g. allotropes of carbon, fullerene, graphite, carbon- |
| constituent | nanotubes, diamond |
| 2224/37449 Manganese [Mn] as principal constituent | 2224/37494 with a principal constituent of the material being a liquid |
| 2224/37455 Nickel [Ni] as principal constituent | not provided for in groups H01L 2224/374 - H01L 2224/37491 |
| 2224/37457 Cobalt [Co] as principal | 2224/37495 with a principal constituent |
| constituent 2224/3746 Iron [Fe] as principal | of the material being a gas not provided for in groups |
| constituent 2224/37463 the principal constituent | H01L 2224/3749 H01L 2224/37491 2224/37498 with a principal constituent |
| melting at a temperature of greater than 1550°C | of the material being a combination of two or more |
| 2224/37464 Palladium [Pd] as | materials in the form of a matrix with a filler, i.e. |
| principal constituent 2224/37466 Titanium [Ti] as principal | being a hybrid material, e.g. |
| constituent | segmented structures, foams 2224/37499 Shape or distribution of the fillers |
| 2224/37469 Platinum [Pt] as principal constituent | 2224/3754 Coating |
| 2224/3747 Zirconium [Zr] as | 2224/37541 Structure 2224/3755 Shape |
| principal constituent | 2224/3756 Disposition, e.g. coating on a part of the |
| | core |
| | |

| 2224/37565 Single coating layer | 2224/3767 Zirconium [Zr] as principal |
|--|--|
| 2224/3757 Plural coating layers | constituent |
| 2224/37572 Two-layer stack coating | 2224/37671 Chromium [Cr] as principal |
| 2224/37573 Three-layer stack coating | constituent |
| 2224/37574 Four-layer stack coating | 2224/37672 Vanadium [V] as principal |
| 2224/37576 being mutually engaged together, e.g. through inserts | constituent 2224/37673 Rhodium [Rh] as principal |
| 2224/37578 being disposed next to each other, e.g. side-to-side arrangements | constituent 2224/37676 Ruthenium [Ru] as principal |
| 2224/37599 Material | constituent |
| 2224/376 with a principal constituent of | 2224/37678 Iridium [Ir] as principal constituent |
| the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], | 2224/37679 Niobium [Nb] as principal constituent |
| antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | 2224/3768 Molybdenum [Mo] as principal constituent |
| 2224/37601 the principal constituent melting at a temperature of less than 400°C | 2224/37681 Tantalum [Ta] as principal constituent |
| 2224/37605 Gallium [Ga] as principal constituent | 2224/37683 Rhenium [Re] as principal constituent |
| 2224/37609 Indium [In] as principal constituent | 2224/37684 Tungsten [W] as principal constituent |
| 2224/37611 Tin [Sn] as principal constituent | 2224/37686 with a principal constituent of the |
| 2224/37613 Bismuth [Bi] as principal constituent | material being a non metallic, non metalloid inorganic material |
| 2224/37614 Thallium [TI] as principal constituent | 2224/37687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics |
| 2224/37616 Lead [Pb] as principal constituent | H01L 2224/37688) 2224/37688 Glasses, e.g. amorphous oxides, |
| 2224/37617 the principal constituent melting at a temperature of greater than or | nitrides or fluorides |
| equal to 400°C and less than 950°C | 2224/3769 with a principal constituent of |
| 2224/37618 Zinc [Zn] as principal constituent | the material being a polymer, e.g. |
| 2224/3762 Antimony [Sb] as principal constituent | polyester, phenolic based polymer, epoxy |
| 2224/37623 Magnesium [Mg] as principal constituent | 2224/37691 The principal constituent being an elastomer, e.g. silicones, isoprene, |
| 2224/37624 Aluminium [Al] as principal constituent | neoprene 2224/37693 with a principal constituent |
| 2224/37638 the principal constituent melting at a temperature of greater than | of the material being a solid not provided for in groups |
| or equal to 950°C and less than 1550°C | <u>H01L 2224/376</u> - <u>H01L 2224/37691</u> , e.g. allotropes of carbon, fullerene, |
| 2224/37639 Silver [Ag] as principal | graphite, carbon-nanotubes, diamond |
| constituent | 2224/37694 with a principal constituent of the material being a liquid |
| 2224/37644 Gold [Au] as principal | not provided for in groups |
| constituent | <u>H01L 2224/376</u> - <u>H01L 2224/37691</u> |
| 2224/37647 Copper [Cu] as principal constituent | 2224/37695 with a principal constituent of the material being a gas |
| 2224/37649 Manganese [Mn] as principal constituent | not provided for in groups |
| 2224/37655 Nickel [Ni] as principal | H01L 2224/376 - H01L 2224/37691 2224/37698 with a principal constituent of the |
| constituent 2224/37657 Cobalt [Co] as principal | material being a combination of two or more materials in the form of a |
| constituent | matrix with a filler, i.e. being a hybrid |
| 2224/3766 Iron [Fe] as principal constituent 2224/37663 the principal constituent melting | material, e.g. segmented structures, foams |
| at a temperature of greater than | 2224/37699 Material of the matrix |
| 1550°C | 2224/377 with a principal constituent of |
| 2224/37664 Palladium [Pd] as principal constituent | the material being a metal or a |
| 2224/37666 Titanium [Ti] as principal | metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic |
| constituent | [As], antimony [Sb], tellurium |
| 2224/37669 Platinum [Pt] as principal constituent | [Te] and polonium [Po], and alloys thereof |
| | · |

| 2224/37701 the principal constituent melting at a temperature of less | 2224/37778 Iridium [Ir] as principal constituent |
|--|---|
| than 400°C 2224/37705 | 2224/37779 Niobium [Nb] as principal constituent |
| constituent 2224/37709 Indium [In] as principal | 2224/3778 Molybdenum [Mo] as principal constituent |
| constituent 2224/37711 Tin [Sn] as principal | 2224/37781 Tantalum [Ta] as principal constituent |
| constituent 2224/37713 Bismuth [Bi] as principal | 2224/37783 Rhenium [Re] as principal constituent |
| constituent 2224/37714 Thallium [TI] as principal | 2224/37784 Tungsten [W] as principal constituent |
| constituent | 2224/37786 with a principal constituent of |
| 2224/37716 Lead [Pb] as principal constituent | the material being a non metallic, non metalloid inorganic material |
| 2224/37717 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C | 2224/37787 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/37788) |
| 2224/37718 Zinc [Zn] as principal constituent | 2224/37788 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/3772 Antimony [Sb] as principal constituent | 2224/3779 with a principal constituent of the material being a polymer, |
| 2224/37723 Magnesium [Mg] as principal constituent | e.g. polyester, phenolic based polymer, epoxy |
| 2224/37724 Aluminium [Al] as principal constituent | 2224/37791 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/37738 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C | 2224/37793 with a principal constituent of the material being a solid not provided for in groups |
| 2224/37739 Silver [Ag] as principal constituent | <u>H01L 2224/377</u> - <u>H01L 2224/37791</u> , e.g. allotropes of carbon, |
| 2224/37744 Gold [Au] as principal constituent | fullerene, graphite, carbon- nanotubes, diamond |
| 2224/37747 Copper [Cu] as principal constituent | 2224/37794 with a principal constituent of the material being a liquid |
| 2224/37749 Manganese [Mn] as principal constituent | not provided for in groups <u>H01L 2224/377</u> - <u>H01L 2224/37791</u> |
| 2224/37755 Nickel [Ni] as principal constituent | 2224/37795 with a principal constituent of the material being a gas |
| 2224/37757 Cobalt [Co] as principal constituent | not provided for in groups <u>H01L 2224/377</u> - <u>H01L 2224/37791</u> |
| 2224/3776 Iron [Fe] as principal | 2224/37798 Fillers 2224/37799 Base material |
| constituent | 2224/378 with a principal constituent |
| 2224/37763 the principal constituent melting at a temperature of greater than 1550°C | of the material being a metal or a metalloid, e.g. boron [B], |
| 2224/37764 Palladium [Pd] as principal constituent | silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], |
| 2224/37766 Titanium [Ti] as principal constituent | tellurium [Te] and polonium [Po], and alloys thereof |
| 2224/37769 Platinum [Pt] as principal constituent | 2224/37801 the principal constituent melting at a temperature of |
| 2224/3777 Zirconium [Zr] as principal constituent | less than 400°C 2224/37805 Gallium [Ga] as principal |
| 2224/37771 Chromium [Cr] as principal constituent | constituent 2224/37809 Indium [In] as principal |
| 2224/37772 Vanadium [V] as principal constituent | constituent 2224/37811 Tin [Sn] as principal |
| 2224/37773 Rhodium [Rh] as principal constituent | constituent 2224/37813 Bismuth [Bi] as principal |
| 2224/37776 Ruthenium [Ru] as principal constituent | constituent 2224/37814 Thallium [Tl] as principal |
| constituent | constituent |

| 2224/37816 Lead [Pb] as principal constituent | 2224/37886 with a principal constituent of the material being a non |
|--|--|
| 2224/37817 the principal constituent melting at a temperature | metallic, non metalloid inorganic material |
| of greater than or equal to 400°C and less than 950°C | 2224/37887 Ceramics, e.g. crystalline carbides, nitrides or |
| 2224/37818 Zinc [Zn] as principal constituent | oxides (glass ceramics H01L 2224/37888) |
| 2224/3782 Antimony [Sb] as principal constituent | 2224/37888 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/37823 Magnesium [Mg] as principal constituent | 2224/3789 with a principal constituent of the material being a polymer, |
| 2224/37824 Aluminium [Al] as principal constituent | e.g. polyester, phenolic based polymer, epoxy |
| 2224/37838 the principal constituent melting at a temperature | 2224/37891 The principal constituent being an elastomer, e.g. |
| of greater than or equal to | silicones, isoprene, neoprene |
| 950°C and less than 1550°C 2224/37839 Silver [Ag] as principal | 2224/37893 with a principal constituent of the material being a solid |
| constituent | not provided for in groups H01L 2224/378 - H01L 2224/37891, |
| 2224/37844 Gold [Au] as principal constituent | e.g. allotropes of carbon, |
| 2224/37847 Copper [Cu] as principal constituent | fullerene, graphite, carbon- nanotubes, diamond |
| 2224/37849 Manganese [Mn] as principal constituent | 2224/37894 with a principal constituent of the material being a liquid |
| 2224/37855 Nickel [Ni] as principal | not provided for in groups <u>H01L 2224/378</u> - <u>H01L 2224/37891</u> |
| constituent [2224/37857] Cobalt [Co] as principal | 2224/37895 with a principal constituent |
| constituent 2224/3786 Iron [Fe] as principal | of the material being a gas not provided for in groups |
| constituent | <u>H01L 2224/378</u> - <u>H01L 2224/37891</u> 2224/37898 with a principal constituent |
| 2224/37863 the principal constituent melting at a temperature of | of the material being a combination of two or more |
| greater than 1550°C 2224/37864 Palladium [Pd] as | materials in the form of |
| principal constituent 2224/37866 Titanium [Ti] as principal | a matrix with a filler, i.e. being a hybrid material, e.g. |
| constituent | segmented structures, foams 2224/37899 Coating material |
| 2224/37869 Platinum [Pt] as principal constituent | 2224/379 with a principal constituent of the material being a metal |
| 2224/3787 Zirconium [Zr] as principal constituent | or a metalloid, e.g. boron [B], |
| 2224/37871 Chromium [Cr] as | silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], |
| principal constituent 2224/37872 Vanadium [V] as principal | tellurium [Te] and polonium [Po], and alloys thereof |
| constituent | 2224/37901 the principal constituent |
| 2224/37873 Rhodium [Rh] as principal constituent | melting at a temperature of less than $400^{\circ}\mathrm{C}$ |
| 2224/37876 Ruthenium [Ru] as principal constituent | 2224/37905 Gallium [Ga] as principal constituent |
| 2224/37878 Iridium [Ir] as principal constituent | 2224/37909 Indium [In] as principal constituent |
| 2224/37879 Niobium [Nb] as principal constituent | 2224/37911 Tin [Sn] as principal |
| 2224/3788 Molybdenum [Mo] as | constituent 2224/37913 Bismuth [Bi] as principal |
| principal constituent 2224/37881 Tantalum [Ta] as principal | constituent 2224/37914 Thallium [TI] as principal |
| constituent [2224/37883] Rhenium [Re] as principal | constituent 2224/37916 Lead [Pb] as principal |
| constituent constituent 2224/37884 Tungsten [W] as principal | constituent |
| constituent | |

| 2224/37917 | | 2224/37986 | 1 1 |
|------------------|--|--------------------------|---|
| | melting at a temperature | | of the material being a non |
| | of greater than or equal to | | metallic, non metalloid |
| | 400°C and less than 950°C | | inorganic material |
| 2224/37918 | | 2224/37987 | |
| 2224/2522 | constituent | | carbides, nitrides or |
| 2224/3792 | | | oxides (glass ceramics |
| | principal constituent | 2224/27099 | H01L 2224/37988) |
| 2224/37923 | 2 [2] | 2224/37988 | Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/27224 | principal constituent | 2224/3799 | |
| 2224/37924 | | 2224/3/99 | with a principal constituent of the material being a polymer, |
| 2224/27029 | principal constituent | | e.g. polyester, phenolic based |
| 2224/37938 | the principal constituent melting at a temperature | | polymer, epoxy |
| | of greater than or equal to | 2224/37991 | |
| | 950°C and less than 1550°C | 222 (/3//9/1 | being an elastomer, e.g. |
| 2224/37939 | | | silicones, isoprene, neoprene |
| 2224/31/3/ | constituent | 2224/37993 | |
| 2224/37944 | | | of the material being a solid |
| 2224/3/)44 | constituent | | not provided for in groups |
| 2224/37947 | | | H01L 2224/379 - H01L 2224/37991, |
| 2224/3//54/ | constituent | | e.g. allotropes of carbon, |
| 2224/37949 | | | fullerene, graphite, carbon- |
| 222 11 3 7 7 1 7 | principal constituent | | nanotubes, diamond |
| 2224/37955 | • • | 2224/37994 | 1 1 |
| | constituent | | of the material being a liquid |
| 2224/37957 | | | not provided for in groups |
| | constituent | | H01L 2224/379 - H01L 2224/37991 |
| 2224/3796 | . Iron [Fe] as principal | 2224/37995 | |
| | constituent | | of the material being a gas |
| 2224/37963 | the principal constituent | | not provided for in groups |
| | melting at a temperature of | 2224/27000 | <u>H01L 2224/379</u> - <u>H01L 2224/37991</u> |
| | greater than 1550°C | 2224/37998 | with a principal constituent of the material being a |
| 2224/37964 | Palladium [Pd] as | | combination of two or more |
| | principal constituent | | materials in the form of |
| 2224/37966 | Titanium [Ti] as principal | | a matrix with a filler, i.e. |
| | constituent | | being a hybrid material, e.g. |
| 2224/37969 | | | segmented structures, foams |
| | constituent | 2224/37999 | Shape or distribution of the fillers |
| 2224/3797 | | 2224/38 of a plurality | y of strap connectors |
| | principal constituent | 2224/39 Structure, shap | be, material or disposition of the |
| 2224/37971 | | strap connecto | ors after the connecting process |
| | principal constituent | 2224/40 of an individual | dual strap connector |
| 2224/37972 | | 2224/4001 Structure | |
| 2224/27072 | constituent | 2224/4005 Shape | |
| 2224/37973 | Rhodium [Rh] as principal constituent | 2224/4007 of bond | ling interfaces, e.g. interlocking |
| 2224/27076 | | feature | S |
| 2224/37976 | Ruthenium [Ru] as principal constituent | 2224/4009 Loop sl | hape |
| 2224/37978 | | 2224/40091 Arch | ed |
| 2224/3/9/8 | constituent | 2224/40095 Kink | ed |
| 2224/37979 | | 2224/401 Disposition | on |
| 2224/3/9/9 | constituent | 2224/40101 Connec | eting bonding areas at the same |
| 2224/3798 | | | e.g. horizontal bond |
| | principal constituent | 2224/40105 Connec | |
| 2224/37981 | | heights | |
| | constituent | 2224/40106 the c | |
| 2224/37983 | | | surface of the semiconductor or |
| | constituent | | -state body, e.g. parallel layout |
| 2224/37984 | | | onnector not being orthogonal to |
| | constituent | | e surface of the semiconductor |
| | | | lid-state body, e.g. fanned-out |
| | | conn | ectors, radial layout |

| 2224/40111 the strap connector extending above another semiconductor or solid-state body | 2224/40228 the bond pad being disposed in a recess of the surface of the item |
|---|---|
| 2224/4013 Connecting within a semiconductor or solid-state body, i.e. fly strap, bridge | 2224/40229 the bond pad protruding from the surface of the item |
| strap 2224/40132 with an intermediate bond, e.g. | 2224/4023 Connecting the strap to a pin of the item |
| continuous strap daisy chain 2224/40135 Connecting between different | 2224/40233 Connecting the strap to a potential ring of the item |
| semiconductor or solid-state bodies, i.e. chip-to-chip | 2224/40235 Connecting the strap to a via metallisation of the item |
| 2224/40137 the bodies being arranged next to each other, e.g. on a common substrate | 2224/40237 Connecting the strap to a die pad of the item |
| 2224/40139 with an intermediate bond, e.g. continuous strap daisy chain | 2224/4024 Connecting between the body and an opposite side of the item |
| 2224/40141 the bodies being arranged on opposite | with respect to the body |
| sides of a substrate, e.g. mirror arrangements | 2224/40245 the item being metallic 2224/40247 Connecting the strap to a bond |
| 2224/40145 the bodies being stacked | pad of the item |
| 2224/40147 with an intermediate bond, e.g. | 2224/40248 the bond pad being disposed |
| continuous strap daisy chain 2224/40151 Connecting between a semiconductor or | in a recess of the surface of the item |
| solid-state body and an item not being a semiconductor or solid-state body, e.g. | 2224/40249 the bond pad protruding from the surface of the item |
| chip-to-substrate, chip-to-passive 2224/40153 the body and the item being arranged | 2224/40253 Connecting the strap to a potential ring of the item |
| next to each other, e.g. on a common | 2224/40257 Connecting the strap to a die pad |
| substrate | of the item |
| 2224/40155 the item being non-metallic, e.g. insulating substrate with or without metallisation | 2224/4026 Connecting between the body and an opposite side of the item with respect to the body |
| 2224/40157 Connecting the strap to a bond pad of the item | 2224/40265 the item being a discrete passive component |
| 2224/40158 the bond pad being disposed | 2224/404 Connecting portions |
| in a recess of the surface of the item | 2224/4046 with multiple bonds on the same bonding area |
| 2224/40159 the bond pad protruding from the surface of the item | 2224/40475 connected to auxiliary connecting means on the bonding areas |
| 2224/4016 Connecting the strap to a pin of the item | 2224/40477 being a pre-ball (i.e. a ball formed by capillary bonding) |
| 2224/40163 Connecting the strap to a potential ring of the item | 2224/40479 on the semiconductor or solid-state body |
| 2224/40165 Connecting the strap to a via metallisation of the item | 2224/4048 outside the semiconductor or solid- |
| 2224/40175 the item being metallic | state body 2224/40484 being a plurality of pre-balls |
| 2224/40177 Connecting the strap to a bond | disposed side-to-side |
| pad of the item 2224/40178 the bond pad being disposed | 2224/40486 on the semiconductor or solid- state body |
| in a recess of the surface of the item | 2224/40487 outside the semiconductor or solid-state body |
| 2224/40179 the bond pad protruding from the surface of the item | 2224/40491 being an additional member attached to the bonding area through an |
| 2224/40183 Connecting the strap to a potential ring of the item | adhesive or solder, e.g. buffer pad 2224/40496 not being interposed between the |
| 2224/40195 the item being a discrete passive component | connector and the bonding area 2224/40499 Material of the auxiliary connecting |
| 2224/40221 the body and the item being stacked | means |
| 2224/40225 the item being non-metallic, e.g. | 2224/405 Material |
| insulating substrate with or without | 2224/40505 at the bonding interface |
| metallisation | 2224/40506 comprising an eutectic alloy |
| 2224/40227 Connecting the strap to a bond pad of the item | 2224/40507 comprising an intermetallic compound |
| | 2224/4051 Morphology of the connecting portion, e.g. grain size distribution |

| 2224/4052 Bonding interface between the | 2224/415 Material |
|--|--|
| connecting portion and the bonding | |
| area | 2224/41505 Connectors having different materials |
| 2224/4099 Auxiliary members for strap connectors, | 2224/42 Wire connectors; Manufacturing methods related thereto |
| e.g. flow-barriers, spacers | |
| 2224/40991 being formed on the semiconductor or | 2224/43 Manufacturing methods |
| solid-state body to be connected | 2224/43001 Involving a temporary auxiliary member not |
| 2224/40992 Reinforcing structures | forming part of the manufacturing apparatus, |
| 2224/40993 Alignment aids | e.g. removable or sacrificial coating, film or substrate |
| | |
| 2224/40996 being formed on an item to be connected | 2224/431 Pre-treatment of the preform connector |
| not being a semiconductor or solid-state body | 2224/4312 Applying permanent coating, e.g. in-situ |
| 2224/40997 Reinforcing structures | coating |
| 2224/40998 Alignment aids | 2224/43125 Plating, e.g. electroplating, electroless |
| | plating |
| 2224/41 of a plurality of strap connectors | 2224/432 Mechanical processes |
| 2224/4101 Structure | 2224/4321 Pulling |
| 2224/4103 Connectors having different sizes | 2224/435 Modification of a pre-existing material |
| 2224/4105 Shape | 2224/4351 Sintering |
| 2224/41051 Connectors having different shapes | 2224/4352 Anodisation |
| 2224/41052 Different loop heights | 2224/437 Involving monitoring, e.g. feedback loop |
| 2224/411 Disposition | 2224/438 Post-treatment of the connector |
| 2224/41105 Connecting at different heights | 2224/4381 Cleaning, e.g. oxide removal step, |
| 2224/41107 on the semiconductor or solid-state | desmearing |
| body being | 2224/4382 Applying permanent coating, e.g. in-situ |
| 2224/41109 outside the semiconductor or solid- | coating |
| state body | 2224/43821 Spray coating |
| 2224/4111 the connectors being bonded to at least | 2224/43822 Dip coating |
| one common bonding area, e.g. daisy | 2224/43823 Immersion coating, e.g. solder bath |
| chain | 2224/43824 Chemical solution deposition [CSD], i.e. |
| 2224/41111 the connectors connecting two | using a liquid precursor |
| common bonding areas | 2224/43825 Plating, e.g. electroplating, electroless |
| 2224/41112 the connectors connecting a common | plating |
| bonding area on the semiconductor or | 2224/43826 Physical vapour deposition [PVD], e.g. |
| solid-state body to different bonding | evaporation, sputtering |
| areas outside the body, e.g. diverging | 2224/43827 Chemical vapour deposition [CVD], e.g. |
| straps | laser CVD |
| 2224/41113 the connectors connecting different bonding areas on the semiconductor | 2224/4383 Reworking |
| or solid-state body to a common | 2224/43831 with a chemical process, e.g. with |
| bonding area outside the body, e.g. | etching of the connector |
| converging straps | 2224/43847 with a mechanical process, e.g. with |
| 2224/4112 Layout | flattening of the connector |
| 2224/4117 Crossed straps | 2224/43848 Thermal treatments, e.g. annealing, |
| 2224/41171 Fan-out arrangements | controlled cooling |
| 2224/41173 Radial fan-out arrangements | 2224/43985 Methods of manufacturing wire connectors |
| 2224/41174 Stacked arrangements | involving a specific sequence of method |
| 2224/41175 Parallel arrangements | steps |
| 2224/41176 Strap connectors having the same | 2224/43986 with repetition of the same manufacturing |
| loop shape and height | step 2224/44 Structure, shape, material or disposition of the |
| 2224/41177 Combinations of different | wire connectors prior to the connecting process |
| arrangements | 2224/45 of an individual wire connector |
| 2224/41179 Corner adaptations, i.e. disposition of | 2224/45001 Core members of the connector |
| the strap connectors at the corners of | |
| the semiconductor or solid-state body | 2224/45005 Structure |
| 2224/4118 being disposed on at least two different | 2224/4501 Shape |
| sides of the body, e.g. dual array | 2224/45012 Cross-sectional shape |
| 2224/414 Connecting portions | 2224/45013 being non uniform along the |
| 2224/4141 the connecting portions being stacked | connector |
| 2224/41421 on the semiconductor or solid-state | 2224/45014 Ribbon connectors, e.g. rectangular |
| body | cross-section |
| 2224/41422 outside the semiconductor or solid- | 2224/45015 being circular |
| state body | 2224/45016 being elliptic |
| 2224/4143 the connecting portions being staggered | 2224/4502 Disposition |
| to the same time time to the same time time time time time time time ti | 2224/45025 Plural core members |

| 2224/45026 being mutually engaged together, e.g. through inserts | 2224/45171 Chromium (Cr) as principal constituent |
|--|---|
| 2224/45028 Side-to-side arrangements | 2224/45172 Vanadium (V) as principal |
| 2224/4503 Stacked arrangements | constituent |
| 2224/45032 Two-layer arrangements | 2224/45173 Rhodium (Rh) as principal |
| 2224/45033 Three-layer arrangements | constituent |
| 2224/45034 Four-layer arrangements | 2224/45176 Ruthenium (Ru) as principal |
| 2224/45099 Material | constituent |
| 2224/451 with a principal constituent of | 2224/45178 Iridium (Ir) as principal |
| the material being a metal or a | constituent |
| metalloid, e.g. boron (B), silicon | 2224/45179 Niobium (Nb) as principal |
| (Si), germanium (Ge), arsenic (As), | constituent |
| antimony (Sb), tellurium (Te) and | 2224/4518 Molybdenum (Mo) as principal |
| polonium (Po), and alloys thereof | constituent |
| 2224/45101 the principal constituent melting at | 2224/45181 Tantalum (Ta) as principal |
| a temperature of less than 400°C | constituent |
| 2224/45105 Gallium (Ga) as principal | 2224/45183 Rhenium (Re) as principal |
| constituent | constituent |
| 2224/45109 Indium (In) as principal | 2224/45184 Tungsten (W) as principal |
| constituent | constituent |
| 2224/45111 Tin (Sn) as principal constituent | 2224/45186 with a principal constituent of the |
| 2224/45113 Bismuth (Bi) as principal | material being a non metallic, non |
| constituent | metalloid inorganic material |
| 2224/45114 Thallium (Tl) as principal | 2224/45187 Ceramics, e.g. crystalline carbides, |
| constituent | nitrides or oxides (glass ceramics |
| 2224/45116 Lead (Pb) as principal constituent | <u>H01L 2224/45188</u>) |
| 2224/45117 the principal constituent melting | 2224/45188 Glasses, e.g. amorphous oxides, |
| at a temperature of greater than or | nitrides or fluorides |
| equal to 400°C and less than 950°C | 2224/4519 with a principal constituent of |
| 2224/45118 Zinc (Zn) as principal constituent | the material being a polymer, e.g. |
| 2224/4512 Antimony (Sb) as principal | polyester, phenolic based polymer, |
| constituent | epoxy |
| 2224/45123 Magnesium (Mg) as principal | 2224/45191 The principal constituent being an |
| constituent | elastomer, e.g. silicones, isoprene, |
| 2224/45124 Aluminium (Al) as principal | neoprene |
| constituent | 2224/45193 with a principal constituent of the material being a solid |
| 2224/45138 the principal constituent melting | not provided for in groups |
| at a temperature of greater than | H01L 2224/451 - H01L 2224/45191, |
| or equal to 950°C and less than | e.g. allotropes of carbon, fullerene, |
| 1550°C | graphite, carbon-nanotubes, diamond |
| 2224/45139 Silver (Ag) as principal | 2224/45194 with a principal constituent |
| constituent | of the material being a liquid |
| 2224/45144 Gold (Au) as principal | not provided for in groups |
| constituent | H01L 2224/451 - H01L 2224/45191 |
| 2224/45147 Copper (Cu) as principal | 2224/45195 with a principal constituent |
| constituent | of the material being a gas |
| 2224/45149 Manganese (Mn) as principal | not provided for in groups |
| constituent | <u>H01L 2224/451</u> - <u>H01L 2224/45191</u> |
| 2224/45155 Nickel (Ni) as principal | 2224/45198 with a principal constituent of the |
| constituent | material being a combination of two |
| 2224/45157 Cobalt (Co) as principal | or more materials in the form of a |
| constituent | matrix with a filler, i.e. being a hybrid |
| 2224/4516 Iron (Fe) as principal constituent | material, e.g. segmented structures, |
| 2224/45163 the principal constituent melting | foams |
| at a temperature of greater than | 2224/45199 Material of the matrix |
| 1550°C | 2224/452 with a principal constituent of |
| 2224/45164 Palladium (Pd) as principal | the material being a metal or a |
| constituent | metalloid, e.g. boron (B), silicon |
| 2224/45166 Titanium (Ti) as principal | (Si), germanium (Ge), arsenic |
| constituent | (As), antimony (Sb), tellurium |
| 2224/45169 Platinum (Pt) as principal | (Te) and polonium (Po), and |
| constituent 7: constituent | alloys thereof |
| 2224/4517 Zirconium (Zr) as principal constituent | |
| Constituent | |

| 2224/45201 the principal constituent melting at a temperature of less | 2224/45278 Iridium (Ir) as principal constituent |
|---|---|
| than 400°C 2224/45205 Gallium (Ga) as principal | 2224/45279 Niobium (Nb) as principal constituent |
| constituent | 2224/4528 Molybdenum (Mo) as |
| 2224/45209 Indium (In) as principal constituent | principal constituent 2224/45281 Tantalum (Ta) as principal |
| 2224/45211 Tin (Sn) as principal | constituent |
| constituent 2224/45213 Bismuth (Bi) as principal | 2224/45283 Rhenium (Re) as principal constituent |
| constituent 2224/45214 Thallium (Tl) as principal | 2224/45284 Tungsten (W) as principal constituent |
| constituent | 2224/45286 with a principal constituent of |
| 2224/45216 Lead (Pb) as principal constituent | the material being a non metallic, non metalloid inorganic material |
| 2224/45217 the principal constituent | 2224/45287 Ceramics, e.g. crystalline |
| melting at a temperature of | carbides, nitrides or |
| greater than or equal to 400°C and less than 950°C | oxides (glass ceramics <u>H01L 2224/45288</u>) |
| 2224/45218 Zinc (Zn) as principal constituent | 2224/45288 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/4522 Antimony (Sb) as principal | 2224/4529 with a principal constituent of |
| constituent | the material being a polymer, |
| 2224/45223 Magnesium (Mg) as | e.g. polyester, phenolic based |
| principal constituent 2224/45224 Aluminium (Al) as principal | polymer, epoxy 2224/45291 The principal constituent being |
| constituent | an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/45238 the principal constituent melting at a temperature of | 2224/45293 with a principal constituent |
| greater than or equal to 950°C | of the material being a solid |
| and less than 1550°C | not provided for in groups |
| 2224/45239 Silver (Ag) as principal constituent | H01L 2224/452 - H01L 2224/45291, e.g. allotropes of carbon, |
| 2224/45244 Gold (Au) as principal | fullerene, graphite, carbon- |
| constituent | nanotubes, diamond |
| 2224/45247 Copper (Cu) as principal constituent | 2224/45294 with a principal constituent of the material being a liquid |
| 2224/45249 Manganese (Mn) as | not provided for in groups |
| principal constituent | H01L 2224/452 - H01L 2224/45291 2224/45295 with a principal constituent |
| 2224/45255 Nickel (Ni) as principal constituent | of the material being a gas |
| 2224/45257 Cobalt (Co) as principal | not provided for in groups H01L 2224/452 - H01L 2224/45291 |
| constituent | 2224/45298 Fillers |
| 2224/4526 Iron (Fe) as principal | 2224/45299 Base material |
| constituent 2224/45263 the principal constituent | 2224/453 with a principal constituent |
| melting at a temperature of | of the material being a metal |
| greater than 1550°C | or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), |
| 2224/45264 Palladium (Pd) as principal constituent | arsenic (As), antimony (Sb), |
| 2224/45266 Titanium (Ti) as principal | tellurium (Te) and polonium |
| constituent | (Po), and alloys thereof 2224/45301 the principal constituent |
| 2224/45269 Platinum (Pt) as principal | melting at a temperature of |
| constituent 2224/4527 Zirconium (Zr) as principal | less than 400°C |
| constituent | 2224/45305 Gallium (Ga) as principal constituent |
| 2224/45271 Chromium (Cr) as principal constituent | 2224/45309 Indium (In) as principal |
| 2224/45272 Vanadium (V) as principal constituent | constituent 2224/45311 Tin (Sn) as principal |
| 2224/45273 Rhodium (Rh) as principal | constituent 2224/45313 Bismuth (Bi) as principal |
| constituent 2224/45276 Ruthenium (Ru) as principal | constituent |
| constituent | 2224/45314 Thallium (Tl) as principal constituent |
| | |

| 2224/45316 Lead (Pb) as principal constituent | 2224/45386 | of the material being a non |
|---|------------|---|
| 2224/45317 the principal constituent melting at a temperature | 222445205 | metallic, non metalloid inorganic material |
| of greater than or equal to 400°C and less than 950°C | 2224/45387 | Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics |
| 2224/45318 Zinc (Zn) as principal constituent | 2224/45388 | H01L 2224/45388) Glasses, e.g. amorphous |
| 2224/4532 Antimony (Sb) as principal constituent 2224/45323 Magnesium (Mg) as | 2224/4539 | oxides, nitrides or fluorides |
| 2224/45323 Magnesium (Mg) as principal constituent 2224/45324 Aluminium (Al) as | 2224/4337 | the material being a polymer, e.g. polyester, phenolic based |
| principal constituent | 2224/45391 | polymer, epoxy The principal constituent |
| 2224/45338 the principal constituent melting at a temperature of greater than or equal to | | being an elastomer, e.g. silicones, isoprene, neoprene |
| 950°C and less than 1550°C | 2224/45393 | with a principal constituent of the material being a solid |
| 2224/45339 Silver (Ag) as principal constituent | | not provided for in groups H01L 2224/453 - H01L 2224/45391, |
| 2224/45344 Gold (Au) as principal constituent | | e.g. allotropes of carbon, fullerene, graphite, carbon- |
| 2224/45347 Copper (Cu) as principal constituent | | nanotubes, diamond |
| 2224/45349 Manganese (Mn) as principal constituent | 2224/45394 | with a principal constituent of the material being a liquid |
| 2224/45355 Nickel (Ni) as principal constituent | | not provided for in groups <u>H01L 2224/453</u> - <u>H01L 2224/45391</u> |
| 2224/45357 Cobalt (Co) as principal constituent | 2224/45395 | with a principal constituent of the material being a gas |
| 2224/4536 Iron (Fe) as principal constituent | | not provided for in groups H01L 2224/453 - H01L 2224/45391 |
| 2224/45363 the principal constituent | 2224/45398 | with a principal constituent of the material being a |
| melting at a temperature of greater than 1550°C | | combination of two or more materials in the form of |
| 2224/45364 Palladium (Pd) as principal constituent | | a matrix with a filler, i.e. |
| 2224/45366 Titanium (Ti) as principal | | being a hybrid material, e.g. segmented structures, foams |
| constituent | | oating material |
| 2224/45369 Platinum (Pt) as principal constituent | 2224/454 | with a principal constituent of the material being a metal |
| 2224/4537 Zirconium (Zr) as principal constituent | | or a metalloid, e.g. boron (B), |
| 2224/45371 | | silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), |
| principal constituent 2224/45372 Vanadium (V) as principal | | tellurium (Te) and polonium |
| constituent | 2224/45401 | (Po), and alloys thereofthe principal constituent |
| 2224/45373 Rhodium (Rh) as principal constituent | | melting at a temperature of less than 400°C |
| 2224/45376 Ruthenium (Ru) as principal constituent | 2224/45405 | Gallium (Ga) as principal constituent |
| 2224/45378 Iridium (Ir) as principal constituent | 2224/45409 | |
| 2224/45379 Niobium (Nb) as principal constituent | 2224/45411 | |
| 2224/4538 Molybdenum (Mo) as principal constituent | 2224/45413 | Bismuth (Bi) as principal |
| 2224/45381 Tantalum (Ta) as principal constituent | 2224/45414 | |
| 2224/45383 Rhenium (Re) as principal | 2224/45416 | |
| constituent 2224/45384 Tungsten (W) as principal | | constituent |
| constituent | | |

| 2224/45417 the principal constituent melting at a temperature | 2224/45486 with a principal constituent of the material being a non |
|---|---|
| of greater than or equal to | metallic, non metalloid |
| 400°C and less than 950°C | inorganic material |
| 2224/45418 Zinc (Zn) as principal | 2224/45487 Ceramics, e.g. crystalline |
| constituent | carbides, nitrides or |
| 2224/4542 Antimony (Sb) as | oxides (glass ceramics |
| principal constituent | H01L 2224/45488) |
| 2224/45423 Magnesium (Mg) as | 2224/45488 Glasses, e.g. amorphous |
| principal constituent | oxides, nitrides or fluorides |
| 2224/45424 Aluminium (Al) as | 2224/4549 with a principal constituent of |
| principal constituent | the material being a polymer, |
| 2224/45438 the principal constituent | e.g. polyester, phenolic based |
| melting at a temperature | polymer, epoxy |
| of greater than or equal to 950°C and less than 1550°C | 2224/45491 The principal constituent being an elastomer, e.g. |
| | silicones, isoprene, neoprene |
| 2224/45439 Silver (Ag) as principal constituent | 2224/45493 with a principal constituent |
| 2224/45444 Gold (Au) as principal | of the material being a solid |
| constituent | not provided for in groups |
| 2224/45447 Copper (Cu) as principal | <u>H01L 2224/454</u> - <u>H01L 2224/45491</u> , |
| constituent | e.g. allotropes of carbon, |
| 2224/45449 Manganese (Mn) as | fullerene, graphite, carbon- |
| principal constituent | nanotubes, diamond |
| 2224/45455 Nickel (Ni) as principal | 2224/45494 with a principal constituent |
| constituent | of the material being a liquid not provided for in groups |
| 2224/45457 Cobalt (Co) as principal | H01L 2224/454 - H01L 2224/45491 |
| constituent | 2224/45495 with a principal constituent |
| 2224/4546 Iron (Fe) as principal | of the material being a gas |
| constituent | not provided for in groups |
| 2224/45463 the principal constituent | H01L 2224/454 - H01L 2224/45491 |
| melting at a temperature of greater than 1550°C | 2224/45498 with a principal constituent |
| 2224/45464 Palladium (Pd) as | of the material being a |
| principal constituent | combination of two or more |
| 2224/45466 Titanium (Ti) as principal | materials in the form of |
| constituent | a matrix with a filler, i.e. being a hybrid material, e.g. |
| 2224/45469 Platinum (Pt) as principal | segmented structures, foams |
| constituent | 2224/45499 Shape or distribution of the fillers |
| 2224/4547 Zirconium (Zr) as | 2224/4554 Coating |
| principal constituent | 2224/45541 Structure |
| 2224/45471 | 2224/4555 Shape |
| principal constituent | 2224/4556 Disposition, e.g. coating on a part of the |
| 2224/45472 Vanadium (V) as principal constituent | core |
| 2224/45473 Rhodium (Rh) as principal | 2224/45565 Single coating layer |
| constituent | 2224/4557 Plural coating layers |
| 2224/45476 Ruthenium (Ru) as | 2224/45572 Two-layer stack coating |
| principal constituent | 2224/45573 Three-layer stack coating |
| 2224/45478 Iridium (Ir) as principal | 2224/45574 Four-layer stack coating |
| constituent | 2224/45576 being mutually engaged together, e.g. |
| 2224/45479 Niobium (Nb) as principal | through inserts |
| constituent | 2224/45578 being disposed next to each other, e.g. |
| 2224/4548 Molybdenum (Mo) as | side-to-side arrangements 2224/45599 Material |
| principal constituent | 2224/456 with a principal constituent of |
| 2224/45481 Tantalum (Ta) as principal | the material being a metal or a |
| constituent Phonium (Po) or principal | metalloid, e.g. boron (B), silicon |
| 2224/45483 Rhenium (Re) as principal constituent | (Si), germanium (Ge), arsenic (As), |
| 2224/45484 Tungsten (W) as principal | antimony (Sb), tellurium (Te) and |
| constituent | polonium (Po), and alloys thereof |
| 2011011111 | 2224/45601 the principal constituent melting at |
| | a temperature of less than 400°C |
| | 2224/45605 Gallium (Ga) as principal |
| | constituent |

| 2224/45609 Indium (In) as principal constituent | 2224/45684 Tungsten (W) as principal constituent |
|---|--|
| 2224/45611 Tin (Sn) as principal constituent 2224/45613 Bismuth (Bi) as principal constituent | 2224/45686 with a principal constituent of the material being a non metallic, non metalloid inorganic material |
| 2224/45614 Thallium (Tl) as principal constituent 2224/45616 Lead (Pb) as principal constituent | 2224/45687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45688) |
| 2224/45617 the principal constituent melting at a temperature of greater than or | 2224/45688 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| equal to 400°C and less than 950°C | 2224/4569 with a principal constituent of the material being a polymer, e.g. |
| 2224/45618 Zinc (Zn) as principal constituent 2224/4562 Antimony (Sb) as principal constituent | polyester, phenolic based polymer, epoxy |
| 2224/45623 Magnesium (Mg) as principal constituent | 2224/45691 The principal constituent being an elastomer, e.g. silicones, isoprene, |
| 2224/45624 Aluminium (Al) as principal constituent | neoprene 2224/45693 with a principal constituent |
| 2224/45638 the principal constituent melting at a temperature of greater than or equal to 950°C and less than | of the material being a solid not provided for in groups H01L 2224/456 - H01L 2224/45691, |
| 1550°C | e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond |
| 2224/45639 Silver (Ag) as principal constituent | 2224/45694 with a principal constituent |
| 2224/45644 Gold (Au) as principal constituent | of the material being a liquid not provided for in groups |
| 2224/45647 Copper (Cu) as principal constituent | <u>H01L 2224/456</u> - <u>H01L 2224/45691</u> 2224/45695 with a principal constituent |
| 2224/45649 Manganese (Mn) as principal constituent | of the material being a gas not provided for in groups |
| 2224/45655 Nickel (Ni) as principal constituent | <u>H01L 2224/456</u> - <u>H01L 2224/45691</u> 2224/45698 with a principal constituent of the |
| 2224/45657 Cobalt (Co) as principal constituent | material being a combination of two or more materials in the form of a |
| 2224/4566 Iron (Fe) as principal constituent | matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, |
| 2224/45663 the principal constituent melting | foams |
| at a temperature of greater than 1550°C | 2224/45699 Material of the matrix 2224/457 with a principal constituent of |
| 2224/45664 Palladium (Pd) as principal constituent | 2224/457 with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon |
| 2224/45666 Titanium (Ti) as principal constituent | (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium |
| 2224/45669 Platinum (Pt) as principal constituent | (Te) and polonium (Po), and alloys thereof |
| 2224/4567 Zirconium (Zr) as principal constituent | 2224/45701 the principal constituent melting at a temperature of less |
| 2224/45671 Chromium (Cr) as principal constituent | than 400°C 2224/45705 |
| 2224/45672 Vanadium (V) as principal constituent | constituent 2224/45709 Indium (In) as principal |
| 2224/45673 Rhodium (Rh) as principal | constituent |
| constituent 2224/45676 Ruthenium (Ru) as principal | 2224/45711 Tin (Sn) as principal constituent |
| constituent 2224/45678 Iridium (Ir) as principal | 2224/45713 Bismuth (Bi) as principal constituent |
| constituent 2224/45679 Niobium (Nb) as principal | 2224/45714 Thallium (Tl) as principal constituent |
| constituent | 2224/45716 Lead (Pb) as principal constituent |
| 2224/4568 Molybdenum (Mo) as principal constituent | 2224/45717 the principal constituent |
| 2224/45681 Tantalum (Ta) as principal constituent | melting at a temperature of greater than or equal to 400°C and less than 950°C |
| 2224/45683 Rhenium (Re) as principal constituent | and less than 930 C |

| 2224/45718 Zinc (Zn) as principal constituent | 2224/45788 Glasses, e.g. amorphous oxides, nitrides or fluorides |
|---|--|
| 2224/4572 Antimony (Sb) as principal constituent | 2224/4579 with a principal constituent of the material being a polymer, |
| 2224/45723 Magnesium (Mg) as principal constituent | e.g. polyester, phenolic based polymer, epoxy |
| 2224/45724 Aluminium (Al) as principal constituent | 2224/45791 The principal constituent being an elastomer, e.g. silicones, |
| 2224/45738 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C | isoprene, neoprene 2224/45793 with a principal constituent of the material being a solid not provided for in groups |
| 2224/45739 Silver (Ag) as principal constituent | H01L 2224/457 - H01L 2224/45791, e.g. allotropes of carbon, |
| 2224/45744 Gold (Au) as principal constituent | fullerene, graphite, carbon- nanotubes, diamond |
| 2224/45747 Copper (Cu) as principal constituent | 2224/45794 with a principal constituent of the material being a liquid |
| 2224/45749 Manganese (Mn) as principal constituent | not provided for in groups H01L 2224/457 - H01L 2224/45791 2224/45795 with a principal constituent |
| 2224/45755 Nickel (Ni) as principal constituent | of the material being a gas not provided for in groups |
| 2224/45757 Cobalt (Co) as principal constituent | H01L 2224/457 - H01L 2224/45791 |
| 2224/4576 Iron (Fe) as principal constituent | 2224/45798 Fillers 2224/45799 Base material |
| 2224/45763 the principal constituent melting at a temperature of | 2224/458 with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), |
| greater than 1550°C 2224/45764 Palladium (Pd) as principal constituent | silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), |
| 2224/45766 Titanium (Ti) as principal constituent | tellurium (Te) and polonium (Po), and alloys thereof |
| 2224/45769 Platinum (Pt) as principal constituent | 2224/45801 the principal constituent melting at a temperature of less than 400°C |
| 2224/4577 Zirconium (Zr) as principal constituent | 2224/45805 Gallium (Ga) as principal constituent |
| 2224/45771 | 2224/45809 Indium (In) as principal constituent |
| 2224/45772 Vanadium (V) as principal constituent | 2224/45811 Tin (Sn) as principal constituent |
| 2224/45773 Rhodium (Rh) as principal constituent | 2224/45813 Bismuth (Bi) as principal constituent |
| 2224/45776 Ruthenium (Ru) as principal constituent | 2224/45814 Thallium (Tl) as principal constituent |
| 2224/45778 Iridium (Ir) as principal constituent | 2224/45816 Lead (Pb) as principal constituent |
| 2224/45779 Niobium (Nb) as principal constituent | 2224/45817 the principal constituent melting at a temperature |
| 2224/4578 Molybdenum (Mo) as principal constituent | of greater than or equal to 400°C and less than 950°C |
| 2224/45781 Tantalum (Ta) as principal constituent | 2224/45818 Zinc (Zn) as principal constituent |
| 2224/45783 Rhenium (Re) as principal constituent | 2224/4582 Antimony (Sb) as principal constituent |
| 2224/45784 Tungsten (W) as principal constituent | 2224/45823 Magnesium (Mg) as principal constituent |
| 2224/45786 with a principal constituent of the material being a non metallic, | 2224/45824 Aluminium (Al) as principal constituent |
| non metalloid inorganic material 2224/45787 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/45788) | 2224/45838 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C |

