

(90/003,900)

Paper No. 41

(90/003,490)

Paper No. 46

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte INTERNATIONAL RECTIFIER CORPORATION

Appeal No. 98-1816
Control Nos. 90/003,900 and 90/003,490¹

ON BRIEF

Before JERRY SMITH, FLEMING and LEE, Administrative Patent Judges.

¹ Reexamination proceedings of U.S. Patent No. 4,959,699 based on Control No. 90/003,900 filed July 25, 1995 and 90/003,490 filed July 12, 1994, to International Rectifier Corporation entitled High Power Mosfet With Low On-Resistance and High Breakdown Voltage, issued June 22, 1989, based on Application 07/371,678, which is a continuation of Application 07/090,664, filed August 28, 1987, now abandoned; which is a division of Application 06/456,813, filed January 10, 1983, now Patent No. 4,705,759, issued November 10, 1987; which is a division of Application 06/232,713, filed February 9, 1981, now Patent No. 4,376,286, issued March 8, 1983; which is a continuation of Application 05/951,310, filed October 13, 1978, now abandoned.

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JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeals under 35 U.S.C. § 134 from the examiner's rejection of claims 1, 3, 6-8, 11, 12, 16, 17, 25, 26, 28 and 29 in two merged reexamination proceedings involving U. S. Patent No. 4,959,699 issued to Lidow et al. (Lidow '699). Independent claims 1 and 7 of the patent have been amended and claims 25-29 were added during the course of the reexamination proceedings. Claim 4 has been cancelled. Claims 2, 5, 9, 10, 13-15, 18-24 and 27 have been indicated by the examiner as being patentable.

The first reexamination request was filed by third party requester SGS-Thomson Microelectronics, Inc. (SGS) on July 12, 1994 and was assigned Control No. 90/003,490. This request for reexamination was granted on September 12, 1994 [Paper No. 4]. A second request for reexamination of Lidow '699 was filed by SGS on July 25, 1995 and was assigned Control No. 90/003,900. This request for reexamination was granted on September 21, 1995 ['900 proceeding, Paper No. 5].

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A request to merge these two reexamination proceedings was granted on November 2, 1995 ['490, No. 12 and '900, No. 7]. Thus, this decision constitutes a decision which is common to both of the reexamination proceedings.

The invention pertains to a three-terminal power metal oxide silicon field effect transistor device.

Representative claim 1 is reproduced as follows:

1. A high power metal oxide silicon field effect transistor device exhibiting relatively low on-resistance and relatively high breakdown voltage; said device comprising:

a wafer of semiconductor material having first and second opposing semiconductor surfaces; said wafer of semiconductor material having a relatively lightly doped major body portion for receiving junctions and being doped with impurities of one conductivity type;

at least first and second spaced base regions of the opposite conductivity type to said one conductivity type formed in said wafer and extending from said first semiconductor surface to a first depth beneath said first semiconductor surface; the space between said at least first and second base regions defining a vertical common conduction region of one conductivity type at a given first semiconductor surface location; the concentration of carriers of said one conductivity type in said common conduction region at said first semiconductor surface being less than the concentration of carriers of said opposite conductivity type of said first and second base regions at said first semiconductor surface;

first and second source regions of said one conductivity

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type formed in each pair of said at least first and second base regions respectively at first and second first surface location to a depth less than said first depth; the outer rim of each of said and second source regions being laterally spaced along said first semiconductor surface from the lateral outer periphery of its said base region to define first and second channel regions along said first semiconductor surface between each pair of said first and second source regions, respectively, and said common conduction region;

source electrode means connected to said source regions;

gate insulation layer means on said first surface, disposed at least on said first and second channel regions;

gate electrode means on said gate insulation layer means and overlying said first and second channel regions;

a drain conductive region remote from said common region and separated therefrom by said relatively lightly doped major body portion;

a drain electrode coupled to said drain conductive region; and

at least said first base region being a cellular polygonal region; said cellular polygonal region being surrounded by said common conduction region; said first source region having the shape of an annular ring disposed within said cellular polygonal first base region.