| 2224/45839 Silver (Ag) as principal constituent | 2224/45893 with a principal constituent of the material being a solid | |
|--|---|-------------|
| 2224/45844 Gold (Au) as principal constituent 2224/45847 Copper (Cu) as principal | not provided for in groups H01L 2224/458 - H01L 2224/4589 e.g. allotropes of carbon, | <u>91</u> , |
| constituent 2224/45849 Manganese (Mn) as | fullerene, graphite, carbon- nanotubes, diamond | |
| principal constituent 2224/45855 Nickel (Ni) as principal | 2224/45894 with a principal constituent of the material being a liquid | |
| constituent 2224/45857 Cobalt (Co) as principal | not provided for in groups H01L 2224/458 - H01L 2224/4589 2224/45895 with a principal constituent | <u>)1</u> |
| constituent 2224/4586 Iron (Fe) as principal constituent | of the material being a gas not provided for in groups | |
| 2224/45863 the principal constituent melting at a temperature of | H01L 2224/458 - H01L 2224/4589 2224/45898 with a principal constituent of the material being a | <u>)1</u> |
| greater than 1550°C 2224/45864 Palladium (Pd) as principal constituent | combination of two or more materials in the form of | |
| 2224/45866 Titanium (Ti) as principal constituent | a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams | |
| 2224/45869 Platinum (Pt) as principal constituent | 2224/45899 Coating material | |
| 2224/4587 Zirconium (Zr) as | 2224/459 with a principal constituent | |
| principal constituent | of the material being a metal or a metalloid, e.g. boron (B), | |
| 2224/45871 Chromium (Cr) as principal constituent | silicon (Si), germanium (Ge), | |
| 2224/45872 Vanadium (V) as principal constituent | arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof | |
| 2224/45873 Rhodium (Rh) as principal | 2224/45901 the principal constituent | |
| constituent 2224/45876 Ruthenium (Ru) as | melting at a temperature of less than 400°C | |
| principal constituent 2224/45878 Iridium (Ir) as principal constituent | 2224/45905 | |
| 2224/45879 Niobium (Nb) as principal | 2224/45909 Indium (In) as principal constituent | |
| constituent 2224/4588 Molybdenum (Mo) as | 2224/45911 Tin (Sn) as principal constituent | |
| principal constituent 2224/45881 Tantalum (Ta) as principal | 2224/45913 Bismuth (Bi) as principal constituent | |
| constituent 2224/45883 Rhenium (Re) as principal | 2224/45914 Thallium (Tl) as principal constituent | |
| constituent | 2224/45916 Lead (Pb) as principal | |
| 2224/45884 Tungsten (W) as principal constituent | constituent | |
| 2224/45886 with a principal constituent of the material being a non | 2224/45917 the principal constituent melting at a temperature of greater than or equal to | |
| metallic, non metalloid inorganic material | 400°C and less than 950°C 2224/45918 Zinc (Zn) as principal | |
| 2224/45887 Ceramics, e.g. crystalline carbides, nitrides or | constituent | |
| oxides (glass ceramics | 2224/4592 Antimony (Sb) as principal constituent | |
| H01L 2224/45888) 2224/45888 Glasses, e.g. amorphous | 2224/45923 Magnesium (Mg) as | |
| oxides, nitrides or fluorides | principal constituent 2224/45924 Aluminium (Al) as | |
| 2224/4589 with a principal constituent of | principal constituent | |
| the material being a polymer, e.g. polyester, phenolic based | 2224/45938 the principal constituent melting at a temperature | |
| polymer, epoxy | of greater than or equal to | |
| 2224/45891 The principal constituent being an elastomer, e.g. | 950°C and less than 1550°C | |
| silicones, isoprene, neoprene | 2224/45939 Silver (Ag) as principal constituent | |
| | 2224/45944 Gold (Au) as principal constituent | |
| | | |

| 2224/45947 Copper (Cu) as principal constituent | 2224/45994 with a principal constituent of the material being a liquid not provided for in groups |
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| 2224/45949 Manganese (Mn) as principal constituent | H01L 2224/459 - H01L 2224/45991 |
| 2224/45955 Nickel (Ni) as principal constituent | 2224/45995 with a principal constituent of the material being a gas |
| 2224/45957 Cobalt (Co) as principal constituent | not provided for in groups <u>H01L 2224/459</u> - <u>H01L 2224/45991</u> |
| 2224/4596 Iron (Fe) as principal constituent | 2224/45998 with a principal constituent of the material being a |
| 2224/45963 the principal constituent melting at a temperature of greater than 1550°C | combination of two or more materials in the form of a matrix with a filler, i.e. |
| 2224/45964 Palladium (Pd) as principal constituent | being a hybrid material, e.g. segmented structures, foams |
| 2224/45966 Titanium (Ti) as principal | 2224/45999 Shape or distribution of the fillers 2224/46 of a plurality of wire connectors |
| constituent 2224/45969 Platinum (Pt) as principal | 2224/46 of a plurality of wire connectors 2224/47 Structure, shape, material or disposition of the |
| constituent | wire connectors after the connecting process |
| 2224/4597 Zirconium (Zr) as | 2224/48 of an individual wire connector |
| principal constituent | 2224/4801 Structure |
| 2224/45971 | 2224/48011 Length |
| principal constituent | 2224/4805 Shape |
| 2224/45972 Vanadium (V) as principal constituent | 2224/4807 of bonding interfaces, e.g. interlocking features |
| 2224/45973 Rhodium (Rh) as principal | 2224/4809 Loop shape |
| constituent | 2224/48091 Arched |
| 2224/45976 Ruthenium (Ru) as | 2224/48092 Helix |
| principal constituent | 2224/48095 Kinked |
| 2224/45978 Iridium (Ir) as principal constituent | 2224/48096 the kinked part being in proximity |
| 2224/45979 Niobium (Nb) as principal | to the bonding area on the semiconductor or solid-state body |
| constituent | 2224/48097 the kinked part being in proximity |
| 2224/4598 Molybdenum (Mo) as principal constituent | to the bonding area outside the semiconductor or solid-state body |
| 2224/45981 Tantalum (Ta) as principal | 2224/481 Disposition |
| constituent 2224/45983 Rhenium (Re) as principal | 2224/48101 Connecting bonding areas at the same height, e.g. horizontal bond |
| constituent | 2224/48105 Connecting bonding areas at different |
| 2224/45984 Tungsten (W) as principal constituent | heights 2224/48106 the connector being orthogonal to a |
| 2224/45986 with a principal constituent of the material being a non | side surface of the semiconductor or solid-state body, e.g. parallel layout |
| metallic, non metalloid | 2224/48108 the connector not being orthogonal to |
| inorganic material | a side surface of the semiconductor |
| 2224/45987 Ceramics, e.g. crystalline carbides, nitrides or | or solid-state body, e.g. fanned-out connectors, radial layout |
| oxides (glass ceramics | 2224/4811 Connecting to a bonding area of the |
| H01L 2224/45988) | semiconductor or solid-state body |
| 2224/45988 Glasses, e.g. amorphous oxides, nitrides or fluorides | located at the far end of the body with respect to the bonding area outside the |
| 2224/4599 with a principal constituent of | semiconductor or solid-state body |
| the material being a polymer, | 2224/48111 the wire connector extending above |
| e.g. polyester, phenolic based polymer, epoxy | another semiconductor or solid-state body |
| 2224/45991 The principal constituent | 2224/4813 Connecting within a semiconductor or |
| being an elastomer, e.g. silicones, isoprene, neoprene | solid-state body, i.e. fly wire, bridge wire |
| 2224/45993 with a principal constituent | 2224/48132 with an intermediate bond, e.g. |
| of the material being a solid | continuous wire daisy chain |
| not provided for in groups | 2224/48135 Connecting between different |
| H01L 2224/459 - H01L 2224/459 e.g. allotropes of carbon, | , |
| fullerene, graphite, carbon- | chip-to-chip |
| nanotubes, diamond | |
| | |

| 2224/48137 the bodies being arranged next to each | 2224/48228 the bond pad being disposed |
|---|--|
| other, e.g. on a common substrate 2224/48138 the wire connector connecting to a | in a recess of the surface of the item |
| bonding area disposed in a recess of the surface | 2224/48229 the bond pad protruding from the surface of the item |
| 2224/48139 with an intermediate bond, e.g. continuous wire daisy chain | 2224/4823 connecting the wire to a pin of the item |
| 2224/4814 the wire connector connecting to a bonding area protruding from the | 2224/48233 connecting the wire to a potential ring of the item |
| surface 2224/48141 the bodies being arranged on opposite | 2224/48235 connecting the wire to a via metallisation of the item |
| sides of a substrate, e.g. mirror arrangements | 2224/48237 connecting the wire to a die pad of the item |
| 2224/48145 the bodies being stacked | 2224/4824 Connecting between the body |
| 2224/48147 with an intermediate bond, e.g. continuous wire daisy chain | and an opposite side of the item with respect to the body |
| 2224/48148 the wire connector connecting to a | 2224/48245 the item being metallic |
| bonding area disposed in a recess of the surface | 2224/48247 connecting the wire to a bond pad of the item |
| 2224/48149 the wire connector connecting to a | 2224/48248 the bond pad being disposed |
| bonding area protruding from the surface | in a recess of the surface of the item |
| 2224/48151 Connecting between a semiconductor or solid-state body and an item not being a | 2224/48249 the bond pad protruding from the surface of the item |
| semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive | 2224/48253 connecting the wire to a potential ring of the item |
| 2224/48153 the body and the item being arranged next to each other, e.g. on a common | 2224/48257 connecting the wire to a die pad of the item |
| substrate | 2224/4826 Connecting between the body |
| 2224/48155 the item being non-metallic, e.g. insulating substrate with or without | and an opposite side of the item with respect to the body |
| metallisation | 2224/48265 the item being a discrete passive |
| 2224/48157 connecting the wire to a bond pad of the item | component |
| 2224/48158 the bond pad being disposed | 2224/484 Connecting portions |
| in a recess of the surface of the | 2224/4845 Details of ball bonds |
| item | 2224/48451 Shape |
| 2224/48159 the bond pad protruding from the surface of the item | 2224/48453 of the interface with the bonding area |
| 2224/4816 connecting the wire to a pin of | 2224/48455 Details of wedge bonds |
| the item | 2224/48456 Shape |
| 2224/48163 connecting the wire to a potential ring of the item | 2224/48458 of the interface with the bonding area |
| 2224/48165 connecting the wire to a via metallisation of the item | 2224/4846 with multiple bonds on the same bonding area |
| 2224/48175 the item being metallic | 2224/48463 the connecting portion on the bonding |
| 2224/48177 connecting the wire to a bond | area of the semiconductor or solid-state |
| pad of the item | body being a ball bond |
| 2224/48178 the bond pad being disposed in a recess of the surface of the item | 2224/48464 the other connecting portion not on the bonding area also being a ball bond, i.e. ball-to-ball |
| 2224/48179 the bond pad protruding from the surface of the item | 2224/48465 the other connecting portion not on the bonding area being a wedge bond, |
| 2224/48183 connecting the wire to a potential ring of the item | i.e. ball-to-wedge, regular stitch |
| 2224/48195 the item being a discrete passive component | 2224/4847 the connecting portion on the bonding area of the semiconductor or solid-state body being a wedge bond |
| 2224/48221 the body and the item being stacked | 2224/48471 the other connecting portion not on |
| 2224/48225 the item being non-metallic, e.g. | the bonding area being a ball bond, |
| insulating substrate with or without | i.e. wedge-to-ball, reverse stitch |
| metallisation | 2224/48472 the other connecting portion not on |
| 2224/48227 connecting the wire to a bond pad of the item | the bonding area also being a wedge |

| 2224/48475 connected to auxiliary connecting means on the bonding areas, e.g. pre-ball, wedge-on-ball, ball-on-ball | 2224/48601 the principal constituent melting at a temperature of less than 400°C |
|---|--|
| 2224/48476 between the wire connector and the bonding area | 2224/48605 |
| 2224/48477 being a pre-ball (i.e. a ball formed by capillary bonding) | 2224/48609 Indium (In) as principal constituent |
| 2224/48478 the connecting portion being a wedge bond, i.e. wedge on pre- | 2224/48611 Tin (Sn) as principal constituent |
| ball 2224/48479 on the semiconductor or solid- | 2224/48613 Bismuth (Bi) as principal constituent |
| state body 2224/4848 outside the semiconductor or | 2224/48614 Thallium (TI) as principal constituent |
| solid-state body 2224/48481 the connecting portion being a | 2224/48616 Lead (Pb) as principal constituent |
| ball bond, i.e. ball on pre-ball | 2224/48617 the principal constituent melting |
| 2224/48482 on the semiconductor or solid- state body 2224/48483 outside the semiconductor or | at a temperature of greater than or equal to 400°C and less than 950 °C |
| solid-state body | 2224/48618 Zinc (Zn) as principal |
| 2224/48484 being a plurality of pre-balls disposed side-to-side | constituent 2224/4862 Antimony (Sb) as principal |
| 2224/48485 the connecting portion being a | constituent |
| wedge bond, i.e. wedge on pre- ball | 2224/48623 Magnesium (Mg) as principal constituent |
| 2224/48486 on the semiconductor or solid-state body | 2224/48624 Aluminium (Al) as principal constituent |
| 2224/48487 outside the semiconductor or solid-state body | 2224/48638 the principal constituent melting at a temperature of greater than |
| 2224/48488 the connecting portion being a ball bond, i.e. ball on pre-ball | or equal to 950°C and less than 1550°C |
| 2224/48489 on the semiconductor or solid-state body | 2224/48639 Silver (Ag) as principal constituent |
| 2224/4849 outside the semiconductor or solid-state body | 2224/48644 Gold (Au) as principal constituent |
| 2224/48491 being an additional member attached to the bonding area | 2224/48647 Copper (Cu) as principal constituent |
| through an adhesive or solder, e.g. buffer pad | 2224/48649 Manganese (Mn) as principal constituent |
| 2224/48496 not being interposed between the wire connector and the bonding area | 2224/48655 Nickel (Ni) as principal constituent |
| 2224/48499 Material of the auxiliary connecting means | 2224/48657 Cobalt (Co) as principal constituent |
| 2224/485 Material 2224/48505 at the bonding interface | 2224/4866 Iron (Fe) as principal constituent |
| 2224/48506 comprising an eutectic alloy | 2224/48663 the principal constituent melting |
| 2224/48507 comprising an intermetallic compound | at a temperature of greater than 1550°C |
| 2224/4851 Morphology of the connecting portion, e.g. grain size distribution | 2224/48664 Palladium (Pd) as principal constituent |
| 2224/48511 Heat affected zone [HAZ] | 2224/48666 Titanium (Ti) as principal |
| 2224/4852 Bonding interface between the connecting portion and the bonding | constituent 2224/48669 Platinum (Pt) as principal |
| area 2224/48599 Principal constituent of the | constituent 2224/4867 Zirconium (Zr) as principal |
| connecting portion of the wire connector being Gold (Au) | constituent 2224/48671 Chromium (Cr) as principal |
| 2224/486 with a principal constituent of the | constituent Vanadium (V) as principal |
| bonding area being a metal or a metalloid, e.g. boron (B), silicon | 2224/48672 Vanadium (V) as principal constituent |
| (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and | 2224/48673 Rhodium (Rh) as principal constituent |
| polonium (Po), and alloys thereof | 2224/48678 Iridium (Ir) as principal constituent |

| 2224/48679 Niobium (Nb) as principal constituent | 2224/48716 Lead (Pb) as principal constituent |
|---|--|
| 2224/4868 Molybdenum (Mo) as principal constituent | 2224/48717 the principal constituent melting at a temperature of greater than |
| 2224/48681 Tantalum (Ta) as principal constituent | or equal to 400°C and less than 950 °C |
| 2224/48683 Rhenium (Re) as principal constituent | 2224/48718 Zinc (Zn) as principal constituent |
| 2224/48684 Tungsten (W) as principal constituent | 2224/4872 Antimony (Sb) as principal constituent |
| 2224/48686 with a principal constituent of the bonding area being a non metallic, | 2224/48723 Magnesium (Mg) as principal constituent |
| non metalloid inorganic material 2224/48687 Ceramics, e.g. crystalline | 2224/48724 Aluminium (Al) as principal constituent |
| carbides, nitrides or oxides (glass ceramics <u>H01L 2224/48688</u>) | 2224/48738 the principal constituent melting at a temperature of greater than |
| 2224/48688 Glasses, e.g. amorphous oxides, nitrides or fluorides | or equal to 950°C and less than 1550°C |
| 2224/4869 with a principal constituent of the bonding area being a polymer, e.g. | 2224/48739 Silver (Ag) as principal constituent |
| polyester, phenolic based polymer, epoxy The principal constituent being | 2224/48744 Gold (Au) as principal constituent 2224/48747 Copper (Cu) as principal |
| 2224/48691 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene | 2224/48747 Copper (Cu) as principal constituent 2224/48749 Manganese (Mn) as principal |
| 2224/48693 with a principal constituent of the bonding area being a | constituent 2224/48755 Nickel (Ni) as principal |
| solid not provided for in groups H01L 2224/486 - H01L 2224/4869, | constituent 2224/48757 Cobalt (Co) as principal |
| e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, | constituent 2224/4876 Iron (Fe) as principal |
| diamond 2224/48694 with a principal constituent | constituent |
| of the bonding area being a liquid not provided for in groups | 2224/48763 the principal constituent melting at a temperature of greater than 1550°C |
| 2224/48698 with a principal constituent of the bonding area being a combination | 2224/48764 Palladium (Pd) as principal constituent |
| of two or more material regions, i.e. being a hybrid material, e.g. | 2224/48766 Titanium (Ti) as principal constituent |
| segmented structures, island patterns | 2224/48769 Platinum (Pt) as principal constituent |
| 2224/48699 Principal constituent of the connecting portion of the wire | 2224/4877 Zirconium (Zr) as principal constituent |
| connector being Aluminium (Al) 2224/487 with a principal constituent of the | 2224/48771 Chromium (Cr) as principal constituent |
| bonding area being a metal or a metalloid, e.g. boron (B), silicon | 2224/48772 Vanadium (V) as principal constituent |
| (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and | 2224/48773 Rhodium (Rh) as principal constituent |
| polonium (Po), and alloys thereof 2224/48701 the principal constituent melting | 2224/48778 Iridium (Ir) as principal constituent |
| at a temperature of less than 400°C | 2224/48779 Niobium (Nb) as principal constituent |
| 2224/48705 Gallium (Ga) as principal constituent | 2224/4878 Molybdenum (Mo) as principal constituent |
| 2224/48709 Indium (In) as principal constituent | 2224/48781 Tantalum (Ta) as principal constituent |
| 2224/48711 Tin (Sn) as principal constituent | 2224/48783 Rhenium (Re) as principal constituent |
| 2224/48713 Bismuth (Bi) as principal constituent | 2224/48784 Tungsten (W) as principal constituent |
| 2224/48714 Thallium (TI) as principal constituent | 2224/48786 with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material |

| 2224/48787 | 2224/48838 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C |
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| 2224/48788 Glasses, e.g. amorphous oxides, nitrides or fluorides 2224/4879 with a principal constituent of the | 2224/48839 Silver (Ag) as principal constituent |
| 2224/4879 with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, | 2224/48844 Gold (Au) as principal constituent |
| epoxy 2224/48791 The principal constituent being | 2224/48847 Copper (Cu) as principal constituent |
| an elastomer, e.g. silicones, isoprene, neoprene | 2224/48849 Manganese (Mn) as principal constituent |
| 2224/48793 with a principal constituent of the bonding area being a | 2224/48855 Nickel (Ni) as principal constituent |
| solid not provided for in groups H01L 2224/487 - H01L 2224/4879, | 2224/48857 Cobalt (Co) as principal constituent |
| e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | 2224/4886 Iron (Fe) as principal constituent |
| 2224/48794 with a principal constituent of the bonding area being a | 2224/48863 the principal constituent melting at a temperature of greater than 1550°C |
| liquid not provided for in groups H01L 2224/487 - H01L 2224/4879 | 2224/48864 Palladium (Pd) as principal constituent |
| 2224/48798 with a principal constituent of the bonding area being a combination | 2224/48866 Titanium (Ti) as principal constituent |
| of two or more material regions, i.e. being a hybrid material, e.g. | 2224/48869 Platinum (Pt) as principal constituent |
| segmented structures, island patterns 2224/48799 Principal constituent of the | 2224/4887 Zirconium (Zr) as principal constituent |
| connecting portion of the wire connector being Copper (Cu) | 2224/48871 Chromium (Cr) as principal constituent |
| 2224/488 with a principal constituent of the bonding area being a metal or a | 2224/48872 Vanadium (V) as principal constituent |
| metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), | 2224/48873 Rhodium (Rh) as principal constituent |
| antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof | 2224/48878 Iridium (Ir) as principal constituent 2224/48879 Niobium (Nb) as principal |
| 2224/48801 the principal constituent melting at a temperature of less than 400°C | constituent 2224/4888 Molybdenum (Mo) as principal |
| 2224/48805 Gallium (Ga) as principal constituent | constituent 2224/48881 Tantalum (Ta) as principal |
| 2224/48809 Indium (In) as principal constituent | constituent 2224/48883 Rhenium (Re) as principal |
| 2224/48811 Tin (Sn) as principal constituent | constituent 2224/48884 Tungsten (W) as principal |
| 2224/48813 Bismuth (Bi) as principal constituent | constituent 2224/48886 with a principal constituent of the |
| 2224/48814 Thallium (Tl) as principal constituent | bonding area being a non metallic, non metalloid inorganic material |
| 2224/48816 Lead (Pb) as principal constituent | 2224/48887 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/48888) |
| 2224/48817 the principal constituent melting at a temperature of greater than | 2224/48888 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| or equal to 400°C and less than 950 °C 2224/48818 Zinc (Zn) as principal | 2224/4889 with a principal constituent of the bonding area being a polymer, e.g. |
| constituent 2224/4882 Antimony (Sb) as principal | polyester, phenolic based polymer, epoxy |
| constituent 2224/48823 Magnesium (Mg) as principal | 2224/48891 The principal constituent being an elastomer, e.g. silicones, |
| constituent 2224/48824 Aluminium (Al) as principal | isoprene, neoprene |
| constituent | |

| 2224/48893 with a principal constituent | 2224/49171 Fan-out arrangements |
|---|--|
| of the bonding area being a | 2224/49173 Radial fan-out arrangements |
| solid not provided for in groups | 2224/49174 Stacked arrangements |
| <u>H01L 2224/488</u> - <u>H01L 2224/4889</u> , | 2224/49175 Parallel arrangements |
| e.g. allotropes of carbon, fullerene, | 2224/49176 Wire connectors having the same |
| graphite, carbon-nanotubes, | loop shape and height |
| diamond | 2224/49177 Combinations of different |
| 2224/48894 with a principal constituent | arrangements |
| of the bonding area being a | 2224/49179 Corner adaptations, i.e. disposition |
| liquid not provided for in groups | of the wire connectors at the |
| <u>H01L 2224/488</u> - <u>H01L 2224/4889</u> | corners of the semiconductor or |
| 2224/48898 with a principal constituent of the | solid-state body |
| bonding area being a combination | 2224/4918 being disposed on at least two different |
| of two or more material regions, | sides of the body, e.g. dual array |
| i.e. being a hybrid material, e.g. | 2224/494 Connecting portions |
| segmented structures, island | 2224/4941 the connecting portions being stacked |
| patterns | 2224/4942 Ball bonds |
| 2224/4899 Auxiliary members for wire connectors, | 2224/49421 on the semiconductor or solid-state |
| e.g. flow-barriers, reinforcing structures, | body |
| spacers, alignment aids | ž |
| 2224/48991 being formed on the semiconductor or | 2224/49422 outside the semiconductor or solid- |
| solid-state body to be connected | state body |
| 2224/48992 Reinforcing structures | 2224/49425 Wedge bonds |
| 2224/48993 Alignment aids | 2224/49426 on the semiconductor or solid-state |
| 2224/48996 being formed on an item to be connected | body |
| not being a semiconductor or solid-state | 2224/49427 outside the semiconductor or solid- |
| body | state body |
| 2224/48997 Reinforcing structures | 2224/49429 Wedge and ball bonds |
| 2224/48998 Alignment aids | 2224/4943 the connecting portions being staggered |
| 2224/49 of a plurality of wire connectors | 2224/49431 on the semiconductor or solid-state |
| 2224/4901 Structure | body |
| 2224/4903 Connectors having different sizes, e.g. | 2224/49433 outside the semiconductor or solid- |
| different diameters | state body |
| different diameters | 2224/4945 Wire connectors having connecting |
| 2224/4905 Shape | 2224/4945 Whe connectors having connecting |
| 2224/4905 Shape Connectors having different shapes | portions of different types on the |
| 2224/49051 Connectors having different shapes | |
| 2224/49051 Connectors having different shapes 2224/49052 Different loop heights | portions of different types on the |
| 2224/49051 Connectors having different shapes 2224/49052 Different loop heights 2224/4909 Loop shape arrangement | portions of different types on the semiconductor or solid-state body, e.g. |
| 2224/49051 Connectors having different shapes 2224/49052 Different loop heights 2224/4909 Loop shape arrangement 2224/49095 parallel in plane | portions of different types on the semiconductor or solid-state body, e.g. regular and reverse stitches |
| 2224/49051 Connectors having different shapes 2224/49052 Different loop heights 2224/4909 Loop shape arrangement 2224/49095 parallel in plane 2224/49096 horizontal | portions of different types on the semiconductor or solid-state body, e.g. regular and reverse stitches 2224/495 Material 2224/49505 Connectors having different materials |
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| 2224/72101 | 2024/7511 |
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| 2224/73101 on the same surface | 2224/7511 High pressure chamber |
| 2224/73103 Bump and layer connectors | 2224/7515 Means for applying permanent coating, e.g. in- |
| 2224/73104 the bump connector being embedded into | situ coating |
| the layer connector | 2224/75151 Means for direct writing |
| 2224/73151 on different surfaces | 2224/75152 Syringe |
| 2224/73153 Bump and layer connectors | 2224/75153 integrated into the bonding head |
| 2224/732 Location after the connecting process | 2224/75155 Jetting means, e.g. ink jet |
| 2224/73201 on the same surface | 2224/75158 including a laser |
| 2224/73203 Bump and layer connectors | 2224/75161 Means for screen printing, e.g. roller, |
| 2224/73204 the bump connector being embedded into | squeegee, screen stencil |
| the layer connector | 2224/7517 Means for applying a preform, e.g. laminator |
| 2224/73205 Bump and strap connectors | 2224/75171 including a vacuum-bag |
| 2224/73207 Bump and wire connectors | 2224/7518 Means for blanket deposition |
| 2224/73209 Bump and HDI connectors | 2224/75181 for spin coating, i.e. spin coater |
| 2224/73211 Bump and TAB connectors | 2224/75182 for curtain coating |
| 2224/73213 Layer and strap connectors | 2224/75183 for immersion coating, i.e. bath |
| 2224/73215 Layer and wire connectors | 2224/75184 for spray coating, i.e. nozzle |
| 2224/73217 Layer and HDI connectors | 2224/75185 Means for physical vapour deposition |
| 2224/73219 Layer and TAB connectors | [PVD], e.g. evaporation, sputtering |
| 2224/73221 Strap and wire connectors | 2224/75186 Means for sputtering, e.g. target |
| 2224/73223 Strap and HDI connectors | 2224/75187 Means for evaporation |
| 2224/73225 Strap and TAB connectors | 2224/75188 Means for chemical vapour deposition |
| 2224/73227 Wire and HDI connectors | [CVD], e.g. for laser CVD |
| 2224/73229 Wire and TAB connectors | 2224/75189 Means for plating, e.g. for electroplating, |
| 2224/73231 HDI and TAB connectors | electroless plating |
| 2224/73251 on different surfaces | 2224/752 Protection means against electrical discharge |
| 2224/73253 Bump and layer connectors | 2224/7525 Means for applying energy, e.g. heating means |
| 2224/73255 Bump and strap connectors | 2224/75251 in the lower part of the bonding apparatus, |
| 2224/73257 Bump and wire connectors | e.g. in the apparatus chuck |
| 2224/73259 Bump and HDI connectors | 2224/75252 in the upper part of the bonding apparatus, |
| 2224/73261 Bump and TAB connectors | e.g. in the bonding head |
| 2224/73263 Layer and strap connectors | 2224/75253 adapted for localised heating |
| 2224/73265 Layer and wire connectors | 2224/7526 Polychromatic heating lamp |
| 2224/73267 Layer and HDI connectors | 2224/75261 Laser |
| 2224/73269 Layer and TAB connectors | 2224/75262 in the lower part of the bonding apparatus, |
| 2224/73271 Strap and wire connectors | e.g. in the apparatus chuck |
| 2224/73273 Strap and HDI connectors | 2224/75263 in the upper part of the bonding apparatus, |
| 2224/73275 Strap and TAB connectors | e.g. in the bonding head |
| 2224/73277 Wire and HDI connectors | 2224/75264 by induction heating, i.e. coils |
| 2224/73279 Wire and TAB connectors | 2224/75265 in the lower part of the bonding apparatus, |
| 2224/73281 HDI and TAB connectors | e.g. in the apparatus chuck |
| 2224/74 • Apparatus for manufacturing arrangements for | 2224/75266 in the upper part of the bonding apparatus, |
| connecting or disconnecting semiconductor or solid- | e.g. in the bonding head |
| state bodies and for methods related thereto | 2224/75267 Flame torch, e.g. hydrogen torch |
| 2224/741 Apparatus for manufacturing means for bonding, | 2224/75268 Discharge electrode |
| e.g. connectors | 2224/75269 Shape of the discharge electrode |
| 2224/742 Apparatus for manufacturing bump connectors | 2224/7527 Material of the discharge electrode |
| 2224/743 Apparatus for manufacturing layer connectors | 2224/75271 Circuitry of the discharge electrode |
| 2224/744 Apparatus for manufacturing strap connectors | 2224/75272 Oven |
| 2224/745 Apparatus for manufacturing wire connectors | 2224/7528 Resistance welding electrodes, i.e. for ohmic |
| 2224/749 Tools for reworking, e.g. for shaping | heating |
| 2224/75 . Apparatus for connecting with bump connectors | 2224/75281 in the lower part of the bonding apparatus, |
| or layer connectors | e.g. in the apparatus chuck |
| 2224/75001 • • • Calibration means | 2224/75282 in the upper part of the bonding apparatus, e.g. in the bonding head |
| 2224/7501 Means for cleaning, e.g. brushes, for hydro | |
| blasting, for ultrasonic cleaning, for dry | 2224/75283 by infrared heating, e.g. infrared heating lamp |
| ice blasting, using gas-flow, by etching, by | 1 |
| applying flux or plasma | 2224/753 by means of pressure |
| 2224/751 Means for controlling the bonding | 2224/75301 Bonding head |
| environment, e.g. valves, vacuum pumps | 2224/75302 Shape |
| 2224/75101 Chamber | 2224/75303 of the pressing surface |
| 2224/75102 Vacuum chamber | 2224/75304 being curved |
| | 2224/75305 comprising protrusions |

| 2224/7531 of other parts | 2224/75725 in the upper part of the bonding apparatus, |
|--|--|
| 2224/75312 Material | e.g. in the bonding head |
| 2224/75313 Removable bonding head | 2224/75733 Magnetic holding means |
| 2224/75314 Auxiliary members on the pressing | 2224/75734 in the lower part of the bonding apparatus, |
| surface | e.g. in the apparatus chuck |
| 2224/75315 Elastomer inlay | 2224/75735 in the upper part of the bonding apparatus, |
| 2224/75316 with retaining mechanisms | e.g. in the bonding head |
| 2224/75317 Removable auxiliary member | 2224/75743 Suction holding means |
| 2224/75318 Shape of the auxiliary member | 2224/75744 in the lower part of the bonding apparatus, |
| 2224/7532 Material of the auxiliary member | e.g. in the apparatus chuck |
| | 2224/75745 in the upper part of the bonding apparatus, |
| 2224/75343 by ultrasonic vibrations | e.g. in the bonding head |
| 2224/75344 Eccentric cams | 2224/75753 Means for optical alignment, e.g. sensors |
| 2224/75345 in the lower part of the bonding | 2224/75754 Guiding structures |
| apparatus, e.g. in the apparatus chuck | 2224/75755 in the lower part of the bonding apparatus, |
| 2224/75346 in the upper part of the bonding | e.g. in the apparatus chuck |
| apparatus, e.g. in the bonding head | |
| 2224/75347 Piezoelectric transducers | 2224/75756 in the upper part of the bonding apparatus, e.g. in the bonding head |
| 2224/75348 in the lower part of the bonding | |
| apparatus, e.g. in the apparatus chuck | 2224/758 Means for moving parts |
| 2224/75349 in the upper part of the bonding | 2224/75801 Lower part of the bonding apparatus, e.g. XY |
| apparatus, e.g. in the bonding head | table |
| 2224/7535 Stable and mobile yokes | 2224/75802 Rotational mechanism |
| 2224/75351 in the lower part of the bonding | 2224/75803 Pivoting mechanism |
| apparatus, e.g. in the apparatus chuck | 2224/75804 Translational mechanism |
| 2224/75352 in the upper part of the bonding | 2224/75821 Upper part of the bonding apparatus, i.e. |
| apparatus, e.g. in the bonding head | bonding head |
| 2224/75353 Ultrasonic horns | 2224/75822 Rotational mechanism |
| 2224/75354 in the lower part of the bonding | 2224/75823 Pivoting mechanism |
| apparatus, e.g. in the apparatus chuck | 2224/75824 Translational mechanism |
| 2224/75355 Design, e.g. of the wave guide | 2224/75841 of the bonding head |
| 2224/755 Cooling means | 2224/75842 Rotational mechanism |
| 2224/75501 in the lower part of the bonding apparatus, | 2224/75843 Pivoting mechanism |
| e.g. in the apparatus chuck | 2224/759 Means for monitoring the connection process |
| 2224/75502 in the upper part of the bonding apparatus, | 2224/75901 using a computer, e.g. fully- or semi- |
| e.g. in the bonding head | automatic bonding |
| 2224/7555 Mechanical means, e.g. for planarising, | 2224/7592 Load or pressure adjusting means, e.g. |
| pressing, stamping | sensors |
| 2224/756 Means for supplying the connector to be | 2224/75925 Vibration adjusting means, e.g. sensors |
| connected in the bonding apparatus | 2224/7595 Means for forming additional members |
| 2224/75601 Storing means | 2224/7598 specially adapted for batch processes |
| 2224/75611 Feeding means | 2224/75981 Apparatus chuck |
| 2224/75621 Holding means | 2224/75982 Shape |
| 2224/7565 Means for transporting the components to be | 2224/75983 of the mounting surface |
| connected | 2224/75984 of other portions |
| 2224/75651 Belt conveyor | 2224/75985 Material |
| 2224/75652 Chain conveyor | 2224/75986 Auxiliary members on the pressing surface |
| 2224/75653 Vibrating conveyor | |
| 2224/75654 Pneumatic conveyor | 2224/75987 Shape of the auxiliary member 2224/75988 Material of the auxiliary member |
| 2224/75655 in a fluid | • |
| 2224/75055 Means for aligning | 2224/76 Apparatus for connecting with build-up |
| | interconnects |
| 2224/75701 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/7601 Calibration means |
| | 2224/7601 Means for cleaning, e.g. brushes, for hydro |
| 2224/75702 in the upper part of the bonding apparatus, e.g. in the bonding head | blasting, for ultrasonic cleaning, for dry |
| 2224/75703 Mechanical holding means | ice blasting, using gas-flow, by etching, by applying flux or plasma |
| | |
| 2224/75704 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/761 Means for controlling the bonding environment, e.g. valves, vacuum pumps |
| 2224/75705 in the upper part of the bonding apparatus, | 2224/76101 Chamber |
| e.g. in the bonding head | |
| 2224/75723 Electrostatic holding means | 2224/76102 Vacuum chamber |
| 2224/75724 in the lower part of the bonding apparatus, | 2224/7611 High pressure chamber |
| e.g. in the apparatus chuck | 2224/7615 Means for depositing |
| e.g. in the apparatus chuck | 2224/76151 Means for direct writing |
| | 2224/76152 Syringe |
| | |

| 2224/76155 Jetting means, e.g. ink jet | 2224/7632 Material of the auxiliary member |
|---|---|
| 2224/76158 including a laser | 2224/76343 by ultrasonic vibrations |
| 2224/76161 Means for screen printing, e.g. roller, | 2224/76344 Eccentric cams |
| squeegee, screen stencil | 2224/76345 in the lower part of the bonding |
| 2224/7617 Means for applying a preform, e.g. laminator | apparatus, e.g. in the apparatus chuck |
| 2224/76171 including a vacuum-bag | 2224/76346 in the upper part of the bonding |
| 2224/7618 Means for blanket deposition | apparatus |
| 2224/76181 for spin coating, i.e. spin coater | 2224/76347 Piezoelectric transducers |
| 2224/76182 for curtain coating | 2224/76348 in the lower part of the bonding |
| 2224/76183 for immersion coating, i.e. bath | apparatus, e.g. in the apparatus chuck |
| 2224/76184 for spray coating, i.e. nozzle | 2224/76349 in the upper part of the bonding |
| 2224/76185 Means for physical vapour deposition | apparatus |
| [PVD] | 2224/7635 Stable and mobile yokes |
| 2224/76186 Means for sputtering, e.g. target | 2224/76351 in the lower part of the bonding |
| 2224/76187 Means for evaporation | apparatus, e.g. in the apparatus chuck |
| 2224/76188 Means for chemical vapour deposition | 2224/76352 in the upper part of the bonding |
| [CVD], e.g. for laser CVD | apparatus |
| 2224/76189 Means for plating, e.g. for electroplating, | 2224/76353 Ultrasonic horns |
| electroless plating | 2224/76354 in the lower part of the bonding |
| 2224/762 Protection means against electrical discharge | apparatus, e.g. in the apparatus chuck |
| 2224/7625 Means for applying energy, e.g. heating means | 2224/76355 Design, e.g. of the wave guide |
| 2224/76251 in the lower part of the bonding apparatus, | 2224/765 Cooling means |
| e.g. in the apparatus chuck | 2224/76501 in the lower part of the bonding apparatus, |
| 2224/76252 in the upper part of the bonding apparatus | e.g. in the apparatus chuck |
| 2224/76253 adapted for localised heating | 2224/76502 in the upper part of the bonding apparatus |
| 2224/7626 Polychromatic heating lamp | 2224/7655 Mechanical means, e.g. for planarising, |
| 2224/76261 Laser | pressing, stamping |
| 2224/76262 in the lower part of the bonding apparatus, | 2224/76552 for drilling |
| e.g. in the apparatus chuck | 2224/76554 for abrasive blasting, e.g. sand blasting, wet |
| 2224/76263 in the upper part of the bonding apparatus | blasting, hydro-blasting, dry ice blasting |
| 2224/76264 by induction heating, i.e. coils | 2224/766 Means for supplying the material of the interconnect |
| 2224/76265 in the lower part of the bonding apparatus, | 2224/76601 Storing means |
| e.g. in the apparatus chuck | 2224/76611 Feeding means |
| 2224/76266 in the upper part of the bonding apparatus | 2224/76621 Holding means |
| 2224/76267 Flame torch, e.g. hydrogen torch | |
| 2224/76268 Discharge electrode | 2224/7665 Means for transporting the components to be connected |
| 2224/76269 Shape of the discharge electrode | 2224/76651 Belt conveyor |
| 2224/7627 Material of the discharge electrode | 2224/76652 Chain conveyor |
| 2224/76271 Circuitry of the discharge electrode | 2224/76653 Vibrating conveyor |
| 2224/76272 Oven | 2224/76654 Pneumatic conveyor |
| 2224/7628 Resistance welding electrodes, i.e. for ohmic | 2224/76655 in a fluid |
| heating | 2224/76033 Ma Huld 2224/767 Means for aligning |
| 2224/76281 in the lower part of the bonding apparatus, | 2224/76701 in the lower part of the bonding apparatus, |
| e.g. in the apparatus chuck | e.g. in the apparatus chuck |
| 2224/76282 in the upper part of the bonding apparatus | 2224/76702 in the upper part of the bonding apparatus |
| 2224/76283 by infrared heating, e.g. infrared heating | 2224/76703 Mechanical holding means |
| lamp | 2224/76704 in the lower part of the bonding apparatus, |
| 2224/763 by means of pressure | e.g. in the apparatus chuck |
| 2224/76301 Pressing head | 2224/76705 in the upper part of the bonding apparatus |
| 2224/76302 Shape | 2224/76723 Electrostatic holding means |
| 2224/76303 of the pressing surface | 2224/76724 in the lower part of the bonding apparatus, |
| 2224/76304 being curved | e.g. in the apparatus chuck |
| 2224/76305 comprising protrusions | 2224/76725 in the upper part of the bonding apparatus |
| 2224/7631 of other parts | 2224/76733 Magnetic holding means |
| 2224/76312 Material | 2224/76734 in the lower part of the bonding apparatus, |
| 2224/76313 Removable pressing head | e.g. in the apparatus chuck |
| 2224/76314 Auxiliary members on the pressing | 2224/76735 in the upper part of the bonding apparatus |
| surface | 2224/76743 Suction holding means |
| 2224/76315 Elastomer inlay | 2224/76744 in the lower part of the bonding apparatus, |
| 2224/76316 with retaining mechanisms | e.g. in the apparatus chuck |
| 2224/76317 Removable auxiliary member | 2224/76745 in the upper part of the bonding apparatus |
| 2224/76318 Shape of the auxiliary member | 2224/76753 Means for optical alignment, e.g. sensors |
| | in to to o o o o tricans for optical alignment, c.g. schsuls |