The examiner relies on the following references:

Ishitani	4,072,975	Feb. 07, 1978
Jambotkar	4,145,700	Mar. 20, 1979
		(filed Aug. 08,

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1977)

Hendrickson 4,148,047 Apr. 03, 1979
(filed Jan. 16,

1978)

Tihanyi et al. (Tihanyi) 4,190,850 Feb. 26, 1980
(filed Jan. 17,

1978)

Takamatsu (Takakuwa) 51-134076 Nov. 20, 1976
(Japanese Kokai)

Sakai 52-106688 Sep. 07, 1977
(Japanese application)

Isao Yoshida et al. (Yoshida), "A High Power MOSFET with a Vertical Drain Electrode and a Meshed Gate Structure," IEEE Journal of Solid-State Circuits, Vol. SC-11, No. 4 (August 1976), pages 472-477.

Michael D. Pocha et al. (Pocha), "A Computer-Aided Design Model for High-Voltage Double Diffused MOS (DMOS) Transistors," IEEE Journal of Solid State Circuits, Vol. SC-11, No. 5 (October 1976), pages 718-726.

James D. Plummer et al. (Plummer), "A Monolithic 200-V CMOS Analog Switch," IEEE Journal of Solid State Circuits, Vol. SC-11, No. 6 (December 1976), pages 809-817.

Surinder Krishna, "Second Breakdown in High Voltage MOS Transistors," Solid State Electronics, Vol. 20 (1977), pages 875-878.

Brad W. Scharf et al. (Scharf), "A MOS-Controlled Triac Device," 1978 IEEE International Solid-State Circuits Conference, Digest of Technical Papers (February 1978), pages

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222-223.

Kenneth P. Lisiak et al. (Lisiak), "Optimization of Nonplanar Power MOS Transistors," IEEE Transactions on Electron Devices, Vol. ED-25, No. 10 (October 1978), pages 1129-1234.

S. M. Sze, Semiconductor Devices Physics and Technology, John Wiley & Sons, New York (1985), pages 401-402.

Claims 1, 3, 6-8, 11, 12, 16, 17, 25, 26, 28 and 29 stand rejected under 35 U.S.C. § 103. As evidence of obviousness the examiner applies the collective teachings of Hendrickson, Takakuwa, Jambotkar and Krishna, as further explained in the Blanchard Declaration executed 22 April 1995² with respect to claims 1, 6, 25 and 28. The same evidence is applied with respect to claim 3 with the addition of Yoshida. Finally, with respect to claims 7, 8, 11, 12, 16, 17, 26 and 29, all the above evidence is applied but additionally considered with Sze, Ishitani and each of the corroborative references of Sakai, Plummer, Scharf, Tihanyi and Pocha.

² The Blanchard Declaration is a declaration filed by requester SGS as part of its second request for reexamination of Lidow '699. In this declaration, Dr. Blanchard attempts to define the state of the art as of the filing date of the patent, to explain the teachings of the applied prior art, and to render his opinion as to what would have been obvious to the artisan as of the effective filing date of Lidow '699.

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Although the above-cited reference to Lisiak does not appear in the statement of any of the rejections, both the examiner and appellant have discussed Lisiak as if it forms part of the collective teachings of the prior art, and therefore, we have considered it as forming part of the rejection.

Rather than repeat the arguments of appellant or the examiner, we make reference to the briefs and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellant's arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the collective evidence relied upon would not

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have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1, 3, 6-8, 11, 12, 16, 17, 25, 26, 28 and 29. Accordingly, we reverse.

We consider first the rejection of independent claim 1 under 35 U.S.C. § 103 as unpatentable over the collective teachings of Hendrickson, Takakuwa, Jambotkar and Krishna, as explained by the Blanchard Declaration. In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (CCPA 1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S.

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825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

This appeal comes before us with a voluminous record of prior art references and other papers filed by the parties. The evidence of record in this appeal includes not only the prosecution of record in the two reexamination proceedings, but also includes declarations submitted by requester SGS and papers filed by appellant which come from other litigations and prosecutions before the PTO involving the subject matter of these and related appeals. Additionally, appellant and SGS have been involved in civil litigation concerning the Lidow '699 patent and other patents issued to Lidow on related subject matter. These other litigations have resulted in papers which have been filed in this merged reexamination

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proceeding by appellant in support of the patentability of the claims now on appeal and by requester in support of the unpatentability of these claims.