| 2224/76754 Guiding structures | 2224/77185 Means for physical vapour deposition |
|---|--|
| 2224/76755 in the lower part of the bonding apparatus, | [PVD], e.g. evaporation, sputtering |
| e.g. in the apparatus chuck | 2224/77186 Means for sputtering, e.g. target |
| 2224/76756 in the upper part of the bonding apparatus | 2224/77187 Means for evaporation |
| 2224/768 Means for moving parts | 2224/77188 Means for chemical vapour deposition |
| 2224/76801 Lower part of the bonding apparatus, e.g. XY | [CVD], e.g. for laser CVD |
| table | 2224/77189 Means for plating, e.g. for electroplating, |
| 2224/76802 Rotational mechanism | electroless plating |
| 2224/76803 Pivoting mechanism | 2224/772 Protection means against electrical discharge |
| 2224/76804 Translational mechanism | 2224/7725 Means for applying energy, e.g. heating means 2224/77251 in the lower part of the bonding apparatus, |
| 2224/76821 Upper part of the bonding apparatus, i.e. bonding head | e.g. in the apparatus chuck |
| 2224/76822 Rotational mechanism | 2224/77252 in the upper part of the bonding apparatus, |
| 2224/76823 Pivoting mechanism | e.g. in the wedge |
| 2224/76824 Translational mechanism | 2224/77253 adapted for localised heating |
| 2224/76841 of the bonding head | 2224/7726 Polychromatic heating lamp |
| 2224/76842 Rotational mechanism | 2224/77261 Laser |
| 2224/76843 Pivoting mechanism | 2224/77262 in the lower part of the bonding apparatus, |
| 2224/769 Means for monitoring the connection process | e.g. in the apparatus chuck |
| 2224/76901 using a computer, e.g. fully- or semi- | 2224/77263 in the upper part of the bonding apparatus, |
| automatic bonding | e.g. in the wedge |
| 2224/7692 Load or pressure adjusting means, e.g. | 2224/77264 by induction heating, i.e. coils |
| sensors | 2224/77265 in the lower part of the bonding apparatus, |
| 2224/76925 Vibration adjusting means, e.g. sensors | e.g. in the apparatus chuck |
| 2224/7695 Means for forming additional members | 2224/77266 in the upper part of the bonding apparatus, |
| 2224/7698 specially adapted for batch processes | e.g. in the wedge |
| 2224/76981 Apparatus chuck | 2224/77267 Flame torch, e.g. hydrogen torch |
| 2224/76982 Shape | 2224/77268 Discharge electrode |
| 2224/76983 of the mounting surface | 2224/77269 Shape of the discharge electrode |
| 2224/76984 of other portions | 2224/7727 Material of the discharge electrode |
| 2224/76985 Material | 2224/77271 Circuitry of the discharge electrode |
| 2224/76986 Auxiliary members on the pressing surface | 2224/77272 Oven |
| 2224/76987 Shape of the auxiliary member | 2224/7728 Resistance welding electrodes, i.e. for ohmic |
| 2224/76988 Material of the auxiliary member | heating |
| 2224/77 • Apparatus for connecting with strap connectors | 2224/77281 in the lower part of the bonding apparatus, e.g. in the apparatus chuck |
| 2224/77001 Calibration means | 2224/77282 in the upper part of the bonding apparatus, |
| 2224/7701 • • • Means for cleaning, e.g. brushes, for hydro | e.g. in the wedge |
| blasting, for ultrasonic cleaning, for dry | 2224/77283 by infrared heating, e.g. infrared heating |
| ice blasting, using gas-flow, by etching, by | lamp |
| applying flux or plasma | 2224/773 by means of pressure |
| 2224/771 Means for controlling the bonding | 2224/77313 Wedge |
| environment, e.g. valves, vacuum pumps 2224/77101 Chamber | 2224/77314 Shape |
| 2224/77102 Vacuum chamber | 2224/77315 of the pressing surface, e.g. tip or |
| 2224/7711 High pressure chamber | head |
| 2224/7715 Means for applying permanent coating, e.g. in- | 2224/77316 comprising protrusions |
| situ coating | 2224/77317 of other portions |
| 2224/77151 Means for direct writing | 2224/77318 inside the capillary |
| 2224/77152 Syringe | 2224/77319 outside the capillary |
| 2224/77153 integrated into the capillary or wedge | 2224/7732 Removable wedge |
| 2224/77155 Jetting means, e.g. ink jet | 2224/77321 Material |
| 2224/77158 including a laser | 2224/77325 Auxiliary members on the pressing |
| 2224/77161 Means for screen printing, e.g. roller, | surface |
| squeegee, screen stencil | 2224/77326 Removable auxiliary member |
| 2224/7717 Means for applying a preform, e.g. laminator | 2224/77327 Shape of the auxiliary member |
| 2224/77171 including a vacuum-bag | 2224/77328 Material of the auxiliary member |
| 2224/7718 Means for blanket deposition | 2224/77343 by ultrasonic vibrations |
| 2224/77181 for spin coating, i.e. spin coater | 2224/77344 Eccentric cams |
| 2224/77182 for curtain coating | 2224/77345 in the lower part of the bonding |
| 2224/77183 for immersion coating, i.e. bath | apparatus, e.g. in the apparatus chuck |
| 2224/77184 for spray coating, i.e. nozzle | 2224/77346 in the upper part of the bonding apparatus, e.g. in the wedge |
| | apparatus, e.g. in the wedge 2224/77347 Piezoelectric transducers |
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| 2224/77348 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/77756 in the upper part of the bonding apparatus, e.g. in the wedge |
| 2224/77349 in the upper part of the bonding | 2224/778 Means for moving parts |
| apparatus, e.g. in the wedge 2224/7735 Stable and mobile yokes | 2224/77801 Lower part of the bonding apparatus, e.g. XY table |
| 2224/77351 in the lower part of the bonding | 2224/77802 Rotational mechanism |
| apparatus, e.g. in the apparatus chuck | 2224/77803 Pivoting mechanism |
| 2224/77352 in the upper part of the bonding | 2224/77804 Translational mechanism |
| apparatus, e.g. in the wedge | 2224/77821 • • • • Upper part of the bonding apparatus, i.e. |
| 2224/77353 Ultrasonic horns | bonding head, e.g. capillary or wedge |
| 2224/77354 in the lower part of the bonding | 2224/77822 Rotational mechanism |
| apparatus, e.g. in the mounting chuck | 2224/77823 Pivoting mechanism |
| 2224/77355 Design, e.g. of the wave guide | 2224/77824 Translational mechanism |
| 2224/775 Cooling means | 2224/77841 of the pressing portion, e.g. tip or head |
| 2224/77501 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/77842 Rotational mechanism |
| 2224/77502 in the upper part of the bonding apparatus, | 2224/77843 Pivoting mechanism |
| e.g. in the wedge | 2224/779 Means for monitoring the connection process |
| 2224/7755 • • • Mechanical means, e.g. for severing, pressing, | 2224/77901 using a computer, e.g. fully- or semi- automatic bonding |
| stamping | 2224/7792 Load or pressure adjusting means, e.g. |
| 2224/776 Means for supplying the connector to be | sensors |
| connected in the bonding apparatus | 2224/77925 Vibration adjusting means, e.g. sensors |
| 2224/77601 Storing means | 2224/7795 Means for forming additional members |
| 2224/77611 Feeding means | 2224/7798 specially adapted for batch processes |
| 2224/77621 Holding means, e.g. wire clampers | 2224/77981 Apparatus chuck |
| 2224/77631 Means for wire tension adjustments | 2224/77982 Shape |
| 2224/7765 Means for transporting the components to be | 2224/77983 of the mounting surface |
| connected | 2224/77984 of other portions |
| 2224/77651 Belt conveyor | 2224/77985 Material |
| 2224/77652 Chain conveyor | 2224/77986 Auxiliary members on the pressing surface |
| 2224/77653 Vibrating conveyor | 2224/77987 Shape of the auxiliary member |
| 2224/77654 Pneumatic conveyor | 2224/77988 Material of the auxiliary member |
| 2224/77655 in a fluid | 2224/78 Apparatus for connecting with wire connectors |
| 2224/777 Means for aligning | 2224/78001 Calibration means |
| 2224/77701 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/7801 Means for cleaning, e.g. brushes, for hydro |
| 2224/77702 in the upper part of the bonding apparatus, | blasting, for ultrasonic cleaning, for dry |
| e.g. in the wedge | ice blasting, using gas-flow, by etching, by |
| 2224/77703 Mechanical holding means | applying flux or plasma |
| 2224/77704 in the lower part of the bonding apparatus, | 2224/781 Means for controlling the bonding |
| e.g. in the apparatus chuck | environment, e.g. valves, vacuum pumps 2224/78101 Chamber |
| 2224/77705 in the upper part of the bonding apparatus, | 2224/78101 Chamber 2224/78102 Vacuum chamber |
| e.g. in the wedge | 2224/7810 High pressure chamber |
| 2224/77723 Electrostatic holding means | 2224/7815 Means for applying permanent coating, e.g. in- |
| 2224/77724 in the lower part of the bonding apparatus, | situ coating |
| e.g. in the apparatus chuck | 2224/782 Protection means against electrical discharge |
| 2224/77725 in the upper part of the bonding apparatus, | 2224/7825 Means for applying energy, e.g. heating means |
| e.g. in the wedge | 2224/78251 in the lower part of the bonding apparatus, |
| 2224/77733 Magnetic holding means | e.g. in the apparatus chuck |
| 2224/77734 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/78252 in the upper part of the bonding apparatus, |
| 2224/77735 in the upper part of the bonding apparatus, | e.g. in the capillary or wedge |
| e.g. in the wedge | 2224/78253 adapted for localised heating |
| 2224/77743 Suction holding means | 2224/7826 Polychromatic heating lamp |
| 2224/77744 in the lower part of the bonding apparatus, | 2224/78261 Laser |
| e.g. in the apparatus chuck | 2224/78262 in the lower part of the bonding apparatus, e.g. in the apparatus chuck |
| 2224/77745 in the upper part of the bonding apparatus, | e.g. in the apparatus chuck 2224/78263 in the upper part of the bonding apparatus, |
| e.g. in the wedge | e.g. in the capillary or wedge |
| 2224/77753 Means for optical alignment, e.g. sensors | 2224/78264 by induction heating, i.e. coils |
| 2224/77754 Guiding structures | 2224/78265 in the lower part of the bonding apparatus, |
| 2224/77755 in the lower part of the bonding apparatus, | e.g. in the apparatus chuck |
| e.g. in the apparatus chuck | 2224/78266 in the upper part of the bonding apparatus, |
| | e.g. in the capillary or wedge |
| | |

| 2224/78267 Flame torch, e.g. hydrogen torch | 2224/78353 Ultrasonic horns |
|--|--|
| 2224/78268 Discharge electrode | 2224/78354 in the lower part of the bonding |
| 2224/78269 Shape of the discharge electrode | apparatus, e.g. in the mounting chuck |
| 2224/7827 Material of the discharge electrode | 2224/78355 Design, e.g. of the wave guide |
| 2224/78271 Circuitry of the discharge electrode | 2224/785 Cooling means |
| 2224/78272 Oven | 2224/78501 in the lower part of the bonding apparatus, |
| 2224/7828 Resistance welding electrodes, i.e. for ohmic | e.g. in the apparatus chuck |
| heating | 2224/78502 in the upper part of the bonding apparatus, |
| 2224/78281 in the lower part of the bonding apparatus, | e.g. in the capillary or wedge |
| e.g. in the apparatus chuck | 2224/7855 Mechanical means, e.g. for severing, pressing, |
| 2224/78282 in the upper part of the bonding apparatus, | stamping |
| e.g. in the capillary or wedge | 2224/786 Means for supplying the connector to be |
| 2224/78283 by infrared heating, e.g. infrared heating | connected in the bonding apparatus |
| lamp | 2224/78601 Storing means |
| 2224/783 by means of pressure | 2224/78611 Feeding means |
| 2224/78301 Capillary | 2224/78621 Holding means, e.g. wire clampers |
| 2224/78302 Shape | 2224/78631 Means for wire tension adjustments |
| - | 2224/7865 Means for transporting the components to be |
| 2224/78303 of the pressing surface, e.g. tip or head | connected |
| 2224/78304 comprising protrusions | 2224/78651 Belt conveyor |
| 2224/78305 of other portions | 2224/78652 Chain conveyor |
| | 2224/78653 Vibrating conveyor |
| 2224/78306 inside the capillary | 2224/78654 Pneumatic conveyor |
| 2224/78307 outside the capillary | 2224/78655 in a fluid |
| 2224/78308 Removable capillary | 2224/78033 In a finda 2224/787 Means for aligning |
| 2224/78309 Material | 5 5 |
| 2224/7831 Auxiliary members on the pressing | 2224/78701 in the lower part of the bonding apparatus, e.g. in the apparatus chuck |
| surface | 2224/78702 in the upper part of the bonding apparatus, |
| 2224/78311 Removable auxiliary member | e.g. in the capillary or wedge |
| 2224/78312 Shape of the auxiliary member | 2224/78703 Mechanical holding means |
| 2224/78313 Wedge | 2224/78704 in the lower part of the bonding apparatus, |
| 2224/78314 Shape | e.g. in the apparatus chuck |
| 2224/78315 of the pressing surface, e.g. tip or head | 2224/78705 in the upper part of the bonding apparatus, |
| 2224/78316 comprising protrusions | e.g. in the capillary or wedge |
| 2224/78317 of other portions | 2224/78723 Electrostatic holding means |
| 2224/78318 inside the capillary | 2224/78724 in the lower part of the bonding apparatus, |
| 2224/78319 outside the capillary | e.g. in the apparatus chuck |
| 2224/7832 Removable wedge | 2224/78725 in the upper part of the bonding apparatus, |
| | e.g. in the capillary or wedge |
| 2224/78321 Material | 2224/78733 Magnetic holding means |
| 2224/78325 Auxiliary members on the pressing surface | 2224/78734 in the lower part of the bonding apparatus, |
| | e.g. in the apparatus chuck |
| 2224/78326 Removable auxiliary member | 2224/78735 in the upper part of the bonding apparatus, |
| 2224/78327 Shape of the auxiliary member | e.g. in the capillary or wedge |
| 2224/78328 Material of the auxiliary member | 2224/78743 Suction holding means |
| 2224/78343 by ultrasonic vibrations | 2224/78744 in the lower part of the bonding apparatus, |
| 2224/78344 Eccentric cams | e.g. in the apparatus chuck |
| 2224/78345 in the lower part of the bonding apparatus, e.g. in the apparatus chuck | 2224/78745 in the upper part of the bonding apparatus, |
| 2224/78346 in the upper part of the bonding | e.g. in the capillary or wedge |
| apparatus, e.g. in the capillary or | 2224/78753 Means for optical alignment, e.g. sensors |
| wedge | 2224/78754 Guiding structures |
| 2224/78347 Piezoelectric transducers | 2224/78755 in the lower part of the bonding apparatus, |
| 2224/78348 in the lower part of the bonding | e.g. in the apparatus chuck |
| apparatus, e.g. in the apparatus chuck | 2224/78756 in the upper part of the bonding apparatus, |
| 2224/78349 in the upper part of the bonding | e.g. in the capillary or wedge |
| apparatus, e.g. in the capillary or | 2224/788 Means for moving parts |
| wedge | 2224/78801 Lower part of the bonding apparatus, e.g. XY |
| 2224/7835 Stable and mobile yokes | table |
| 2224/78351 in the lower part of the bonding | 2224/78802 Rotational mechanism |
| apparatus, e.g. in the apparatus chuck | 2224/78803 Pivoting mechanism |
| 2224/78352 in the upper part of the bonding | 2224/78804 Translational mechanism |
| apparatus, e.g. in the capillary or | 2224/78821 Upper part of the bonding apparatus, i.e. |
| wedge | bonding head, e.g. capillary or wedge |
| | |

| 2224/78822 Rotational mechanism | 2224/79253 adapted for localised heating |
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| 2224/78823 Pivoting mechanism | 2224/7926 Polychromatic heating lamp |
| 2224/78824 Translational mechanism | 2224/79261 Laser |
| | 2224/79262 in the lower part of the bonding apparatus, |
| 2224/78841 of the pressing portion, e.g. tip or head 2224/78842 Rotational mechanism | e.g. in the apparatus chuck |
| 2224/78843 Pivoting mechanism | 2224/79263 in the upper part of the bonding apparatus, |
| 2224/789 Means for monitoring the connection process | e.g. in the pressing head |
| | 2224/79264 by induction heating, i.e. coils |
| 2224/78901 using a computer, e.g. fully- or semi- automatic bonding | 2224/79265 in the lower part of the bonding apparatus, |
| 2224/7892 Load or pressure adjusting means, e.g. | e.g. in the apparatus chuck |
| sensors | 2224/79266 in the upper part of the bonding apparatus, |
| 2224/78925 Vibration adjusting means, e.g. sensors | e.g. in the pressing head |
| 2224/7895 Means for forming additional members | 2224/79267 Flame torch, e.g. hydrogen torch |
| 2224/7898 specially adapted for batch processes | 2224/79268 Discharge electrode |
| 2224/78981 Apparatus chuck | 2224/79269 Shape of the discharge electrode |
| 2224/78982 Shape | 2224/7927 Material of the discharge electrode |
| 2224/78983 of the mounting surface | 2224/79271 Circuitry of the discharge electrode |
| 2224/78984 of other portions | 2224/79272 Oven |
| 2224/78985 Material | 2224/7928 Resistance welding electrodes, i.e. for ohmic |
| 2224/78986 Auxiliary members on the pressing surface | heating |
| 2224/78987 Shape of the auxiliary member | 2224/79281 in the lower part of the bonding apparatus, |
| 2224/78988 Material of the auxiliary member | e.g. in the apparatus chuck |
| 2224/79 Apparatus for Tape Automated Bonding [TAB] | 2224/79282 in the upper part of the bonding apparatus, |
| 2224/79 Apparatus for Tape Automated Boilding [TAB] | e.g. in the pressing head |
| | 2224/79283 by infrared heating, e.g. infrared heating |
| 2224/7901 Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry | lamp |
| ice blasting, using gas-flow, by etching, by | 2224/793 by means of pressure |
| applying flux or plasma | 2224/79301 Pressing head |
| 2224/791 Means for controlling the bonding | 2224/79302 Shape |
| environment, e.g. valves, vacuum pumps | 2224/79303 of the pressing surface |
| 2224/79101 Chamber | 2224/79304 being curved |
| 2224/79102 Vacuum chamber | 2224/79305 comprising protrusions |
| 2224/7911 High pressure chamber | 2224/7931 of other parts |
| 2224/7915 Means for applying permanent coating | 2224/79312 Material |
| 2224/79151 Means for direct writing | 2224/79313 Removable pressing head |
| 2224/79152 Syringe | 2224/79314 Auxiliary members on the pressing |
| 2224/79153 integrated into the pressing head | surface |
| 2224/79155 Jetting means, e.g. ink jet | 2224/79315 Elastomer inlay |
| 2224/79158 including a laser | 2224/79316 with retaining mechanisms |
| 2224/79161 Means for screen printing, e.g. roller, | 2224/79317 Removable auxiliary member |
| squeegee, screen stencil | 2224/79318 Shape of the auxiliary member |
| 2224/7917 Means for applying a preform, e.g. laminator | 2224/7932 Material of the auxiliary member |
| 2224/79171 including a vacuum-bag | 2224/79343 by ultrasonic vibrations |
| 2224/7918 Means for blanket deposition | 2224/79344 Eccentric cams |
| 2224/79181 for spin coating, i.e. spin coater | 2224/79345 in the lower part of the bonding |
| 2224/79182 for curtain coating | apparatus, e.g. in the apparatus chuck |
| 2224/79183 for immersion coating, i.e. bath | 2224/79346 in the upper part of the bonding |
| 2224/79184 for spray coating, i.e. nozzle | apparatus, e.g. in the pressing head |
| 2224/79185 Means for physical vapour deposition | 2224/79347 Piezoelectric transducers |
| [PVD], e.g. evaporation, sputtering | 2224/79348 in the lower part of the bonding |
| 2224/79186 Means for sputtering, e.g. target | apparatus, e.g. in the apparatus chuck |
| 2224/79187 Means for evaporation | 2224/79349 in the upper part of the bonding |
| 2224/79188 Means for chemical vapour deposition | apparatus, e.g. in the pressing head |
| [CVD], e.g. for laser CVD | 2224/7935 Stable and mobile yokes |
| 2224/79189 Means for plating, e.g. for electroplating, | 2224/79351 in the lower part of the bonding |
| electroless plating | apparatus, e.g. in the apparatus chuck |
| 2224/792 Protection means against electrical discharge | 2224/79352 in the upper part of the bonding |
| 2224/7925 Means for applying energy, e.g. heating means | apparatus, e.g. in the pressing head |
| 2224/79251 in the lower part of the bonding apparatus, | 2224/79353 Ultrasonic horns |
| e.g. in the apparatus chuck | 2224/79354 in the lower part of the bonding |
| 2224/79252 in the upper part of the bonding apparatus, | apparatus, e.g. in the apparatus chuck |
| e.g. in the pressing head | 2224/79355 Design, e.g. of the wave guide |
| 0 1 0 | 2224/795 Cooling means |
| | |

| e.g. in the apparatus check 2224/7992 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/7995 Means for supplying the connector to be connected in the bonding apparatus 2224/79961 Storing means 2224/79961 Feeding means 2224/79961 Holding means 2224/79962 Holding means 2224/79963 Means for transporting the components to be connected in the conveyor 2224/79964 Means for temportring the components to be connected in the conveyor 2224/79965 Chain conveyor 2224/79965 Nipper part of the bonding apparatus, e.g. in the apparatus chuck 2224/7997 Means for aligning 2224/7997 In the tower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79970 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79973 Electrostatic holding means 2224/79974 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79973 Electrostatic holding means 2224/79974 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79975 in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79973 Selectrostatic holding means 2224/79974 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79975 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79973 Selectrostatic holding means 2224/79974 in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79975 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79976 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79978 Means for more part of the bonding apparatus, e.g. in the pressing head 2224/79978 Means for more part of the bonding apparatus, e.g. in the pressing head 2224/7998 Means for more part of the bonding apparatus, e.g. in the pressing head 2224/7998 Means for more part of the bonding apparatus, e.g. in the pressing head 2224/7998 Means for more part of the bonding apparatus, e.g. in the pressing head 2224/7998 Means for more part of the bonding apparatus, e.g. in the p | 2224/79501 in the lower part of the bonding apparatus, | 2224/79901 using a computer, e.g. fully- or semi- |
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| e.g. in the pressing head 2224/7995 Mechanical methoding apparatus connected in the bonding apparatus 2224/7961 Storing means 2224/79821 Holding means 2224/79822 Holding means 2224/79821 Belt conveyor 2224/79854 Demunstration of the components to be connected in the special processor of the mounting surface 2224/79855 The conveyor 2224/79856 The memory of the components to be connected in the special processor of the mounting surface 2224/79856 The memory of the special processor of the mounting surface 2224/7986 The memory of the special processor of the mounting surface 2224/7985 The memory of the special processor of the mounting surface 2224/7985 The memory of the special processor of the mounting surface 2224/7985 The memory of the special processor of the mounting surface 2224/7986 The memory of the special processor of the mounting surface 2224/7986 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory of the special processor of the mounting surface 2224/7998 The memory part of the bonding apparatus, e.g. in the apparatus check 2224/7972 The memory of the special processor of the mounting surface 2224/7973 The special processor of the special processor of the mounting surface 2224/7973 The special processor of the special processor of the mounting surface to be connected upon the mounting surface to be connected upon the surface to be co | e.g. in the apparatus chuck | automatic bonding |
| 22247961 Storing means 22247981 Apparatus chack 22247981 Means for forming additional members 222479801 Storing means 22247981 Apparatus chack 22247981 Means for the bonding apparatus, e.g. in the apparatus chack 22247987 in the toper part of the bonding apparatus, e.g. in the apparatus chack 222479724 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479734 in the tower part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479736 in the upper part of the bonding apparatus, e.g. in the apparatus chack 222479735 in the upper part of the bonding apparatus, e.g. in the apparatus chack 22247936 in the upper part of the bonding apparatus, e.g. in the apparatus chack 22247936 in the upper part of the bonding apparatus, e.g. in the apparatus chack 22247986 in the upper part of th | | |
| connected in the bonding apparatus 2224/79981 | 2224/7955 Mechanical means, e.g. for pressing, stamping | 2224/79925 Vibration adjusting means, e.g. sensors |
| 2224/7961 Storing means 2224/7982 | 2224/796 Means for supplying the connector to be | 2224/7995 Means for forming additional members |
| 2224/7981 — Feeding means 2224/7982 — Shape 2224/7985 — Means for transporting the components to be connected connected 2224/7985 — Means for transporting the components to be connected connected 2224/7985 — Helt conveyor 2224/7986 — Auxiliary members on the pressing surface 2224/7986 — Neumatic conveyor 2224/7998 — Shape of the auxiliary member 2224/7998 — Means for digning 2224/799 — Means for digning 2224/799 — Means for digning 2224/797 — Means for digning 2224/7970 — in the paparatus chuck 2224/7970 — in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/7970 — in the lower part of the bonding apparatus, e.g. in the pressing head 2224/7972 — in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79724 — in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79725 — in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79733 — Magnetic holding means 2224/79734 — in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79735 — in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79736 — in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79735 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79735 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79735 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79735 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79736 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79736 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79736 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79736 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79736 — in the tower part of the bonding apparatus, e.g. in the pressing head 2224/79748 — in the foreity of the bonding apparatus, e.g. in the pressing head 2224/79801 | connected in the bonding apparatus | 2224/7998 specially adapted for batch processes |
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| 2224/7965 Means for transporting the components to be connected connecte | 2224/79611 Feeding means | 2224/79982 Shape |
| cumencted 2224/79985 | 2224/79621 Holding means | 2224/79983 of the mounting surface |
| 2224/79651 Belt conveyor 2224/7986 Auxiliary members on the pressing surface 2224/7985 Chain conveyor 2224/7988 Material of the auxiliary member 2224/79865 Pheumatic conveyor 2224/7988 Material of the auxiliary member 2224/7986 Pheumatic conveyor 2224/7998 Metarial of the auxiliary member 2224/7999 For disconnecting 2224/800 Methods for commetting semiconductor or other 500 distate bodies using means for bonding being attached to re-bonding area i.e. connected 2224/8000 e.g. in the pressing head 2224/8000 which is the lower part of the bonding apparatus, e.g. in the upper pa | 2224/7965 Means for transporting the components to be | 2224/79984 of other portions |
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| 2224/79702 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/80003 involving a temporary auxiliary member not of the bonding apparatus, e.g. in the upper part of the bonding apparatus, e.g. in the upper part of the bonding apparatus, e.g. in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/80006 being a removable or sacrificial coating e.g. in the apparatus chuck 2224/80007 involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. in the apparatus chuck 2224/80006 being a removable or sacrificial coating e.g. in the apparatus chuck 2224/80007 in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/8001 cleaning the bonding area during or after the bonding process 2224/8001 cleaning the bonding area during or after the bonding process 2224/8001 cleaning the bonding area during or after the bonding process 2224/8001 cleaning the bonding area 2224/8001 cleaning the bonding apparatus, e.g. in the pressing head 2224/8001 cleaning the bonding area in | | |
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| 2224/79704 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79705 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/8007 in the lower part of the bonding apparatus, e.g. in the paparatus chuck 2224/79724 in the lower part of the bonding apparatus, e.g. in the paparatus chuck 2224/79725 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79734 in the lower part of the bonding apparatus, e.g. in the paparatus chuck 2224/79735 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79744 in the lower part of the bonding apparatus, e.g. in the paparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79755 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79756 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79801 Lower part of the bonding apparatus, e.g. in the pressing head 2224/79802 Rotational mechanism 2224/79804 Translational mechanism 2224/79804 Translational mechanism 2224/79804 Protting mechanism 2224/79805 Protting mechanism 2224/79804 Protting mechanism 2224/79805 Protting mechanism 2224/79804 Protting mechanism 2224/79805 | | |
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| 2224/79725 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79724 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79725 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79738 Magnetic holding means 2224/79734 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79735 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79744 in the Upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79755 in the upper part of the bonding apparatus, e.g. in the apparatus chuck 2224/79755 in the upper part of the bonding apparatus, e.g. in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79756 in the upper part of the bonding apparatus, e.g. in the paparatus chuck 2224/79801 Lower part of the bonding apparatus, e.g. in the pressing head 2224/79801 Lower part of the bonding apparatus, e.g. in the pressing head 2224/79801 Lower part of the bonding apparatus, e.g. in the pressing head 2224/79802 Rotational mechanism 2224/79803 Pryoting mechanism 2224/79804 Translational mechanism 2224/79824 Rotational mechanism 2224/79824 Rotational mechanism 2224/79824 Rotational mechanism 2224/79824 Rotational mechanism 2224/79843 Pryoting mechanism 2224/79844 Rotational mechanism 2224/79845 Pryoting mechanism 2224/79846 Propriet of the bonding apparatus | | |
| e.g. in the pressing head 2224/79723 . Electrostatic holding means 2224/79724 . in the apparatus chuck 2224/79725 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79730 . Magnetic holding means 2224/79731 . in the lower part of the bonding apparatus, c.g. in the pressing head 2224/79732 . in the lower part of the bonding apparatus, c.g. in the apparatus chuck 2224/79733 . Magnetic holding means 2224/79735 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79735 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79744 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79755 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79756 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79801 . Lower part of the bonding apparatus, e.g. in the pressing head 2224/79802 . Rotational mechanism 2224/79803 . Pivoting mechanism 2224/79804 . Translational mechanism 2224/79824 . Proving mechanism 2224/79824 . Rotational mechanism 2224/79824 . Rotational mechanism 2224/79824 . Rotational mechanism 2224/79843 . Pivoting mechanism 2224/79844 . Rotational mechanism 2224/79845 . Pivoting mechanism 2224/79846 . Pivoting mechanism 2224/79847 . Pivoting mechanism 2224/79848 . Pivoting mechanism 2224/7 | | |
| 2224/79723 | | |
| being left in the finished device, e.g. aids for protecting the bonding apparatus, e.g. in the apparatus chuck 2224/79732 | | |
| e.g. in the apparatus chuck 2224/79725 | | |
| 2224/79735 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79734 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79735 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79744 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79746 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/79753 . Means for optical alignment, e.g. sensors 2224/79754 . Guiding structures 2224/79755 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79756 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79801 . Lower part of the bonding apparatus, e.g. in the pressing head 2224/79802 . Rotational mechanism 2224/79803 . Pivoting mechanism 2224/79804 . Translational mechanism 2224/79824 . Proting mechanism 2224/79825 . Pivoting mechanism 2224/79824 . Proting mechanism 2224/79825 . Pivoting mechanism 2224/79842 . Rotational mechanism 2224/79843 . Pivoting mechanism 2224/79844 . Rotational mechanism 2224/79845 . Rotational mechanism 2224/79846 . Rotational mechanism 2224/79847 . Pivoting mechanism 2224/79848 . Pivoting mechanis | | |
| e.g. in the pressing head 2224/79733 | | |
| 2224/9733 . Magnetic holding means 2224/79734 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79735 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79743 . Suction holding means 2224/79744 . in the lower part of the bonding apparatus, e.g. in the paparatus chuck 2224/79745 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/7975 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/7975 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/7975 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/7975 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/7975 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/7980 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/7980 . Lower part of the bonding apparatus, e.g. in the pressing head 2224/7980 . Rotational mechanism 2224/79801 . Upper part of the bonding apparatus, 2224/79802 . Rotational mechanism 2224/79803 . Pivoting mechanism 2224/79804 . Translational mechanism 2224/79823 . Pivoting mechanism 2224/79824 . Translational mechanism 2224/79824 . Rotational mechanism 2224/79825 . Pivoting mechanism 2224/79826 . Rotational mechanism 2224/79827 . Pivoting mechanism 2224/79828 . Rotational mechanism 2224/79829 . Rotational mechanism 2224/79824 . Rotational mechanism 2224/79825 . Pivoting mechanism 2224/79826 . Rotational mechanism 2224/79827 . Pivoting mechanism 2224/79828 . Rotational mechanism 2224/79829 . Rotational mechanism 2224/79829 . Rotational mechanism 2224/79824 . Rotational mechanism 2224/79825 . Pivoting mechanism 2224/79842 . Rotational mechanism 2224/79842 . Rotational mechanism 2224/79843 . Pivoting mechanism 2224/79845 . Rotational mechanism 2224/79846 . Rotational | | |
| 2224/79734 | | |
| e.g. in the apparatus chuck 2224/79735 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79744 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/79745 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79746 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79757 . Means for optical alignment, e.g. sensors 2224/79758 . Means for optical alignment, e.g. sensors 2224/79759 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79750 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/79750 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79801 . Lower part of the bonding apparatus, e.g. in the pressing head 2224/79802 . Rotational mechanism 2224/79803 . Pivoting mechanism 2224/79824 . Translational mechanism 2224/79824 . Pototing mechanism 2224/79824 . Translational mechanism 2224/79825 . Rotational mechanism 2224/79826 . Rotational mechanism 2224/79827 . Rotational mechanism 2224/79828 . Rotational mechanism 2224/79824 . Translational mechanism 2224/79824 . Translational mechanism 2224/79825 . Rotational mechanism 2224/79826 . Rotational mechanism 2224/79827 . Rotational mechanism 2224/79828 . Rotational mechanism 2224/79829 . Rotational mechanism 2224/79824 . Translational mechanism 2224/79825 . Rotational mechanism 2224/79826 . Rotational mechanism 2224/79827 . Rotational mechanism 2224/79828 . Rotational mechanism 2224/79829 . Rotational mechanism 2224/79842 . Rotational mechanism 2224/79843 . Pivoting mechanism | | |
| 2224/80012 | | |
| e.g. in the pressing head 2224/79743 | | |
| 2224/79743 Suction holding means 2224/79744 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79745 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79753 | | |
| 2224/79744 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79755 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79756 in the lower part of the bonding apparatus, e.g. in the pressing head 2224/79757 in the lower part of the bonding apparatus, e.g. in the paparatus chuck 2224/79756 in the lower part of the bonding apparatus, e.g. in the pressing head 2224/79801 . Lower part of the bonding apparatus, e.g. in the pressing head 2224/79801 . Lower part of the bonding apparatus, e.g. XY table 2224/79802 . Rotational mechanism 2224/79803 Pivoting mechanism 2224/79821 . Upper part of the bonding apparatus, i.e. pressing head 2224/79822 . Rotational mechanism 2224/79824 . Translational mechanism 2224/79842 . Rotational mechanism 2224/79843 Pivoting mechanism 2224/79844 | | |
| e.g. in the apparatus chuck in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79753 . Means for optical alignment, e.g. sensors 2224/79754 . Guiding structures 2224/79755 . in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79756 . in the lower part of the bonding apparatus, e.g. in the pressing head 2224/7980 . in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79801 . Lower part of the bonding apparatus, e.g. and the bonding apparatus apparatus 2224/79801 . Lower part of the bonding apparatus, e.g. XY table 2224/79802 . Rotational mechanism 2224/79804 . Translational mechanism 2224/79821 . Upper part of the bonding apparatus, i.e. pressing head 2224/79822 . Rotational mechanism 2224/79823 . Pivoting mechanism 2224/79824 . Translational mechanism 2224/79824 . Translational mechanism 2224/79825 . Rotational mechanism 2224/79826 . Pivoting mechanism 2224/79827 . Pivoting mechanism 2224/79828 . Pivoting mechanism 2224/79829 . Rotational mechanism 2224/79821 . Translational mechanism 2224/79822 . Rotational mechanism 2224/79823 . Pivoting mechanism 2224/79824 . Translational mechanism 2224/79824 . Translational mechanism 2224/79825 . Rotational mechanism 2224/79826 . Pivoting mechanism 2224/79827 . Pivoting mechanism 2224/79828 . Pivoting mechanism 2224/79829 . Rotational mechanism 2224/79840 . Translational mechanism 2224/79841 . of the pressing head 2224/79842 . Rotational mechanism 2224/80047 . by mechanical means, e.g. severing, pressing, stamping 2224/80048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/79843 . Pivoting mechanism 2224/80048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling | | |
| 2224/79755 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79754 | | |
| 2224/79753 Means for optical alignment, e.g. sensors 2224/79754 Guiding structures 2224/79755 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79756 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/7980 In the upper part of the bonding apparatus, e.g. in the pressing head 2224/79801 Lower part of the bonding apparatus, e.g. XY table 2224/79802 Rotational mechanism 2224/79803 Pivoting mechanism 2224/79804 Translational mechanism 2224/79821 Upper part of the bonding apparatus, i.e. pressing head 2224/79822 Rotational mechanism 2224/79823 Pivoting mechanism 2224/79824 | | sublimation |
| 2224/79754 | | 2224/80019 Combinations of two or more |
| 2224/79755 in the lower part of the bonding apparatus, e.g. in the apparatus chuck 2224/79756 in the upper part of the bonding apparatus, e.g. in the upper part of the bonding apparatus, e.g. in the pressing head 2224/798 | 2224/79753 Means for optical alignment, e.g. sensors | |
| e.g. in the apparatus chuck e.g. in the apparatus chuck 2224/79756 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/798 | 2224/79754 Guiding structures | |
| 2224/79801 in the upper part of the bonding apparatus, e.g. in the pressing head 2224/79801 Lower part of the bonding apparatus, e.g. XY table 2224/79802 Rotational mechanism 2224/79803 Pivoting mechanism 2224/79821 Upper part of the bonding apparatus, i.e. pressing head 2224/79822 Rotational mechanism 2224/79823 Pivoting mechanism 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/79844 Translational mechanism 2224/79845 Pivoting mechanism 2224/79846 Rotational mechanism 2224/79847 | 2224/79755 in the lower part of the bonding apparatus, | |
| e.g. in the pressing head 2224/79801 | e.g. in the apparatus chuck | |
| 2224/79801 Means for moving parts 2224/79802 Lower part of the bonding apparatus, e.g. XY table 2224/79803 | | |
| bonding apparatus Lower part of the bonding apparatus, e.g. XY table 2224/79802 Rotational mechanism 2224/79803 Pivoting mechanism 2224/79804 Translational mechanism 2224/79821 Upper part of the bonding apparatus, i.e. pressing head 2224/79822 Rotational mechanism 2224/79824 Rotational mechanism 2224/79825 Pivoting mechanism 2224/79826 Pivoting mechanism 2224/79827 Pivoting mechanism 2224/79828 Pivoting mechanism 2224/79829 Rotational mechanism 2224/79829 Rotational mechanism 2224/79829 Pivoting mechanism 2224/79829 Translational mechanism 2224/79829 Translational mechanism 2224/79820 Translational mechanism 2224/79821 Pivoting mechanism 2224/79822 Pivoting mechanism 2224/79824 Translational mechanism 2224/79825 Pivoting mechanism 2224/79826 Rotational mechanism 2224/79827 Translational mechanism 2224/79829 Translational mechanism 2224/79829 | | <u>v</u> |
| table 2224/79802 Rotational mechanism 2224/79803 Pivoting mechanism 2224/79804 Translational mechanism 2224/79821 Upper part of the bonding apparatus, i.e. pressing head 2224/79822 Rotational mechanism 2224/79823 Pivoting mechanism 2224/79824 Rotational mechanism 2224/79825 Pivoting mechanism 2224/79826 Rotational mechanism 2224/79827 Pivoting mechanism 2224/79828 Pivoting mechanism 2224/79829 Rotational mechanism 2224/79829 Rotational mechanism 2224/79829 Rotational mechanism 2224/79829 Translational mechanism 2224/79829 Translational mechanism 2224/79829 | | |
| 2224/79802 Rotational mechanism 2224/79803 Pivoting mechanism 2224/79804 Translational mechanism 2224/79821 Upper part of the bonding apparatus, i.e. pressing head 2224/79822 Rotational mechanism 2224/79823 Pivoting mechanism 2224/79824 Pivoting mechanism 2224/79824 Translational mechanism 2224/79824 Translational mechanism 2224/79825 Pivoting mechanism 2224/79826 Pivoting mechanism 2224/79827 Translational mechanism 2224/79828 Pivoting mechanism 2224/79829 Translational mechanism 2224/79840 Translational mechanism 2224/79841 | 2224/79801 Lower part of the bonding apparatus, e.g. XY | 0 11 |
| 2224/79803 | | |
| 2224/79821 | | |
| 2224/79821 | | |
| 2224/79822 Rotational mechanism 2224/79823 Pivoting mechanism 2224/79824 Translational mechanism 2224/79841 of the pressing head 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/79843 Pivoting mechanism 2224/79843 Pivoting mechanism 2224/80041 | | |
| 2224/79822 Rotational mechanism 2224/80039 using a laser 2224/79823 Pivoting mechanism 2224/79824 Translational mechanism 2224/79841 of the pressing head 2224/79842 Rotational mechanism 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/80051 Forming additional members | | |
| 2224/79823 Pivoting mechanism 2224/79824 Translational mechanism 2224/79841 of the pressing head 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/80048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/80051 Forming additional members | | |
| 2224/79824 Frivoting mechanism 2224/79824 Translational mechanism 2224/79841 of the pressing head 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/80051 Forming additional members | | |
| 2224/79841 Of the pressing head 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/80051 Forming additional members | | |
| 2224/79842 Of the pressing head 2224/79842 Rotational mechanism 2224/79843 Pivoting mechanism 2224/80051 Forming additional members | | |
| 2224/79842 Rotational mechanism controlled pre-heating or pre-cooling 2224/79843 Pivoting mechanism 2224/80051 Forming additional members | · · | |
| 2224/79843 · · · · · Pivoting mechanism 2224/80051 · · · Forming additional members | | |
| • • • Means for monitoring the connection process | · · · · · · · · · · · · · · · · · · · | |
| | Means for monitoring the connection process | - |

| 2224/80052 Detaching bonding areas, e.g. after testing | 2224/80203 Thermocompression bonding, e.g. |
|--|---|
| (unsoldering in general <u>B23K 1/018</u>) | diffusion bonding, pressure joining, |
| 2224/80053 Bonding environment | thermocompression welding or solid-state |
| 2224/80054 Composition of the atmosphere | welding |
| 2224/80055 being oxidating | 2224/80204 with a graded temperature profile |
| 2224/80065 being reducing | 2224/80205 Ultrasonic bonding |
| 2224/80075 being inert | 2224/80206 Direction of oscillation |
| 2224/80085 being a liquid, e.g. for fluidic self-assembly | 2224/80207 Thermosonic bonding |
| 2224/8009 Vacuum | 2224/80209 applying unidirectional static pressure |
| 2224/80091 Under pressure | 2224/80211 applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid |
| 2224/80092 Atmospheric pressure | 2224/80213 using a reflow oven |
| 2224/80093 Transient conditions, e.g. gas-flow | 2224/80215 with a graded temperature profile |
| 2224/80095 Temperature settings | 2224/8022 with energy being in the form of |
| 2224/80096 Transient conditions 2224/80097 Heating | electromagnetic radiation |
| 2224/80097 Cooling | 2224/80222 Induction heating, i.e. eddy currents |
| 2224/80099 Ambient temperature | 2224/80224 using a laser |
| 2224/8011 involving protection against electrical | 2224/8023 Polychromatic or infrared lamp heating |
| discharge, e.g. removing electrostatic charge | 2224/80232 using an autocatalytic reaction, e.g. |
| 2224/8012 Aligning | exothermic brazing |
| 2224/80121 Active alignment, i.e. by apparatus steering, | 2224/80234 using means for applying energy being |
| e.g. optical alignment using marks or sensors | within the device, e.g. integrated heater |
| 2224/80122 by detecting inherent features of, or | 2224/80236 using electro-static corona discharge |
| outside, the semiconductor or solid-state | 2224/80237 using an electron beam (electron beam |
| body | welding in general B23K 15/00) |
| 2224/80123 Shape or position of the body | 2224/80238 using electric resistance welding, i.e. ohmic heating |
| 2224/80125 Bonding areas on the body | 2224/8034 Bonding interfaces of the bonding area |
| 2224/80127 Bonding areas outside the body | 2224/80345 Shape, e.g. interlocking features |
| 2224/80129 Shape or position of the other item | 2224/80355 having an external coating, e.g. protective |
| 2224/8013 using marks formed on the semiconductor or solid-state body | bond-through coating |
| 2224/80132 using marks formed outside the | 2224/80357 being flush with the surface |
| semiconductor or solid-state body, i.e. | 2224/80359 Material |
| "off-chip" | 2224/8036 Bonding interfaces of the semiconductor or |
| 2224/80136 involving guiding structures, e.g. spacers or | solid state body |
| supporting members | 2224/80365 Shape, e.g. interlocking features 2224/80375 having an external coating, e.g. protective |
| 2224/80138 the guiding structures being at least partially left in the finished device | bond-through coating |
| 2224/80139 Guiding structures on the body | 2224/80379 Material (material of the bonding area prior |
| 2224/8014 Guiding structures outside the body | to the connecting process H01L 2224/05099 |
| 2224/80141 Guiding structures both on and outside | and <u>H01L 2224/05599</u>) |
| the body | 2224/8038 Bonding interfaces outside the semiconductor |
| 2224/80143 Passive alignment, i.e. self alignment, e.g. | or solid-state body |
| using surface energy, chemical reactions, | 2224/80385 Shape, e.g. interlocking features 2224/80395 having an external coating, e.g. protective |
| thermal equilibrium | bond-through coating |
| 2224/80148 involving movement of a part of the bonding apparatus | 2224/80399 Material |
| 2224/80149 being the lower part of the bonding | 2224/804 with a principal constituent of the material |
| apparatus, i.e. holding means for the | being a metal or a metalloid, e.g. boron |
| bodies to be connected, e.g. XY table | [B], silicon [Si], germanium [Ge], arsenic |
| 2224/8015 Rotational movements | [As], antimony [Sb], tellurium [Te] and |
| 2224/8016 Translational movements | polonium [Po], and alloys thereof |
| 2224/80169 being the upper part of the bonding | 2224/80401 the principal constituent melting at a temperature of less than 400°C |
| apparatus, i.e. bonding head | 2224/80405 Gallium [Ga] as principal constituent |
| 2224/8017 Rotational movements | 2224/80409 Indium [In] as principal constituent |
| 2224/8018 Translational movements | 2224/80411 Tin [Sn] as principal constituent |
| 2224/8019 Arrangement of the bonding areas prior to mounting | 2224/80413 Bismuth [Bi] as principal constituent |
| 2224/80194 Lateral distribution of the bonding areas | 2224/80414 Thallium [TI] as principal constituent |
| 2224/802 Applying energy for connecting | 2224/80416 Lead [Pb] as principal constituent |
| 2224/80201 Compression bonding | 2224/80417 the principal constituent melting at a |
| Tompleson contains | temperature of greater than or equal to |
| | 400°C and less than 950°C |
| | |

| 2224/80418 Zinc [Zn] as principal constituent | 2224/80498 with a principal constituent of the material |
|--|---|
| 2224/8042 Antimony [Sb] as principal | being a combination of two or more |
| constituent | materials in the form of a matrix with a |
| 2224/80423 Magnesium [Mg] as principal | filler, i.e. being a hybrid material, e.g. |
| constituent | segmented structures, foams |
| 2224/80424 Aluminium [Al] as principal | 2224/80499 Material of the matrix |
| constituent | 2224/805 with a principal constituent of |
| 2224/80438 the principal constituent melting at a | the material being a metal or a |
| temperature of greater than or equal to | metalloid, e.g. boron [B], silicon |
| 950°C and less than 1550°C | [Si], germanium [Ge], arsenic [As], |
| 2224/80439 Silver [Ag] as principal constituent | antimony [Sb], tellurium [Te] and |
| 2224/80444 Gold [Au] as principal constituent | polonium [Po], and alloys thereof |
| 2224/80447 Copper [Cu] as principal constituent | 2224/80501 the principal constituent melting at |
| 2224/80449 Manganese [Mn] as principal | a temperature of less than 400°C |
| constituent | 2224/80505 Gallium [Ga] as principal constituent |
| 2224/80455 Nickel [Ni] as principal constituent | 2224/80509 Indium [In] as principal |
| 2224/80457 Cobalt [Co] as principal constituent | constituent |
| 2224/8046 Iron [Fe] as principal constituent | 2224/80511 Tin [Sn] as principal constituent |
| 2224/80463 the principal constituent melting at a | 2224/80513 Bismuth [Bi] as principal |
| temperature of greater than 1550°C | constituent |
| 2224/80464 Palladium [Pd] as principal | 2224/80514 Thallium [TI] as principal |
| constituent | constituent |
| 2224/80466 Titanium [Ti] as principal constituent | 2224/80516 Lead [Pb] as principal constituent |
| 2224/80469 Platinum [Pt] as principal constituent | 2224/80517 the principal constituent melting |
| 2224/8047 Zirconium [Zr] as principal | at a temperature of greater than or |
| constituent Chromium [Crl on principal | equal to 400°C and less than 950°C |
| 2224/80471 Chromium [Cr] as principal constituent | 2224/80518 Zinc [Zn] as principal constituent |
| 2224/80472 Vanadium [V] as principal constituent | 2224/8052 Antimony [Sb] as principal |
| 2224/80473 Rhodium [Rh] as principal constituent | constituent |
| 2224/80476 Ruthenium [Ru] as principal | 2224/80523 Magnesium [Mg] as principal |
| constituent | constituent |
| 2224/80478 Iridium [Ir] as principal constituent | 2224/80524 Aluminium [Al] as principal |
| 2224/80479 Niobium [Nb] as principal constituent | constituent |
| 2224/8048 Molybdenum [Mo] as principal | 2224/80538 the principal constituent melting at a temperature of greater than |
| constituent | or equal to 950°C and less than |
| 2224/80481 Tantalum [Ta] as principal constituent | 1550°C |
| 2224/80483 Rhenium [Re] as principal constituent | 2224/80539 Silver [Ag] as principal |
| 2224/80484 Tungsten [W] as principal constituent | constituent |
| 2224/80486 with a principal constituent of the material | 2224/80544 Gold [Au] as principal |
| being a non metallic, non metalloid | constituent |
| inorganic material | 2224/80547 Copper [Cu] as principal |
| 2224/80487 Ceramics, e.g. crystalline carbides, | constituent |
| nitrides or oxides (glass ceramics | 2224/80549 Manganese [Mn] as principal |
| H01L 2224/80488) Glasses a g amorphous avides nitrides | constituent |
| 2224/80488 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/80555 Nickel [Ni] as principal |
| 2224/8049 with a principal constituent of the material | constituent [2224/80557] Cobalt [Co] as principal |
| being a polymer, e.g. polyester, phenolic | constituent |
| based polymer, epoxy | 2224/8056 Iron [Fe] as principal constituent |
| 2224/80491 The principal constituent being an | 2224/80563 the principal constituent melting |
| elastomer, e.g. silicones, isoprene, | at a temperature of greater than |
| neoprene | 1550°C |
| 2224/80493 with a principal constituent of the material | 2224/80564 Palladium [Pd] as principal |
| being a solid not provided for in groups | constituent |
| <u>H01L 2224/804</u> - <u>H01L 2224/80491</u> , e.g. | 2224/80566 Titanium [Ti] as principal |
| allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | constituent |
| 2224/80494 with a principal constituent of the material | 2224/80569 Platinum [Pt] as principal |
| being a liquid not provided for in groups | constituent |
| H01L 2224/804 - H01L 2224/80491 | 2224/8057 Zirconium [Zr] as principal |
| 2224/80495 with a principal constituent of the material | constituent Charming [Cal as animainal] |
| being a gas not provided for in groups | 2224/80571 Chromium [Cr] as principal constituent |
| H01L 2224/804 - H01L 2224/80491 | Constituent |
| | |

| 2224/80572 Vanadium [V] as principal constituent | 2224/80613 Bismuth [Bi] as principal constituent |
|--|---|
| 2224/80573 Rhodium [Rh] as principal constituent | 2224/80614 Thallium [Tl] as principal constituent |
| 2224/80576 Ruthenium [Ru] as principal constituent | 2224/80616 Lead [Pb] as principal constituent |
| 2224/80578 Iridium [Ir] as principal constituent | 2224/80617 the principal constituent melting at a temperature of greater than |
| 2224/80579 Niobium [Nb] as principal constituent | or equal to 400°C and less than 950°C |
| 2224/8058 Molybdenum [Mo] as principal constituent | 2224/80618 Zinc [Zn] as principal constituent |
| 2224/80581 Tantalum [Ta] as principal constituent | 2224/8062 Antimony [Sb] as principal constituent |
| 2224/80583 Rhenium [Re] as principal constituent | 2224/80623 Magnesium [Mg] as principal constituent |
| 2224/80584 Tungsten [W] as principal constituent | 2224/80624 Aluminium [Al] as principal constituent |
| 2224/80586 with a principal constituent of the material being a non metallic, non | 2224/80638 the principal constituent melting at a temperature of greater than |
| metalloid inorganic material 2224/80587 Ceramics, e.g. crystalline carbides, | or equal to 950°C and less than 1550°C |
| nitrides or oxides (glass ceramics <u>H01L 2224/80588</u>) | 2224/80639 Silver [Ag] as principal constituent |
| 2224/80588 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/80644 Gold [Au] as principal constituent |
| 2224/8059 with a principal constituent of the material being a polymer, e.g. | 2224/80647 Copper [Cu] as principal constituent |
| polyester, phenolic based polymer, epoxy | 2224/80649 Manganese [Mn] as principal constituent |
| 2224/80591 The principal constituent being an elastomer, e.g. silicones, isoprene, | 2224/80655 Nickel [Ni] as principal constituent |
| neoprene 2224/80593 with a principal constituent | 2224/80657 Cobalt [Co] as principal constituent |
| of the material being a solid not provided for in groups | 2224/8066 Iron [Fe] as principal constituent |
| H01L 2224/805 - H01L 2224/80591, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | 2224/80663 the principal constituent melting at a temperature of greater than |
| 2224/80594 with a principal constituent of the material being a liquid | 1550°C 2224/80664 Palladium [Pd] as principal |
| not provided for in groups H01L 2224/805 - H01L 2224/80591 | constituent 2224/80666 Titanium [Ti] as principal |
| 2224/80595 with a principal constituent of the material being a gas | constituent 2224/80669 Platinum [Pt] as principal |
| not provided for in groups H01L 2224/805 - H01L 2224/80591 | constituent 2224/8067 Zirconium [Zr] as principal |
| 2224/80598 Fillers 2224/80599 Base material | constituent 2224/80671 Chromium [Cr] as principal constituent |
| 2224/806 with a principal constituent of the material being a metal or a | 2224/80672 Vanadium [V] as principal constituent |
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], | 2224/80673 Rhodium [Rh] as principal constituent |
| antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | 2224/80676 Ruthenium [Ru] as principal constituent |
| 2224/80601 the principal constituent melting at a temperature of less than | 2224/80678 Iridium [Ir] as principal constituent |
| 400°C 2224/80605 Gallium [Ga] as principal | 2224/80679 Niobium [Nb] as principal constituent |
| constituent 2224/80609 Indium [In] as principal | 2224/8068 Molybdenum [Mo] as principal constituent |
| constituent 2224/80611 Tin [Sn] as principal | 2224/80681 Tantalum [Ta] as principal constituent |
| constituent | Constituent |

| 2224/80683 Rhenium [Re] as principal constituent 2224/80684 Tungsten [W] as principal | 2224/80717 the principal constituent melting at a temperature of greater than or equal to 400°C and less than |
|---|--|
| constituent 2224/80686 with a principal constituent of the | 950°C 2224/80718 Zinc [Zn] as principal |
| material being a non metallic, non metalloid inorganic material 2224/80687 Ceramics, e.g. crystalline | constituent 2224/8072 Antimony [Sb] as principal constituent |
| carbides, nitrides or oxides (glass ceramics H01L 2224/80688) | 2224/80723 Magnesium [Mg] as principal constituent |
| 2224/80688 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2224/80724 Aluminium [Al] as principal constituent |
| 2224/8069 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy | 2224/80738 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C |
| 2224/80691 The principal constituent being an elastomer, e.g. silicones, | 2224/80739 Silver [Ag] as principal constituent |
| isoprene, neoprene 2224/80693 with a principal constituent | 2224/80744 Gold [Au] as principal constituent |
| of the material being a solid not provided for in groups | 2224/80747 Copper [Cu] as principal constituent |
| <u>H01L 2224/806</u> - <u>H01L 2224/80691</u> , e.g. allotropes of carbon, fullerene, | 2224/80749 Manganese [Mn] as principal constituent |
| graphite, carbon-nanotubes, diamond | 2224/80755 Nickel [Ni] as principal constituent |
| 2224/80694 with a principal constituent of the material being a liquid | 2224/80757 Cobalt [Co] as principal constituent |
| not provided for in groups H01L 2224/806 - H01L 2224/80691 | 2224/8076 Iron [Fe] as principal constituent |
| 2224/80695 with a principal constituent of the material being a gas not provided for in groups | 2224/80763 the principal constituent melting at a temperature of greater than 1550°C |
| 2224/80698 with a principal constituent of the material being a combination of | 2224/80764 Palladium [Pd] as principal constituent |
| two or more materials in the form of a matrix with a filler, i.e. being | 2224/80766 Titanium [Ti] as principal constituent |
| a hybrid material, e.g. segmented structures, foams | 2224/80769 Platinum [Pt] as principal constituent |
| 2224/80699 Coating material | 2224/8077 Zirconium [Zr] as principal constituent |
| 2224/807 with a principal constituent of the material being a metal or a | 2224/80771 Chromium [Cr] as principal constituent |
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], | 2224/80772 Vanadium [V] as principal constituent |
| antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | 2224/80773 Rhodium [Rh] as principal constituent |
| 2224/80701 the principal constituent melting at a temperature of less than 400°C | 2224/80776 Ruthenium [Ru] as principal constituent |
| 2224/80705 Gallium [Ga] as principal constituent | 2224/80778 Iridium [Ir] as principal constituent |
| 2224/80709 Indium [In] as principal constituent | 2224/80779 Niobium [Nb] as principal constituent |
| 2224/80711 Tin [Sn] as principal constituent | 2224/8078 Molybdenum [Mo] as principal constituent |
| 2224/80713 Bismuth [Bi] as principal constituent | 2224/80781 Tantalum [Ta] as principal constituent |
| 2224/80714 Thallium [Tl] as principal constituent | 2224/80783 Rhenium [Re] as principal constituent |
| 2224/80716 Lead [Pb] as principal constituent | 2224/80784 Tungsten [W] as principal constituent |
| Constituent | 2224/80786 with a principal constituent of the material being a non metallic, non metalloid inorganic material |

| 2224/80787 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/80788) 2224/80788 | 2224/80885 Combinations of two or more hardening methods provided for in at least two different groups from H01L 2224/80855 - H01L 2224/8088, e.g. |
|--|---|
| nitrides or fluorides 2224/8079 with a principal constituent of | for hybrid thermoplastic-thermosetting adhesives |
| the material being a polymer, e.g. polyester, phenolic based polymer, | 2224/8089 using an inorganic non metallic glass type adhesive, e.g. solder glass |
| epoxy 2224/80791 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene | 2224/80893 Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond |
| 2224/80793 with a principal constituent of the material being a solid not provided for in groups HO1L 2224/807 - HO1L 2224/80791, | 2224/80894 Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces |
| e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | 2224/80895 between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding |
| 2224/80794 with a principal constituent of the material being a liquid | 2224/80896 between electrically insulating surfaces, e.g. oxide or nitride layers |
| not provided for in groups <u>H01L 2224/807</u> - <u>H01L 2224/80791</u> | 2224/80897 Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like |
| 2224/80795 with a principal constituent of the material being a gas not provided for in groups H01L 2224/807 - H01L 2224/80791 | 2224/80898 Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other 2224/80899 using resilient parts in the bonding area |
| 2224/80798 with a principal constituent of the | 2224/809 with the bonding area not providing any |
| material being a combination of two or more materials in the form | mechanical bonding 2224/80901 Pressing a bonding area against another |
| of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams | bonding area by means of a further bonding area or connector (detachable pressure contact H01L 2224/72) |
| 2224/80799 Shape or distribution of the fillers | 2224/80902 by means of a further bonding area |
| 2224/808 Bonding techniques 2224/80801 Soldering or alloying | 2224/80903 by means of a bump or layer connector |
| 2224/80805 involving forming a eutectic alloy at the | 2224/80904 by means of an encapsulation layer or foil 2224/80905 Combinations of bonding methods provided |
| bonding interface 2224/8081 involving forming an intermetallic | for in at least two different groups from H01L 2224/80904 |
| compound at the bonding interface | 2224/80906 Specific sequence of method steps |
| 2224/80815 Reflow soldering | 2224/80907 Intermediate bonding, i.e. intermediate |
| 2224/8082 Diffusion bonding | bonding step for temporarily bonding the |
| 2224/80825 Solid-liquid interdiffusion | semiconductor or solid-state body, followed |
| 2224/8083 Solid-solid interdiffusion | by at least a further bonding step |
| 2224/8084 Sintering | 2224/80908 involving monitoring, e.g. feedback loop |
| 2224/8085 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, | 2224/80909 Post-treatment of the bonding area 2224/8091 Cleaning, e.g. oxide removal step, |
| polyester | desmearing |
| 2224/80855 Hardening the adhesive by curing, i.e. | 2224/80911 Chemical cleaning, e.g. etching, flux |
| thermosetting 2224/80856 Pre-cured adhesive, i.e. B-stage adhesive | 2224/80912 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow |
| 2224/80859 Localised curing of parts of the bonding | 2224/80913 Plasma cleaning |
| area | 2224/80914 Thermal cleaning, e.g. using laser ablation |
| 2224/80862 Heat curing | or by electrostatic corona discharge |
| 2224/80865 Microwave curing 2224/80868 Infrared [IR] curing | 2224/80919 Combinations of two or more cleaning methods provided for in |
| 2224/80871 Visible light curing | at least two different groups from |
| 2224/80874 Ultraviolet [UV] curing | H01L 2224/8091 - H01L 2224/80914 |
| 2224/80877 Moisture curing, i.e. curing by exposing | 2224/8092 Applying permanent coating, e.g. protective |
| to humidity, e.g. for silicones and | coating |
| polyurethanes | 2224/8093 Reshaping |
| 2224/8088 Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives | 2224/80931 by chemical means, e.g. etching 2224/80935 by heating means, e.g. reflowing |

| 2224/80937 using a polychromatic heating lamp | 2224/81055 being oxidating |
|---|---|
| 2224/80939 using a polyemoniate neating famp | 2224/81065 being reducing |
| 2224/80941 Induction heating, i.e. eddy currents | 2224/81075 being feducing |
| 2224/80943 using a flame torch, e.g. hydrogen torch | 2224/81085 being a liquid, e.g. for fluidic self-assembly |
| 2224/80945 using a traine tolch, e.g. hydrogen tolch | 2224/8109 Vacuum |
| flame off [EFO] | |
| 2224/80947 by mechanical means, e.g. pull-and-cut, | 2224/81091 Under pressure |
| pressing, stamping | 2224/81092 Atmospheric pressure |
| 2224/80948 Thermal treatments, e.g. annealing, | 2224/81093 Transient conditions, e.g. gas-flow |
| controlled cooling | 2224/81095 Temperature settings |
| 2224/80951 Forming additional members, e.g. for | 2224/81096 Transient conditions |
| reinforcing | 2224/81097 Heating |
| 2224/80986 Specific sequence of steps, e.g. repetition of | 2224/81098 Cooling |
| manufacturing steps, time sequence | 2224/81099 Ambient temperature |
| 2224/81 using a bump connector | 2224/811 the bump connector being supplied to the parts |
| 2224/81001 involving a temporary auxiliary member not | to be connected in the bonding apparatus |
| forming part of the bonding apparatus | 2224/81101 as prepeg comprising a bump connector, e.g. |
| 2224/81002 being a removable or sacrificial coating | provided in an insulating plate member |
| 2224/81005 being a temporary or sacrificial substrate | 2224/8111 involving protection against electrical |
| 2224/81007 involving a permanent auxiliary member being | discharge, e.g. removing electrostatic charge |
| left in the finished device, e.g. aids for holding | 2224/8112 Aligning |
| or protecting the bump connector during or | 2224/81121 Active alignment, i.e. by apparatus steering, |
| after the bonding process | e.g. optical alignment using marks or sensors |
| 2224/81009 Pre-treatment of the bump connector or the | 2224/81122 by detecting inherent features of, or |
| bonding area | outside, the semiconductor or solid-state body |
| 2224/8101 Cleaning the bump connector, e.g. oxide | 2224/81123 Shape or position of the body |
| removal step, desmearing | 2224/81125 Bonding areas on the body |
| 2224/81011 Chemical cleaning, e.g. etching, flux | 2224/81127 Bonding areas outside the body |
| 2224/81012 Mechanical cleaning, e.g. abrasion | 2224/81129 Shape or position of the other item |
| using hydro blasting, brushes, ultrasonic | 2224/8113 using marks formed on the semiconductor |
| cleaning, dry ice blasting, gas-flow | or solid-state body |
| 2224/81013 Plasma cleaning | 2224/81132 using marks formed outside the |
| 2224/81014 Thermal cleaning, e.g. decomposition, | semiconductor or solid-state body, i.e. |
| sublimation | "off-chip" |
| 2224/81019 Combinations of two or more | 2224/81136 involving guiding structures, e.g. spacers or |
| cleaning methods provided for in | supporting members |
| at least two different groups from | 2224/81138 the guiding structures being at least |
| <u>H01L 2224/8101</u> - <u>H01L 2224/81014</u> | partially left in the finished device |
| 2224/8102 Applying permanent coating to the bump | 2224/81139 Guiding structures on the body |
| connector in the bonding apparatus, e.g. insitu coating | 2224/8114 Guiding structures outside the body |
| 2224/81022 Cleaning the bonding area, e.g. oxide | 2224/81141 Guiding structures both on and outside |
| removal step, desmearing | the body |
| 2224/81024 Applying flux to the bonding area | 2224/81143 Passive alignment, i.e. self alignment, e.g. |
| 2224/81026 Applying a precursor material to the bonding | using surface energy, chemical reactions, |
| area | thermal equilibrium |
| 2224/8103 Reshaping the bump connector in the | 2224/81148 involving movement of a part of the bonding |
| bonding apparatus, e.g. flattening the bump | apparatus |
| connector | 2224/81149 being the lower part of the bonding |
| 2224/81031 by chemical means, e.g. etching, | apparatus, i.e. holding means for the |
| anodisation | bodies to be connected, e.g. XY table |
| 2224/81035 by heating means | 2224/8115 Rotational movements |
| 2224/81037 using a polychromatic heating lamp | 2224/8116 Translational movements |
| 2224/81039 using a laser | 2224/81169 being the upper part of the bonding |
| 2224/81041 Induction heating, i.e. eddy currents | apparatus, i.e. bonding head |
| 2224/81047 by mechanical means, e.g. severing, | 2224/8117 Rotational movements |
| pressing, stamping | 2224/8118 Translational movements |
| 2224/81048 Thermal treatments, e.g. annealing, | 2224/8119 Arrangement of the bump connectors prior to |
| controlled pre-heating or pre-cooling | mounting |
| 2224/81051 Forming additional members | 2224/81191 wherein the bump connectors are disposed |
| 2224/81052 Detaching bump connectors, e.g. after testing | only on the semiconductor or solid-state |
| (unsoldering in general <u>B23K 1/018</u>) | body |
| 2224/81053 Bonding environment | |
| 2224/81054 Composition of the atmosphere | |
| | |

| 2224/81192 wherein the bump connectors are disposed | 2224/81401 the principal constituent melting at a |
|---|--|
| only on another item or body to be connected | temperature of less than 400°C |
| to the semiconductor or solid-state body | 2224/81405 Gallium [Ga] as principal constituent |
| 2224/81193 wherein the bump connectors are disposed | 2224/81409 Indium [In] as principal constituent |
| on both the semiconductor or solid-state | 2224/81411 Tin [Sn] as principal constituent |
| body and another item or body to be | 2224/81413 Bismuth [Bi] as principal constituent |
| connected to the semiconductor or solid-state | 2224/81414 Thallium [Tl] as principal constituent |
| body | 2224/81416 Lead [Pb] as principal constituent |
| 2224/81194 Lateral distribution of the bump connectors | 2224/81417 the principal constituent melting at a |
| 2224/812 Applying energy for connecting | temperature of greater than or equal to |
| 2224/81201 Compression bonding | 400°C and less than 950°C |
| 2224/81203 Thermocompression bonding, e.g. | 2224/81418 Zinc [Zn] as principal constituent |
| diffusion bonding, pressure joining, | 2224/8142 Antimony [Sb] as principal |
| thermocompression welding or solid-state | constituent |
| welding | 2224/81423 Magnesium [Mg] as principal |
| 2224/81204 with a graded temperature profile | constituent |
| 2224/81205 Ultrasonic bonding | 2224/81424 Aluminium [Al] as principal |
| 2224/81206 Direction of oscillation | constituent |
| 2224/81207 Thermosonic bonding | 2224/81438 the principal constituent melting at a |
| 2224/81208 applying unidirectional static pressure | temperature of greater than or equal to |
| 2224/81209 applying isostatic pressure, e.g. degassing | 950°C and less than 1550°C |
| using vacuum or a pressurised liquid | 2224/81439 Silver [Ag] as principal constituent |
| 2224/8121 using a reflow oven | 2224/81444 Gold [Au] as principal constituent |
| 2224/81211 with a graded temperature profile | 2224/81447 Copper [Cu] as principal constituent |
| 2224/8122 with energy being in the form of | 2224/81449 Manganese [Mn] as principal |
| electromagnetic radiation | constituent |
| 2224/81222 Induction heating, i.e. eddy currents | 2224/81455 Nickel [Ni] as principal constituent |
| 2224/81224 using a laser | 2224/81457 Cobalt [Co] as principal constituent |
| 2224/8123 Polychromatic or infrared lamp heating | 2224/8146 Iron [Fe] as principal constituent |
| 2224/81232 using an autocatalytic reaction, e.g. | 2224/81463 the principal constituent melting at a |
| exothermic brazing | temperature of greater than 1550°C |
| 2224/81234 using means for applying energy being | 2224/81464 Palladium [Pd] as principal |
| within the device, e.g. integrated heater | constituent |
| 2224/81236 using electro-static corona discharge | 2224/81466 Titanium [Ti] as principal constituent |
| 2224/81237 using an electron beam (electron beam | 2224/81469 Platinum [Pt] as principal constituent |
| welding in general <u>B23K 15/00</u>) | 2224/8147 Zirconium [Zr] as principal |
| 2224/81238 using electric resistance welding, i.e. ohmic heating | constituent |
| 2224/8134 Bonding interfaces of the bump connector | 2224/81471 Chromium [Cr] as principal |
| 2224/81345 Shape, e.g. interlocking features | constituent |
| 2224/81355 having an external coating, e.g. protective | 2224/81472 Vanadium [V] as principal constituent |
| bond-through coating | 2224/81473 Rhodium [Rh] as principal constituent |
| 2224/81359 Material | 2224/81476 Ruthenium [Ru] as principal |
| 2224/8136 Bonding interfaces of the semiconductor or | constituent |
| solid state body | 2224/81478 Iridium [Ir] as principal constituent |
| 2224/81365 Shape, e.g. interlocking features | 2224/81479 Niobium [Nb] as principal constituent |
| 2224/81375 having an external coating, e.g. protective | 2224/8148 Molybdenum [Mo] as principal constituent |
| bond-through coating | |
| 2224/81379 Material (material of the bump | 2224/81481 Tantalum [Ta] as principal constituent 2224/81483 Rhenium [Re] as principal constituent |
| connector prior to the connecting process | 2224/81484 Tungsten [W] as principal constituent |
| H01L 2224/13099 and H01L 2224/13599, | 2224/81486 with a principal constituent of the material |
| and subgroups) | being a non metallic, non metalloid |
| 2224/8138 Bonding interfaces outside the semiconductor | inorganic material |
| or solid-state body | 2224/81487 Ceramics, e.g. crystalline carbides, |
| 2224/81385 Shape, e.g. interlocking features | nitrides or oxides (glass ceramics |
| 2224/81395 having an external coating, e.g. protective | H01L 2224/81488) |
| bond-through coating | 2224/81488 Glasses, e.g. amorphous oxides, nitrides |
| 2224/81399 Material | or fluorides |
| 2224/814 with a principal constituent of the material | 2224/8149 with a principal constituent of the material |
| being a metal or a metalloid, e.g. boron | being a polymer, e.g. polyester, phenolic |
| [B], silicon [Si], germanium [Ge], arsenic | based polymer, epoxy |
| [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | |
| potomum [1 o], and alloys dicteor | |

| 2224/81491 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene | 2224/8156 Iron [Fe] as principal constituent 2224/81563 the principal constituent melting at a temperature of greater than |
|---|--|
| 2224/81493 with a principal constituent of the material being a solid not provided for in groups HOLL 2224/814 - HOLL 2224/81491, e.g. | 1550°C 2224/81564 Palladium [Pd] as principal constituent |
| allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | 2224/81566 Titanium [Ti] as principal constituent |
| 2224/81494 with a principal constituent of the material being a liquid not provided for in groups H01L 2224/814 - H01L 2224/81491 | 2224/81569 Platinum [Pt] as principal constituent |
| 2224/81495 with a principal constituent of the material | 2224/8157 Zirconium [Zr] as principal constituent |
| being a gas not provided for in groups H01L 2224/814 - H01L 2224/81491 | 2224/81571 Chromium [Cr] as principal constituent |
| 2224/81498 with a principal constituent of the material being a combination of two or more | 2224/81572 Vanadium [V] as principal constituent |
| materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. | 2224/81573 Rhodium [Rh] as principal constituent |
| segmented structures, foams 2224/81499 Material of the matrix | 2224/81576 Ruthenium [Ru] as principal |
| 2224/815 with a principal constituent of | constituent 2224/81578 Iridium [Ir] as principal |
| the material being a metal or a metalloid, e.g. boron [B], silicon | constituent |
| [Si], germanium [Ge], arsenic [As], | 2224/81579 Niobium [Nb] as principal constituent |
| antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | 2224/8158 Molybdenum [Mo] as principal |
| 2224/81501 the principal constituent melting at a temperature of less than 400°C | constituent 2224/81581 Tantalum [Ta] as principal |
| 2224/81505 Gallium [Ga] as principal | constituent 2224/81583 Rhenium [Re] as principal |
| constituent 2224/81509 Indium [In] as principal | constituent |
| constituent | 2224/81584 Tungsten [W] as principal constituent |
| 2224/81511 Tin [Sn] as principal constituent 2224/81513 Bismuth [Bi] as principal | 2224/81586 with a principal constituent of the |
| constituent | material being a non metallic, non metalloid inorganic material |
| 2224/81514 Thallium [TI] as principal constituent 2224/81516 Lead [Pb] as principal constituent | 2224/81587 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics |
| 2224/81517 the principal constituent melting | H01L 2224/81588) 2224/81588 Glasses, e.g. amorphous oxides, |
| at a temperature of greater than or equal to 400°C and less than 950°C | nitrides or fluorides |
| 2224/81518 Zinc [Zn] as principal constituent | 2224/8159 with a principal constituent of the material being a polymer, e.g. |
| 2224/8152 Antimony [Sb] as principal constituent | polyester, phenolic based polymer, |
| 2224/81523 Magnesium [Mg] as principal | epoxy 2224/81591 The principal constituent being an |
| constituent 2224/81524 Aluminium [Al] as principal | elastomer, e.g. silicones, isoprene, neoprene |
| constituent | 2224/81593 with a principal constituent |
| 2224/81538 the principal constituent melting at a temperature of greater than | of the material being a solid not provided for in groups |
| or equal to 950°C and less than 1550°C | <u>H01L 2224/815</u> - <u>H01L 2224/81591</u> , |
| 2224/81539 Silver [Ag] as principal | e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond |
| constituent 2224/81544 Gold [Au] as principal | 2224/81594 with a principal constituent of the material being a liquid |
| constituent 2224/81547 Copper [Cu] as principal | not provided for in groups H01L 2224/815 - H01L 2224/81591 |
| constituent | 2224/81595 with a principal constituent |
| 2224/81549 Manganese [Mn] as principal constituent | of the material being a gas not provided for in groups |
| 2224/81555 Nickel [Ni] as principal | <u>H01L 2224/815</u> - <u>H01L 2224/81591</u> |
| constituent 2224/81557 Cobalt [Co] as principal | 2224/81598 Fillers 2224/81599 Base material |
| constituent | |

| 2224/816 with a principal constituent of the material being a metal or a | 2224/81672 Vanadium [V] as principal constituent |
|--|---|
| metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], | 2224/81673 Rhodium [Rh] as principal constituent |
| antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof | 2224/81676 Ruthenium [Ru] as principal constituent |
| 2224/81601 the principal constituent melting at a temperature of less than | 2224/81678 Iridium [Ir] as principal constituent |
| 400°C 2224/81605 Gallium [Ga] as principal | 2224/81679 Niobium [Nb] as principal constituent |
| constituent 2224/81609 Indium [In] as principal | 2224/8168 Molybdenum [Mo] as principal constituent |
| constituent 2224/81611 Tin [Sn] as principal constituent | 2224/81681 Tantalum [Ta] as principal constituent |
| 2224/81613 Bismuth [Bi] as principal constituent | 2224/81683 Rhenium [Re] as principal constituent |
| 2224/81614 Thallium [Tl] as principal constituent | 2224/81684 Tungsten [W] as principal constituent 2224/81686 with a principal constituent of the |
| 2224/81616 Lead [Pb] as principal constituent | material being a non metallic, non metalloid inorganic material |
| 2224/81617 the principal constituent melting at a temperature of greater than or equal to 400°C and less than | 2224/81687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics H01L 2224/81688) |
| 950°C 2224/81618 Zinc [Zn] as principal | 2224/81688 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| constituent 2224/8162 Antimony [Sb] as principal constituent | 2224/8169 with a principal constituent of the material being a polymer, e.g. |
| 2224/81623 Magnesium [Mg] as principal constituent | polyester, phenolic based polymer, epoxy 2224/81691 The principal constituent being |
| 2224/81624 Aluminium [Al] as principal constituent | an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/81638 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C | 2224/81693 with a principal constituent of the material being a solid not provided for in groups |
| 2224/81639 Silver [Ag] as principal constituent | H01L 2224/816 - H01L 2224/81691, e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, |
| 2224/81644 Gold [Au] as principal constituent | diamond 2224/81694 with a principal constituent |
| 2224/81647 Copper [Cu] as principal constituent | of the material being a liquid not provided for in groups |
| 2224/81649 Manganese [Mn] as principal constituent | <u>H01L 2224/816</u> - <u>H01L 2224/81691</u> 2224/81695 with a principal constituent |
| 2224/81655 Nickel [Ni] as principal constituent | of the material being a gas not provided for in groups H01L 2224/816 - H01L 2224/81691 |
| 2224/81657 Cobalt [Co] as principal constituent | 2224/81698 with a principal constituent of the material being a combination of |
| 2224/8166 Iron [Fe] as principal constituent | two or more materials in the form of a matrix with a filler, i.e. being |
| 2224/81663 the principal constituent melting at a temperature of greater than 1550°C | a hybrid material, e.g. segmented structures, foams |
| 2224/81664 Palladium [Pd] as principal constituent | 2224/81699 Coating material 2224/817 with a principal constituent of |
| 2224/81666 Titanium [Ti] as principal constituent | the material being a metal or a metalloid, e.g. boron [B], silicon |
| 2224/81669 Platinum [Pt] as principal constituent | [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof |
| 2224/8167 Zirconium [Zr] as principal constituent | 2224/81701 the principal constituent melting at a temperature of less than |
| 2224/81671 Chromium [Cr] as principal constituent | 400°C |

| 2224/81705 Gallium [Ga] as principal constituent | 2224/81779 Niobium [Nb] as principal constituent |
|--|---|
| 2224/81709 Indium [In] as principal constituent | 2224/8178 Molybdenum [Mo] as principal constituent |
| 2224/81711 Tin [Sn] as principal constituent | 2224/81781 Tantalum [Ta] as principal constituent |
| 2224/81713 Bismuth [Bi] as principal constituent | 2224/81783 Rhenium [Re] as principal constituent |
| 2224/81714 Thallium [Tl] as principal | 2224/81784 Tungsten [W] as principal constituent |
| constituent | |
| 2224/81716 Lead [Pb] as principal constituent | 2224/81786 with a principal constituent of the material being a non metallic, non |
| 2224/81717 the principal constituent melting | metalloid inorganic material |
| at a temperature of greater than | 2224/81787 Ceramics, e.g. crystalline |
| or equal to 400°C and less than 950°C | carbides, nitrides or oxides (glass ceramics <u>H01L 2224/81788</u>) |
| 2224/81718 Zinc [Zn] as principal constituent | 2224/81788 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/8172 Antimony [Sb] as principal | 2224/8179 with a principal constituent of |
| constituent | the material being a polymer, e.g. |
| 2224/81723 Magnesium [Mg] as principal | polyester, phenolic based polymer, |
| constituent | epoxy |
| 2224/81724 Aluminium [Al] as principal | 2224/81791 The principal constituent being |
| constituent | an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/81738 the principal constituent melting | |
| at a temperature of greater than | 2224/81793 with a principal constituent |
| or equal to 950°C and less than | of the material being a solid |
| 1550°C | not provided for in groups |
| 2224/81739 Silver [Ag] as principal | <u>H01L 2224/817</u> - <u>H01L 2224/81791</u> , |
| constituent | e.g. allotropes of carbon, fullerene, |
| 2224/81744 Gold [Au] as principal | graphite, carbon-nanotubes, |
| constituent | diamond |
| 2224/81747 Copper [Cu] as principal | 2224/81794 with a principal constituent |
| constituent | of the material being a liquid |
| 2224/81749 Manganese [Mn] as principal | not provided for in groups |
| constituent | H01L 2224/817 - H01L 2224/81791 |
| | 2224/81795 with a principal constituent |
| 2224/81755 Nickel [Ni] as principal constituent | of the material being a gas |
| | not provided for in groups |
| 2224/81757 Cobalt [Co] as principal | H01L 2224/817 - H01L 2224/81791 |
| constituent | 2224/81798 with a principal constituent of the |
| 2224/8176 Iron [Fe] as principal | material being a combination of |
| constituent | two or more materials in the form |
| 2224/81763 the principal constituent melting | of a matrix with a filler, i.e. being |
| at a temperature of greater than | a hybrid material, e.g. segmented |
| 1550°C | structures, foams |
| 2224/81764 Palladium [Pd] as principal | 2224/81799 Shape or distribution of the fillers |
| constituent | 2224/818 Bonding techniques |
| 2224/81766 Titanium [Ti] as principal | 2224/81801 Soldering or alloying |
| constituent | 2224/81805 involving forming a eutectic alloy at the |
| 2224/81769 Platinum [Pt] as principal | bonding interface |
| constituent | 2224/8181 involving forming an intermetallic |
| 2224/8177 Zirconium [Zr] as principal | |
| constituent | compound at the bonding interface |
| 2224/81771 Chromium [Cr] as principal | 2224/81815 Reflow soldering |
| constituent | 2224/8182 Diffusion bonding |
| 2224/81772 Vanadium [V] as principal | 2224/81825 Solid-liquid interdiffusion |
| constituent | 2224/8183 Solid-solid interdiffusion |
| 2224/81773 Rhodium [Rh] as principal | 2224/8184 Sintering |
| constituent | 2224/8185 using a polymer adhesive, e.g. an adhesive |
| | based on silicone, epoxy, polyimide, |
| 2224/81776 Ruthenium [Ru] as principal | polyester |
| constituent | 2224/81855 Hardening the adhesive by curing, i.e. |
| 2224/81778 Iridium [Ir] as principal | thermosetting |
| constituent | mermosetting |
| | |

| 2224/81856 Pre-cured adhesive, i.e. B-stage | 2224/81912 Mechanical cleaning, e.g. abrasion |
|--|--|
| adhesive | using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow |
| 2224/81859 Localised curing of parts of the bump connector | 2224/81913 Plasma cleaning |
| 2224/81862 Heat curing | 2224/81914 Thermal cleaning, e.g. using laser ablation |
| 2224/81865 Microwave curing | or by electrostatic corona discharge |
| 2224/81868 Infrared [IR] curing | 2224/81919 Combinations of two or more |
| 2224/81871 Visible light curing | cleaning methods provided for in |
| 2224/81874 Ultraviolet [UV] curing | at least two different groups from |
| 2224/81877 Moisture curing, i.e. curing by exposing | H01L 2224/8191 - H01L 2224/81914 |
| to humidity, e.g. for silicones and | 2224/8192 Applying permanent coating, e.g. protective |
| polyurethanes | coating |
| 2224/8188 Hardening the adhesive by cooling, e.g. for | 2224/8193 Reshaping |
| thermoplastics or hot-melt adhesives | 2224/81931 by chemical means, e.g. etching |
| 2224/81885 Combinations of two or more | 2224/81935 by heating means, e.g. reflowing |
| hardening methods provided for in | 2224/81937 using a polychromatic heating lamp |
| at least two different groups from | 2224/81939 using a laser |
| <u>H01L 2224/81855</u> - <u>H01L 2224/8188</u> , e.g. | 2224/81941 Induction heating, i.e. eddy currents |
| for hybrid thermoplastic-thermosetting | 2224/81943 using a flame torch, e.g. hydrogen torch |
| adhesives | 2224/81945 using a corona discharge, e.g. electronic |
| 2224/8189 using an inorganic non metallic glass type | flame off [EFO] |
| adhesive, e.g. solder glass | 2224/81947 by mechanical means, e.g. "pull-and-cut", |
| 2224/81893 Anodic bonding, i.e. bonding by applying a | pressing, stamping |
| voltage across the interface in order to induce | 2224/81948 Thermal treatments, e.g. annealing, |
| ions migration leading to an irreversible chemical bond | controlled cooling |
| 2224/81894 Direct bonding, i.e. joining surfaces | 2224/81951 Forming additional members, e.g. for |
| by means of intermolecular attracting | reinforcing |
| interactions at their interfaces, e.g. covalent | 2224/81986 Specific sequence of steps, e.g. repetition of |
| bonds, van der Waals forces | manufacturing steps, time sequence |
| 2224/81895 between electrically conductive surfaces, | 2224/82 • • by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI] |
| e.g. copper-copper direct bonding, surface | 2224/82001 involving a temporary auxiliary member not |
| activated bonding | forming part of the bonding apparatus |
| 2224/81896 between electrically insulating surfaces, | 2224/82002 being a removable or sacrificial coating |
| e.g. oxide or nitride layers | 2224/82005 being a temporary or sacrificial substrate |
| 2224/81897 Mechanical interlocking, e.g. anchoring, | 2224/82007 involving a permanent auxiliary member being |
| hook and loop-type fastening or the like | left in the finished device, e.g. aids for holding |
| 2224/81898 Press-fitting, i.e. pushing the parts | or protecting a build-up interconnect during or |
| together and fastening by friction, e.g. by | after the bonding process |
| compression of one part against the other 2224/81899 using resilient parts in the bump | 2224/82009 Pre-treatment of the connector or the bonding |
| connector or in the bonding area | area |
| 2224/819 with the bump connector not providing any | 2224/8201 Cleaning, e.g. oxide removal step, |
| mechanical bonding | desmearing |
| 2224/81901 Pressing the bump connector against the | 2224/8203 Reshaping, e.g. forming vias |
| bonding areas by means of another connector | 2224/82031 by chemical means, e.g. etching, |
| (detachable pressure contact <u>H01L 2224/72</u>) | anodisation |
| 2224/81902 by means of another bump connector | 2224/82035 by heating means |
| 2224/81903 by means of a layer connector | 2224/82039 using a laser |
| 2224/81904 by means of an encapsulation layer or foil | 2224/82045 using a corona discharge, e.g. electronic |
| 2224/81905 Combinations of bonding methods provided | flame off [EFO] |
| for in at least two different groups from | 2224/82047 by mechanical means, e.g. severing, pressing, stamping |
| H01L 2224/818 - H01L 2224/81904 | 2224/82048 Thermal treatments, e.g. annealing, |
| 2224/81906 Specific sequence of method steps | controlled pre-heating or pre-cooling |
| 2224/81907 Intermediate bonding, i.e. intermediate | 2224/82051 Forming additional members |
| bonding step for temporarily bonding the | 2224/82053 Bonding environment |
| semiconductor or solid-state body, followed by at least a further bonding step | 2224/82054 Composition of the atmosphere |
| 2224/81908 involving monitoring, e.g. feedback loop | 2224/82085 being a liquid, e.g. for fluidic self-assembly |
| 2224/81909 Post-treatment of the bump connector or | 2224/8209 Vacuum |
| bonding area | 2224/82091 Under pressure |
| 2224/8191 Cleaning, e.g. oxide removal step, | 2224/82095 Temperature settings |
| desmearing | 2224/82096 Transient conditions |
| 2224/81911 Chemical cleaning, e.g. etching, flux | 2224/82097 Heating |
| <i>5</i> , 1.6, 1.1 | |

| 2224/82098 Cooling | 2224/82237 using electron beam, (electron beam in |
|--|---|
| 2224/82099 Ambient temperature | general <u>B23K 15/00</u>) |
| 2224/821 Forming a build-up interconnect | 2224/82238 using electric resistance welding, i.e. ohmic |
| 2224/82101 by additive methods, e.g. direct writing | heating |
| 2224/82102 using jetting, e.g. ink jet | 2224/8234 Bonding interfaces of the connector |
| 2224/82103 using laser direct writing | 2224/82345 Shape, e.g. interlocking features |
| 2224/82104 using screen printing | 2224/82355 having an external coating, e.g. protective bond-through coating |
| 2224/82105 by using a preform | 2224/82359 Material |
| 2224/82106 by subtractive methods | 2224/8236 Bonding interfaces of the semiconductor or |
| 2224/82108 by self-assembly processes 2224/8211 involving protection against electrical | solid state body |
| discharge, e.g. removing electrostatic charge | 2224/82365 Shape, e.g. interlocking features |
| 2224/8212 Aligning | 2224/82375 having an external coating, e.g. protective |
| 2224/82121 Active alignment, i.e. by apparatus steering, | bond-through coating |
| e.g. optical alignment using marks or sensors | 2224/82379 Material |
| 2224/82122 by detecting inherent features of, or | 2224/8238 Bonding interfaces outside the semiconductor |
| outside, the semiconductor or solid-state | or solid-state body |
| body | 2224/82385 Shape, e.g. interlocking features |
| 2224/8213 using marks formed on the semiconductor | 2224/82395 having an external coating, e.g. protective |
| or solid-state body | bond-through coating 2224/82399 Material |
| 2224/82132 using marks formed outside the | 2224/828 Bonding techniques |
| semiconductor or solid-state body, i.e. "off-chip" | 2224/82801 Soldering or alloying |
| 2224/82136 involving guiding structures, e.g. spacers or | 2224/82805 involving forming a eutectic alloy at the |
| supporting members | bonding interface |
| 2224/82138 the guiding structures being at least | 2224/8281 involving forming an intermetallic |
| partially left in the finished device | compound at the bonding interface |
| 2224/82143 Passive alignment, i.e. self alignment, e.g. | 2224/82815 Reflow soldering |
| using surface energy, chemical reactions, | 2224/8282 Diffusion bonding |
| thermal equilibrium | 2224/82825 Solid-liquid interdiffusion |
| 2224/82148 involving movement of a part of the bonding | 2224/8283 Solid-solid interdiffusion |
| apparatus | 2224/8284 Sintering |
| 2224/82149 being the lower part of the bonding apparatus, i.e. holding means for the | 2224/8285 using a polymer adhesive, e.g. an adhesive |
| bodies to be connected, e.g. XY table | based on silicone, epoxy, polyimide, |
| 2224/8215 Rotational movements | polyester 2224/82855 Hardening the adhesive by curing, i.e. |
| 2224/8216 Translational movements | thermosetting |
| 2224/82169 being the upper part of the bonding | 2224/82856 Pre-cured adhesive, i.e. B-stage |
| apparatus, e.g. nozzle | adhesive |
| 2224/8217 Rotational movement | 2224/82859 Localised curing of parts of the |
| 2224/8218 Translational movements | connector |
| 2224/82181 connecting first on the semiconductor | 2224/82862 Heat curing |
| or solid-state body, i.e. on-chip, | 2224/82865 Microwave curing |
| 2224/82186 connecting first outside the | 2224/82868 Infrared [IR] curing |
| semiconductor or solid-state body, i.e. off-chip | 2224/82871 Visible light curing |
| 2224/82191 connecting first both on and outside | 2224/82874 Ultraviolet [UV] curing |
| the semiconductor or solid-state body | 2224/82877 Moisture curing, i.e. curing by exposing |
| 2224/822 Applying energy for connecting | to humidity, e.g. for silicones and |
| 2224/82201 Compression bonding | polyurethanes 2224/8288 Hardening the adhesive by cooling, e.g. for |
| 2224/82203 Thermocompression bonding | thermoplastics or hot-melt adhesives |
| 2224/82205 Ultrasonic bonding | 2224/82885 Combinations of two or more |
| 2224/82207 Thermosonic bonding | hardening methods provided for in |
| 2224/8221 with energy being in the form of | at least two different groups from |
| electromagnetic radiation | <u>H01L 2224/82855</u> - <u>H01L 2224/8288</u> , e.g. |
| 2224/82212 Induction heating, i.e. eddy currents | for hybrid thermoplastic-thermosetting |
| 2224/82214 using a laser | adhesives |
| 2224/8223 Polychromatic or infrared lamp heating | 2224/8289 using an inorganic non metallic glass type |
| 2224/82232 using an autocatalytic reaction, e.g. | adhesive, e.g. solder glass |
| exothermic brazing | 2224/82893 Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce |
| 2224/82234 using means for applying energy being | ions migration leading to an irreversible |
| within the device, e.g. integrated heater 2224/82236 using electro-static corona discharge | chemical bond |
| | |

| 2224/82895 Direct bonding, i.e. joining surfaces | 2224/8303 Reshaping the layer connector in the bonding |
|---|---|
| by means of intermolecular attracting | apparatus, e.g. flattening the layer connector |
| interactions at their interfaces, e.g. covalent bonds, van der Waals forces | 2224/83031 by chemical means, e.g. etching, anodisation |
| 2224/82896 between electrically conductive surfaces, | 2224/83035 by heating means |
| e.g. copper-copper direct bonding, surface | 2224/83037 using a polychromatic heating lamp |
| activated bonding | 2224/83039 using a polyeliromatic heating lamp |
| 2224/82897 between electrically insulating surfaces, | 2224/83041 Induction heating, i.e. eddy currents |
| e.g. oxide or nitride layers | 2224/83047 by mechanical means, e.g. severing, |
| 2224/82899 Combinations of bonding methods provided | pressing, stamping |
| for in at least two different groups from H01L 2224/828 - H01L 2224/82897 | 2224/83048 Thermal treatments, e.g. annealing, |
| 2224/829 involving monitoring, e.g. feedback loop | controlled pre-heating or pre-cooling |
| 2224/82909 Post-treatment of the connector or the bonding | 2224/83051 Forming additional members, e.g. dam |
| area | structures |
| 2224/8291 Cleaning, e.g. oxide removal step, | 2224/83052 Detaching layer connectors, e.g. after testing (unsoldering in general B23K 1/018) |
| desmearing | 2224/83053 Bonding environment |
| 2224/8293 Reshaping | 2224/83054 Composition of the atmosphere |
| 2224/82931 by chemical means, e.g. etching, | |
| anodisation | 2224/83055 being oxidating |
| 2224/82935 by heating means | 2224/83065 being reducing |
| 2224/82939 using a laser | 2224/83075 being inert |
| 2224/82945 using a corona discharge, e.g. electronic | 2224/83085 being a liquid, e.g. for fluidic self-assembly |
| flame off [EFO] | 2224/8309 Vacuum |
| 2224/82947 by mechanical means, e.g. severing, | 2224/83091 Under pressure |
| pressing, stamping | 2224/83092 Atmospheric pressure |
| 2224/82948 Thermal treatments, e.g. annealing, | 2224/83093 Transient conditions, e.g. gas-flow |
| controlled pre-heating or pre-cooling | 2224/83095 Temperature settings |
| 2224/82951 Forming additional members | 2224/83096 Transient conditions |
| 2224/82986 Specific sequence of steps, e.g. repetition of | 2224/83097 Heating |
| manufacturing steps, time sequence | 2224/83098 Cooling |
| 2224/83 using a layer connector | 2224/83099 Ambient temperature |
| 2224/83001 involving a temporary auxiliary member not forming part of the bonding apparatus | 2224/831 the layer connector being supplied to the parts to be connected in the bonding apparatus |
| 2224/83002 being a removable or sacrificial coating | 2224/83101 as prepeg comprising a layer connector, e.g. |
| 2224/83005 being a temporary or sacrificial substrate | provided in an insulating plate member |
| 2224/83007 involving a permanent auxiliary member being | 2224/83102 using surface energy, e.g. capillary forces |
| left in the finished device, e.g. aids for holding | 2224/83104 by applying pressure, e.g. by injection |
| or protecting the layer connector during or after | 2224/8311 involving protection against electrical |
| the bonding process | discharge, e.g. removing electrostatic charge |
| 2224/83009 Pre-treatment of the layer connector or the | 2224/8312 Aligning |
| bonding area | 2224/83121 Active alignment, i.e. by apparatus steering, |
| 2224/8301 Cleaning the layer connector, e.g. oxide | e.g. optical alignment using marks or sensors |
| removal step, desmearing | 2224/83122 by detecting inherent features of, or |
| 2224/83011 Chemical cleaning, e.g. etching, flux | outside, the semiconductor or solid-state body |
| 2224/83012 Mechanical cleaning, e.g. abrasion | • |
| using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow | 2224/83123 Shape or position of the body 2224/83125 Bonding areas on the body |
| | 2224/83127 Bonding areas outside the body |
| 2224/83013 Plasma cleaning Thormal cleaning and decomposition | 2224/83129 Shape or position of the other item |
| 2224/83014 Thermal cleaning, e.g. decomposition, sublimation | 2224/8313 using marks formed on the semiconductor |
| 2224/83019 Combinations of two or more | or solid-state body |
| cleaning methods provided for in | 2224/83132 using marks formed outside the |
| at least two different groups from H01L 2224/8301 - H01L 2224/83014 | semiconductor or solid-state body, i.e. "off-chip" |
| 2224/8302 Applying permanent coating to the layer | 2224/83136 involving guiding structures, e.g. spacers or |
| connector in the bonding apparatus, e.g. in- | supporting members |
| situ coating | 2224/83138 the guiding structures being at least |
| 2224/83022 Cleaning the bonding area, e.g. oxide | partially left in the finished device |
| removal step, desmearing | 2224/83139 Guiding structures on the body |
| 2224/83024 Applying flux to the bonding area | 2224/8314 Guiding structures outside the body |
| 2224/83026 Applying a precursor material to the bonding | 2224/83141 Guiding structures both on and outside |
| area | the body |
| | • |