The examiner's statement of the rejection in the answer notes that claim 1 is rejected under 35 U.S.C. § 103 based on "Hendrickson considered with Takakuwa, Jambotkar and Krishna, as further explained in the Blanchard Declaration executed 22 April 1995" [answer, page 4]. As noted above, the Blanchard Declaration is a declaration on behalf of requester SGS filed by SGS in support of its request to have the claims of this reexamination proceeding declared unpatentable. In this declaration, Dr. Blanchard offers several opinions as to what would have been known to the artisan practicing in this art in 1978 and what would have been obvious to such artisan based upon the teachings of the references cited above. To the extent that the examiner has relied on and cited this declaration as evidence of what would have been obvious to the artisan in view of the applied prior art, such reliance was clearly improper.

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Prosecution before the Patent and Trademark Office (PTO) is designed to be an ex parte prosecution. This means that the participation by third parties in the prosecution of a reexamination proceeding is limited to bringing prior art to the attention of the PTO and offering a view as to why the claims are not patentable. Opinions of third party requesters do not constitute "evidence" on which the patentee's claims may be found unpatentable. Reexamination is not an inter partes proceeding wherein the patentee would have an opportunity to cross-examine the declaration testimony of persons like Dr. Blanchard. Nor does the examiner have an opportunity to view the demeanor of third party witnesses. Reexamination is ex parte in nature and the PTO is in no position to receive or regard the requester's view as established facts or evidence of obviousness, especially when the patentee or applicant for patent has a different opinion as to the facts.

Notwithstanding the improper reliance on the Blanchard Declaration as evidence of what is suggested by the prior art in this case, we agree that the examiner is certainly

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permitted to reach the exact same conclusions as Dr. Blanchard did. The examiner's conclusions, however, must be based on the clear teachings of the applied prior art and not on what Dr. Blanchard believes. In other words, if the applied prior art clearly supports Dr. Blanchard's opinions and conclusions, then the examiner is free to make Dr. Blanchard's case as his own. However, if the examiner is relying on Dr. Blanchard's opinions as bridging the obviousness gap between what is taught by the applied prior art and what is specifically claimed, then such reliance is improper.

Our view of the rejection is that it is not based only on the clear teachings of the references. The rejection appears to be a complicated effort to throw various bits and pieces together and to rely on a general premise proposed by Dr. Blanchard that the person skilled in this art could have made the invention. The rejection basically takes the position that any feature in one type of semiconductor device was automatically applicable to a different type of semiconductor device in 1978. Thus, the examiner combines teachings from different types of semiconductor structures

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with the only rationale being that the artisan would have recognized the obviousness of mixing these teachings according to Dr. Blanchard. Although we do not doubt that the artisan provided with the invention on appeal could have fabricated such a device in 1978, we do not see where the references relied on suggest all the features of the claimed invention and the motivation to combine the references as proposed by Dr. Blanchard and accepted by the examiner. We have a strong sense that the artisan, even if provided with all the applied prior art, would not have come up with the claimed invention in 1978 without the advance knowledge of what was invented here. In other words, the rejection appears to us to be analogous to putting together a jigsaw puzzle when given all the individual pieces and an indication of what the final puzzle looks like. The labored and complicated combination of the references proposed by Dr. Blanchard and the examiner does not appear to be based only on the teachings of the applied references.

The prosecution of these merged reexamination proceedings and related proceedings between appellant and SGS

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suggests that the fact situation is complicated and compelling arguments can be made on both sides of the issue.

Understanding subject matter as complicated as the subject matter of this appeal can easily reduce to a battle between "experts" who disagree on almost every important conclusion which can be drawn from whatever facts are presented. Both the requester and the appellant have done a creditable job, and it would be easy to find some credibility in the arguments of both the appellant and the requester during the course of prosecution here.