| D 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2224/02265 |
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| 2224/83143 Passive alignment, i.e. self alignment, e.g. | 2224/83365 Shape, e.g. interlocking features |
| using surface energy, chemical reactions, | 2224/83375 having an external coating, e.g. protective |
| thermal equilibrium | bond-through coating |
| 2224/83148 involving movement of a part of the bonding | 2224/83379 Material (material of the layer connector |
| apparatus | prior to the connecting process |
| 2224/83149 being the lower part of the bonding | <u>H01L 2224/29099</u> and <u>H01L 2224/29599</u> , |
| apparatus, i.e. holding means for the | and subgroups) |
| bodies to be connected, e.g. XY table | 2224/8338 Bonding interfaces outside the semiconductor |
| 2224/8315 Rotational movements | or solid-state body |
| 2224/8316 Translational movements | 2224/83385 Shape, e.g. interlocking features |
| 2224/83169 being the upper part of the bonding | 2224/83395 having an external coating, e.g. protective |
| apparatus, i.e. bonding head | bond-through coating |
| 2224/8317 Rotational movements | 2224/83399 Material |
| 2224/8318 Translational movements | 2224/834 with a principal constituent of the material |
| 2224/8319 Arrangement of the layer connectors prior to | being a metal or a metalloid, e.g. boron |
| mounting | [B], silicon [Si], germanium [Ge], arsenic |
| 2224/83191 wherein the layer connectors are disposed | [As], antimony [Sb], tellurium [Te] and |
| only on the semiconductor or solid-state | polonium [Po], and alloys thereof |
| body | 2224/83401 the principal constituent melting at a |
| 2224/83192 wherein the layer connectors are disposed | temperature of less than 400°C |
| only on another item or body to be connected | 2224/83405 Gallium [Ga] as principal constituent |
| to the semiconductor or solid-state body | 2224/83409 Indium [In] as principal constituent |
| · | |
| 2224/83193 wherein the layer connectors are disposed on | 2224/83411 Tin [Sn] as principal constituent |
| both the semiconductor or solid-state body | 2224/83413 Bismuth [Bi] as principal constituent |
| and another item or body to be connected to | 2224/83414 Thallium [Tl] as principal constituent |
| the semiconductor or solid-state body | 2224/83416 Lead [Pb] as principal constituent |
| 2224/83194 Lateral distribution of the layer connectors | 2224/83417 the principal constituent melting at a |
| 2224/832 Applying energy for connecting | temperature of greater than or equal to |
| 2224/83201 Compression bonding | 400°C and less than 950°C |
| 2224/83203 Thermocompression bonding, e.g. | 2224/83418 Zinc [Zn] as principal constituent |
| diffusion bonding, pressure joining, | 2224/8342 Antimony [Sb] as principal |
| thermocompression welding or solid-state | constituent |
| welding | 2224/83423 Magnesium [Mg] as principal |
| 2224/83204 with a graded temperature profile | constituent |
| 2224/83205 Ultrasonic bonding | 2224/83424 Aluminium [Al] as principal |
| 2224/83206 Direction of oscillation | constituent |
| 2224/83207 Thermosonic bonding | 2224/83438 the principal constituent melting at a |
| 2224/83208 applying unidirectional static pressure | temperature of greater than or equal to |
| 2224/83209 applying isostatic pressure, e.g. degassing | 950°C and less than 1550°C |
| using vacuum or a pressurised liquid | 2224/83439 Silver [Ag] as principal constituent |
| 2224/8321 using a reflow oven | 2224/83444 Gold [Au] as principal constituent |
| 2224/83211 with a graded temperature profile | 2224/83447 Copper [Cu] as principal constituent |
| | |
| 2224/8322 with energy being in the form of | 2224/83449 Manganese [Mn] as principal |
| electromagnetic radiation | constituent |
| 2224/83222 Induction heating, i.e. eddy currents | 2224/83455 Nickel [Ni] as principal constituent |
| 2224/83224 using a laser | 2224/83457 Cobalt [Co] as principal constituent |
| 2224/8323 Polychromatic or infrared lamp heating | 2224/8346 Iron [Fe] as principal constituent |
| 2224/83232 using an autocatalytic reaction, e.g. | 2224/83463 the principal constituent melting at a |
| exothermic brazing | temperature of greater than 1550°C |
| 2224/83234 using means for applying energy being | 2224/83464 Palladium [Pd] as principal |
| within the device, e.g. integrated heater | constituent |
| 2224/83236 using electro-static corona discharge | 2224/83466 Titanium [Ti] as principal constituent |
| 2224/83237 using an electron beam (electron beam | 2224/83469 Platinum [Pt] as principal constituent |
| welding in general B23K 15/00) | 2224/8347 Zirconium [Zr] as principal |
| 2224/83238 using electric resistance welding, i.e. ohmic | constituent |
| heating | 2224/83471 Chromium [Cr] as principal |
| 2224/8334 Bonding interfaces of the layer connector | constituent |
| 2224/83345 Shape, e.g. interlocking features | 2224/83472 Vanadium [V] as principal constituent |
| 2224/83355 having an external coating, e.g. protective | 2224/83473 Rhodium [Rh] as principal constituent |
| bond-through coating | 2224/83476 Ruthenium [Ru] as principal |
| 2224/83359 Material | constituent |
| | |
| 2224/8336 Bonding interfaces of the semiconductor or | 2224/83478 Iridium [Ir] as principal constituent |
| solid state body | 2224/83479 Niobium [Nb] as principal constituent |

| 2224/8348 Molybdenum [Mo] as principal constituent 2224/83481 Tantalum [Ta] as principal constituent | 2224/83538 the principal constituent melting at a temperature of greater than or equal to 950°C and less than |
|---|---|
| 2224/83483 Rhenium [Re] as principal constituent 2224/83484 Tungsten [W] as principal constituent | 1550°C 2224/83539 Silver [Ag] as principal |
| 2224/83486 with a principal constituent of the material being a non metallic, non metalloid | constituent 2224/83544 Gold [Au] as principal constituent |
| inorganic material 2224/83487 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics | 2224/83547 Copper [Cu] as principal constituent |
| H01L 2224/83488) 2224/83488 Glasses, e.g. amorphous oxides, nitrides | 2224/83549 Manganese [Mn] as principal constituent |
| or fluorides 2224/8349 with a principal constituent of the material | 2224/83555 Nickel [Ni] as principal constituent |
| being a polymer, e.g. polyester, phenolic based polymer, epoxy | 2224/83557 Cobalt [Co] as principal constituent |
| 2224/83491 The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene | 2224/8356 Iron [Fe] as principal constituent 2224/83563 the principal constituent melting at a temperature of greater than 1550°C |
| 2224/83493 with a principal constituent of the material being a solid not provided for in groups H01L 2224/834 - H01L 2224/83491, e.g. | 2224/83564 Palladium [Pd] as principal constituent |
| allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond | 2224/83566 Titanium [Ti] as principal constituent |
| 2224/83494 with a principal constituent of the material being a liquid not provided for in groups | 2224/83569 Platinum [Pt] as principal constituent |
| H01L 2224/83491 2224/83495 with a principal constituent of the material | 2224/8357 Zirconium [Zr] as principal constituent |
| being a gas not provided for in groups H01L 2224/834 - H01L 2224/83491 | 2224/83571 Chromium [Cr] as principal constituent |
| 2224/83498 with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a | 2224/83572 Vanadium [V] as principal constituent |
| filler, i.e. being a hybrid material, e.g. segmented structures, foams | 2224/83573 Rhodium [Rh] as principal constituent |
| 2224/83499 Material of the matrix 2224/835 with a principal constituent of | 2224/83576 Ruthenium [Ru] as principal constituent |
| the material being a metal or a metalloid, e.g. boron [B], silicon | 2224/83578 Iridium [Ir] as principal constituent |
| [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and | 2224/83579 Niobium [Nb] as principal constituent 2224/8358 |
| polonium [Po], and alloys thereof 2224/83501 the principal constituent melting at | 2224/8358 Molybdenum [Mo] as principal constituent |
| a temperature of less than 400°C 2224/83505 Gallium [Ga] as principal | 2224/83581 Tantalum [Ta] as principal constituent |
| constituent 2224/83509 Indium [In] as principal | 2224/83583 Rhenium [Re] as principal constituent 2224/83584 Tungsten [W] as principal |
| constituent 2224/83511 Tin [Sn] as principal constituent | 2224/83584 Tungsten [W] as principal constituent 2224/83586 with a principal constituent of the |
| 2224/83513 Bismuth [Bi] as principal constituent | material being a non metallic, non metalloid inorganic material |
| 2224/83514 Thallium [Tl] as principal constituent | 2224/83587 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics |
| 2224/83516 Lead [Pb] as principal constituent 2224/83517 the principal constituent melting | H01L 2224/83588) 2224/83588 Glasses, e.g. amorphous oxides, |
| at a temperature of greater than or equal to 400°C and less than 950°C | nitrides or fluorides |
| 2224/83518 Zinc [Zn] as principal constituent | 2224/8359 with a principal constituent of the material being a polymer, e.g. |
| 2224/8352 Antimony [Sb] as principal constituent | polyester, phenolic based polymer, epoxy |
| 2224/83523 Magnesium [Mg] as principal constituent | 2224/83591 The principal constituent being an elastomer, e.g. silicones, isoprene, |
| 2224/83524 Aluminium [Al] as principal | neoprene |

constituent

| 2224/83593 with a principal constituent of the material being a solid | 2224/8366 Iron [Fe] as principal constituent |
|--|--|
| not provided for in groups H01L 2224/835 - H01L 2224/83591, e.g. allotropes of carbon, fullerene, | 2224/83663 the principal constituent melting at a temperature of greater than 1550°C |
| graphite, carbon-nanotubes, diamond 2224/83594 with a principal constituent | 2224/83664 Palladium [Pd] as principal constituent |
| of the material being a liquid not provided for in groups | 2224/83666 Titanium [Ti] as principal constituent |
| <u>H01L 2224/835</u> - <u>H01L 2224/83591</u> 2224/83595 with a principal constituent | 2224/83669 Platinum [Pt] as principal |
| of the material being a gas not provided for in groups | constituent 2224/8367 Zirconium [Zr] as principal |
| <u>H01L 2224/835</u> - <u>H01L 2224/83591</u> 2224/83598 Fillers | constituent 2224/83671 Chromium [Cr] as principal |
| 2224/83599 Base material | constituent |
| 2224/836 with a principal constituent of | 2224/83672 Vanadium [V] as principal |
| the material being a metal or a metalloid, e.g. boron [B], silicon | constituent 2224/83673 Rhodium [Rh] as principal constituent |
| [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and | 2224/83676 Ruthenium [Ru] as principal constituent |
| polonium [Po], and alloys thereof 2224/83601 the principal constituent melting | 2224/83678 Iridium [Ir] as principal |
| at a temperature of less than 400°C | constituent 2224/83679 Niobium [Nb] as principal |
| 2224/83605 Gallium [Ga] as principal constituent | constituent 2224/8368 Molybdenum [Mo] as principal |
| 2224/83609 Indium [In] as principal constituent | constituent 2224/83681 Tantalum [Ta] as principal |
| 2224/83611 Tin [Sn] as principal constituent | constituent 2224/83683 Rhenium [Re] as principal |
| 2224/83613 Bismuth [Bi] as principal constituent | constituent 2224/83684 Tungsten [W] as principal |
| 2224/83614 Thallium [Tl] as principal constituent | constituent 2224/83686 with a principal constituent of the |
| 2224/83616 Lead [Pb] as principal constituent | material being a non metallic, non metalloid inorganic material |
| 2224/83617 the principal constituent melting at a temperature of greater than | 2224/83687 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass |
| or equal to 400°C and less than 950°C | ceramics <u>H01L 2224/83688</u>) 2224/83688 Glasses, e.g. amorphous oxides, |
| 2224/83618 Zinc [Zn] as principal | nitrides or fluorides |
| constituent | 2224/8369 with a principal constituent of the material being a polymer, e.g. |
| 2224/8362 Antimony [Sb] as principal constituent | polyester, phenolic based polymer, epoxy |
| 2224/83623 Magnesium [Mg] as principal constituent | 2224/83691 The principal constituent being an elastomer, e.g. silicones, |
| 2224/83624 Aluminium [Al] as principal constituent | isoprene, neoprene 2224/83693 with a principal constituent |
| 2224/83638 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C | of the material being a solid not provided for in groups H01L 2224/836 - H01L 2224/83691, e.g. allotropes of carbon, fullerene, |
| 2224/83639 Silver [Ag] as principal constituent | graphite, carbon-nanotubes, diamond |
| 2224/83644 Gold [Au] as principal constituent | 2224/83694 with a principal constituent of the material being a liquid |
| 2224/83647 Copper [Cu] as principal constituent | not provided for in groups H01L 2224/836 - H01L 2224/83691 |
| 2224/83649 Manganese [Mn] as principal constituent | 2224/83695 with a principal constituent of the material being a gas |
| 2224/83655 Nickel [Ni] as principal constituent | not provided for in groups H01L 2224/836 - H01L 2224/83691 |
| 2224/83657 Cobalt [Co] as principal constituent | 11012 222 11030 |
| | |

| 2224/83698 with a principal constituent of the | 2224/83769 Platinum [Pt] as principal |
|---|---|
| material being a combination of two or more materials in the form | constituent 2224/8377 Zirconium [Zr] as principal |
| of a matrix with a filler, i.e. being a hybrid material, e.g. segmented | constituent 2224/83771 Chromium [Cr] as principal |
| structures, foams | constituent |
| 2224/83699 Coating material 2224/837 with a principal constituent of | 2224/83772 Vanadium [V] as principal constituent |
| the material being a metal or a metalloid, e.g. boron [B], silicon | 2224/83773 Rhodium [Rh] as principal constituent |
| [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and | 2224/83776 Ruthenium [Ru] as principal |
| polonium [Po], and alloys thereof | constituent 2224/83778 Iridium [Ir] as principal |
| 2224/83701 the principal constituent melting at a temperature of less than | constituent |
| 400°C | 2224/83779 Niobium [Nb] as principal constituent |
| 2224/83705 Gallium [Ga] as principal constituent | 2224/8378 Molybdenum [Mo] as principal constituent |
| 2224/83709 Indium [In] as principal constituent | 2224/83781 Tantalum [Ta] as principal constituent |
| 2224/83711 Tin [Sn] as principal constituent | 2224/83783 Rhenium [Re] as principal |
| 2224/83713 Bismuth [Bi] as principal | constituent 2224/83784 Tungsten [W] as principal |
| constituent [2224/83714] Thallium [Tl] as principal | constituent 2224/83786 with a principal constituent of the |
| constituent 2224/83716 Lead [Pb] as principal | material being a non metallic, non |
| constituent | metalloid inorganic material 2224/83787 Ceramics, e.g. crystalline |
| 2224/83717 the principal constituent melting at a temperature of greater than | carbides, nitrides or oxides (glass ceramics H01L 2224/83788) |
| or equal to 400°C and less than 950°C | 2224/83788 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/83718 Zinc [Zn] as principal constituent | 2224/8379 with a principal constituent of |
| 2224/8372 Antimony [Sb] as principal constituent | the material being a polymer, e.g. polyester, phenolic based polymer, |
| 2224/83723 Magnesium [Mg] as principal | epoxy 2224/83791 The principal constituent being |
| constituent [2224/83724] Aluminium [Al] as principal | an elastomer, e.g. silicones, isoprene, neoprene |
| constituent | 2224/83793 with a principal constituent |
| 2224/83738 the principal constituent melting at a temperature of greater than | of the material being a solid not provided for in groups |
| or equal to 950°C and less than 1550°C | H01L 2224/837 - H01L 2224/83791, e.g. allotropes of carbon, fullerene, |
| 2224/83739 Silver [Ag] as principal constituent | graphite, carbon-nanotubes, |
| 2224/83744 Gold [Au] as principal | diamond 2224/83794 with a principal constituent |
| constituent 2224/83747 Copper [Cu] as principal | of the material being a liquid not provided for in groups |
| constituent | <u>H01L 2224/837</u> - <u>H01L 2224/83791</u> |
| 2224/83749 Manganese [Mn] as principal constituent | 2224/83795 with a principal constituent of the material being a gas |
| 2224/83755 Nickel [Ni] as principal constituent | not provided for in groups <u>H01L 2224/837 - H01L 2224/83791</u> |
| 2224/83757 Cobalt [Co] as principal constituent | 2224/83798 with a principal constituent of the material being a combination of |
| 2224/8376 Iron [Fe] as principal | two or more materials in the form |
| constituent [2224/83763] the principal constituent melting | of a matrix with a filler, i.e. being a hybrid material, e.g. segmented |
| at a temperature of greater than 1550°C | structures, foams 2224/83799 Shape or distribution of the fillers |
| 2224/83764 Palladium [Pd] as principal | 2224/838 Bonding techniques |
| constituent [2224/83766] Titanium [Ti] as principal | 2224/83801 Soldering or alloying 2224/83805 involving forming a eutectic alloy at the |
| constituent | bonding interface |

| 2224/8381 involving forming an intermetallic | 2224/83899 using resilient parts in the layer |
|--|---|
| compound at the bonding interface | connector or in the bonding area |
| 2224/83815 Reflow soldering | 2224/839 with the layer connector not providing any |
| 2224/8382 Diffusion bonding | mechanical bonding |
| 2224/83825 Solid-liquid interdiffusion | 2224/83901 Pressing the layer connector against the |
| 2224/8383 Solid-solid interdiffusion | bonding areas by means of another connector |
| 2224/8384 Sintering | 2224/83902 by means of another layer connector |
| 2224/8385 using a polymer adhesive, e.g. an adhesive | 2224/83903 by means of a bump connector |
| based on silicone, epoxy, polyimide, | 2224/83904 by means of an encapsulation layer or foil |
| polyester | 2224/83905 Combinations of bonding methods provided |
| 2224/83851 being an anisotropic conductive adhesive | for in at least two different groups from |
| 2224/83855 Hardening the adhesive by curing, i.e. | <u>H01L 2224/838</u> - <u>H01L 2224/83904</u> |
| thermosetting | 2224/83906 Specific sequence of method steps |
| 2224/83856 Pre-cured adhesive, i.e. B-stage | 2224/83907 Intermediate bonding, i.e. intermediate |
| adhesive | bonding step for temporarily bonding the |
| 2224/83859 Localised curing of parts of the layer | semiconductor or solid-state body, followed |
| connector | by at least a further bonding step |
| 2224/83862 Heat curing | 2224/83908 involving monitoring, e.g. feedback loop |
| 2224/83865 Microwave curing | 2224/83909 Post-treatment of the layer connector or |
| 2224/83868 Infrared [IR] curing | bonding area |
| 2224/83871 Visible light curing | 2224/8391 Cleaning, e.g. oxide removal step, |
| 2224/83874 Ultraviolet [UV] curing | desmearing |
| 2224/83877 Moisture curing, i.e. curing by exposing | 2224/83911 Chemical cleaning, e.g. etching, flux |
| to humidity, e.g. for silicones and | 2224/83912 Mechanical cleaning, e.g. abrasion |
| polyurethanes | using hydro blasting, brushes, ultrasonic |
| 2224/8388 Hardening the adhesive by cooling, e.g. for | cleaning, dry ice blasting, gas-flow |
| thermoplastics or hot-melt adhesives | 2224/83913 Plasma cleaning |
| 2224/83885 Combinations of two or more | 2224/83914 Thermal cleaning, e.g. using laser ablation |
| hardening methods provided for in | or by electrostatic corona discharge |
| at least two different groups from | 2224/83919 Combinations of two or more |
| H01L 2224/83855 - H01L 2224/8388, e.g. | cleaning methods provided for in |
| for hybrid thermoplastic-thermosetting | at least two different groups from |
| adhesives | H01L 2224/8391 - H01L 2224/83914 |
| 2224/83886 Involving a self-assembly process, e.g. self- | 2224/8392 Applying permanent coating, e.g. protective |
| agglomeration of a material dispersed in a | coating |
| fluid | 2224/8393 Reshaping |
| 2224/83887 Auxiliary means therefor, e.g. for self- | 2224/83931 by chemical means, e.g. etching |
| assembly activation | 2224/83935 by heating means, e.g. reflowing |
| 2224/83888 with special adaptation of the surface of | 2224/83937 using a polychromatic heating lamp |
| the body to be connected, e.g. surface | 2224/83939 using a laser |
| shape specially adapted for the self- | 2224/83941 Induction heating, i.e. eddy currents |
| assembly process | 2224/83943 using a flame torch, e.g. hydrogen torch |
| 2224/83889 involving the material of the bonding area, | 2224/83945 using a traine tolch, e.g. hydrogen tolch |
| e.g. bonding pad | flame off [EFO] |
| 2224/8389 using an inorganic non metallic glass type | 2224/83947 by mechanical means, e.g. "pull-and-cut", |
| adhesive, e.g. solder glass | pressing, stamping |
| 2224/83893 Anodic bonding, i.e. bonding by applying a | 2224/83948 Thermal treatments, e.g. annealing, |
| voltage across the interface in order to induce | controlled cooling |
| ions migration leading to an irreversible | |
| chemical bond | 2224/83951 Forming additional members, e.g. for reinforcing, fillet sealant |
| 2224/83894 Direct bonding, i.e. joining surfaces | 2224/83986 Specific sequence of steps, e.g. repetition of |
| by means of intermolecular attracting | manufacturing steps, time sequence |
| interactions at their interfaces, e.g. covalent | 2224/84 using a strap connector |
| bonds, van der Waals forces | |
| 2224/83895 between electrically conductive surfaces, | 2224/84001 involving a temporary auxiliary member not |
| e.g. copper-copper direct bonding, surface | forming part of the bonding apparatus |
| activated bonding | 2224/84002 being a removable or sacrificial coating |
| 2224/83896 between electrically insulating surfaces, | 2224/84005 being a temporary substrate |
| e.g. oxide or nitride layers | 2224/84007 involving a permanent auxiliary member being |
| 2224/83897 Mechanical interlocking, e.g. anchoring, | left in the finished device, e.g. aids for holding |
| hook and loop-type fastening or the like | or protecting the strap connector during or after |
| 2224/83898 Press-fitting, i.e. pushing the parts | the bonding process Programment of the connector and/or the |
| together and fastening by friction, e.g. by | 2224/84009 Pre-treatment of the connector and/or the |
| compression of one part against the other | bonding area |
| | |

| 2224/8401 Cleaning, e.g. oxide removal step, | 2224/84132 using marks formed outside the |
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| desmearing | semiconductor or solid-state body, i.e. |
| 2224/84011 Chemical cleaning, e.g. etching, flux | "off-chip" |
| 2224/84012 Mechanical cleaning, e.g. abrasion | 2224/84136 involving guiding structures, e.g. spacers or |
| using hydro blasting, brushes, ultrasonic | supporting members |
| cleaning, dry ice blasting, gas-flow | 2224/84138 the guiding structures being at least |
| 2224/84013 Plasma cleaning | partially left in the finished device |
| 2224/84014 Thermal cleaning, e.g. decomposition, | 2224/84143 Passive alignment, i.e. self alignment, e.g. |
| sublimation | using surface energy, chemical reactions, |
| 2224/84019 Combinations of two or more | thermal equilibrium |
| cleaning methods provided for in | 2224/84148 involving movement of a part of the bonding |
| at least two different groups from | apparatus |
| H01L 2224/8401 - H01L 2224/84014 | 2224/84149 being the lower part of the bonding |
| 2224/8402 Applying permanent coating, e.g. in-situ | apparatus, i.e. holding means for the |
| coating | bodies to be connected, e.g. XY table |
| 2224/8403 Reshaping | 2224/8415 Rotational movements |
| 2224/84031 by chemical means, e.g. etching, | 2224/8416 Translational movements |
| anodisation | 2224/84169 being the upper part of the bonding |
| 2224/84035 by heating means, e.g. "free-air-ball" | apparatus, i.e. bonding head, |
| | 2224/8417 Rotational movements |
| 2224/84037 using a polychromatic heating lamp | 2224/8418 Translational movements |
| 2224/84039 using a laser | |
| 2224/84041 Induction heating, i.e. eddy currents | 2224/84181 connecting first on the semiconductor |
| 2224/84043 using a flame torch, e.g. hydrogen torch | or solid-state body, i.e. on-chip, |
| 2224/84045 using a corona discharge, e.g. electronic | regular stitch |
| flame off [EFO] | 2224/84186 connecting first outside the |
| 2224/84047 by mechanical means, e.g. severing, | semiconductor or solid-state body, i.e. |
| pressing, stamping | off-chip, reverse stitch |
| 2224/84048 Thermal treatments, e.g. annealing, | 2224/84191 connecting first both on and outside |
| controlled pre-heating or pre-cooling | the semiconductor or solid-state body, |
| 2224/84051 Forming additional members | i.e. regular and reverse stitches |
| 2224/84053 Bonding environment | 2224/84196 involving intermediate connecting |
| 2224/84054 Composition of the atmosphere | steps before cutting the strap |
| 2224/84055 being oxidating | connector |
| 2224/84065 being reducing | 2224/842 Applying energy for connecting |
| 2224/84075 being inert | 2224/84201 Compression bonding |
| 2224/84085 being a liquid (e.g. for fluidic self-assembly) | 2224/84203 Thermocompression bonding |
| 2224/8409 Vacuum | 2224/84205 Ultrasonic bonding |
| 2224/84091 Under pressure | 2224/84206 Direction of oscillation |
| - | 2224/84207 Thermosonic bonding |
| 2224/84092 Atmospheric pressure | 2224/8421 with energy being in the form of |
| 2224/84093 Transient conditions, e.g. gas-flow | electromagnetic radiation |
| 2224/84095 Temperature settings | 2224/84212 Induction heating, i.e. eddy currents |
| 2224/84096 Transient conditions | 2224/84214 using a laser |
| 2224/84097 Heating | 2224/8423 Polychromatic or infrared lamp heating |
| 2224/84098 Cooling | 2224/84232 • • • using an autocatalytic reaction, e.g. |
| 2224/84099 Ambient temperature | exothermic brazing |
| 2224/841 the connector being supplied to the parts to be | 2224/84234 using means for applying energy being |
| connected in the bonding apparatus | within the device, e.g. integrated heater |
| 2224/8411 involving protection against electrical | 2224/84236 using electro-static corona discharge |
| discharge, e.g. removing electrostatic charge | 2224/84237 using an electron beam (electron beam |
| 2224/8412 Aligning | welding in general B23K 15/00) |
| 2224/84121 Active alignment, i.e. by apparatus steering, | 2224/84238 using electric resistance welding, i.e. ohmic |
| e.g. optical alignment using marks or sensors | heating |
| 2224/84122 by detecting inherent features of, or | |
| outside, the semiconductor or solid-state | 2224/8434 Bonding interfaces of the connector |
| body | 2224/84345 Shape, e.g. interlocking features |
| 2224/84123 Shape or position of the body | 2224/84355 having an external coating, e.g. protective |
| 2224/84125 Bonding areas on the body | bond-through coating |
| 2224/84127 Bonding areas outside the body | 2224/84359 Material |
| 2224/84129 Shape or position of the other item | 2224/8436 Bonding interfaces of the semiconductor or |
| 2224/8413 using marks formed on the semiconductor | solid state body |
| or solid-state body | 2224/84365 Shape, e.g. interlocking features |
| or some suite oody | 2224/84375 having an external coating, e.g. protective |
| | bond-through coating |
| | |

| 2224/84379 Material | 2224/84486 with a principal constituent of the material |
|---|--|
| 2224/8438 Bonding interfaces outside the semiconductor or solid-state body | being a non metallic, non metalloid inorganic material |
| 2224/84385 Shape, e.g. interlocking features | 2224/84487 Ceramics, e.g. crystalline carbides, |
| 2224/84395 having an external coating, e.g. protective bond-through coating | nitrides or oxides (glass ceramics H01L 2224/84488) |
| 2224/84399 Material | 2224/84488 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| 2224/844 with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and | 2224/8449 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy 2224/84491 The principal constituent being an |
| polonium [Po], and alloys thereof 2224/84401 the principal constituent melting at a temperature of less than 400°C | elastomer, e.g. silicones, isoprene, neoprene |
| 2224/84405 Gallium [Ga] as principal constituent | 2224/84493 with a principal constituent of the material |
| 2224/84409 Indium [In] as principal constituent | being a solid not provided for in groups |
| 2224/84411 Tin [Sn] as principal constituent | <u>H01L 2224/844</u> - <u>H01L 2224/84491</u> , e.g. |
| 2224/84413 Bismuth [Bi] as principal constituent | allotropes of carbon, fullerene, graphite, |
| 2224/84414 Thallium [TI] as principal constituent | carbon-nanotubes, diamond |
| 2224/84416 Lead [Pb] as principal constituent | 2224/84494 with a principal constituent of the material |
| 2224/84417 the principal constituent melting at a | being a liquid not provided for in groups |
| temperature of greater than or equal to | H01L 2224/844 - H01L 2224/84491 2224/84495 with a principal constituent of the material |
| 400°C and less than 950°C | 2224/84495 with a principal constituent of the material being a gas not provided for in groups |
| 2224/84418 Zinc [Zn] as principal constituent | H01L 2224/844 - H01L 2224/84491 |
| 2224/8442 Antimony [Sb] as principal constituent | 2224/84498 with a principal constituent of the material |
| 2224/84423 Magnesium [Mg] as principal | being a combination of two or more |
| constituent | materials in the form of a matrix with a |
| 2224/84424 Aluminium [Al] as principal | filler, i.e. being a hybrid material, e.g. segmented structures, foams |
| constituent | |
| 2224/84438 the principal constituent melting at a | |
| temperature of greater than or equal to | 2224/845 with a principal constituent of the material being a metal or a |
| 950°C and less than 1550°C | metalloid, e.g. boron [B], silicon |
| 2224/84439 Silver [Ag] as principal constituent | [Si], germanium [Ge], arsenic [As], |
| 2224/84444 Gold [Au] as principal constituent | antimony [Sb], tellurium [Te] and |
| 2224/84447 Copper [Cu] as principal constituent | polonium [Po], and alloys thereof |
| 2224/84449 Manganese [Mn] as principal | 2224/84501 the principal constituent melting at |
| constituent | a temperature of less than 400°C |
| 2224/84455 Nickel [Ni] as principal constituent | 2224/84505 Gallium [Ga] as principal |
| 2224/84457 Cobalt [Co] as principal constituent | constituent |
| 2224/8446 Iron [Fe] as principal constituent | 2224/84509 Indium [In] as principal |
| 2224/84463 the principal constituent melting at a | constituent 2224/84511 Tin [Sn] as principal constituent |
| temperature of greater than 1550°C 2224/84464 Palladium [Pd] as principal | 2224/84513 Bismuth [Bi] as principal |
| constituent | constituent |
| 2224/84466 Titanium [Ti] as principal constituent | 2224/84514 Thallium [T1] as principal |
| 2224/84469 Platinum [Pt] as principal constituent | constituent |
| 2224/8447 Zirconium [Zr] as principal | 2224/84516 Lead [Pb] as principal constituent |
| constituent 2224/84471 Chromium [Cr] as principal constituent | 2224/84517 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C |
| 2224/84472 Vanadium [V] as principal constituent | 2224/84518 Zinc [Zn] as principal constituent |
| 2224/84473 Rhodium [Rh] as principal constituent | 2224/8452 Antimony [Sb] as principal |
| 2224/84476 Ruthenium [Ru] as principal | constituent |
| constituent | 2224/84523 Magnesium [Mg] as principal |
| 2224/84478 Iridium [Ir] as principal constituent | constituent |
| 2224/84479 Niobium [Nb] as principal constituent | 2224/84524 Aluminium [Al] as principal |
| 2224/8448 Molybdenum [Mo] as principal | constituent 2224/84538 the principal constituent melting |
| constituent Tentalum [Tollog principal constituent | at a temperature of greater than |
| 2224/84481 Tantalum [Ta] as principal constituent | or equal to 950°C and less than |
| 2224/84483 Rhenium [Re] as principal constituent | 1550°C |
| 2224/84484 Tungsten [W] as principal constituent | 2224/84539 Silver [Ag] as principal |
| | constituent |

| 2224/84547 Copper [Cu] as principal constituent Cons |
|--|
| 2224/84555 Nickel [Ni] as principal constituent Cobalt [Co] as principal constituent Cob |
| Constituent Cobalt [Co] as principal Cobal |
| 2224/8456 |
| the principal constituent melting at a temperature of greater than 1550°C 2224/84564 Palladium [Pd] as principal constituent melting at a temperature of greater than 1550°C 2224/84566 Palladium [Ti] as principal constituent 2224/84569 Platinum [Ti] as principal constituent 2224/8457 Zirconium [Zr] as principal constituent 2224/8457 Zirconium [Cr] as principal constituent 2224/84571 Chromium [Cr] as principal constituent 2224/84572 Vanadium [V] as principal constituent 2224/84573 Rhodium [Rh] as principal constituent 2224/84574 Ruthenium [Ru] as principal constituent 2224/84575 Ruthenium [Ru] as principal constituent 2224/84576 Ruthenium [Ru] as principal constituent 2224/84577 Ruthenium [Ru] as principal constituent 2224/84578 Iridium [Ir] as principal constituent 2224/84579 Niobium [Nb] as principal constituent 2224/8458 Molybdenum [Mo] as principal constituent 2224/8458 Molybdenum [Mo] as principal constituent 2224/8458 Zinc [Zn] as principal constituent 2224/8458 Jincipal constituent 2 |
| constituent 2224/84566 . Titanium [Ti] as principal constituent 2224/84569 . Platinum [Pt] as principal constituent 2224/8457 . Zirconium [Zr] as principal constituent 2224/8457 . Zirconium [Cr] as principal constituent 2224/8457 . Chromium [Cr] as principal constituent 2224/8457 . Chromium [Cr] as principal constituent 2224/8457 . Chromium [Cr] as principal constituent 2224/8457 . Vanadium [V] as principal constituent 2224/8457 . Vanadium [V] as principal constituent 2224/8457 . Rhodium [Rh] as principal constituent 2224/8457 . Rhodium [Rh] as principal constituent 2224/8457 . Ruthenium [Ru] as principal constituent 2224/8457 . Lead [Pb] as principal constituent 2224/8458 . Molybdenum [Mo] as principal 2224/84618 . Zinc [Zn] as principal 2224/8458 . Zinc [Zn] as principal 2224/8458 . Zinc [Zn] as principal 2224/84618 . Zinc [Zn] as principal |
| constituent 2224/84569 Platinum [Pt] as principal constituent 2224/8457 Zirconium [Zr] as principal constituent 2224/8457 Zirconium [Zr] as principal constituent 2224/84571 Chromium [Cr] as principal constituent 2224/84572 Vanadium [V] as principal constituent 2224/84573 Rhodium [Rh] as principal constituent 2224/84574 Ruthenium [Ru] as principal constituent 2224/84575 Ruthenium [Ru] as principal constituent 2224/84576 Ruthenium [Ru] as principal constituent 2224/84578 Iridium [Ir] as principal constituent 2224/84579 Niobium [Nb] as principal constituent 2224/84579 Niobium [Nb] as principal constituent 2224/8458 Molybdenum [Mo] as principal constituent 2224/8458 Molybdenum [Mo] as principal constituent 2224/8458 Ziric [Zn] as principal constituent |
| 2224/8457 Plathum [Ft] as principal constituent 2224/84605 Gallium [Ga] as principal constituent 2224/8457 |
| 2224/84571 . Chromium [Cr] as principal constituent |
| 2224/84572 |
| 2224/84572 . Vanadium [V] as principal constituent 2224/84573 . Rhodium [Rh] as principal constituent 2224/84576 . Ruthenium [Ru] as principal constituent 2224/84578 . Iridium [Ir] as principal constituent 2224/84579 . Niobium [Nb] as principal constituent 2224/8458 . Molybdenum [Mo] as principal constituent 2224/8458 . Molybdenum [Mo] as principal constituent 2224/8458 . Molybdenum [Mo] as principal constituent 2224/84618 . Zinc [Zn] as principal constituent 2224/84618 . Zinc [Zn] as principal constituent |
| 2224/84573 . Rhodium [Rh] as principal constituent 2224/84576 . Ruthenium [Ru] as principal constituent 2224/84578 . Iridium [Ir] as principal constituent 2224/84579 . Niobium [Nb] as principal constituent 2224/8458 . Molybdenum [Mo] as principal constituent 2224/8458 . Molybdenum [Mo] as principal constituent 2224/84618 . Zinc [Zn] as principal constituent 2224/84618 . Zinc [Zn] as principal constituent |
| 2224/84576 . Ruthenium [Ru] as principal constituent 2224/84578 . Iridium [Ir] as principal constituent 2224/84579 . Iridium [Nb] as principal constituent 2224/8458 . Niobium [Nb] as principal constituent 2224/8458 . Molybdenum [Mo] as principal constituent 2224/8458 . Zinc [Zn] as principal constituent |
| 2224/84578 |
| 2224/84579 Niobium [Nb] as principal constituent 2224/8458 Molybdenum [Mo] as principal constituent 2224/8458 Molybdenum [Mo] as principal constituent 2224/8458 |
| 2224/8458 Molybdenum [Mo] as principal constituent 950°C 2224/84618 Zinc [Zn] as principal constituent |
| constituent |
| 2224/84581 Tantalum [Ta] as principal constituent 2224/8462 Antimony [Sb] as principal |
| constituent 2224/84583 Rhenium [Re] as principal constituent 2224/84623 |
| 2224/84584 Tungsten [W] as principal constituent |
| constituent 2224/84624 Aluminium [Al] as principal constituent 2224/84586 with a principal constituent of the |
| material being a non metallic, non metallic, non metalloid inorganic material 2224/84638 the principal constituent meltin at a temperature of greater than or equal to 950°C and less than 1550°C. |
| nitrides or oxides (glass ceramics |
| 2224/84588 Glasses, e.g. amorphous oxides, |
| 2224/8459 with a principal constituent of constituent |
| the material being a polymer, e.g. polyester, phenolic based polymer, |
| epoxy 2224/84649 Manganese [Mn] as principal constituent being an |
| elastomer, e.g. silicones, isoprene, neoprene 2224/84655 Nickel [Ni] as principal constituent |
| 2224/84593 with a principal constituent of the material being a solid 2224/84657 Cobalt [Co] as principal constituent |
| not provided for in groups H01L 2224/845 - H01L 2224/84591, 2224/8466 Iron [Fe] as principal constituent |
| e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond 2224/84663 the principal constituent meltin at a temperature of greater than 1550°C |

| 2224/84664 Pa | alladium [Pd] as principal onstituent | 2224/847 | • • • | | with a principal constituent of the material being a metal or a |
|----------------------|--|--------------|-------|---------|---|
| 2224/84666 Tit | tanium [Ti] as principal | | | | metalloid, e.g. boron [B], silicon |
| 2224/84669 Pla | onstituent atinum [Pt] as principal | | | | [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and |
| 2224/8467 Zii | onstituent | 2224/84701 | | | polonium [Po], and alloys thereofthe principal constituent melting |
| co | onstituent | | | | at a temperature of less than 400°C |
| | nromium [Cr] as principal onstituent | 2224/84705 . | | | Gallium [Ga] as principal |
| | anadium [V] as principal | 2224/84709 . | | | constituent Indium [In] as principal |
| 2224/84673 Rh | nodium [Rh] as principal | 2224/84711 . | | | constituent . Tin [Sn] as principal |
| 2224/84676 Ru | uthenium [Ru] as principal | | | | constituent |
| | onstituent dium [Ir] as principal | 2224/84713 . | • • • | | Bismuth [Bi] as principal constituent |
| CO | nstituent | 2224/84714 . | | | Thallium [Tl] as principal constituent |
| | iobium [Nb] as principal onstituent | 2224/84716 . | | | Lead [Pb] as principal |
| 2224/8468 Mo | olybdenum [Mo] as principal | 2224/84717 | | | constituent the principal constituent melting |
| | antalum [Ta] as principal | 222 1/01/17 | | | at a temperature of greater than |
| | onstituent henium [Re] as principal | | | | or equal to 400°C and less than 950°C |
| CO | nstituent | 2224/84718 . | | | Zinc [Zn] as principal constituent |
| | ungsten [W] as principal | 2224/8472 | | | |
| 2224/84686 with a p | | 2224/84723 . | | | constituent Magnesium [Mg] as principal |
| | al being a non metallic, non bid inorganic material | | | | constituent |
| 2224/84687 Cera | imics, e.g. crystalline ides, nitrides or oxides (glass | 2224/84724 . | • • • | • • • • | Aluminium [Al] as principal constituent |
| cerar | mics <u>H01L 2224/84688</u>) | 2224/84738 . | | | |
| | ses, e.g. amorphous oxides, des or fluorides | | | | at a temperature of greater than or equal to 950°C and less than |
| 2224/8469 with a p | principal constituent of terial being a polymer, e.g. | 2224/84739 . | | | 1550°C . Silver [Ag] as principal |
| polyest | ter, phenolic based polymer, | 2224/84744 | | | constituent . Gold [Au] as principal |
| epoxy 2224/84691 The | principal constituent being | 2224/04/44 • | • • • | | constituent |
| an el | lastomer, e.g. silicones, rene, neoprene | 2224/84747 . | • • • | | Copper [Cu] as principal constituent |
| 2224/84693 with a p | principal constituent material being a solid | 2224/84749 . | | | Manganese [Mn] as principal constituent |
| not pro | ovided for in groups | 2224/84755 . | | | Nickel [Ni] as principal |
| | 2224/846 - H01L 2224/84691, otropes of carbon, fullerene, | 2224/84757 . | | | constituent Cobalt [Co] as principal |
| graphit diamon | te, carbon-nanotubes, | 2224/9476 | | | constituent |
| | principal constituent | 2224/8476 . | • • • | • • • • | Iron [Fe] as principal constituent |
| | material being a liquid ovided for in groups | 2224/84763 . | | | • the principal constituent melting at a temperature of greater than |
| <u>H01L 2</u> | 2224/846 - <u>H01L 2224/84691</u> | | | | 1550°C |
| | principal constituent material being a gas | 2224/84764 . | • • • | | Palladium [Pd] as principal constituent |
| | ovided for in groups 2224/846 - H01L 2224/84691 | 2224/84766 . | | | Titanium [Ti] as principal constituent |
| 2224/84698 with a p | principal constituent of the al being a combination of | 2224/84769 . | | | Platinum [Pt] as principal |
| two or | more materials in the form | 2224/8477 | | | constituent Zirconium [Zr] as principal |
| | atrix with a filler, i.e. being d material, e.g. segmented | 2224/84771 . | | | constituent |
| structur | res, foams | 2227/04//1 | • • • | | constituent |
| 2224/84699 Coating n | паспа | | | | |

| 2224/84772 Vanadium [V] as principal | 2224/8483 Solid-solid interdiffusion |
|--|--|
| constituent | 2224/8484 Sintering |
| 2224/84773 Rhodium [Rh] as principal constituent | 2224/8485 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, |
| 2224/84776 Ruthenium [Ru] as principal | polyester |
| constituent 2224/84778 Iridium [Ir] as principal | 2224/84855 Hardening the adhesive by curing, i.e. thermosetting |
| constituent constituent 2224/84779 Niobium [Nb] as principal | 2224/84856 Pre-cured adhesive, i.e. B-stage adhesive |
| constituent | 2224/84859 Localised curing of parts of the |
| 2224/8478 Molybdenum [Mo] as principal constituent | connector |
| 2224/84781 Tantalum [Ta] as principal | 2224/84862 Heat curing |
| constituent | 2224/84865 Microwave curing 2224/84868 Infrared [IR] curing |
| 2224/84783 Rhenium [Re] as principal | 2224/84871 Visible light curing |
| constituent | 2224/84874 Ultraviolet [UV] curing |
| 2224/84784 Tungsten [W] as principal constituent | 2224/84877 Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and |
| 2224/84786 with a principal constituent of the | polyurethanes |
| material being a non metallic, non | 2224/8488 Hardening the adhesive by cooling, e.g. for |
| metalloid inorganic material | thermoplastics or hot-melt adhesives |
| 2224/84787 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass | 2224/84885 Combinations of two or more hardening methods provided for in |
| ceramics <u>H01L 2224/84788</u>) | at least two different groups from |
| 2224/84788 Glasses, e.g. amorphous oxides, nitrides or fluorides | H01L 2224/84855 - H01L 2224/8488, e.g. for hybrid thermoplastic-thermosetting |
| 2224/8479 with a principal constituent of | adhesives |
| the material being a polymer, e.g. polyester, phenolic based polymer, | 2224/8489 using an inorganic non metallic glass type adhesive, e.g. solder glass |
| epoxy | 2224/84893 Anodic bonding, i.e. bonding by applying a |
| 2224/84791 The principal constituent being an elastomer, e.g. silicones, | voltage across the interface in order to induce ions migration leading to an irreversible |
| isoprene, neoprene | chemical bond |
| 2224/84793 with a principal constituent of the material being a solid | 2224/84895 Direct bonding, i.e. joining surfaces |
| not provided for in groups | by means of intermolecular attracting interactions at their interfaces, e.g. covalent |
| H01L 2224/847 - H01L 2224/84791, | bonds, van der Waals forces |
| e.g. allotropes of carbon, fullerene, | 2224/84897 between electrically conductive surfaces, |
| graphite, carbon-nanotubes, diamond | e.g. copper-copper direct bonding, surface activated bonding |
| 2224/84794 with a principal constituent | 2224/84898 between electrically insulating surfaces, |
| of the material being a liquid | e.g. oxide or nitride layersg |
| not provided for in groups H01L 2224/847 - H01L 2224/84791 | 2224/84899 Combinations of bonding methods provided |
| 2224/84795 with a principal constituent | for in at least two different groups from |
| of the material being a gas | <u>H01L 2224/848</u> - <u>H01L 2224/84898</u> |
| not provided for in groups | 2224/849 involving monitoring, e.g. feedback loop 2224/84909 Post-treatment of the connector or bonding area |
| <u>H01L 2224/847</u> - <u>H01L 2224/84791</u> | 2224/8491 Cleaning, e.g. oxide removal step, |
| 2224/84798 with a principal constituent of the | desmearing |
| material being a combination of | 2224/84911 Chemical cleaning, e.g. etching, flux |
| two or more materials in the form of a matrix with a filler, i.e. being | 2224/84912 Mechanical cleaning, e.g. abrasion |
| a hybrid material, e.g. segmented | using hydro blasting, brushes, ultrasonic |
| structures, foams | cleaning, dry ice blasting, gas-flow |
| 2224/84799 Shape or distribution of the fillers | 2224/84913 Plasma cleaning |
| 2224/848 Bonding techniques | 2224/84914 Thermal cleaning, e.g. using laser ablation |
| 2224/84801 Soldering or alloying | or by electrostatic corona discharge |
| 2224/84805 involving forming a eutectic alloy at the bonding interface | 2224/84919 Combinations of two or more cleaning methods provided for in |
| 2224/8481 involving forming an intermetallic compound at the bonding interface | at least two different groups from <u>H01L 2224/8491</u> - <u>H01L 2224/84914</u> |
| 2224/84815 Reflow soldering | 2224/8492 Applying permanent coating, e.g. protective |
| 2224/8482 Diffusion bonding | coating |
| 2224/84825 Solid-liquid interdiffusion | 2224/8493 Reshaping, e.g. for severing the strap, modifying the loop shape |
| | mountying the toop shape |

| 222485955 Octoposition of the atmosphere | | |
|--|--|---|
| 2224/8597 using a polychromatic heating lamp 2224/8998 using a laser 2224/8994 induction heating, i.e. cidy currents 2224/8995 using a fame nrche, e.g. phylogens torch 2224/8994 using a cronna discharge, e.g. electronic filame off IL4O 2224/8997 by mechanical means, e.g. pressing, 3224/8997 by mechanical means, e.g. pressing, 3224/8998 Thermal treatments, e.g. pressing, 2224/8998 Terming additional members, e.g. for 2224/8998 Terming additional members, e.g. for 2224/8998 Specific sequence of steps, e.g. repetition of 224/8996 Specific sequence of steps, e.g. repetition of 224/8996 Specific sequence of steps, e.g. repetition of 224/8996 Specific sequence of steps, e.g. repetition of 224/8909 Terming additional members, e.g. for 2224/89001 involving a temporary anxiliary member 2224/89002 being a removable or sacrificial cotting 2224/89009 being a removable or sacrificial cotting 2224/89009 being a temporary or sacrificial cotting 2224/89009 Per-treatment of the connector or the bounding apparatus 2224/89009 Per-treatment of the connector or the bounding area 2224/89010 Cleaning, e.g. oxide removal step, dementing, only see blacking, gas flow 2224/89011 Chemical cleaning, e.g. etching, flux 2224/89012 Mechanical cleaning, e.g. etching, flux 2224/89013 December of the connector or the bonding 2224/89014 The model cleaning, e.g. etching, flux 2224/89017 Lelectron beam cleaning 2224/89018 Terming terming the body 2224/89019 Chemical cleaning, e.g. etching, flux 2224/89019 Lelectron beam cleaning 2224/89019 Chemical cleaning, e.g. shown on the body 2224/89019 Chemical cleaning, e.g. shown on the body 2224/89019 Lelectron beam cleaning | 2224/84931 by chemical means, e.g. etching | 2224/85053 Bonding environment |
| 22248949 using a laser 22248949 Induction heating, i.e. eddy currents 22248949 (using a comon discharge, e.g. electronic 22248949 (using a comon discharge, e.g. electronic 22248949 (Induction heating, i.e. eddy currents 22248949 (Using a comon discharge, e.g. electronic 22248950 (Using a laser 22248950 (Using a la | 2224/84935 by heating means, e.g. reflowing | 2224/85054 Composition of the atmosphere |
| 22248949 using a laser 22248949 Induction heating, i.e. eddy currents 22248949 (using a comon discharge, e.g. electronic 22248949 (using a comon discharge, e.g. electronic 22248949 (Induction heating, i.e. eddy currents 22248949 (Using a comon discharge, e.g. electronic 22248950 (Using a laser 22248950 (Using a la | 2224/84937 using a polychromatic heating lamp | 2224/85055 being oxidating |
| 222485941 Induction heating, i.e. eddy currents 222485975 being inert 222485995 sing a corona discharge, e.g. electronic flame tork, e.g. pressing 22248599 Vacuum 22248599 Under pressure 22248591 Unde | | |
| 2224/8594 . using a flame torch, e.g. hydrogen torch 2224/8594 . using a corona discharge, e.g. dectronic flame off [FFO] 2224/8594 . being a corona discharge, e.g. pressing, 3224/8594 . Thermal treatments, e.g. annealing, controlled cooling 2224/8595 . The controlled cooling 2224/8595 . Specific sequence of steps, e.g. repetition of reinforcing 2224/8596 . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/85901 . involving a temporary auxiliary member a forfirming part of the bonding apparatus, e.g. removable or sacrificial coating, 2224/85002 . being a removable or sacrificial coating 2224/85007 . involving a permanent auxiliary member to substrate e.g. removable or sacrificial coating 2224/85007 . involving a permanent auxiliary member being 2224/85009 . Pre-treatment of the connector of the bonding area 2224/85009 . Pre-treatment of the connector of the bonding area 2224/85010 . Cleaning, e.g. oxide removal step, desmeranial 2224/85011 . Chemical cleaning, e.g. etching, flux 2224/85012 . Shape or position of the body 2224/85013 . Plasma cleaning 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85015 . Shape or position of the body 2224/85016 . Involving a permanent outing, e.g. in-situ 2224/85017 . Electron beam cleaning 2224/85018 . Thermal cleaning, e.g. decomposition, and the proposition of the body 2224/85019 . Shape or position of the body 2224/850 | | |
| 2224/89497 | | |
| flame of [EFO] stamping 2224/85948 2224/85948 2224/85948 2224/85969 2224/85969 2224/8597 2224/8597 2224/85969 2224/8597 2224/8597 2224/85969 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85902 2224/85902 2224/85902 2224/85902 2224/85902 2224/85902 2224/85902 2224/85903 2224/85909 2224/85903 2224/85903 2224/85909 2224/85903 2224/85909 2224/85904 2224/85909 2224/85904 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85901 2224/85909 2224/85901 2224/85909 2224/85901 2224/85902 2224/85901 2224/85901 2224/85901 2224/85902 2224/85901 2224/85902 2224/85901 2224/85902 2224/85902 2224/85902 2224/85903 2224/85902 2224/85903 22 | 2224/84943 using a flame torch, e.g. hydrogen torch | 2224/85085 being a liquid, e.g. for fluidic self-assembly |
| flame of [EFO] stamping 2224/85948 2224/85948 2224/85948 2224/85969 2224/85969 2224/8597 2224/8597 2224/85969 2224/8597 2224/8597 2224/85969 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85999 2224/85902 2224/85902 2224/85902 2224/85902 2224/85902 2224/85902 2224/85902 2224/85903 2224/85909 2224/85903 2224/85903 2224/85909 2224/85903 2224/85909 2224/85904 2224/85909 2224/85904 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85909 2224/85901 2224/85909 2224/85901 2224/85909 2224/85901 2224/85902 2224/85901 2224/85901 2224/85901 2224/85902 2224/85901 2224/85902 2224/85901 2224/85902 2224/85902 2224/85902 2224/85903 2224/85902 2224/85903 22 | 2224/84945 using a corona discharge, e.g. electronic | 2224/8509 Vacuum |
| 2224/83947 Dy mechanical members, e.g. pressing sampling controlled cooling cool | | |
| stamping Controlled cooling Controlled pre-beating or pre-cooling Controlled pre-beating | | |
| 2224/8908 | | |
| controlled cooling 1224/85961 Forming additional members, e.g. for reinforcing 1224/8596 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 1224/8596 | | 2224/85093 Transient conditions, e.g. gas-flow |
| controlled cooling reinforcing 2224/8596 2224/8598 2224/8599 2224/8590 2224/ | 2224/84948 Thermal treatments, e.g. annealing, | 2224/85095 Temperature settings |
| 2224/8509 - Pre-trainment of the connector or the bonding process left in the finished device, e.g., e.g. airs for holding or protecting the winding expertition of material content of the bonding process leaves are the bonding process leaves leave | controlled cooling | |
| reinforcing Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/8501 | 2224/84951 Forming additional members, e.g. for | |
| 2224/8509 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/85001 involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate of the substrate into the substrate and the substrate into the substrate in | | |
| manufacturing steps, time sequence 2224/8501 using a wire connector 2224/8501 involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate 2224/85002 being a removable or sacrificial coating, left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85009 Pre-treatment of the connector during or after the bonding process 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/85012 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning dry ice blasting, gas-flow 2224/85013 Plasma cleaning 2224/85014 Thermal cleaning, e.g. decomposition, sublination 2224/85019 Combinations of two or more cleaning membods provided for in at least two different groups from HOLL 2224/85017 Bectron beam cleaning 2224/8503 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 using a laser 2224/85031 Using a laser 2224/85031 Using a laser 2224/85041 Thermal cleaning, e.g. decomposition, sublination HOLL 2224/85014 Thermal cleaning 2224/85031 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 Using a laser 2224/85032 Using a laser 2224/85033 Using a laser 2224/85034 Using a laser 2224/85035 Using a laser 2224/85036 Using a laser 2224/85037 Using a laser 2224/85037 Using a laser 2224/85037 Using a laser 2224/85038 Using a laser 2224/85031 U | | |
| 2224/8501 using a wire connector 2224/8502 involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate substrate involving a permanent auxiliary member being a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85002 being a temporary or sacrificial substrate left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85010 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector or the bonding area 2224/85010 . Cleaning, e.g. oxide removal step, desmearing 2224/85011 . Cleaning, e.g. ching, flux 2224/85012 . Mechanical cleaning, e.g. etching, flux 2224/85013 . Demand cleaning, e.g. etching, flux 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85016 . Using a laser 2224/85017 . Electron beam cleaning 2224/85018 . Ombinations of two or more cleaning methods provided for in at least two different groups from HOIL 2224/85014 . Pophyling permanent coating, e.g. in situ coating 2224/8503 . Reshaping, e.g. forming the hall or the wedge of the wire connector 2224/8503 . bring a laser 2224/8504 . hydroid permanent coating, e.g. in situ coating 2224/8504 . by chemical means, e.g. "free-air-ball" 2224/8504 . by heating means, e.g. "free-air-ball" 2224/8504 . by mechanical incleaning, e.g. electronia discharge, e.g. encomball", shall-order personal," shall-order personal, "shall-order personal," shall-order personal," shall-order personal, "shall-or-wedge," order personal," shall-or-wedge," shall-order personal," shall-or-wedge, orderly shall-order personal, "shall-or-wedge," shall-order personal, "shall-or-wedge," shall-order personal coating controlled per-heating or pre-cooling controlled per-heating or p | | 2224/85099 Ambient temperature |
| 2224/8501 ausing a wire connector 2224/8502 ausing a wire connector not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate 2224/8500 being a temporary or sacrificial substrate 2224/8500 involving a permanent auxiliary member being left in the finished device, e.g. actis for holding or protecting the wire connector during or after the bonding process 2224/8501 cleaning, e.g. oxide removal step, desmearing desmearing 2224/8501 chemical cleaning, e.g. etching, flux 2224/8501 chemical cleaning, e.g. etching, flux 2224/8501 chemical cleaning, e.g. etching, flux 2224/8501 chemical cleaning, e.g. decomposition, sublimation 2224/8501 chemical cleaning | - · · · · · · · · · · · · · · · · · · · | 2224/851 the connector being supplied to the parts to be |
| involving a temporary auxiliary member not forming part of the bonding apartaus, e.g. removable or sacrificial coating, category or sacrificial coating, category or such substrate 2224/85002 being a removable or sacrificial coating (2224/85005) being a temporary or sacrificial coating (2224/85006) being a temporary or sacrificial aubstrate left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process (2224/85007) involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process (2224/8512) area (2224/8513) area (2224/8514) | 2224/85 using a wire connector | |
| not forming part of the bonding apparatus, e.g. removable or sarcificial coating, 2224/85002 being a temporary or sacrificial substrate 2224/85005 being a temporary or sacrificial substrate 2224/85007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85099 Pre-treatment of the connector or the bonding area 2224/85010 Cleaning, e.g. oxide removal step, desmearing 2224/85011 Cleaning, e.g. oxide removal step, desmearing 2224/85012 Mechanical cleaning, e.g. etching, flux 2224/85012 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, utrasonic cleaning, dy ice blasting, gas-flow 2224/85013 Plasma cleaning 2224/85014 Thermal cleaning, e.g. decomposition, sublimation 2224/85016 using a laser 2224/85017 Electron beam cleaning 2224/85018 Reshaping, e.g. forming the ball or the wedge of the wire connector words of the wire connector words of the wire connector from Hult 2224/85014 polychromatic heating lamp 2224/85031 by chemical means, e.g. etching, anodisation 2224/85033 using a plaser 2224/85043 using a placer controlled pre-heating or pre-cooling 2224/85043 remained for the wedge of the wire connector from the many controlled pre-heating or pre-cooling 2224/85045 remained for the means, e.g. severing, pressing, stamping 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal reatments, e.g. annealing, controlled pro-heal', "ball-on-wedge," 'ball-on-wedge, 'ball-on-wedge, 'ball-on-wedge, 'ball-on-wedge, 'ball-on-wedge | 2224/85001 involving a temporary auxiliary member | |
| e.g. removable or sacrificial coating, film or substrate 2224/85002 being a removable or sacrificial coating 2224/85005 being a temporary or sacrificial substrate 2224/85006 being a temporary or sacrificial substrate 2224/85007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85009 Pre-treatment of the connector of the bonding area 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/8501 Cleaning, e.g. etching, flux 2224/8501 Cleaning, e.g. etching, flux 2224/8501 Cleaning, e.g. etching, flux 2224/8501 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85014 Thermal cleaning e.g. edocomposition, sublimation 2224/85016 Using a laser 2224/85017 Electron beam cleaning 2224/85018 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/8503 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 using a laser 2224/85031 Shape or position of the body 2224/85112 Shape or position of the body 2224/85123 Using marks formed outside the body 2224/85132 using marks formed outside the semiconductor or solid-state body, i.e. "off-chip" 2224/85016 Time all cleaning e.g. e.g. decomposition, sublimation 2224/85017 Electron beam cleaning 2224/85021 Applying permanent coating, e.g. in-situ coating 2224/85031 Using a laser 2224/85031 Using a laser 2224/85031 Using a laser 2224/85031 Phenical means, e.g. forming the ball or the wedge of the wire connector 2224/85031 Using a laser 2224/85031 Using a laser 2224/85031 Using a laser 2224/85032 Phenical means, e.g. e.g. ecthing, anodisation 2224/85033 Using a laser 2224/85034 Using a laser 2224/85035 Using a laser 2224/85036 Using a laser 2224/85037 Using a laser 2224/85038 Using a laser 2224/85039 Using a laser 2224/85031 Using a laser 2224/85031 Using a laser 2224/85031 Using a laser 2224/85032 Using a laser 2224/85033 Using a laser 2224/85034 Using | | |
| substrate 2224/85007 being a removable or sacrificial coating 2224/85007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/8509 Pre-treatment of the connector or the bonding area 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/8501 Chemical cleaning, e.g. etching, flux 2224/8501 Chemical cleaning, e.g. etching, flux 2224/8501 Chemical cleaning, e.g. decomposition, subsimation 2224/85013 Plasma cleaning 2224/85014 Thermal cleaning, e.g. decomposition, sublimation 2224/85017 Cleaning methods provided for in at least two different groups from HDIL 2224/85014 Decomposition wedge of the wire connector wedge of the wire connector and deating 2224/8503 Plasma cleaning 2224/8504 Plasma cleaning 2224/8504 Plasma cleaning 2224/8505 Plasma cleaning 2224/8505 Plasma cleaning 2224/8506 Plasma cleaning 2224/8507 Plasma cleaning 2224/8508 Plasma cleaning 2224/8508 Plasma cleaning 2224/8509 Plasma cleaning 2224/8500 Plasma | | |
| 2224/85002 being a removable or sacrificial coating 2224/85005 being a temporary or sucrificial substrate 2224/85006 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/8509 Pre-treatment of the connector or the bonding area 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/8501 Mechanical cleaning, e.g. acthing, flux 2224/85012 Mechanical cleaning, e.g. acthing, flux 2224/85013 Plasma cleaning 2224/85014 Thermal cleaning, e.g. decomposition, sublimation 2224/85016 using a laser 2224/85017 Electron beam cleaning 2224/85019 Combinations of two or more cleaning methods provided for in at least two different groups from H011_2224/8501 + H011_2224/85014 coating 2224/8502 Applying permanent coating, e.g. in-situ coating 2224/8503 by chemical means, e.g. etching, anodisation 2224/8503 by heating means, e.g. "free-air-ball" 2224/8504 using a a corona discharge, e.g. electronic flame off (EPC) 2224/8504 by heating means, e.g. electronic flame off (EPC) 2224/8504 Thermal treatments, e.g. amnealing, controlled pre-heating or pre-cooling 2224/8504 Porming additional members, e.g. for "wedge-on-ball", "holl-on-wedge", "hall-on-wedge", "ball-on-wedge", ball-on-wedge, "ball-o | | 2224/8512 Aligning |
| 2224/85007 being a removator or sacrificial substrate 2224/85007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85009 Pre-treatment of the connector or the bonding area 2224/8501 | | 2224/85121 Active alignment, i.e. by apparatus steering, |
| 2224/85007 involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/8509 Pre-treatment of the connector or the bonding area 2224/8501 | | |
| Involving a permanent auxilary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process 2224/85099 Pre-treatment of the connector or the bonding area 2224/85127 Bonding areas outside the body | 2224/85005 being a temporary or sacrificial substrate | |
| left in the finished device, e.g., aids for holding or protecting the wire connector during or after the bonding process 2224/85099 Pre-treatment of the connector or the bonding area 2224/8501 . Cleaning, e.g. oxide removal step, desmearing 2224/8501 . Chemical cleaning, e.g. etching, flux 2224/85012 . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85015 . Electron beam cleaning 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning etnestive different groups from H011, 2224/8501 + H011, 2224/8501 + H011, 2224/8501 + H011, 2224/8501 + Wedge of the wire connector 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. "free-air-ball" 2224/85045 . using a laser, "ree-air-ball" 2224/85045 . using a polychromatic heating lamp 2224/85046 . using a lacer, "ree-air-ball" 2224/85047 . by mechanical means, e.g. severing, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85048 . Thermal reatments, e.g. annealing, controlled pre-heating or pre-cooling **Responsible to the own connecting first out to the semiconductor or solid-state body, i.e. orf-chip, regular and reverse stitchs **Conficulty of the bonding apparatus, i.e. bonding means for the bonding | 2224/85007 involving a permanent auxiliary member being | |
| 2224/85019 or protecting the wire connector during or after the bonding process 2224/8502 Pre-treatment of the connector or the bonding area 2224/85011 | | • |
| the bonding process Pre-treatment of the connector or the bonding area 2224/85019 Pre-treatment of the connector or the bonding area 2224/8501 Cleaning, e.g. oxide removal step, desmearing 2224/85011 Chemical cleaning, e.g. etching, flux 2224/85012 Mechanical cleaning, e.g. etching, flux 2224/85012 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, lutrusonic cleaning, dry ice blasting, gas-flow 2224/85014 Thermal cleaning, e.g. decomposition, sublimation 2224/85016 Using a laser 2224/85017 Electron beam cleaning 2224/85017 Electron beam cleaning 2224/85018 Combinations of two or more cleaning etching by the display of the wire connector 2224/85018 Pressing, e.g. forming the ball or the wedge of the wire connector 2224/85031 by chemical means, e.g. etching, anodisation 2224/85035 by heating means, e.g. etching, anodisation 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling wedge-or-ball," ball-on-wedge, "ball-on-wedge", ball-on-wedge, ball-yishlow and of the other item decomposition or solid-state body, i.e. off-chip or solid-state body, i.e. regular and reverse stitch or solid-state body, i.e. off-chip or solid-state body, i.e. off-chip, reverse stitch or solid-state body, i.e. off-chip or solid-state body, i.e. off-chip regular and reverse stitch or solid-state body, i.e. off-chip regular and reverse stitch or solid-state body, i.e. off-chip regular and reverse stitch or solid-state body, i.e. off-chip regular and reverse stitch or solid-state body, i.e. off-chip regular and reverse stitch or solid-s | | • |
| 2224/85019 Pre-treatment of the connector or the bonding area outside the body area area outside the body 2224/85011 Cleaning, e.g. oxide removal step, desmearing 2224/85012 Mechanical cleaning, e.g. etching, flux 2224/85012 Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, designed by the blasting, gas-flow 2224/85013 Plasma cleaning 2224/85014 Thermal cleaning, e.g. decomposition, sublimation sublimation sublimation sublimation sublimation sublimation sublimation sublimation at least two different groups from Holl L 2224/85017 Electron beam cleaning 2224/85019 Combinations of two or more cleaning methods provided for in at least two different groups from Holl L 2224/8501 - Holl L 2224/85014 Applying permanent coating, e.g. in-situ coating 2224/8503 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 by chemical means, e.g. etching, anodisation 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame for LiFeO 2224/85047 by mechanical means, e.g., severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling controlled pre-heating or pre-cooling wedge-on-ball." bill how the pre-part of the bond outside the semiconductor or solid-state body, i.e. off-chip or s | | 2224/85123 Shape or position of the body |
| 2224/8501 | | 2224/85125 Bonding areas on the body |
| 2224/85011 . Cleaning, e.g. oxide removal step, desmearing | 2224/85009 Pre-treatment of the connector or the bonding | |
| desmearing 2224/85011 . Chemical cleaning, e.g. etching, flux 2224/85012 . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85013 . Plasma cleaning 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85016 . using a laser 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H011_2224/8501 . Holl_2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85032 . by heating means, e.g. etching, 2224/85033 . using a polychromatic heating lamp 2224/85041 . Induction heating, i.e. eddy currents 2224/85042 . using a flame torch, e.g. hydrogen torch 2224/85043 . using a flame torch, e.g. hydrogen torch 2224/85044 . Induction heating, i.e. eddy currents 2224/85045 . by mechanical means, e.g. escering, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling "wedge-on-ball", "ball-on-wedge", ball-on- "wedge-on-ball", "ball-on-wedge", ball-on- "ball and the semiconductor or solid-state body, i.e. orgular and reverse stitchs 2224/85151 . using a roman discharge, e.g. electronic flame off [EFO] 2224/85045 . by mechanical means, e.g. severing, pressing, stamping 2224/85046 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling "wedge-on-ball", "ball-on-wedge", ball-on- | area | |
| desmearing 2224/85011 . Chemical cleaning, e.g. etching, flux 2224/85012 . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85013 . Plasma cleaning 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H011_2224/8501 + H011_2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85032 . using a polychromatic heating lamp 2224/85033 . using a polychromatic heating lamp 2224/85041 . Induction heating, i.e. eddy currents 2224/85041 . Induction heating, i.e. eddy currents 2224/85042 . using a flame torch, e.g. hydrogen torch flame off [EFO] 2224/85043 . using a flame torch, e.g. hydrogen torch flame off [EFO] 2224/85045 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85045 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", 'ball-on- "def chip" 2224/85136 . using a marks formed on the semiconductor or solid-state body, i.e. "off-chip" 2224/85136 . using marks formed on the semiconductor or solid-state body, i.e. "off-chip" 2224/85136 . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip" 2224/85148 . involving guiding structures, e.g. spacers or supporting members 2224/85148 . Passive alignment, i.e. self alignment, e.g. 2224/85148 . involving movement of a part of the bonding apparatus. 2224/85149 . being the lower part of the bonding apparatus, i.e. bolding means for the bodies to be connected, e.g. XY table 2224/8516 . Translational movements 2224/85181 . Rotational movements 2224/85181 . Rotational movements 2224/85181 . Rotational movements 2224/85181 . Connecting first ont he semiconductor or solid-state body, i.e. off-chip" | 2224/8501 Cleaning, e.g. oxide removal step, | |
| 2224/85011 . Chemical cleaning, e.g. etching, flux 2224/85012 . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85014 . Plasma cleaning 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 + H01L 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/8503 . by heating means, e.g. etching, anodisation 2224/8503 . using a laser 2224/8503 . using a polychromatic heating lamp 2224/8503 . using a palser 2224/8504 . Induction heating, i.e. eddy currents 2224/8504 . using a flame torch, e.g. hydrogen torch 2224/8504 . using a flame torch, e.g. hydrogen torch flame off [EFO] 2224/8504 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- | | |
| 2224/85012 . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85013 . Plasma cleaning 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning membods provided for in at least two different groups from H0IL 2224/8501 + H0IL 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/8503 . by chemical means, e.g. etching, anodisation 2224/8503 . using a polychromatic heating lamp 2224/8504 . Induction heating, i.e. eddy currents 2224/8504 . using a flame torch, e.g. hydrogen torch 2224/8504 . Using a flame torch, e.g. hydrogen torch 2224/8504 . Using a corona discharge, e.g. electronic flame off [EFO] 2224/8504 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- | <u> </u> | or solid-state body |
| vising hydro blasting, brushes, ultrasonic cleaning, e.g. avisation using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow 2224/85014 . Plasma cleaning 2224/85014 . Thermad cleaning e.g. decomposition, sublimation 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 - H01L 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85035 . by heating means, e.g. effect-air-ball" 2224/85039 . using a polychromatic heating lamp 2224/85041 . Induction heating, i.e. eddy currents 2224/85043 . using a flame torch, e.g. hydrogen torch 2224/85045 . using a corona discharge, e.g. electronic flame off [EFO] 2224/85045 . by mechanical means, e.g. severing, pressing, stamping 2224/85046 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", " | | 2224/85132 using marks formed outside the |
| 2224/85013 Plasma cleaning or the billing gas-flow 2224/85014 Thermal cleaning, e.g. decomposition, sublimation 2224/85016 using a laser 2224/85017 Electron beam cleaning 2224/85019 Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 H01L 2224/85014 Applying permanent coating, e.g. in-situ coating 2224/8502 Applying permanent coating, e.g. in-situ coating 2224/8503 Reshaping, e.g. forming the ball or the wedge of the wire connector wedge of the wire connector 2224/8503 by chemical means, e.g. etching, anodisation 2224/8503 using a player provided for in a plass of the wedge of the wire connector 2224/8503 by heating means, e.g. effecting anodisation 2224/8504 Induction heating, i.e. eddy currents 2224/85045 using a flame torch, e.g. hydrogen torch 2224/85045 using a flame torch, e.g. hydrogen torch 2224/85045 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", 'ball-on-wedge', 'ball-on-we | | |
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| 2224/85014 . Thermal cleaning, e.g. decomposition, sublimation sublimation sublimation . using a laser 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 - H01L 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85035 . by heating means, e.g. "free-air-ball" 2224/85043 . using a polychromatic heating lamp 2224/85041 . Induction heating, i.e. eddy currents 2224/85043 . using a flame torch, e.g. hydrogen torch 2224/85045 . using a corona discharge, e.g. electronic flame off [EFO] 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "bal | 2224/85013 Plasma cleaning | |
| sublimation 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85035 . by heating means, e.g. "free-air-ball" 2224/85041 . Induction heating, i.e. eddy currents 2224/85043 . using a flame torch, e.g. hydrogen torch 2224/85045 . using a flame torch, e.g. hydrogen torch 2224/85047 . by mechanical means, e.g. severing, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-wedge" | | |
| 2224/85016 . using a laser 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H0IL 2224/8501 - H0IL 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/8503 . by chemical means, e.g. etching, anodisation 2224/8503 . by heating means, e.g. "free-air-ball" 2224/8503 . using a polychromatic heating lamp 2224/8503 . using a flame torch, e.g. hydrogen torch 2224/85041 . Induction heating, i.e. eddy currents 2224/85043 . using a flame torch, e.g. hydrogen torch 2224/85045 . by mechanical means, e.g. escerting, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-o | | 2224/85138 the guiding structures being at least |
| 2224/85017 . Electron beam cleaning 2224/85019 . Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 - H01L 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85035 . by heating means, e.g. "free-air-ball" 2224/85037 . using a polychromatic heating lamp 2224/85039 . using a laser 2224/85041 . Induction heating, i.e. eddy currents 2224/85043 . using a flame torch, e.g. hydrogen torch 2224/85045 . by mechanical means, e.g. electronic flame off [EFO] 2224/85047 . by mechanical means, e.g. severing, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- | | partially left in the finished device |
| 2224/85017 Electron beam cleaning | | 2224/85143 Passive alignment, i.e. self alignment, e.g. |
| Combinations of two or more cleaning methods provided for in at least two different groups from H01L 2224/8501 - H01L 2224/85014 2224/8502 Applying permanent coating, e.g. in-situ coating 2224/8503 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/8503 by chemical means, e.g. etching, anodisation 2224/8503 by heating means, e.g. "free-air-ball" 2224/8503 using a polychromatic heating lamp 2224/8503 using a laser 2224/8504 Induction heating, i.e. eddy currents 2224/8504 using a flame torch, e.g. hydrogen torch 2224/85047 by mechanical means, e.g. eelectronic flame off [EFO] 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball- | | |
| cleaning methods provided for in at least two different groups from H01L 2224/85014 2224/8502 | 2224/85019 Combinations of two or more | |
| at least two different groups from H0IL 2224/8501 - H0IL 2224/85014 2224/8502 | cleaning methods provided for in | |
| H01L 2224/8501 - H01L 2224/85014 2224/8502 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85035 . by heating means, e.g. "free-air-ball" 2224/85037 . using a polychromatic heating lamp 2224/85049 . using a laser 2224/85040 . Induction heating, i.e. eddy currents 2224/85047 . by mechanical means, e.g. electronic flame off [EFO] 2224/85048 . Thermal treatments, e.g. annealing, pressing, stamping 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-wedge | | |
| 2224/8503 . Applying permanent coating, e.g. in-situ coating 2224/8503 . Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 . by chemical means, e.g. etching, anodisation 2224/85035 . by heating means, e.g. "free-air-ball" 2224/85037 . using a polychromatic heating lamp 2224/85039 . using a laser 2224/85041 . Induction heating, i.e. eddy currents 2224/85043 . using a flame torch, e.g. hydrogen torch 22224/85045 . using a corona discharge, e.g. electronic flame off [EFO] 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-wed | | apparatus |
| 2224/8503 | | 2224/85149 being the lower part of the bonding |
| 2224/85031 | | apparatus, i.e. holding means for the |
| 2224/85031 Reshaping, e.g. forming the ball or the wedge of the wire connector 2224/85031 by chemical means, e.g. etching, anodisation 2224/85035 by heating means, e.g. "free-air-ball" 2224/85037 using a polychromatic heating lamp 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ba | · · · · · · · · · · · · · · · · · · · | bodies to be connected, e.g. XY table |
| 2224/85031 by chemical means, e.g. etching, anodisation 2224/85035 by heating means, e.g. "free-air-ball" 2224/85037 using a polychromatic heating lamp 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "b | | |
| 2224/85031 by chemical means, e.g. etching, anodisation 2224/85035 by heating means, e.g. "free-air-ball" 2224/85037 using a polychromatic heating lamp 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-we | wedge of the wire connector | |
| anodisation 2224/85035 by heating means, e.g. "free-air-ball" 2224/85037 using a polychromatic heating lamp 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-wed | 2224/85031 by chemical means, e.g. etching, | |
| 2224/85035 by heating means, e.g. "free-air-ball" 2224/85037 using a polychromatic heating lamp 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-"wedge", "ball-on | | |
| 2224/85037 using a polychromatic heating lamp 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-we | | apparatus, i.e. bonding head, e.g. capillary |
| 2224/85039 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", | | or wedge |
| 2224/85049 using a laser 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", | | 2224/8517 Rotational movements |
| 2224/85041 Induction heating, i.e. eddy currents 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "bal | 2224/85039 using a laser | |
| 2224/85043 using a flame torch, e.g. hydrogen torch 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-wed | 2224/85041 Induction heating, i.e. eddy currents | |
| 2224/85045 using a corona discharge, e.g. electronic flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", | | |
| flame off [EFO] 2224/85047 by mechanical means, e.g. severing, pressing, stamping 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-wed | | • |
| 2224/85047 by mechanical means, e.g. severing, pressing, stamping semiconductor or solid-state body, i.e. off-chip, reverse stitch 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling the semiconductor or solid-state body, i.e. off-chip, reverse stitch connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches i.e. regular and reverse stitches | | - |
| 2224/85047 by mechanical means, e.g. severing, pressing, stamping semiconductor or solid-state body, i.e. off-chip, reverse stitch 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling the semiconductor or solid-state body, i.e. off-chip, reverse stitch connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches i.e. regular and reverse stitches | | 2224/85186 connecting first outside the |
| pressing, stamping off-chip, reverse stitch 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling the semiconductor or solid-state body, i.e. regular and reverse stitches 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- | | |
| 2224/85048 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- | pressing, stamping | |
| controlled pre-heating or pre-cooling 2224/85051 Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on- | 2224/85048 Thermal treatments, e.g. annealing. | |
| 2224/85051 Forming additional members, e.g. for i.e. regular and reverse stitches "wedge-on-ball", "ball-on-wedge", "ball-on- | | |
| "wedge-on-ball", "ball-on-wedge", "ball-on- | | |
| | | i.e. regular and reverse stitches |
| DATE CONTENTION | ball" connections | |

ball" connections

| 2224/85196 involving intermediate connecting steps before cutting the wire connector | 2224/85438 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C |
|--|--|
| 2224/852 Applying energy for connecting | 2224/85439 Silver (Ag) as principal constituent |
| 2224/85201 Compression bonding | 2224/85444 Gold (Au) as principal constituent |
| | |
| 2224/85203 Thermocompression bonding | 2224/85447 Copper (Cu) as principal constituent |
| 2224/85205 Ultrasonic bonding | 2224/85449 Manganese (Mn) as principal |
| 2224/85206 Direction of oscillation | constituent |
| 2224/85207 Thermosonic bonding | 2224/85455 Nickel (Ni) as principal constituent |
| 2224/8521 with energy being in the form of | 2224/85457 Cobalt (Co) as principal constituent |
| electromagnetic radiation | 2224/8546 Iron (Fe) as principal constituent |
| 2224/85212 Induction heating, i.e. eddy currents | 2224/85463 the principal constituent melting at a |
| | temperature of greater than 1550°C |
| 2224/85214 using a laser | |
| 2224/8523 Polychromatic or infrared lamp heating | 2224/85464 Palladium (Pd) as principal |
| 2224/85232 using an autocatalytic reaction, e.g. | constituent |
| exothermic brazing | 2224/85466 Titanium (Ti) as principal constituent |
| 2224/85234 using means for applying energy being | 2224/85469 Platinum (Pt) as principal constituent |
| within the device, e.g. integrated heater | 2224/8547 Zirconium (Zr) as principal |
| 2224/85236 using electro-static corona discharge | constituent |
| 2224/85237 using electron beam (using electron beam in | 2224/85471 Chromium (Cr) as principal |
| general B23K 15/00) | constituent |
| | |
| 2224/85238 using electric resistance welding, i.e. ohmic | 2224/85472 Vanadium (V) as principal constituent |
| heating | 2224/85473 Rhodium (Rh) as principal constituent |
| 2224/8534 Bonding interfaces of the connector | 2224/85476 Ruthenium (Ru) as principal |
| 2224/85345 Shape, e.g. interlocking features | constituent |
| 2224/85355 having an external coating, e.g. protective | 2224/85478 Iridium (Ir) as principal constituent |
| bond-through coating | 2224/85479 Niobium (Nb) as principal constituent |
| 2224/85359 Material | 2224/8548 Molybdenum (Mo) as principal |
| 2224/8536 Bonding interfaces of the semiconductor or | constituent |
| solid state body | 2224/85481 Tantalum (Ta) as principal constituent |
| • • • • • • • • • • • • • • • • • • • | |
| 2224/85365 Shape, e.g. interlocking features | 2224/85483 Rhenium (Re) as principal constituent |
| 2224/85375 having an external coating, e.g. protective | 2224/85484 Tungsten (W) as principal constituent |
| bond-through coating | 2224/85486 with a principal constituent of the material |
| 2224/85379 Material | being a non metallic, non metalloid |
| 2224/8538 Bonding interfaces outside the semiconductor | inorganic material |
| or solid-state body | 2224/85487 Ceramics, e.g. crystalline carbides, |
| 2224/85385 Shape, e.g. interlocking features | nitrides or oxides (glass ceramics |
| 2224/85395 having an external coating, e.g. protective | H01L 2224/85488) |
| bond-through coating | 2224/85488 Glasses, e.g. amorphous oxides, nitrides |
| | or fluorides |
| 2224/85399 Material | 2224/8549 with a principal constituent of the material |
| 2224/854 with a principal constituent of the material | |
| being a metal or a metalloid, e.g. boron | being a polymer, e.g. polyester, phenolic |
| (B), silicon (Si), germanium (Ge), arsenic | based polymer, epoxy |
| (As), antimony (Sb), tellurium (Te) and | 2224/85491 The principal constituent being an |
| polonium (Po), and alloys thereof | elastomer, e.g. silicones, isoprene, |
| 2224/85401 the principal constituent melting at a | neoprene |
| temperature of less than 400°C | 2224/85493 with a principal constituent of the material |
| 2224/85405 Gallium (Ga) as principal constituent | being a solid not provided for in groups |
| 2224/85409 Indium (In) as principal constituent | H01L 2224/854 - H01L 2224/85491, e.g. |
| 2224/85411 Tin (Sn) as principal constituent | allotropes of carbon, fullerene, graphite, |
| | carbon-nanotubes, diamond |
| 2224/85413 Bismuth (Bi) as principal constituent | 2224/85494 with a principal constituent of the material |
| 2224/85414 Thallium (Tl) as principal constituent | being a liquid not provided for in groups |
| 2224/85416 Lead (Pb) as principal constituent | H01L 2224/854 - H01L 2224/85491 |
| 2224/85417 the principal constituent melting at a | 2224/85495 with a principal constituent of the material |
| temperature of greater than or equal to | |
| 400°C and less than 950°C | being a gas not provided for in groups |
| 2224/85418 Zinc (Zn) as principal constituent | <u>H01L 2224/854</u> - <u>H01L 2224/85491</u> |
| 2224/8542 Antimony (Sb) as principal | 2224/85498 with a principal constituent of the material |
| constituent | being a combination of two or more |
| | materials in the form of a matrix with a |
| 2224/85423 Magnesium (Mg) as principal | filler, i.e. being a hybrid material, e.g. |
| constituent | segmented structures, foams |
| 2224/85424 Aluminium (Al) as principal | 2224/85499 Material of the matrix |
| constituent | |

| 2224/855 with a principal constituent of the material being a metal or a | 2224/85578 Iridium (Ir) as principal constituent |
|--|--|
| metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), | 2224/85579 Niobium (Nb) as principal constituent |
| antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof | 2224/8558 Molybdenum (Mo) as principal constituent |
| 2224/85501 the principal constituent melting at a temperature of less than 400°C | 2224/85581 Tantalum (Ta) as principal constituent |
| 2224/85505 Gallium (Ga) as principal constituent | 2224/85583 Rhenium (Re) as principal constituent |
| 2224/85509 Indium (In) as principal constituent | 2224/85584 Tungsten (W) as principal constituent |
| 2224/85511 Tin (Sn) as principal constituent | 2224/85586 with a principal constituent of the |
| 2224/85513 Bismuth (Bi) as principal constituent | material being a non metallic, non metalloid inorganic material |
| 2224/85514 Thallium (Tl) as principal constituent | 2224/85587 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass ceramics |
| 2224/85516 Lead (Pb) as principal constituent | <u>H01L 2224/85588</u>) |
| 2224/85517 the principal constituent melting at a temperature of greater than or | 2224/85588 Glasses, e.g. amorphous oxides, nitrides or fluorides |
| equal to 400°C and less than 950°C | 2224/8559 with a principal constituent of |
| 2224/85518 Zinc (Zn) as principal constituent | the material being a polymer, e.g. |
| 2224/8552 Antimony (Sb) as principal constituent | polyester, phenolic based polymer, epoxy |
| 2224/85523 Magnesium (Mg) as principal constituent | 2224/85591 The principal constituent being an elastomer, e.g. silicones, isoprene, |
| 2224/85524 Aluminium (Al) as principal | neoprene |
| constituent | 2224/85593 with a principal constituent of the material being a solid |
| 2224/85538 the principal constituent melting at a temperature of greater than | not provided for in groups |
| or equal to 950°C and less than | H01L 2224/855 - H01L 2224/85591, |
| 1550°C | e.g. allotropes of carbon, fullerene, |
| 2224/85539 Silver (Ag) as principal | graphite, carbon-nanotubes, diamond 2224/85594 with a principal constituent |
| constituent Cold (Ap) as principal | of the material being a liquid |
| 2224/85544 Gold (Au) as principal constituent | not provided for in groups |
| 2224/85547 Copper (Cu) as principal constituent | H01L 2224/85591 2224/85595 with a principal constituent |
| 2224/85549 Manganese (Mn) as principal | of the material being a gas |
| constituent | not provided for in groups H01L 2224/855 - H01L 2224/85591 |
| 2224/85555 Nickel (Ni) as principal constituent | 2224/85598 Fillers |
| 2224/85557 Cobalt (Co) as principal | 2224/85599 Base material |
| constituent | 2224/856 with a principal constituent of |
| 2224/8556 Iron (Fe) as principal constituent | the material being a metal or a metalloid, e.g. boron (B), silicon |
| 2224/85563 the principal constituent melting | (Si), germanium (Ge), arsenic (As), |
| at a temperature of greater than 1550°C | antimony (Sb), tellurium (Te) and |
| 2224/85564 Palladium (Pd) as principal | polonium (Po), and alloys thereof |
| constituent | 2224/85601 the principal constituent melting |
| 2224/85566 Titanium (Ti) as principal constituent | at a temperature of less than $400^{\circ}\mathrm{C}$ |
| 2224/85569 Platinum (Pt) as principal constituent | 2224/85605 Gallium (Ga) as principal constituent |
| 2224/8557 Zirconium (Zr) as principal | 2224/85609 Indium (In) as principal constituent |
| constituent 2224/85571 Chromium (Cr) as principal | 2224/85611 Tin (Sn) as principal constituent |
| constituent 2224/85572 Vanadium (V) as principal | 2224/85613 Bismuth (Bi) as principal |
| constituent | constituent 2224/85614 Thallium (Tl) as principal |
| 2224/85573 Rhodium (Rh) as principal constituent | constituent |
| 2224/85576 Ruthenium (Ru) as principal constituent | 2224/85616 Lead (Pb) as principal constituent |
| | |

| 2224/85617 the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C | 2224/85687 |
|--|--|
| 2224/85618 Zinc (Zn) as principal | nitrides or fluorides |
| constituent 2224/8562 Antimony (Sb) as principal constituent | 2224/8569 with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, |
| 2224/85623 Magnesium (Mg) as principal constituent | epoxy 2224/85691 The principal constituent being |
| 2224/85624 Aluminium (Al) as principal constituent | an elastomer, e.g. silicones, isoprene, neoprene |
| 2224/85638 the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C | 2224/85693 with a principal constituent of the material being a solid not provided for in groups H01L 2224/856 - H01L 2224/85691, e.g. allotropes of carbon, fullerene, |
| 2224/85639 Silver (Ag) as principal constituent | graphite, carbon-nanotubes, diamond |
| 2224/85644 Gold (Au) as principal constituent | 2224/85694 with a principal constituent |
| 2224/85647 Copper (Cu) as principal constituent | of the material being a liquid not provided for in groups H01L 2224/856 - H01L 2224/85691 |
| 2224/85649 Manganese (Mn) as principal constituent | 2224/85695 with a principal constituent |
| 2224/85655 Nickel (Ni) as principal constituent | of the material being a gas not provided for in groups |
| 2224/85657 Cobalt (Co) as principal constituent | <u>H01L 2224/856</u> - <u>H01L 2224/85691</u> 2224/85698 with a principal constituent of the |
| 2224/8566 Iron (Fe) as principal constituent | material being a combination of two or more materials in the form |
| 2224/85663 the principal constituent melting at a temperature of greater than 1550°C | of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams |
| 2224/85664 Palladium (Pd) as principal | 2224/85699 Coating material |
| constituent 2224/85666 Titanium (Ti) as principal | 2224/857 with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon |
| constituent 2224/85669 Platinum (Pt) as principal | (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and |
| constituent 2224/8567 Zirconium (Zr) as principal | polonium (Po), and alloys thereof |
| constituent 2224/85671 Chromium (Cr) as principal | 2224/85701 the principal constituent melting at a temperature of less than 400°C |
| constituent 2224/85672 Vanadium (V) as principal | 2224/85705 Gallium (Ga) as principal |
| constituent | constituent 2224/85709 Indium (In) as principal |
| 2224/85673 Rhodium (Rh) as principal constituent | constituent 2224/85711 Tin (Sn) as principal |
| 2224/85676 Ruthenium (Ru) as principal constituent | constituent |
| 2224/85678 Iridium (Ir) as principal constituent | 2224/85713 Bismuth (Bi) as principal constituent |
| 2224/85679 Niobium (Nb) as principal constituent | 2224/85714 Thallium (Tl) as principal constituent |
| 2224/8568 Molybdenum (Mo) as principal | 2224/85716 Lead (Pb) as principal constituent |
| constituent 2224/85681 Tantalum (Ta) as principal | 2224/85717 the principal constituent melting at a temperature of greater than |
| constituent 2224/85683 Rhenium (Re) as principal | or equal to 400°C and less than 950°C |
| constituent 2224/85684 Tungsten (W) as principal | 2224/85718 Zinc (Zn) as principal constituent |
| constituent 2224/85686 with a principal constituent of the | 2224/8572 Antimony (Sb) as principal constituent |
| material being a non metallic, non metalloid inorganic material | 2224/85723 Magnesium (Mg) as principal |