Nevertheless, we limite our consideration to the examiner's rejection which is based on the collective teachings of Hendrickson, Takakuwa, Jambotkar and Krishna. In the absence of Dr. Blanchard's opinions, we are constrained to conclude that the claimed invention would not have been an obvious result to the artisan having these four references before him. We agree with appellant that there are so many conflicting ideas running through these references that the proposed combination could

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only result from an improper hind-sight reconstruction of the invention. Even using hindsight, the attempt to combine the teachings of these references seems tenuous at best. The four references alone simply would not have suggested the obviousness of the claimed invention within the meaning of 35 U.S.C. § 103.

Notwithstanding any of the above comments, it also appears that the rejection has never really addressed the limitations of independent claims 1 and 7 as amended in these reexamination proceedings. The amendments to claims 1 and 7 presumably were made to patentably distinguish the claims of Lidow '699 from the combination of references cited by requester SGS and applied by the examiner. These amendments included a recitation of the relationship between carrier concentrations in the conduction region and the base regions (claims 1 and 7) and the profiles of the base regions designed to allow the device to withstand relatively high breakdown voltages (claim 7). The rejection, however, has remained focused on the

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unpatentability of the original claims rather than on the claims currently before us.

The examiner only addresses the concentration limitation briefly by asserting that such a relationship of carrier concentrations would inherently be present in any of Jambotkar, Takakuwa, Krishna and Hendrickson [answer, page 7]. None of the applied prior art specifically supports the inherency of this relationship, and we are unable to verify this position of the examiner. We are not inclined to permit the examiner to simply conclude that a claimed feature is present in the prior art when the prior art is being contested by appellant. With respect to the claimed breakdown voltages of independent claim 7, the examiner basically takes the position that this claimed function must inherently be carried out by the prior art transistors because they appear to have similarly shaped base regions. The examiner dismisses the radius of curvature limitation added to claim 7 of Lidow '699 by citing the Sze textbook which was published long after the date of invention here [answer, page 8]. Sze describes how diffusion can take place under different circumstances but

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does not teach that devices in 1978 must have inherently had the properties recited in amended claim 7. We do not find that Sze can be relied on to support the position of inherency argued by the examiner.

We recognize that each of Sakai, Tihanyi, Plummer, Scharf and Pocha shows a dual base region in a semiconductor device which has an appearance that is similar to the dual base region shown in Figure 2 of Lidow '699, and was cited specifically to address the limitations of independent claim 7. Sakai shows a device having dual base regions in Figures 6 and 7. There is no description in Sakai that suggests that the Sakai device meets the carrier concentration limitations of claims 1 and 7 or the radius of curvature and the voltage breakdown profile limitations of claim 7. We will not simply speculate on this point as the examiner apparently has. The dual base regions shown in Tihanyi, Plummer, Scharf and Pocha have an appearance similar to the Sakai dual base region, but each of these references also fails to provide any information which would enable one to deduce that the limitations of amended claims 1 and 7 are suggested by any or all of these

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references. We are not prepared to find obviousness based primarily on the speculation of the examiner when that speculation has been challenged by appellant.

In summary, we have determined that there is no motivation within the applied references for combining their teachings in the manner proposed by the examiner absent a need to reconstruct the claimed invention in hindsight. We have also determined that none of the applied prior art suggests the specific details of amended claims 1 and 7 concerning the carrier concentrations and the base region profiles for allowing a device to withstand relatively high breakdown voltages. The rejection on this record is based on speculation and "facts" [the Blanchard Declaration] which were improperly considered in this case. Accordingly, the rejection of independent claims 1 and 7 under 35 U.S.C. § 103 is not sustained. Therefore, the rejection of the dependent claims is also not sustained.

Since we have determined that the record in this case does not support the rejection of the claims under 35 U.S.C. § 103, we need not address the issue of whether appellant's

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evidence of secondary considerations would have been sufficient to overcome the rejection on obviousness.

In conclusion, we have not sustained the examiner's rejection of claims 1, 3, 6-8, 11, 12, 16, 17, 25, 26, 28 and 29 under 35 U.S.C. § 103 based on the record before us. Therefore, the decision of the examiner rejecting these claims is reversed.

REVERSED

JERRY SMITH)
Administrative Patent Judge)
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	MICHAEL R. FLEMING)	BOARD OF
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