| 2224/85724 Aluminium (Al) as principal constituent | 2224/85791 The principal constituent being an elastomer, e.g. silicones, |
|---|---|
| 2224/85738 the principal constituent melting at a temperature of greater than or equal to 950°C and less than | isoprene, neoprene 2224/85793 with a principal constituent of the material being a solid |
| 1550°C 2224/85739 Silver (Ag) as principal | not provided for in groups H01L 2224/857 - H01L 2224/85791, |
| constituent 2224/85744 Gold (Au) as principal | e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, |
| constituent | diamond 2224/85794 with a principal constituent |
| 2224/85747 Copper (Cu) as principal constituent | of the material being a liquid |
| 2224/85749 Manganese (Mn) as principal constituent | not provided for in groups <u>H01L 2224/857</u> - <u>H01L 2224/85791</u> |
| 2224/85755 Nickel (Ni) as principal constituent | 2224/85795 with a principal constituent of the material being a gas |
| 2224/85757 Cobalt (Co) as principal constituent | not provided for in groups <u>H01L 2224/857</u> - <u>H01L 2224/85791</u> |
| 2224/8576 Iron (Fe) as principal | 2224/85798 with a principal constituent of the material being a combination of |
| constituent 2224/85763 the principal constituent melting | two or more materials in the form |
| at a temperature of greater than 1550°C | of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams |
| 2224/85764 Palladium (Pd) as principal constituent | 2224/85799 Shape or distribution of the fillers |
| 2224/85766 Titanium (Ti) as principal | 2224/858 Bonding techniques |
| constituent 2224/85769 Platinum (Pt) as principal | 2224/85801 Soldering or alloying 2224/85805 involving forming a eutectic alloy at the |
| constituent | bonding interface |
| 2224/8577 Zirconium (Zr) as principal constituent | 2224/8581 involving forming an intermetallic compound at the bonding interface |
| 2224/85771 Chromium (Cr) as principal | 2224/85815 Reflow soldering |
| constituent 2224/85772 Vanadium (V) as principal | 2224/8582 Diffusion bonding 2224/85825 Solid-liquid interdiffusion |
| constituent | 2224/8583 Solid-solid interdiffusion, e.g. "direct |
| 2224/85773 Rhodium (Rh) as principal constituent | bonding" 2224/8584 Sintering |
| 2224/85776 Ruthenium (Ru) as principal constituent | 2224/8585 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, |
| 2224/85778 Iridium (Ir) as principal | polyester |
| constituent 2224/85779 Niobium (Nb) as principal | 2224/85855 Hardening the adhesive by curing, i.e. thermosetting |
| constituent | 2224/85856 Pre-cured adhesive, i.e. B-stage |
| 2224/8578 Molybdenum (Mo) as principal constituent | adhesive 2224/85859 Localised curing of parts of the |
| 2224/85781 Tantalum (Ta) as principal | connector |
| constituent 2224/85783 Rhenium (Re) as principal | 2224/85862 Heat curing 2224/85865 Microwave curing |
| constituent | 2224/85868 Infrared [IR] curing |
| 2224/85784 Tungsten (W) as principal constituent | 2224/85871 Visible light curing 2224/85874 Ultraviolet [UV] curing |
| 2224/85786 with a principal constituent of the | 2224/85877 Moisture curing, i.e. curing by exposing |
| material being a non metallic, non metalloid inorganic material | to humidity, e.g. for silicones and polyurethanes |
| 2224/85787 Ceramics, e.g. crystalline carbides, nitrides or oxides (glass | 2224/8588 Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives |
| ceramics <u>H01L 2224/85788</u>) | 2224/85885 Combinations of two or more |
| 2224/85788 Glasses, e.g. amorphous oxides, nitrides or fluorides | hardening methods provided for in at least two different groups from |
| 2224/8579 with a principal constituent of | <u>H01L 2224/85855</u> - <u>H01L 2224/8588</u> , e.g. for hybrid thermoplastic-thermosetting |
| the material being a polymer, e.g. polyester, phenolic based polymer, | adhesives |
| epoxy | 2224/8589 using an inorganic non metallic glass type |
| | adhesive, e.g. solder glass |

| 2224/07002 | 2224/0<000 P + + + 64 |
|---|--|
| 2224/85893 Anodic bonding, i.e. bonding by applying a | 2224/86009 Pre-treatment of the connector or the bonding |
| voltage across the interface in order to induce ions migration leading to an irreversible | area |
| chemical bond | 2224/8601 Cleaning, e.g. oxide removal step, |
| 2224/85895 Direct bonding, i.e. joining surfaces | desmearing |
| by means of intermolecular attracting | 2224/8603 Reshaping |
| interactions at their interfaces, e.g. covalent | 2224/86031 by chemical means, e.g. etching, |
| bonds, van der Waals forces | anodisation |
| 2224/85897 between electrically conductive surfaces, | 2224/86035 by heating |
| e.g. copper-copper direct bonding, surface | 2224/86039 using a laser |
| activated bonding | 2224/86045 using a corona discharge, e.g. electronic |
| 2224/85898 between electrically insulating surfaces, | flame off [EFO] |
| e.g. oxide or nitride layers | 2224/86047 by mechanical means, e.g. severing, |
| 2224/85899 Combinations of bonding methods provided | pressing, stamping |
| for in at least two different groups from | 2224/86048 Thermal treatment, e.g. annealing, controlled |
| H01L 2224/858 - H01L 2224/85898 | pre-heating or pre-cooling |
| 2224/859 involving monitoring, e.g. feedback loop | 2224/86051 Forming additional members |
| 2224/85909 Post-treatment of the connector or wire | 2224/86053 Bonding environment |
| bonding area | 2224/86054 Composition of the atmosphere |
| 2224/8591 Cleaning, e.g. oxide removal step, | 2224/86085 being a liquid, e.g. fluidic self-assembly |
| desmearing | 2224/8609 Vacuum |
| 2224/85911 Chemical cleaning, e.g. etching, flux | 2224/86091 Under pressure |
| 2224/85912 Mechanical cleaning, e.g. abrasion | 2224/86095 Temperature settings |
| using hydro blasting, brushes, ultrasonic | 2224/86096 Transient conditions |
| cleaning, dry ice blasting, gas-flow | 2224/86097 Heating |
| 2224/85913 Plasma cleaning | 2224/86098 Cooling |
| 2224/85914 Thermal cleaning, e.g. using laser ablation | 2224/86099 Ambient temperature |
| or by electrostatic corona discharge | 2224/861 the connector being supplied to the parts to be |
| 2224/85916 using a laser | connected in the bonding apparatus |
| 2224/85917 Electron beam cleaning | 2224/8611 involving protection against electrical |
| 2224/85919 Combinations of two or more | discharge, e.g. removing electrostatic charge |
| cleaning methods provided for in | 2224/8612 Aligning |
| at least two different groups from | 2224/86121 Active alignment, i.e. by apparatus steering, |
| <u>H01L 2224/8591</u> - <u>H01L 2224/85914</u> | e.g. optical alignment using marks or sensors |
| 2224/8592 Applying permanent coating, e.g. protective | 2224/86122 by detecting inherent features of, or |
| coating | outside, the semiconductor or solid-state |
| 2224/8593 Reshaping, e.g. for severing the wire, | body |
| modifying the wedge or ball or the loop | 2224/8613 using marks formed on the semiconductor |
| shape | or solid-state body |
| 2224/85931 by chemical means, e.g. etching | 2224/86132 using marks formed outside the |
| 2224/85935 by heating means, e.g. reflowing | semiconductor or solid-state body, i.e. |
| 2224/85937 using a polychromatic heating lamp | "off-chip" |
| 2224/85939 using a laser | 2224/86136 involving guiding structures, e.g. spacers or supporting members |
| 2224/85941 Induction heating, i.e. eddy currents | ** • |
| 2224/85943 using a flame torch, e.g. hydrogen torch | 2224/86138 the guiding structures being at least partially left in the finished device |
| 2224/85945 using a corona discharge, e.g. electronic | 2224/86143 Passive alignment, i.e. self alignment, e.g. |
| flame off [EFO] | using surface energy, chemical reactions, |
| 2224/85947 by mechanical means, e.g. "pull-and-cut", | thermal equilibrium |
| pressing, stamping | 2224/86148 involving movement of a part of the bonding |
| 2224/85948 Thermal treatments, e.g. annealing, | apparatus |
| controlled cooling | 2224/86149 being the lower part of the bonding |
| 2224/85951 Forming additional members, e.g. for | apparatus, i.e. holding means for the |
| reinforcing | bodies to be connected, e.g. XY table |
| 2224/85986 Specific sequence of steps, e.g. repetition of | 2224/8615 Rotational movements |
| manufacturing steps, time sequence | 2224/8616 Translational movements |
| 2224/86 using tape automated bonding [TAB] | 2224/86169 being the upper part of the bonding |
| 2224/86001 involving a temporary auxiliary member not | apparatus, e.g. nozzle |
| forming part of the bonding apparatus | 2224/8617 Rotational movement |
| 2224/86002 being a removable or sacrificial coating | 2224/8618 Translational movements |
| 2224/86005 being a temporary or sacrificial substrate | 2224/86181 connecting first on the semiconductor |
| 2224/86007 involving a permanent auxiliary member being | or solid-state body, i.e. on-chip, |
| left in the finished device, e.g. aids for holding | |
| or protecting the TAB connector during or after | |

or protecting the TAB connector during or after the bonding process

| 2224/06106 | 2224/06060 |
|---|---|
| 2224/86186 connecting first outside the | 2224/86868 Infrared [IR] curing |
| semiconductor or solid-state body, i.e. | 2224/86871 Visible light curing |
| off-chip | 2224/86874 Ultraviolet [UV] curing |
| 2224/86191 connecting first both on and outside | 2224/86877 Moisture curing, i.e. curing by exposing |
| the semiconductor or solid-state body | to humidity, e.g. for silicones and |
| 2224/862 Applying energy for connecting | polyurethanes |
| 2224/86201 Compression bonding | 2224/8688 Hardening the adhesive by cooling, e.g. for |
| 2224/86203 Thermo-compression bonding | thermoplastics or hot-melt adhesives |
| 2224/86205 Ultrasonic bonding | 2224/86885 Combinations of two or more hardening |
| 2224/86207 Thermosonic bonding | methods provided for in at least |
| 2224/8621 with energy being in the form of | two different groups selected from |
| electromagnetic radiation | H01L 2224/86855 - H01L 2224/8688, |
| 2224/86212 Induction heating, i.e. eddy currents | e.g. hybrid thermoplastic-thermosetting |
| 2224/86214 using a laser | adhesives |
| 2224/8623 Polychromatic or infrared lamp heating | 2224/8689 using an inorganic non metallic glass type |
| · · · | adhesive, e.g. solder glass |
| 2224/86232 using an autocatalytic reaction, e.g. | 2224/86893 Anodic bonding, i.e. bonding by applying a |
| exothermic brazing | voltage across the interface in order to induce |
| 2224/86234 using means for applying energy being | ions migration leading to an irreversible |
| within the device, e.g. integrated heater | chemical bond |
| 2224/86236 using electro-static corona discharge | 2224/86895 Direct bonding, i.e. joining surfaces |
| 2224/86237 using electron beam (electron beam in | by means of intermolecular attracting |
| general <u>B23K 15/00</u>) | interactions at their interfaces, e.g. covalent |
| 2224/86238 using electric resistance welding, i.e. | bonds, van der Waals forces |
| ohmic heating | 2224/86896 between electrically conductive surfaces, |
| 2224/8634 Bonding interfaces of the connector | e.g. copper-copper direct bonding, surface |
| 2224/86345 Shape, e.g. interlocking features | activated bonding |
| 2224/86355 having an external coating, e.g. protective | 2224/86897 between electrically insulating surfaces, |
| bond-through coating | e.g. oxide or nitride layers |
| 2224/86359 Material | 2224/86899 Combinations of bonding methods provided |
| 2224/8636 Bonding interfaces of the semiconductor or | |
| solid state body | for in at least two different groups from |
| 2224/86365 Shape, e.g. interlocking features | <u>H01L 2224/868</u> - <u>H01L 2224/86897</u> |
| | 2224/869 involving monitoring, e.g. feedback loop |
| 2224/86375 having an external coating, e.g. protective | 2224/86909 Post-treatment of the connector or the bonding |
| bond-through coating | area |
| 2224/86379 Material | 2224/8691 Cleaning, e.g. oxide removal step, |
| 2224/8638 Bonding interfaces outside the semiconductor | desmearing |
| or solid-state body | 2224/9602 Darkania |
| | 2224/8693 Reshaping |
| 2224/86385 Shape, e.g. interlocking features | 2224/86931 by chemical means, e.g. etching, |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective | |
| 2224/86385 Shape, e.g. interlocking features | 2224/86931 by chemical means, e.g. etching, |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping |
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| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface 2224/8681 involving forming an intermetallic compound at the bonding interface | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping 2224/86948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling |
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| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface 2224/8681 involving forming an intermetallic compound at the bonding interface 2224/86815 Reflow soldering 2224/8682 Diffusion bonding 2224/86825 Solid-liquid interdiffusion | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping 2224/86948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/86951 Forming additional members 2224/86986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface 2224/8681 involving forming an intermetallic compound at the bonding interface 2224/86815 Reflow soldering 2224/8682 Diffusion bonding 2224/8683 Solid-liquid interdiffusion 2224/8683 Solid-solid interdiffusion | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping 2224/86948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/86951 Forming additional members 2224/86986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/89 . using at least one connector not provided for in |
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| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface 2224/8681 involving forming an intermetallic compound at the bonding interface 2224/86815 Reflow soldering 2224/8682 Diffusion bonding 2224/8683 Solid-liquid interdiffusion 2224/8684 Solid-solid interdiffusion 2224/8685 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester | 2224/86931 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping 2224/86948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/86951 Forming additional members 2224/86986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/89 . using at least one connector not provided for in any of the groups H01L 2224/81 - H01L 2224/86 2224/90 . Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be |
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| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface 2224/8681 involving forming an intermetallic compound at the bonding interface 2224/8681 Reflow soldering 2224/8682 Diffusion bonding 2224/8683 Solid-liquid interdiffusion 2224/8684 Sintering 2224/8685 Solid-solid interdiffusion 2224/8685 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester 2224/8685 Hardening the adhesive by curing, i.e. thermosetting 2224/8685 Pre-cured adhesive, i.e. B-stage adhesive | 2224/86935 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping 2224/86948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/86951 Forming additional members 2224/86986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/89 . using at least one connector not provided for in any of the groups HOIL 2224/81 - HOIL 2224/86 2224/90 . Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips 2224/91 . Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups HOIL 2224/80 - HOIL 2224/90 |
| 2224/86385 Shape, e.g. interlocking features 2224/86395 having an external coating, e.g. protective bond-through coating 2224/86399 Material 2224/868 Bonding techniques 2224/86801 Soldering or alloying 2224/86805 involving forming a eutectic alloy at the bonding interface 2224/8681 involving forming an intermetallic compound at the bonding interface 2224/8681 Reflow soldering 2224/8682 Diffusion bonding 2224/8682 Solid-liquid interdiffusion 2224/8683 Solid-solid interdiffusion 2224/8684 Sintering 2224/8685 using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester 2224/8685 Hardening the adhesive by curing, i.e. thermosetting 2224/8685 Pre-cured adhesive, i.e. B-stage adhesive 2224/86859 Localised curing of parts of the connector | 2224/86935 by chemical means, e.g. etching, anodisation 2224/86935 by heating means 2224/86939 using a laser 2224/86945 using a corona discharge, e.g. electronic flame off [EFO] 2224/86947 by mechanical means, e.g. severing, pressing, stamping 2224/86948 Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling 2224/86951 Forming additional members 2224/86986 Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence 2224/89 using at least one connector not provided for in any of the groups H01L 2224/81 - H01L 2224/86 2224/90 . Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips 2224/91 . Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups |
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| 2224/9201 • • • Forming connectors during the connecting process, e.g. in-situ formation of bumps | 2224/92172 the first connecting process involving a TAB connector |
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| 2224/9202 • • • Forming additional connectors after the connecting process | 2224/92173 the second connecting process involving a bump connector |
| 2224/9205 Intermediate bonding steps, i.e. partial connection of the semiconductor or solid-state | 2224/92174 the second connecting process involving a build-up interconnect |
| body during the connecting process 2224/921 Connecting a surface with connectors of | 2224/92175 the second connecting process involving a layer connector |
| different types | 2224/92176 the second connecting process involving |
| 2224/9211 Parallel connecting processes | a strap connector |
| 2224/9212 Sequential connecting processes | 2224/92177 the second connecting process involving |
| 2224/92122 the first connecting process involving a bump connector | a wire connector |
| 2224/92124 the second connecting process involving a build-up interconnect | 2224/922 Connecting different surfaces of the semiconductor or solid-state body with connectors of different types |
| 2224/92125 the second connecting process involving | 2224/9221 Parallel connecting processes |
| a layer connector | 2224/9222 Sequential connecting processes |
| 2224/92127 the second connecting process involving a wire connector | 2224/92222 the first connecting process involving a bump connector |
| 2224/92132 the first connecting process involving a build-up interconnect | 2224/92224 the second connecting process involving a build-up interconnect |
| 2224/92133 the second connecting process involving a bump connector | 2224/92225 the second connecting process involving a layer connector |
| 2224/92135 the second connecting process involving a layer connector | 2224/92226 the second connecting process involving a strap connector |
| 2224/92136 the second connecting process involving a strap connector | 2224/92227 the second connecting process involving a wire connector |
| 2224/92137 the second connecting process involving a wire connector | 2224/92228 the second connecting process involving a TAB connector |
| 2224/92138 the second connecting process involving a TAB connector | 2224/92242 the first connecting process involving a layer connector |
| 2224/92142 the first connecting process involving a layer connector | 2224/92244 the second connecting process involving a build-up interconnect |
| 2224/92143 the second connecting process involving a bump connector | 2224/92246 the second connecting process involving a strap connector |
| 2224/92144 the second connecting process involving a build-up interconnect | 2224/92247 the second connecting process involving a wire connector |
| 2224/92147 the second connecting process involving a wire connector | 2224/92248 the second connecting process involving a TAB connector |
| 2224/92148 the second connecting process involving a TAB connector | 2224/92252 the first connecting process involving a strap connector |
| 2224/92152 the first connecting process involving a strap connector | 2224/92253 the second connecting process involving a bump connector |
| 2224/92153 the second connecting process involving a bump connector | 2224/92255 the second connecting process involving a layer connector |
| 2224/92155 the second connecting process involving | 2224/93 • Batch processes |
| a layer connector | 2224/94 at wafer-level, i.e. with connecting carried out |
| 2224/92157 the second connecting process involving a wire connector | on a wafer comprising a plurality of undiced individual devices |
| 2224/92158 the second connecting process involving a TAB connector | • at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips |
| 2224/92162 the first connecting process involving a wire connector | 2224/95001 involving a temporary auxiliary member not forming part of the bonding apparatus, |
| 2224/92163 the second connecting process involving a bump connector | e.g. removable or sacrificial coating, film or substrate |
| 2224/92164 the second connecting process involving a build-up interconnect | 2224/95053 Bonding environment 2224/95085 being a liquid, e.g. for fluidic self-assembly |
| 2224/92165 the second connecting process involving a layer connector | 2224/95091 Under pressure 2224/95092 Atmospheric pressure, e.g. dry self- |
| 2224/92166 the second connecting process involving a strap connector | assembly 2224/95093 Transient conditions, e.g. assisted by a gas |
| 2224/92168 the second connecting process involving | flow or a liquid flow |
| a TAB connector | 2224/951 Supplying the plurality of semiconductor or solid-state bodies |

| 2224/95101 in a liquid medium | |
|--|---|
| | 2225/06531 Non-galvanic coupling, e.g. capacitive |
| 2224/95102 being a colloidal droplet | coupling |
| 2224/9511 using a rack or rail | 2225/06534 Optical coupling |
| 2224/95115 using a roll-to-roll transfer technique | 2225/06537 Electromagnetic shielding |
| 2224/9512 Aligning the plurality of semiconductor or | 2225/06541 Conductive via connections through the |
| solid-state bodies | device, e.g. vertical interconnects, through |
| 2224/95121 Active alignment, i.e. by apparatus steering | silicon via [TSV] (manufacturing via |
| 2224/95122 by applying vibration | connections per se H01L 21/76898) |
| 2224/95123 by applying a pressurised fluid flow, e.g. | 2225/06544 Design considerations for via |
| liquid or gas flow | connections, e.g. geometry or layout |
| 2224/95133 by applying an electromagnetic field | 2225/06548 Conductive via connections through the |
| 2224/95134 Electrowetting, i.e. by changing the | substrate, container, or encapsulation |
| surface energy of a droplet | 2225/06551 Conductive connections on the side of the |
| 2224/95136 involving guiding structures, e.g. shape | device |
| matching, spacers or supporting members | 2225/06555 Geometry of the stack, e.g. form of the |
| 2224/95143 Passive alignment, i.e. self alignment, e.g. | devices, geometry to facilitate stacking |
| using surface energy, chemical reactions, | 2225/06558 the devices having passive surfaces |
| thermal equilibrium | facing each other, i.e. in a back-to-back |
| 2224/95144 Magnetic alignment, i.e. using permanent | arrangement |
| magnetic parts in the semiconductor or | 2225/06562 at least one device in the stack being |
| solid-state body | rotated or offset |
| 2224/95145 Electrostatic alignment, i.e. polarity | 2225/06565 the devices having the same size and there being no auxiliary carrier between |
| alignment with Coulomb charges | the devices |
| 2224/95146 by surface tension | 2225/06568 the devices decreasing in size, e.g. |
| 2224/95147 by molecular lock-key, e.g. by DNA | pyramidical stack |
| 2224/95148 involving movement of a part of the bonding | 2225/06572 Auxiliary carrier between devices, the |
| apparatus | carrier having an electrical connection |
| 2224/96 the devices being encapsulated in a common | structure |
| layer, e.g. neo-wafer or pseudo-wafer, said | 2225/06575 Auxiliary carrier between devices, the |
| common layer being separable into individual | carrier having no electrical connection |
| assemblies after connecting | structure |
| 2224/97 the devices being connected to a common substrate, e.g. interposer, said common | 2225/06579 TAB carriers; beam leads |
| substrate, e.g. interposer, said common substrate being separable into individual | 2225/06582 Housing for the assembly, e.g. chip scale |
| assemblies after connecting | package [CSP] |
| 2224/98 • Methods for disconnecting semiconductor or solid- | 2225/06586 Housing with external bump or bump- |
| state bodies | like connectors |
| | 2225/06589 Thermal management, e.g. cooling |
| Details relating to assemblies covered by the group | 2225/06593 Mounting aids permanently on device; |
| H01L 25/00 but not provided for in its subgroups | arrangements for alignment (use of |
| . All the devices being of a type provided | temporary supports <u>H01L 21/6835</u>) |
| for in the same subgroup of groups | |
| | 2225/06596 Structural arrangements for testing (testing |
| <u>H01L 27/00</u> - <u>H01L 33/648</u> and <u>H10K 99/00</u> | or measuring during manufacture or |
| 2225/04 the devices not having separate containers | or measuring during manufacture or treatment <u>H01L 22/00</u> ; testing electrical |
| 2225/04 the devices not having separate containers 2225/065 the devices being of a type provided for in | or measuring during manufacture or treatment <u>H01L 22/00</u> ; testing electrical properties or locating electrical faults |
| 2225/04 the devices not having separate containers 2225/065 the devices being of a type provided for in group H01L 27/00 | or measuring during manufacture or treatment <u>H01L 22/00</u> ; testing electrical properties or locating electrical faults <u>G01R 31/00</u>) |
| 2225/04 the devices not having separate containers 2225/065 the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers |
| 2225/04 the devices not having separate containers 2225/065 the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in |
| 2225/04 the devices not having separate containers 2225/065 the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 |
| 2225/04 the devices not having separate containers 2225/065 the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 the devices having separate containers 2225/1005 the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked |
| 2225/04 . the devices not having separate containers 2225/065 . the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 . the containers being in a stacked arrangement |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 • the devices having separate containers 2225/1005 • the devices being of a type provided for in group H01L 27/00 2225/1011 • the containers being in a stacked arrangement 2225/1017 • the lowermost container comprising a device support |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices Wire or wire-like electrical connections from device to substrate Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a device support 2225/1023 the support being an insulating substrate |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 the devices having separate containers 2225/1005 the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a device support 2225/1023 the support being an insulating substrate 2225/1029 the support being a lead frame |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 the devices having separate containers 2225/1005 the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a device support 2225/1023 the support being an insulating substrate 2225/1029 the support being a lead frame 2225/1035 the device being entirely enclosed by the |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a device support 2225/1023 the support being an insulating substrate 2225/1029 the support being a lead frame 2225/1035 the device being entirely enclosed by the support, e.g. high-density interconnect |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical connections from substrate to substrate | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a device support 2225/1023 the support being an insulating substrate 2225/1029 the device being entirely enclosed by the support, e.g. high-density interconnect [HDI] |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical connections from substrate to substrate 2225/06524 Electrical connections formed on device | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 the containers being in a stacked arrangement 2225/1017 the lowermost container comprising a device support 2225/1023 the support being an insulating substrate 2225/1029 the support being a lead frame 2225/1035 the device being entirely enclosed by the support, e.g. high-density interconnect [HDI] 2225/1041 Special adaptations for top connections of |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical connections from substrate to substrate 2225/06524 Electrical connections formed on device or on substrate, e.g. a deposited or grown | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 . the devices having separate containers 2225/1005 . the devices being of a type provided for in group H01L 27/00 2225/1011 . the containers being in a stacked arrangement 2225/1027 . the lowermost container comprising a device support 2225/1023 the support being an insulating substrate 2225/1029 the support being a lead frame 2225/1035 the device being entirely enclosed by the support, e.g. high-density interconnect [HDI] 2225/1041 Special adaptations for top connections of the lowermost container, e.g. redistribution |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical connections from substrate to substrate 2225/06524 Electrical connections formed on device or on substrate, e.g. a deposited or grown layer | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 • the devices having separate containers 2225/1005 • the devices being of a type provided for in group H01L 27/00 2225/1011 • • the containers being in a stacked arrangement 2225/1017 • • the lowermost container comprising a device support 2225/1023 • • • the support being an insulating substrate 2225/1029 • • • the support being a lead frame 2225/1035 • • • the device being entirely enclosed by the support, e.g. high-density interconnect [HDI] 2225/1041 • • • Special adaptations for top connections of the lowermost container, e.g. redistribution layer, integral interposer |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical connections from substrate to substrate 2225/06524 Electrical connections formed on device or on substrate, e.g. a deposited or grown layer 2225/06527 Special adaptation of electrical | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 • the devices having separate containers 2225/1005 • the devices being of a type provided for in group H01L 27/00 2225/1011 • the containers being in a stacked arrangement 2225/1027 • the lowermost container comprising a device support 2225/1023 • the support being an insulating substrate 2225/1029 • the support being a lead frame 2225/1035 • the device being entirely enclosed by the support, e.g. high-density interconnect [HDI] 2225/1041 • Special adaptations for top connections of the lowermost container, e.g. redistribution layer, integral interposer 2225/1047 • Details of electrical connections between |
| 2225/04 the devices not having separate containers the devices being of a type provided for in group H01L 27/00 2225/06503 Stacked arrangements of devices 2225/06506 Wire or wire-like electrical connections between devices 2225/0651 Wire or wire-like electrical connections from device to substrate 2225/06513 Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps 2225/06517 Bump or bump-like direct electrical connections from device to substrate 2225/0652 Bump or bump-like direct electrical connections from substrate to substrate 2225/06524 Electrical connections formed on device or on substrate, e.g. a deposited or grown layer | or measuring during manufacture or treatment H01L 22/00; testing electrical properties or locating electrical faults G01R 31/00) 2225/10 • the devices having separate containers 2225/1005 • the devices being of a type provided for in group H01L 27/00 2225/1011 • • the containers being in a stacked arrangement 2225/1017 • • the lowermost container comprising a device support 2225/1023 • • • the support being an insulating substrate 2225/1029 • • • the support being a lead frame 2225/1035 • • • the device being entirely enclosed by the support, e.g. high-density interconnect [HDI] 2225/1041 • • • Special adaptations for top connections of the lowermost container, e.g. redistribution layer, integral interposer |

| 2225/1058 | Bump or bump-like electrical | 2924/01017 Chlorine [Cl] |
|--------------|---|--|
| | connections, e.g. balls, pillars, posts | 2924/01018 Argon [Ar] |
| 2225/1064 | Electrical connections provided on | 2924/01019 Potassium [K] |
| | a side surface of one or more of the | 2924/0102 Calcium [Ca] |
| | containers | 2924/01021 Scandium [Sc] |
| 2225/107 | Indirect electrical connections, e.g. via | 2924/01022 Titanium [Ti] |
| | an interposer, a flexible substrate, using | 2924/01023 Vanadium [V] |
| | TAB (printed circuits <u>H05K 1/00</u>) | 2924/01024 Chromium [Cr] |
| | Shape of the containers | 2924/01025 • • Manganese [Mn] |
| 2225/1082 | • • • • for improving alignment between | 2924/01026 • • Iron [Fe] |
| | containers, e.g. interlocking features | 2924/01027 Cobalt [Co] |
| 2225/1088 | Arrangements to limit the height of the | 2924/01028 . Nickel [Ni] |
| | assembly | 2924/01029 Copper [Cu] |
| 2225/1094 | Thermal management, e.g. cooling | 2924/01029 Copper [Cu] 2924/0103 Zinc [Zn] |
| 2229/00 | Indexing scheme for semiconductor devices | |
| 2229/00 | adapted for rectifying, amplifying, oscillating or | 2924/01031 Gallium [Ga] |
| | switching, or capacitors or resistors with at least | 2924/01032 Germanium [Ge] |
| | one potential-jump barrier or surface barrier, for | 2924/01033 Arsenic [As] |
| | details of semiconductor bodies or of electrodes | 2924/01034 Selenium [Se] |
| | thereof, or for multistep manufacturing processes | 2924/01035 Bromine [Br] |
| | therefor | 2924/01036 Krypton [Kr] |
| | | 2924/01037 Rubidium [Rb] |
| 2924/00 | Indexing scheme for arrangements or methods | 2924/01038 Strontium [Sr] |
| | for connecting or disconnecting semiconductor or | 2924/01039 Yttrium [Y] |
| | solid-state bodies as covered by H01L 24/00 | 2924/0104 Zirconium [Zr] |
| 2924/0001 | Technical content checked by a classifier | 2924/01041 Niobium [Nb] |
| | NOTE | 2924/01042 • • Molybdenum [Mo] |
| | | 2924/01043 • • Technetium [Tc] |
| | Codes <u>H01L 2924/0001</u> - <u>H01L 2924/0002</u> are | 2924/01044 • Ruthenium [Ru] |
| | used to describe the status of reclassification; | 2924/01045 . Rhodium [Rh] |
| | they do not relate to technical features as such | 2924/01046 Palladium [Pd] |
| 2924/00011 | • Not relevant to the scope of the group, the symbol | |
| 2)24/00011 | of which is combined with the symbol of this | 2924/01047 Silver [Ag] |
| | group | 2924/01048 Cadmium [Cd] |
| 2924/00012 | Relevant to the scope of the group, the symbol of | 2924/01049 Indium [In] |
| 272 1/00012 | which is combined with the symbol of this group | 2924/0105 Tin [Sn] |
| 2924/00013 | Fully indexed content | 2924/01051 Antimony [Sb] |
| | the subject-matter covered by the group, the | 2924/01052 Tellurium [Te] |
| 2)24/00014 | symbol of which is combined with the symbol | 2924/01053 Iodine [I] |
| | of this group, being disclosed without further | 2924/01054 Xenon [Xe] |
| | technical details | 2924/01055 Cesium [Cs] |
| 2924/00015 | • • the subject-matter covered by the group, the | 2924/01056 Barium [Ba] |
| 2)2 !/ 00010 | symbol of which is combined with the symbol of | 2924/01057 Lanthanum [La] |
| | this group, being disclosed as prior art | 2924/01058 Cerium [Ce] |
| 2924/0002 | • Not covered by any one of groups H01L 24/00, | 2924/01059 Praseodymium [Pr] |
| | H01L 24/00 and H01L 2224/00 | 2924/0106 Neodymium [Nd] |
| 2924/01 | • Chemical elements | 2924/01061 Promethium [Pm] |
| | Hydrogen [H] | 2924/01062 Samarium [Sm] |
| | Helium [He] | 2924/01063 • • Europium [Eu] |
| | . Lithium [Li] | 2924/01064 Gadolinium [Gd] |
| | Beryllium [Be] | 2924/01065 Terbium [Tb] |
| | . Boron [B] | 2924/01066 • Dysprosium [Dy] |
| | . Carbon [C] | 2924/01067 Holmium [Ho] |
| | Nitrogen [N] | 2924/01068 . Erbium [Er] |
| | | |
| | . Oxygen [O] | 2924/01069 Thulium [Tm] |
| | Fluorine [F] | 2924/0107 . Ytterbium [Yb] |
| | Neon [Ne] | 2924/01071 Lutetium [Lu] |
| | Sodium [Na] | 2924/01072 Hafnium [Hf] |
| | Magnesium [Mg] | 2924/01073 Tantalum [Ta] |
| | Aluminum [Al] | 2924/01074 Tungsten [W] |
| 2924/01014 | Silicon [Si] | 2924/01075 Rhenium [Re] |
| | Phosphorus [P] | 2924/01076 Osmium [Os] |
| 2924/01016 | Sulfur [S] | 2924/01077 • • Iridium [Ir] |
| | | |

| 2924/01078 Platinum [Pt] | 2924/01402 • • Invar, i.e. single-phase alloy of around 36% |
|---|--|
| 2924/01079 Gold [Au] | nickel and 64% iron |
| 2924/0108 Mercury [Hg] | 2924/01403 Kovar, i.e. FeNiCo alloys |
| 2924/01081 Thallium [T1] | 2924/01404 Alloy 42, i.e. FeNi42 |
| 2924/01082 Lead [Pb] | 2924/01405 Inovco, i.e. Fe-33Ni-4.5Co |
| 2924/01083 Bismuth [Bi] | Borides composed of metals from groups of the |
| 2924/01084 Polonium [Po] | periodic table |
| 2924/01085 Astatine [At] | 2924/0421 1st Group |
| 2924/01086 Radon [Rn] | 2924/0422 2nd Group |
| 2924/01087 Francium [Fr] | 2924/0423 3rd Group |
| 2924/01088 Radium [Ra] | 2924/0424 4th Group |
| 2924/01089 Actinium [Ac] | 2924/0425 5th Group |
| 2924/0109 Thorium [Th] | 2924/0426 6th Group |
| 2924/01091 Protactinium [Pa] | 2924/0427 • • • 7th Group |
| 2924/01092 Uranium [U] | 2924/0428 8th Group |
| 2924/01093 Neptunium [Np] | 2924/0429 9th Group |
| 2924/01094 Plutonium [Pu] | 2924/044 10th Group |
| 2924/011 • Groups of the periodic table | 2924/0441 11th Group |
| 2924/01101 Alkali metals | 2924/0442 • 12th Group |
| 2924/01102 Alkali earth metals | 2924/0443 • • 13th Group |
| 2924/01103 Transition metals | 2924/0444 14th Group |
| 2924/01104 Refractory metals | 2924/0445 Lanthanides |
| 2924/01105 Rare earth metals | 2924/0446 Actinides |
| 2924/01106 Lanthanides, i.e. Ce, Pr, Nd, Pm, Sm, Eu, Gd, | 2924/0449 being a combination of two or more |
| Tb, Dy, Ho, Er, Tm, Yb, Lu | materials provided in the groups |
| 2924/01107 Actinides, i.e. Th, Pa, U, Np, Pu, Am, Cm, Bk, | <u>H01L 2924/0421</u> - <u>H01L 2924/0446</u> |
| Cf, Es, Fm, Md, No, Lr | 2924/04491 having a monocrystalline microstructure |
| 2924/01108 Noble metals | 2924/04492 having a polycrystalline microstructure |
| 2924/01109 Metalloids or Semi-metals | 2924/04494 having an amorphous microstructure, i.e. glass |
| 2924/0111 Chalcogens | 2924/045 • Carbides composed of metals from groups of the periodic table |
| 2924/01111 Halogens | |
| 2924/01112 Noble gases | 2924/0451 1st Group |
| 2924/012 • Semiconductor purity grades | 2924/0452 • • 2nd Group |
| 2924/01201 1N purity grades, i.e. 90% | 2924/0453 • • 3rd Group |
| 2924/01202 2N purity grades, i.e. 99% | 2924/0454 • • 4th Group |
| 2924/01203 3N purity grades, i.e. 99.9% | 2924/04541 TiC |
| 2924/01204 4N purity grades, i.e. 99.99% | 2924/0455 • • 5th Group |
| 2924/01205 5N purity grades, i.e. 99.999% | 2924/0456 6th Group 2924/04563 WC |
| 2924/01206 • • 6N purity grades, i.e. 99.9999% | |
| 2924/01207 • • 7N purity grades, i.e. 99.99999% | 2924/0457 7th Group 2924/0458 8th Group |
| 2924/01208 8N purity grades, i.e. 99.999999% | - |
| 2924/013 • Alloys | 2924/0459 • • 9th Group |
| 2924/0132 Binary Alloys | 2924/046 • 10th Group |
| 2924/01321 Isomorphous Alloys | 2924/0461 11th Group |
| 2924/01322 Eutectic Alloys, i.e. obtained by a liquid | 2924/0462 • • 12th Group |
| transforming into two solid phases | 2924/0463 13th Group |
| 2924/01323 Hypoeutectic alloys i.e. with compositions | 2924/0464 14th Group |
| lying to the left of the eutectic point | 2924/04642 SiC |
| 2924/01324 Hypereutectic alloys i.e. with compositions | 2924/0465 • Lanthanides |
| lying to the right of the eutectic point | 2924/0466 • Actinides |
| 2924/01325 Peritectic Alloys, i.e. obtained by a liquid and | 2924/0469 being a combination of two or more |
| a solid transforming into a new and different | materials provided in the groups H01L 2924/0451 - H01L 2924/0466 |
| solid phase 2924/01326 Monotectics, i.e. obtained by a liquid | 2924/04691 • having a monocrystalline microstructure |
| transforming into a solid and a new and | 2924/04692 having a polycrystalline microstructure |
| different liquid phase | 2924/04694 • having an amorphous microstructure, i.e. glass |
| 2924/01327 Intermediate phases, i.e. intermetallics | 2924/047 • Silicides composed of metals from groups of the |
| compounds | • Sincides composed of metals from groups of the periodic table |
| 2924/0133 Ternary Alloys | 2924/0471 • • 1st Group |
| 2924/0134 Quaternary Alloys | 2924/0472 • 2nd Group |
| 2924/0135 Quinary Alloys | |
| 2)24/0133 • • Quinary Tinoys | - |
| 2924/014 . Solder alloys | 2924/0473 3rd Group 2924/0474 4th Group |

| 2924/0475 • • 5th Group | 2924/0525 • Lanthanides |
|--|--|
| 2924/0476 • • 6th Group | 2924/0526 Actinides |
| 2924/0477 7th Group | 2924/0529 being a combination of two or more |
| 2924/0478 8th Group | materials provided in the groups H01L 2924/0511 - H01L 2924/0526 |
| 2924/0479 9th Group | 2924/05291 • having a monocrystalline microstructure |
| 2924/048 10th Group | 2924/05292 • having a polycrystalline microstructure |
| 2924/0481 11th Group | 2924/05294 • having an amorphous microstructure, i.e. glass |
| 2924/0482 12th Group | 2924/053 • Oxides composed of metals from groups of the |
| 2924/0483 13th Group | periodic table |
| 2924/0484 14th Group | 2924/0531 • • 1st Group |
| 2924/0485 . Lanthanides | 2924/0532 2nd Group |
| 2924/0486 • Actinides | 2924/0533 3rd Group |
| 2924/0489 being a combination of two or more materials provided in the groups | 2924/0534 4th Group |
| H01L 2924/0471 - H01L 2924/0486 | 2924/05341 TiO ₂ |
| 2924/04891 having a monocrystalline microstructure | 2924/05342 ZrO ₂ |
| 2924/04892 having a monocrystalline microstructure | 2924/0535 • • 5th Group |
| 2924/04894 • having an amorphous microstructure, i.e. glass | 2924/0536 • • 6th Group |
| 2924/049 • Nitrides composed of metals from groups of the | 2924/0537 • • 7th Group |
| periodic table | 2924/0538 • • 8th Group |
| 2924/0491 1st Group | 2924/05381 FeOx |
| 2924/0492 2nd Group | 2924/0539 • • 9th Group |
| 2924/0493 3rd Group | 2924/054 10th Group |
| 2924/0494 • • 4th Group | 2924/0541 11th Group |
| 2924/04941 TiN | 2924/0542 12th Group |
| 2924/0495 5th Group | 2924/0543 13th Group |
| 2924/04953 TaN | 2924/05432 Al ₂ O ₃ |
| 2924/0496 6th Group | 2924/0544 14th Group |
| 2924/0497 7th Group | 2924/05442 SiO ₂ |
| 2924/0498 8th Group | 2924/0545 Lanthanides |
| 2924/0499 • • 9th Group | 2924/0546 Actinides |
| | |
| 2924/05 10th Group | 2924/0549 being a combination of two or more |
| 2924/05 10th Group 2924/0501 11th Group | materials provided in the groups |
| • | materials provided in the groups <u>H01L 2924/0531</u> - <u>H01L 2924/0546</u> |
| 2924/0501 11th Group | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 . having a monocrystalline microstructure |
| 2924/0501 11th Group 2924/0502 12th Group | materials provided in the groups HO1L 2924/0531 - HO1L 2924/0546 2924/05491 having a monocrystalline microstructure 2924/05492 having a polycrystalline microstructure |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 . having a monocrystalline microstructure 2924/05492 . having a polycrystalline microstructure 2924/05494 . having an amorphous microstructure, i.e. glass |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN | materials provided in the groups |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 having a monocrystalline microstructure 2924/05494 having a polycrystalline microstructure 2924/05494 having an amorphous microstructure, i.e. glass Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/05042 Si ₃ N ₄ 2924/0505 Lanthanides 2924/0506 Actinides | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 • having a monocrystalline microstructure 2924/05494 • having a polycrystalline microstructure 2924/05494 • having an amorphous microstructure, i.e. glass 2924/055 • Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/05042 Si ₃ N ₄ 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 having a monocrystalline microstructure 2924/05492 having a polycrystalline microstructure 2924/05494 having an amorphous microstructure, i.e. glass Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 Ist Group |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/05042 Si ₃ N ₄ 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 having a monocrystalline microstructure 2924/05494 having a polycrystalline microstructure 2924/0555 Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 1st Group 2924/0552 2nd Group |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0504 Si ₃ N ₄ 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 | materials provided in the groups |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0504 Si ₃ N ₄ 2924/0505 . Lanthanides 2924/0506 . Actinides 2924/0509 . being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 . having a monocrystalline microstructure 2924/05492 . having a polycrystalline microstructure 2924/05494 . having an amorphous microstructure, i.e. glass 2924/055 . Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 . 1st Group 2924/0552 . 2nd Group 2924/0553 . 3rd Group 2924/0554 . 4th Group |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure | materials provided in the groups H01L 2924/0546 2924/05491 . having a monocrystalline microstructure 2924/05492 . having a polycrystalline microstructure 2924/05494 . having an amorphous microstructure, i.e. glass 2924/055 . Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 . 1st Group 2924/0552 . 2nd Group 2924/0553 . 3rd Group 2924/0554 . 4th Group 2924/0555 . 5th Group |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0505 Lanthanides 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure, i.e. glass | materials provided in the groups H01L 2924/0546 2924/05491 having a monocrystalline microstructure 2924/05494 having a polycrystalline microstructure 2924/0554 Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 Ist Group 2924/0553 The Group 2924/0555 The Group 2924/0556 The Group The G |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0504 Si ₃ N ₄ 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05094 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure 2924/051 . Phosphides composed of metals from groups of the | materials provided in the groups H01L 2924/0546 2924/05491 • having a monocrystalline microstructure 2924/05494 • having a polycrystalline microstructure 2924/0554 • having an amorphous microstructure, i.e. glass 2924/055 • Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 • 1st Group 2924/0552 • 2nd Group 2924/0553 • 3rd Group 2924/0555 • 5th Group 2924/0556 • 6th Group 2924/0557 • 7th Group |
| 2924/0501 . 11th Group 2924/0502 . 12th Group 2924/0503 . 13th Group 2924/05032 . AIN 2924/0504 . 14th Group 2924/0505 . Lanthanides 2924/0506 . Actinides 2924/0509 . being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having an amorphous microstructure 2924/05094 . having an amorphous microstructure, i.e. glass 2924/051 . Phosphides composed of metals from groups of the periodic table | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 . having a monocrystalline microstructure 2924/05492 . having a polycrystalline microstructure 2924/05494 . having an amorphous microstructure, i.e. glass 2924/055 . Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 . 1st Group 2924/0552 . 2nd Group 2924/0553 . 3rd Group 2924/0554 . 4th Group 2924/0555 . 5th Group 2924/0556 . 6th Group 2924/0557 . 7th Group 2924/0558 . 8th Group |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0505 Lanthanides 2924/0505 Lanthanides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure 2924/0511 . Phosphides composed of metals from groups of the periodic table 2924/0511 . 1st Group | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure, i.e. glass 2924/0511 . 1st Group 2924/0512 . 2nd Group | materials provided in the groups H01L 2924/0546 2924/05491 . having a monocrystalline microstructure 2924/05492 . having a polycrystalline microstructure 2924/05494 . having an amorphous microstructure, i.e. glass 2924/055 . Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 . 1st Group 2924/0552 . 2nd Group 2924/0553 . 3rd Group 2924/0554 . 4th Group 2924/0555 . 5th Group 2924/0556 . 6th Group 2924/0557 . 7th Group 2924/0559 . 8th Group 2924/0559 . 9th Group 2924/0559 . 10th Group |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AIN 2924/0504 14th Group 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure, i.e. glass 2924/051 . 1st Group 2924/0512 . 2nd Group 2924/0513 . 3rd Group | materials provided in the groups |
| 2924/0501 . 11th Group 2924/0502 . 12th Group 2924/0503 . 13th Group 2924/05032 . AIN 2924/0504 . 14th Group 2924/0505 . Lanthanides 2924/0506 . Actinides 2924/0509 . being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure, i.e. glass 2924/051 . 1st Group 2924/0512 . 2nd Group 2924/0513 . 3rd Group 2924/0514 . 4th Group | materials provided in the groups |
| 2924/0501 . 11th Group 2924/0502 . 12th Group 2924/0503 . 13th Group 2924/05032 . AIN 2924/0504 . 14th Group 2924/0505 . Lanthanides 2924/0506 . Actinides 2924/0509 . being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 . having a monocrystalline microstructure 2924/05092 . having a polycrystalline microstructure 2924/05094 . having an amorphous microstructure, i.e. glass 2924/051 . 1st Group 2924/0512 . 2nd Group 2924/0513 . 3rd Group 2924/0514 . 4th Group 2924/0515 . 5th Group | materials provided in the groups |
| 2924/0501 | materials provided in the groups |
| 2924/0501 | materials provided in the groups |
| 2924/0501 | materials provided in the groups |
| 2924/0501 11th Group 2924/0502 12th Group 2924/0503 13th Group 2924/05032 AlN 2924/0504 14th Group 2924/0505 Lanthanides 2924/0506 Actinides 2924/0509 being a combination of two or more materials provided in the groups H01L 2924/0491 - H01L 2924/0506 2924/05091 having a monocrystalline microstructure 2924/05092 having a polycrystalline microstructure 2924/05094 having an amorphous microstructure 2924/0510 . Phosphides composed of metals from groups of the periodic table 2924/0511 1st Group 2924/0512 2nd Group 2924/0513 3rd Group 2924/0514 4th Group 2924/0515 5th Group 2924/0517 7th Group 2924/0518 8th Group 2924/0519 9th Group | materials provided in the groups |
| 2924/0501 2924/0502 2924/0503 2924/05032 2924/0504 2924/0504 2924/0505 2924/0506 2924/0509 2924/0509 2924/05091 2924/05092 2924/05092 2924/05093 2924/05093 2924/05094 2924/05094 2924/05095 2924/05095 2924/05095 2924/05096 2924/05096 2924/05096 2924/05097 2924/05098 2924/05101 2924/05101 2924/0511 2924/0511 2924/0512 2924/0513 2924/0514 2924/0515 2924/0515 2924/0516 2924/0517 2924/0517 2924/0518 2924/0519 2924/052 2924/0519 2924/0519 2924/052 2924/0519 2924/052 2924/0519 2924/052 2924/0519 2924/052 2924/0519 2924/052 2924/0519 2924/052 2924/052 2924/0519 2924/052 2924/052 2924/052 2924/0519 2924/052 2924/052 2924/052 2924/0519 2924/052 | materials provided in the groups |
| 2924/0501 2924/0502 2924/0503 2924/0503 2924/0503 2924/0504 2924/0504 2924/0505 2924/0505 2924/0506 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0510 2924/0510 2924/0511 2924/0512 2924/0513 2924/0514 2924/0515 2924/0516 2924/0517 2924/0518 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0510 2924/0510 2924/0510 2924/0511 2924/0511 2924/0511 2924/0512 2924/0515 2924/0515 2924/0516 2924/0516 2924/0517 2924/0518 2924/0519 2924/0519 2924/0520 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05492 |
| 2924/0501 2924/0502 2924/0503 2924/0503 2924/0504 2924/0504 2924/0505 2924/0505 2924/0506 2924/0509 2924/0509 2924/0509 2924/05091 2924/05092 2924/05094 2924/05091 2924/05094 2924/05095 2924/05095 2924/05091 2924/05091 2924/05091 2924/05092 2924/05094 2924/05094 2924/0510 2924/0511 2924/0512 2924/0512 2924/0513 2924/0513 2924/0514 2924/0515 2924/0515 2924/0515 2924/0516 2924/0516 2924/0517 2924/0518 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0510 2924/0510 2924/0511 2924/0511 2924/0512 2924/0512 2924/0513 2924/0513 2924/0514 2924/0515 2924/0515 2924/0516 2924/0516 2924/0517 2924/0518 2924/0519 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 2924/0522 | materials provided in the groups |
| 2924/0501 2924/0502 2924/0503 2924/0503 2924/0503 2924/0504 2924/0504 2924/0505 2924/0505 2924/0506 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0509 2924/0510 2924/0510 2924/0511 2924/0512 2924/0513 2924/0514 2924/0515 2924/0516 2924/0517 2924/0518 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0519 2924/0510 2924/0510 2924/0510 2924/0511 2924/0511 2924/0511 2924/0512 2924/0515 2924/0515 2924/0516 2924/0516 2924/0517 2924/0518 2924/0519 2924/0519 2924/0520 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 2924/0521 | materials provided in the groups H01L 2924/0531 - H01L 2924/0546 2924/05491 . having a monocrystalline microstructure 2924/05492 . having a polycrystalline microstructure 2924/05494 . having an amorphous microstructure, i.e. glass 2924/055 . Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table 2924/0551 . 1st Group 2924/0552 . 2nd Group 2924/0553 . 3rd Group 2924/0554 . 4th Group 2924/0555 . 5th Group 2924/0556 . 6th Group 2924/0557 . 7th Group 2924/0558 . 8th Group 2924/0559 . 9th Group 2924/0561 . 10th Group 2924/0562 . 12th Group 2924/0563 . 13th Group 2924/0564 . 14th Group 2924/0565 . Lanthanides 2924/0566 . Actinides 2924/0569 . being a combination of two or more materials provided in the groups H01L 2924/0551 - H01L 2924/0566 2924/0569 . having a monocrystalline microstructure |

| 2924/057 | Halides composed of metals from groups of the | 2924/095 . with a principal constituent of the material being a |
|------------|---|---|
| | periodic table | combination of two or more materials provided in |
| | 1st Group | the groups <u>H01L 2924/013</u> - <u>H01L 2924/0715</u> |
| 2924/0572 | 2nd Group | 2924/0951 Glass epoxy laminates |
| 2924/0573 | 3rd Group | 2924/09511 FR-4 |
| 2924/0574 | 4th Group | 2924/09512 FR-5 |
| 2924/0575 | 5th Group | 2924/09522 G10 |
| 2924/0576 | 6th Group | 2924/09523 G11 |
| 2924/0577 | 7th Group | 2924/096 . Cermets, i.e. composite material composed of |
| 2924/0578 | 8th Group | ceramic and metallic materials |
| 2924/0579 | • 9th Group | 2924/0970 . Glass-ceramics, e.g. devitrified glass |
| 2924/058 | 10th Group | 2924/09701 Low temperature co-fired ceramic [LTCC] |
| 2924/0581 | 11th Group | 2924/10 • Details of semiconductor or other solid state devices to be connected |
| 2924/0582 | 12th Group | 2924/1011 Structure |
| | 13th Group | 2924/1015 . Shape |
| | 14th Group | 2924/10155 being other than a cuboid |
| 2924/0585 | . Lanthanides | 2924/10156 at the periphery |
| | . Actinides | 2924/10157 at the active surface |
| 2924/0589 | being a combination of two or more motorials provided in the groups | 2924/10158 at the passive surface |
| | materials provided in the groups H01L 2924/0571 - H01L 2924/0586 | 2924/1016 being a cuboid |
| 2024/05801 | having a monocrystalline microstructure | 2924/10161 with a rectangular active surface |
| | having a monocrystalline microstructure having a polycrystalline microstructure | 2924/10162 with a square active surface |
| | having a polycrystamic interostructure having an amorphous microstructure, i.e. glass | 2924/1017 being a sphere |
| 2924/059 | Being combinations of any of the materials from | 2924/102 • Material of the semiconductor or solid state |
| 2724/037 | the groups H01L 2924/042 - H01L 2924/0584, e.g. | bodies |
| | oxynitrides | 2924/1025 Semiconducting materials |
| 2924/05991 | having a monocrystalline microstructure | 2924/10251 Elemental semiconductors, i.e. Group IV |
| | having a polycrystalline microstructure | 2924/10252 Germanium [Ge] |
| | having an amorphous microstructure, i.e. glass | 2924/10253 Silicon [Si] |
| 2924/06 | • Polymers (polymers <u>per se C08</u> ; polymer adhesives | 2924/10254 Diamond [C] |
| | <u>C09J</u>) | 2924/1026 Compound semiconductors |
| 2924/061 | • • Polyolefin polymer | 2924/1027 IV |
| 2924/0615 | • • Styrenic polymer | 2924/10271 Silicon-germanium [SiGe] |
| 2924/062 | Halogenated polymer | 2924/10272 Silicon Carbide [SiC] |
| 2924/0625 | Polyvinyl alchohol | 2924/1032 III-V |
| 2924/063 | Polyvinyl acetate | 2924/10321 Aluminium antimonide [AlSb] |
| | Acrylic polymer | 2924/10322 Aluminium arsenide [AlAs] |
| 2924/064 | Graft polymer | 2924/10323 Aluminium nitride [AlN] |
| 2924/0645 | Block copolymer | 2924/10324 Aluminium phosphide [AIP] |
| 2924/065 | ABS | 2924/10325 Boron nitride [BN], e.g. cubic, |
| 2924/0655 | • Polyacetal | hexagonal, nanotube |
| 2924/066 | Phenolic resin | 2924/10326 Boron phosphide [BP] |
| 2924/0665 | Epoxy resin | 2924/10327 Boron arsenide [BAs, $B_{12}As_2$] |
| 2924/067 | Polyphenylene | 2924/10328 Gallium antimonide [GaSb] |
| 2924/0675 | Polyester | 2924/10329 Gallium arsenide [GaAs] |
| 2924/068 | Polycarbonate | 2924/1033 Gallium nitride [GaN] |
| 2924/0685 | Polyether | 2924/10331 Gallium phosphide [GaP] |
| 2924/069 | Polyurethane | 2924/10332 Indium antimonide [InSb] |
| 2924/0695 | . Polyamide | 2924/10333 Indium arsenide [InAs] |
| 2924/07 | 3 1 3 | 2924/10334 Indium nitride [InN] |
| | Polyamine | 2924/10335 Indium phosphide [InP] |
| | Polyimide | 2924/10336 Aluminium gallium arsenide [AlGaAs] |
| | Sulfur containing polymer | 2924/10337 Indium gallium arsenide [InGaAs] |
| | Polysiloxane | 2924/10338 Indium gallium phosphide [InGaP] |
| | Adhesive characteristics other than chemical | 2924/10339 Aluminium indium arsenide [AlInAs] |
| | not being an ohmic electrical conductor | 2924/1034 Aluminium indium antimonide [AlInSb] |
| | being an ohmic electrical conductor | 2924/10341 Gallium arsenide nitride [GaAsN] |
| 2924/U/811 | • • • Extrinsic, i.e. with electrical conductive fillers | 2924/10342 Gallium arsenide phosphide [GaAsP] 2924/10343 Gallium arsenide antimonide [GaAsSb] |
| 2924/07812 | Intrinsic, e.g. polyaniline [PANI] | 2924/10344 Aluminium gallium nitride [AlGaN] |
| | being pressure sensitive | 2924/10345 Aluminium gallium phosphide [AlGaP] |
| 2,21,0702 | comb bressers sensitive | Adminiming gamum phospinus [Aldar] |

| 2924/10346 Indium gallium nitride [InGaN] | 2924/1067 Oxide |
|--|---|
| 2924/10347 Indium arsenide antimonide [InAsSb] | 2924/10671 Titanium dioxide, anatase, rutile, |
| 2924/10348 Indium gallium antimonide [InGaSb] | brookite [TiO ₂] |
| 2924/10349 Aluminium gallium indium phosphide | 2924/10672 Copper(I)oxide [Cu ₂ O] |
| [AlGaInP] | 2924/10673 Copper(II)oxide [CuO] |
| 2924/1035 Aluminium gallium arsenide phosphide | 2924/10674 Uranium dioxide [UO ₂] |
| [AlGaInP] | 2924/10675 Uranium trioxide [UO ₃] |
| 2924/10351 Indium gallium arsenide phosphide | 2924/10676 Bismuth trioxide [Bi ₂ O ₃] |
| [InGaAsP] | 2924/10677 Tin dioxide [SnO ₂] |
| 2924/10352 Indium gallium arsenide antimonide [InGaAsSb] | 2924/10678 Barium titanate [BaTiO ₃] |
| 2924/10353 Indium arsenide antimonide phosphide | 2924/10679 Strontium titanate [SrTiO ₃] |
| [InAsSbP] | 2924/1068 Lithium niobate [LiNbO ₃] |
| 2924/10354 Aluminium indium arsenide phosphide | 2924/10681 Lanthanum copper oxide [La_2CuO_4] |
| [AlInAsP] | 2924/1072 Layered |
| 2924/10355 Aluminium gallium arsenide nitride | 2924/10721 Lead(II)iodide [PbI ₂] |
| [AlGaAsN] | 2924/10722 Molybdenum disulfide [MoS_2] |
| 2924/10356 Indium gallium arsenide nitride | 2924/10723 Gallium selenide [GaSe] |
| [InGaAsN] | 2924/10724 Tin sulfide [SnS] |
| 2924/10357 Indium aluminium arsenide nitride | 2924/10725 Bismuth sulfide $[Bi_2S_3]$ |
| [InAlAsN] | 2924/1077 Magnetic diluted [DMS] |
| 2924/10358 Gallium arsenide antimonide nitride | 2924/10771 Gallium manganese arsenide [GaMnAs] |
| [GaAsSbN] | 2924/10772 Indium manganese arsenide [InMnAs] |
| 2924/10359 Gallium indium nitride arsenide | 2924/10773 Cadmium manganese telluride |
| antimonide [GaInNAsSb] | [CdMnTe] |
| 2924/1036 Gallium indium arsenide antimonide | 2924/10774 Lead manganese telluride [PbMnTe] |
| phosphide [GaInAsSbP] | 2924/10775 Lanthanum calcium manganate |
| 2924/1037 II-VI | $[La_{0.7}Ca_{0.3}MnO_3]$ |
| 2924/10371 Cadmium selenide [CdSe] | 2924/10776 Iron(II)oxide [FeO] |
| 2924/10372 Cadmium sulfide [CdS] | 2924/10777 Nickel(II)oxide [NiO] |
| 2924/10373 Cadmium telluride [CdTe] | 2924/10778 Europium(II)oxide [EuO] |
| 2924/10375 Zinc selenide [ZnSe] | 2924/10779 Europium(II)sulfide [EuS] |
| 2924/10376 Zinc sulfide [ZnS] | 2924/1078 Chromium(III)bromide [CrBr ₃] |
| 2924/10377 Zinc telluride [ZnTe] | 2924/1082 Other |
| 2924/10378 Cadmium zinc telluride, i.e. CZT [CdZnTe] | 2924/10821 Copper indium gallium selenide, CIGS [Cu[In,Ga]Se ₂] |
| 2924/10379 Mercury cadmium telluride [HgZnTe] | 2924/10822 Copper zinc tin sulfide, CZTS |
| 2924/1038 Mercury zinc telluride [HgZnSe] | $[Cu_2ZnSnS_4]$ |
| 2924/10381 Mercury zinc selenide [HgZnSe] | 2924/10823 Copper indium selenide, CIS [CuInSe ₂] |
| 2924/1042 I-VII | 2924/10824 Silver gallium sulfide [AgGaS ₂] |
| 2924/10421 Cuprous chloride [CuCl] | 2924/10825 Zinc silicon phosphide [ZnSiP ₂] |
| 2924/1047 I-VI | 2924/10826 Arsenic selenide $[As_2S_3]$ |
| 2924/10471 Copper sulfide [CuS] | 2924/10827 Platinum silicide [PtSi] |
| 2924/1052 IV-VI | 2924/10828 Bismuth(III)iodide [BiI ₃] |
| 2924/10521 Lead selenide [PbSe] | 2924/10829 Mercury(II)iodide [HgI ₂] |
| 2924/10522 Lead(II)sulfide [PbS] | 2924/1083 Thallium(I)bromide [TlBr] |
| 2924/10523 Lead telluride [PbTe] | 2924/10831 Selenium [Se] |
| 2924/10524 Tin sulfide [SnS, SnS ₂] | 2924/10832 Silver sulfide [Ag ₂ S] |
| 2924/10525 Tin telluride [SnTe] | 2924/10833 Iron disulfide [FeS ₂] |
| 2924/10526 Lead tin telluride [PbSnTe] | 2924/11 Device type |
| 2924/10527 Thallium tin telluride [Tl ₂ SnTe ₅] | 2924/12 Passive devices, e.g. 2 terminal devices |
| 2924/10528 Thallium germanium telluride | 2924/1203 Rectifying Diode |
| $[Tl_2GeTe_5]$ | 2924/12031 PIN diode |
| 2924/1057 V-VI | 2924/12032 Schottky diode |
| 2924/10571 Bismuth telluride [Bi_2Te_3] | 2924/12033 Gunn diode |
| 2924/1062 II-V | 2924/12034 Varactor |
| 2924/10621 Cadmium phosphide $[Cd_3P_2]$ | 2924/12035 Zener diode |
| 2924/10622 Cadmium arsenide $[Cd_3As_2]$ | 2924/12036 PN diode |
| 2924/10623 Cadmium antimonide [Cd_3Sb_2] | 2924/12037 Cat's whisker diode |
| 2924/10624 Zinc phosphide $[Zn_3P_2]$ | 2924/12038 Point contact |
| 2924/10625 Zinc arsenide $[Zn_3As_2]$ | 2924/1204 Optical Diode |
| 2924/10626 Zinc antimonide $[Zn_3Sb_2]$ | 2924/12041 LED |
| | 2924/12042 LASER |

| 2924/12043 Photo diode | 2924/13063 Metal-Semiconductor Field-Effect |
|--|--|
| 2924/12044 OLED | Transistor [MESFET] |
| | 2924/13064 High Electron Mobility Transistor |
| 2924/1205 Capacitor | [HEMT, HFET [heterostructure FET], |
| 2924/1206 Inductor | MODFET] |
| 2924/1207 Resistor | 2924/13066 Inverted-T field effect transistor |
| 2924/13 Discrete devices, e.g. 3 terminal devices | [ITFET] |
| 2924/1301 Thyristor | 2924/13067 FinFET, source/drain region shapes fins |
| 2924/13011 Anode Gate Thyristor [AGT] | on the silicon surface |
| 2924/13013 Bidirectional Control Thyristor [BCT] | 2924/13068 Fast-reverse epitaxial diode field-effect |
| 2924/13014 Breakover Diode [BOD] | transistor [FREDFET] |
| 2924/13015 DIAC - Bidirectional trigger device | 2924/13069 Thin film transistor [TFT] |
| 2924/13016 Dynistor - Unidirectional switching device | 2924/1307 Organic Field-Effect Transistor [OFET] |
| 2924/13017 Shockley diode - Unidirectional trigger | |
| and switching device | 2924/13071 Ballistic transistor |
| 2924/13018 SIDAC - Bidirectional switching device | 2924/13072 Sensor FET |
| 2924/13019 Trisil, SIDACtor - Bidirectional protection | 2924/13073 ion-sensitive field-effect transistor |
| devices | [ISFET] |
| 2924/1302 GTO - Gate Turn-Off thyristor | 2924/13074 Electrolyte-oxide-semiconductor |
| 2924/13021 DB-GTO - Distributed Buffer Gate | field effect transistor [EOSFET], e.g. |
| Turn-Off thyristor | Neurochip |
| 2924/13022 MA-GTO - Modified Anode Gate Turn- | 2924/13075 Deoxyribonucleic acid field-effect |
| Off thyristor | transistor [DNAFET] |
| 2924/13023 IGCT - Integrated Gate Commutated | 2924/13076 DEPFET |
| Thyristor | 2924/13078 Unijunction transistors |
| 2924/13024 LASCR - Light Activated SCR, or LTT - | 2924/13079 Single-electron transistors [SET] |
| Light triggered thyristor | 2924/1308 Nanofluidic transistor |
| 2924/13025 Light Activated Semiconducting Switch | 2924/13081 Multigate devices |
| [LASS] | 2924/13082 Tetrode transistor |
| 2924/13026 MCT - MOSFET Controlled Thyristor - It | 2924/13083 Pentode transistor |
| contains two additional FET structures for | 2924/13084 Trigate transistor |
| on/off control | 2924/13085 Dual gate FETs |
| 2924/13027 BRT - Base Resistance Controlled | 2924/13086 Junctionless Nanowire Transistor [JNT] |
| Thyristor | 2924/13087 Vertical-Slit Field-Effect Transistor |
| 2924/13028 RCT - Reverse Conducting Thyristor | [VeSFET] |
| 2924/13029 PUT or PUJT - Programmable Unijunction | 2924/13088 Graphene Nanoribbon Field-Effect |
| Transistor - A thyristor with gate on n-type | Transistor [GNRFET] |
| layer near to the anode used as a functional | 2924/13089 Nanoparticle Organic Memory Field- |
| replacement for unijunction transistor | Effect Transistor [NOMFET] |
| 2924/1303 SCS - Silicon Controlled Switch or | 2924/1309 Modulation-Doped Field Effect |
| Thyristor Tetrode - A thyristor with both | Transistor [MODFET] |
| cathode and anode gates | 2924/13091 Metal-Oxide-Semiconductor Field- |
| 2924/13032 SITh - Static Induction Thyristor, or FCTh | Effect Transistor [MOSFET] |
| - Field Controlled Thyristor - containing | 2924/13092 Dual Gate Metal-Oxide- |
| a gate structure that can shut down anode | Semiconductor Field-Effect |
| current flow | Transistor [DGMOSFET] |
| 2924/13033 TRIAC - Triode for Alternating Current | 2924/14 Integrated circuits |
| - A bidirectional switching device | 2924/141 Analog devices |
| containing two thyristor structures with | 2924/142 HF devices |
| common gate contact | 2924/1421 RF devices |
| 2924/13034 Silicon Controlled Rectifier [SCR] | |
| 2924/13035 Asymmetrical SCR [ASCR] | 2924/14211 Voltage-controlled oscillator [VCO] |
| 2924/1304 Transistor | 2924/14215 Low-noise amplifier [LNA] |
| 2924/1305 Bipolar Junction Transistor [BJT] | 2924/1422 Mixer |
| 2924/13051 Heterojunction bipolar transistor [HBT] | 2924/14221 Electronic mixer |
| 2924/13052 Schottky transistor | 2924/14222 Frequency mixer |
| 2924/13053 Avalanche transistor | 2924/1423 Monolithic Microwave Integrated Circuit |
| | [MMIC] |
| 2924/13054 Darlington transistor | 2924/1424 Operational amplifier |
| 2924/13055 Insulated gate bipolar transistor [IGBT] | 2924/1425 Converter |
| 2924/13056 Photo transistor | 2924/14251 Frequency converter |
| 2924/1306 Field-effect transistor [FET] | 2924/14252 Voltage converter |
| 2924/13061 Carbon nanotube field-effect transistor | 2924/14253 Digital-to-analog converter [DAC] |
| [CNFET] | 2924/1426 Driver |
| 2924/13062 Junction field-effect transistor [JFET] | 2924/1427 Voltage regulator [VR] |
| | |

| 2924/143 Digital devices | 2924/15174 in different layers of the multilayer |
|--|--|
| 2924/1431 Logic devices | substrate |
| 2924/1432 Central processing unit [CPU] | 2924/15182 Fan-in arrangement of the internal vias |
| 2924/1433 Application-specific integrated circuit | 2924/15183 in a single layer of the multilayer substrate |
| [ASIC] | 2924/15184 in different layers of the multilayer |
| 2924/14335 Digital signal processor [DSP] | substrate |
| 2924/1434 Memory | 2924/15192 Resurf arrangement of the internal vias |
| 2924/1435 Random access memory [RAM] | 2924/152 Disposition |
| 2924/1436 Dynamic random-access memory | 2924/153 Connection portion |
| [DRAM] | 2924/1531 the connection portion being formed only on |
| 2924/14361 Synchronous dynamic random | the surface of the substrate opposite to the |
| access memory [SDRAM] | die mounting surface |
| 2924/14362 RAS Only Refresh [ROR] | 2924/15311 being a ball array, e.g. BGA |
| 2924/14363 CAS before RAS refresh [CBR] | 2924/15312 being a pin array, e.g. PGA |
| 2924/14364 Multibank DRAM [MDRAM] | 2924/15313 being a land array, e.g. LGA |
| 2924/14365 Video DRAM [VRAM] | 2924/1532 the connection portion being formed on the |
| 2924/14366 Window DRAM [WRAM] | die mounting surface of the substrate |
| 2924/14367 Fast page mode DRAM [FPM | 2924/15321 being a ball array, e.g. BGA |
| DRAM] | 2924/15322 being a pin array, e.g. PGA |
| 2924/14368 Extended data out DRAM [EDO | 2924/15323 being a land array, e.g. LGA |
| DRAM] | 2924/1533 the connection portion being formed |
| 2924/14369 Burst EDO DRAM [BEDO | both on the die mounting surface of the |
| DRAM] | substrate and outside the die mounting |
| 2924/1437 Static random-access memory | surface of the substrate |
| [SRAM] | 2924/15331 being a ball array, e.g. BGA |
| 2924/1438 Flash memory | 2924/15332 being a pin array, e.g. PGA |
| 2924/1441 Ferroelectric RAM [FeRAM or | 2924/15333 being a land array, e.g. LGA |
| FRAM] | 2924/156 Material |
| 2924/1442 Synchronous graphics RAM | 2924/157 with a principal constituent of the material |
| [SGRAM] | being a metal or a metalloid, e.g. boron [B], |
| 2924/1443 Non-volatile random-access memory | silicon [Si], germanium [Ge], arsenic [As], |
| [NVRAM] | antimony [Sb], tellurium [Te] and polonium |
| 2924/1444 PBRAM | [Po], and alloys thereof |
| 2924/145 Read-only memory [ROM] | 2924/15701 the principal constituent melting at a |
| 2924/1451 EPROM | temperature of less than 400 C |
| 2924/14511 EEPROM | 2924/15717 the principal constituent melting at a |
| 2924/1453 PROM | temperature of greater than or equal to 400 C and less than 950 C |
| 2924/146 • • Mixed devices | |
| 2924/1461 MEMS | 252 / 16 / 2 · · · · · · · · · · · · · · · · · · |
| 2924/15 Details of package parts other than the | 2924/15738 the principal constituent melting at a |
| semiconductor or other solid state devices to be | temperature of greater than or equal to 950 C and less than 1550 C |
| connected | 2924/15747 Copper [Cu] as principal constituent |
| 2924/151 Die mounting substrate | |
| 2924/1511 Structure | 2924/1576 Iron [Fe] as principal constituent 2924/15763 the principal constituent melting at a |
| 2924/1515 Shape | temperature of greater than 1550 C |
| 2924/15151 the die mounting substrate comprising an | 2924/15786 with a principal constituent of the material |
| aperture, e.g. for underfilling, outgassing, | being a non metallic, non metalloid inorganic |
| window type wire connections | material |
| 2924/15153 the die mounting substrate comprising a | 2924/15787 Ceramics, e.g. crystalline carbides, nitrides |
| recess for hosting the device | or oxides |
| 2924/15155 the shape of the recess being other than a | 2924/15788 Glasses, e.g. amorphous oxides, nitrides or |
| cuboid | fluorides |
| 2924/15156 Side view | 2924/1579 with a principal constituent of the material |
| 2924/15157 Top view | being a polymer, e.g. polyester, phenolic |
| 2924/15158 the die mounting substrate being other than a | based polymer, epoxy |
| cuboid | 2924/15791 The principal constituent being an |
| 2924/15159 Side view | elastomer, e.g. silicones, isoprene, |
| 2924/15162 Top view | neoprene |
| 2924/15165 Monolayer substrate | 2924/15793 with a principal constituent of the material |
| 2924/1517 Multilayer substrate | being a solid not provided for in groups |
| 2924/15172 Fan-out arrangement of the internal vias | <u>H01L 2924/157</u> - <u>H01L 2924/15791</u> , e.g. |
| 2924/15173 in a single layer of the multilayer substrate | allotropes of carbon, fullerene, graphite, |
| | carbon-nanotubes, diamond |
| | |

| 2924/15798 with a principal constituent of the material | 2924/1631 Structure |
|---|---|
| being a combination of two or more | 2924/16315 Shape |
| materials in the form of a matrix with a filler, | 2924/1632 Disposition |
| i.e. being a hybrid material, e.g. segmented | 2924/164 Material |
| structures, foams | 2924/165 with a principal constituent of the material |
| 2924/161 • Cap | being a metal or a metalloid, e.g. boron |
| 2924/1611 Structure | [B], silicon [Si], germanium [Ge], arsenic |
| 2924/1615 Shape | [As], antimony [Sb], tellurium [Te] and |
| 2924/16151 Cap comprising an aperture, e.g. for pressure | polonium [Po], and alloys thereof |
| control, encapsulation | 2924/16586 with a principal constituent of the material |
| 2924/16152 Cap comprising a cavity for hosting the device, e.g. U-shaped cap | being a non metallic, non metalloid inorganic material |
| 2924/16153 Cap enclosing a plurality of side-by-side | 2924/16587 Ceramics, e.g. crystalline carbides, |
| cavities [e.g. E-shaped cap] | nitrides or oxides |
| 2924/1616 Cavity shape | 2924/16588 Glasses, e.g. amorphous oxides, nitrides |
| 2924/1617 Cavity shape | or fluorides |
| 2924/16171 Material | 2924/1659 with a principal constituent of the material |
| 2924/16172 with a principal constituent of | being a polymer, e.g. polyester, phenolic |
| the material being a metal or a | based polymer, epoxy |
| metalloid, e.g. boron [B], silicon | 2924/16593 with a principal constituent of the material |
| [Si], germanium [Ge], arsenic [As], | being a solid not provided for in groups |
| antimony [Sb], tellurium [Te] and | <u>H01L 2924/157</u> - <u>H01L 2924/15791</u> , e.g. |
| polonium [Po], and alloys thereof | allotropes of carbon, fullerene, graphite, |
| 2924/16173 with a principal constituent of the | carbon-nanotubes, diamond |
| material being a non metallic, non | 2924/16598 with a principal constituent of the material |
| metalloid inorganic material | being a combination of two or more materials in the form of a matrix with a |
| 2924/16174 Ceramics, e.g. crystalline carbides, | filler, i.e. being a hybrid material, e.g. |
| nitrides or oxides (glass ceramics H01L 2224/16175) | segmented structures, foams |
| 2924/16175 Glasses, e.g. amorphous oxides, | 2924/166 Material |
| nitrides or fluorides | 2924/167 with a principal constituent of the material |
| 2924/16176 with a principal constituent of | being a metal or a metalloid, e.g. boron [B], |
| the material being a polymer, e.g. | silicon [Si], germanium [Ge], arsenic [As], |
| polyester, phenolic based polymer, | antimony [Sb], tellurium [Te] and polonium |
| epoxy | [Po], and alloys thereof |
| 2924/16177 The principal constituent being an | 2924/16701 the principal constituent melting at a |
| elastomer, e.g. silicones, isoprene, | temperature of less than 400 C |
| neoprene | 2924/16717 the principal constituent melting at a temperature of greater than or equal to 400 |
| 2924/16178 with a principal constituent | C and less than 950 C |
| of the material being a solid not provided for in groups | 2924/16724 Aluminium [Al] as principal constituent |
| H01L 2924/157 - H01L 2924/15791, | 2924/16738 the principal constituent melting at a |
| e.g. allotropes of carbon, fullerene, | temperature of greater than or equal to 950 |
| graphite, carbon-nanotubes, diamond | C and less than 1550 C |
| 2924/16179 with a principal constituent of the | 2924/16747 Copper [Cu] as principal constituent |
| material being a combination of two | 2924/1676 Iron [Fe] as principal constituent |
| or more materials in the form of a | 2924/16763 the principal constituent melting at a |
| matrix with a filler, i.e. being a hybrid | temperature of greater than 1550 C |
| material, e.g. segmented structures, | 2924/16786 with a principal constituent of the material |
| foams Covity costing shape | being a non metallic, non metalloid inorganic |
| 2924/1619 Cavity coating shape 2924/16195 Flat cap [not enclosing an internal cavity] | material |
| 2924/16196 Cap forming a cavity, e.g. being a curved | 2924/16787 Ceramics, e.g. crystalline carbides, nitrides |
| metal foil | or oxides 2924/16788 Glasses, e.g. amorphous oxides, nitrides or |
| 2924/162 Disposition | fluorides |
| 2924/16235 Connecting to a semiconductor or solid-state | 2924/1679 with a principal constituent of the material |
| bodies, i.e. cap-to-chip | being a polymer, e.g. polyester, phenolic |
| 2924/16251 Connecting to an item not being a | based polymer, epoxy |
| semiconductor or solid-state body, e.g. cap- | 2924/16791 The principal constituent being an |
| to-substrate | elastomer, e.g. silicones, isoprene, |
| 2924/1626 Cap-in-cap assemblies | neoprene |
| 2924/1627 stacked type assemblies, e.g. stacked multi- | |
| cavities | |
| 2924/163 Connection portion, e.g. seal | |

| 2924/16793 with a principal constituent of the material | 2924/18161 of a flip chip |
|--|---|
| being a solid not provided for in groups | 2924/18162 of a chip with build-up interconnect |
| <u>H01L 2924/167</u> - <u>H01L 2924/16791</u> , e.g. | 2924/18165 of a wire bonded chip |
| allotropes of carbon, fullerene, graphite, | 2924/182 Disposition |
| carbon-nanotubes, diamond | 2924/183 Connection portion, e.g. seal |
| 2924/16798 with a principal constituent of the material | 2924/18301 being an anchoring portion, i.e. mechanical |
| being a combination of two or more | interlocking between the encapsulation resin |
| materials in the form of a matrix with a filler, | and another package part |
| i.e. being a hybrid material, e.g. segmented | 2924/186 • • • Material |
| structures, foams | 2924/19 . Details of hybrid assemblies other than the |
| 2924/171 Frame | semiconductor or other solid state devices to be |
| 2924/1711 Structure | connected |
| 2924/1715 Shape | 2924/1901 • Structure |
| 2924/17151 Frame comprising an aperture, e.g. for | 2924/19011 including integrated passive components |
| pressure control, encapsulation | 2924/19015 including thin film passive components |
| 2924/172 Disposition | 2924/1902 including thick film passive components |
| 2924/173 Connection portion, e.g. seal | 2924/1903 including wave guides |
| 2924/176 Material | 2924/19031 being a strip line type |
| 2924/177 with a principal constituent of the material | 2924/19032 being a microstrip line type |
| being a metal or a metalloid, e.g. boron [B], | 2924/19033 being a coplanar line type |
| silicon [Si], germanium [Ge], arsenic [As], | 2924/19038 being a hybrid line type |
| antimony [Sb], tellurium [Te] and polonium | 2924/19039 impedance transition between different |
| [Po], and alloys thereof | types of wave guides |
| 2924/17701 the principal constituent melting at a | 2924/1904 Component type |
| temperature of less than 400 C | 2924/19041 being a capacitor |
| 2924/17717 the principal constituent melting at a | |
| temperature of greater than or equal to 400 | 2924/19042 being an inductor |
| C and less than 950 C | 2924/19043 being a resistor |
| 2924/17724 Aluminium [Al] as principal constituent | 2924/1905 Shape |
| 2924/17738 the principal constituent melting at a | 2924/19051 Impedance matching structure [e.g. balun] |
| temperature of greater than or equal to 950 | 2924/191 Disposition |
| C and less than 1550 C | 2924/19101 of discrete passive components |
| 2924/17747 Copper [Cu] as principal constituent | 2924/19102 in a stacked assembly with the |
| 2924/1776 Iron [Fe] as principal constituent | semiconductor or solid state device |
| 2924/17763 the principal constituent melting at a | 2924/19103 interposed between the semiconductor or |
| temperature of greater than 1550 C | solid-state device and the die mounting |
| 2924/17786 with a principal constituent of the material | substrate, i.e. chip-on-passive |
| being a non metallic, non metalloid inorganic | 2924/19104 on the semiconductor or solid-state device, |
| material | i.e. passive-on-chip |
| 2924/17787 Ceramics, e.g. crystalline carbides, nitrides | 2924/19105 in a side-by-side arrangement on a common |
| or oxides | die mounting substrate |
| 2924/17788 Glasses, e.g. amorphous oxides, nitrides or fluorides | 2924/19106 in a mirrored arrangement on two different |
| | side of a common die mounting substrate |
| 2924/1779 with a principal constituent of the material | 2924/19107 off-chip wires |
| being a polymer, e.g. polyester, phenolic based polymer, epoxy | 2924/20 • Parameters |
| 2924/17791 The principal constituent being an | 2924/201 Temperature ranges |
| elastomer, e.g. silicones, isoprene, | 2924/20101 Temperature range T<0 C, T<273.15 K |
| neoprene | 2924/20102 Temperature range 0 C= <t<60 273.15="" c,="" k<="" td=""></t<60> |
| 2924/17793 with a principal constituent of the material | = <t< 333.15k<="" td=""></t<> |
| being a solid not provided for in groups | 2924/20103 Temperature range 60 C= <t<100 333.15="" c,="" k<="" td=""></t<100> |
| H01L 2924/177 - H01L 2924/17791, e.g. | =< T< 373.15K |
| allotropes of carbon, fullerene, graphite, | 2924/20104 Temperature range 100 C= <t<150 373.15="" c,="" k<="" td=""></t<150> |
| carbon-nanotubes, diamond | = < T < 423.15K |
| 2924/17798 with a principal constituent of the material | 2924/20105 Temperature range 150 C= <t<200 423.15="" c,="" k<="" td=""></t<200> |
| being a combination of two or more | =< T < 473.15K |
| materials in the form of a matrix with a filler, | 2924/20106 Temperature range 200 C= <t<250 473.15="" c,="" k<="" td=""></t<250> |
| i.e. being a hybrid material, e.g. segmented | = <t 523.15k<="" <="" td=""></t> |
| structures, foams | 2924/20107 Temperature range 250 C= <t<300 523.15k<="" c,="" td=""></t<300> |
| 2924/181 . Encapsulation | = <t< 573.15k<="" td=""></t<> |
| 2924/1811 Structure | 2924/20108 Temperature range 300 C= <t<350 573.15k<="" c,="" td=""></t<350> |
| 2924/1815 Shape | = <t<623.15k< td=""></t<623.15k<> |
| 2924/1816 Exposing the passive side of the | 2924/20109 Temperature range 350 C= <t<400 623.15k="<T<" 673.15k<="" c,="" td=""></t<400> |
| semiconductor or solid-state body | -<1< 0/3.13K |
| · | |

| 2924/2011 Temperature range 400 C= <t<450 673.15k="<T<" 723.15k<="" c,="" td=""><td>2924/20652 larger or equal to 2000 microns less than 2500 microns</td></t<450> | 2924/20652 larger or equal to 2000 microns less than 2500 microns |
|--|---|
| 2924/20111 Temperature range 450 C= <t<500 723.15k="<T<773.15K</td" c,=""><td>2924/20653 larger or equal to 2500 microns less than 3000 microns</td></t<500> | 2924/20653 larger or equal to 2500 microns less than 3000 microns |
| 2924/202 Electromagnetic wavelength ranges [W] | 2924/20654 larger or equal to 3000 microns less than 4000 |
| 2924/20201 Gamma radiation, i.e. wavelength less than | microns |
| 0.01 nm | 2924/20655 larger or equal to 4000 microns less than 5000 |
| 2924/20202 X-ray radiation, i.e. wavelength 0.01 to 10 nm | microns |
| 2924/2021 Ultraviolet radiation | 2924/20656 larger or equal to 5000 microns less than 6000 |
| 2924/20211 UV-C 100= <w<280 nm<="" td=""><td>microns</td></w<280> | microns |
| 2924/20212 UV-B 280= <w<315 nm<="" td=""><td>2924/20657 larger or equal to 6000 microns less than 7000</td></w<315> | 2924/20657 larger or equal to 6000 microns less than 7000 |
| 2924/20213 UV-A 315= <w<400 nm<="" td=""><td>microns</td></w<400> | microns |
| 2924/2024 Visible spectrum wavelength 390= <w<700< td=""><td>2924/20658 larger or equal to 7000 microns less than 8000</td></w<700<> | 2924/20658 larger or equal to 7000 microns less than 8000 |
| | microns |
| nm, i.e. 400-790 THz | 2924/207 . Diameter ranges |
| 2924/2026 Infrared radiation 700= <w<3000 nm<="" td=""><td>2924/2075 • • • larger or equal to 1 micron less than 10 microns</td></w<3000> | 2924/2075 • • • larger or equal to 1 micron less than 10 microns |
| 2924/20261 IR-A 700= <w<1400 215="" i.e.="" nm,="" td="" thz-430<=""><td></td></w<1400> | |
| THz | 2924/20751 larger or equal to 10 microns less than 20 |
| 2924/20262 IR-B 1400= <w<3000 100thz-215<="" i.e.="" nm,="" td=""><td>microns</td></w<3000> | microns |
| THz | 2924/20752 larger or equal to 20 microns less than 30 |
| 2924/20263 IR-C 3000 nm = <w<1 300<="" i.e.="" mm,="" td=""><td>microns</td></w<1> | microns |
| GHz-100THz | 2924/20753 larger or equal to 30 microns less than 40 |
| 2924/2027 Radio 1 mm - km 300 GHz - 3 Hz | microns |
| | 2924/20754 larger or equal to 40 microns less than 50 |
| 2924/20271 Microwave radiation 1 mm - 1 meter, ie 300 | microns |
| GHz - 300 MHz | |
| 2924/203 • Ultrasonic frequency ranges, i.e. KHz | 2924/20755 larger or equal to 50 microns less than 60 |
| 2924/20301 Ultrasonic frequency [f] f<25 kHz | microns |
| 2924/20302 Ultrasonic frequency [f] 25 Khz= <f< 50="" khz<="" td=""><td>2924/20756 larger or equal to 60 microns less than 70</td></f<> | 2924/20756 larger or equal to 60 microns less than 70 |
| 2924/20303 Ultrasonic frequency [f] 50 Khz= <f< 75="" khz<="" td=""><td>microns</td></f<> | microns |
| 2924/20304 Ultrasonic frequency [f] 75 Khz= <f< 100="" khz<="" td=""><td>2924/20757 larger or equal to 70 microns less than 80</td></f<> | 2924/20757 larger or equal to 70 microns less than 80 |
| | microns |
| 2924/20305 Ultrasonic frequency [f] 100 Khz= <f< 125="" khz<="" td=""><td>2924/20758 larger or equal to 80 microns less than 90 microns</td></f<> | 2924/20758 larger or equal to 80 microns less than 90 microns |
| 2924/20306 Ultrasonic frequency [f] 125 Khz= <f< 150<="" td=""><td></td></f<> | |
| KHz | 2924/20759 larger or equal to 90 microns less than 100 microns |
| 2924/20307 Ultrasonic frequency [f] 150 Khz= <f< 175<="" td=""><td></td></f<> | |
| KHz | 2924/2076 equal to or larger than 100 microns |
| 2924/20308 Ultrasonic frequency [f] 175 Khz= <f< 200<="" td=""><td>2924/30 • Technical effects</td></f<> | 2924/30 • Technical effects |
| KHz | 2924/301 • Electrical effects |
| 2924/20309 Ultrasonic frequency [f] f>=200 KHz | 2924/30101 Resistance |
| 2924/206 . Length ranges | 2924/30105 Capacitance |
| | 2924/30107 Inductance |
| 2924/2064 larger or equal to 1 micron less than 100 | 2924/3011 Impedance |
| microns | |
| 2924/20641 larger or equal to 100 microns less than 200 | 2924/30111 matching |
| microns | 2924/302 Electrostatic |
| 2924/20642 larger or equal to 200 microns less than 300 | 2924/30201 Charge |
| microns | 2924/30205 Discharge |
| 2924/20643 larger or equal to 300 microns less than 400 | 2924/3025 Electromagnetic shielding |
| microns | 2924/35 . Mechanical effects |
| 2924/20644 larger or equal to 400 microns less than 500 | 2924/351 • • • Thermal stress |
| microns | |
| | 2924/3511 Warping |
| 2924/20645 larger or equal to 500 microns less than 600 | 2924/3512 Cracking |
| microns | 2924/35121 Peeling or delaminating |
| 2924/20646 larger or equal to 600 microns less than 700 | 2924/36 • Material effects |
| microns | 2924/364 Polymers |
| 2924/20647 larger or equal to 700 microns less than 800 | 2924/3641 Outgassing |
| microns | 2924/365 Metallurgical effects |
| 2924/20648 larger or equal to 800 microns less than 900 | 2924/3651 Formation of intermetallics |
| microns | |
| 2924/20649 larger or equal to 900 microns less than 1000 | 2924/36511 Purple plague |
| microns | 2924/3656 Formation of Kirkendall voids |
| | 2924/37 • Effects of the manufacturing process |
| 2924/2065 larger or equal to 1000 microns less than 1500 | 2924/37001 Yield |
| microns | 2924/37002 Shelf life |
| 2924/20651 larger or equal to 1500 microns less than 2000 | 2924/3701 • • increased through put |
| microns | |
| | |

| 2924/38 | • Effects and problems related to the device integration | 2933/0075 | |
|------------------------|--|-----------|--------|
| 2924/381 | - | 2933/0083 | . Peri |
| | Bump effects | | pac |
| | Solder bridging | 2933/0091 | . Sca |
| | Wire effects | 2733/0071 | or s |
| | Sag | | pred |
| | | | • |
| | Sweep | | |
| 2924/40 | Details of apparatuses used for either manufacturing connectors or connecting the semiconductor or | | |
| | solid-state body | | |
| 2924/401 | LASER | | |
| | Mode | | |
| | being pulsed | | |
| | being continous | | |
| | Beam details | | |
| | | | |
| | Shape | | |
| | Type | | |
| | being a chemical | | |
| | Deuterium Flouride [DF] LASER | | |
| | Hydrogen Flouride [HF] LASER | | |
| | Dye laser | | |
| | being a gas | | |
| | argon-ion LASER | | |
| | CO ₂ LASER | | |
| | HeAg LASER | | |
| | HeNe LASER | | |
| | NeCu LASER | | |
| | being an Excimer | | |
| | ArF LASER | | |
| | F2 LASER | | |
| | KrCl LASER | | |
| | KrF LASER | | |
| | XeCl LASER | | |
| | XeF LASER | | |
| | being a fiber hosted LASER | | |
| 2924/404 | being a solid state | | |
| _, _ , , , , , , , , , | Free electron LASER | | |
| | Photonic crystal LASER | | |
| | Fiber solid state LASER | | |
| 2924/40404 | Yttrium Aluminium Garnet Nd:YAG LASER | | |
| 2924/40405 | Yttrium Lithium Flouride Nd:YLF | | |
| 2024/4040 | LASER | | |
| | Ruby LASER | | |
| | Yb:YAG LASER | | |
| | Wavelength | | |
| | UV spectrum | | |
| | · · · · Visible spectrum | | |
| 2924/40503 | IR spectrum | | |
| 2933/00 | Details relating to devices covered by the group H01L 33/00 but not provided for in its subgroups | | |
| 2933/0008 | Processes | | |
| 2933/0008 | | | |
| 2933/0016 | _ | | |
| | relating to coatings relating to semiconductor body packages | | |
| | | | |
| 2933/0041 | relating to wavelength conversion elements | | |
| 2933/005 | relating to encapsulations | | |
| 2933/0058 | relating to optical field-shaping elementsrelating to arrangements for conducting electric | | |
| 2022/00/ | | | |

2933/0075 . . . relating to heat extraction or cooling elements

 Periodic patterns for optical field-shaping in or on the semiconductor body or semiconductor body package, e.g. photonic bandgap structures

 Scattering means in or on the semiconductor body or semiconductor body package (<u>H01L 33/22</u> takes precedence)