

TC2800 SEMICONDUCTOR PARTNERSHIP MEETING

Factors Affecting Value of Semiconductor Patents

July 26, 2018

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Speaker Information



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Factors Affecting Value

- Enforcement Perspective
- Damages Perspective

Valuable Claims: Enforcement Perspective

Evidence of Use

- To enforce a patent, PO needs to show that an accused product or process meets each element of a patent claim.
 - Reasonable pre-suit investigation of infringement is required
 - Reverse engineering may be necessary before an enforcement action can be brought.
- To mitigate the challenges and costs of investigation, consider whether claimed features can be easily identified in infringing products.



Subtractive Process Steps

- Attention to subtractive steps in process claims
 - If a layer is entirely removed/etched, not straightforward to show the layer ever existed or an etching process was performed by just analyzing the finished product.
 - Detailed steps in fabrication processes are likely not published and may be protected as trade secrets.
- Example:
 - Both “spin-coat-resist” and “hard mask” are entirely removed in the finished device → not straightforward to show those two layers were deposited.
 - May not need to specifically claim “expose/develop” or “hard mask etch” but simply claim “lithography” or “mask etch.”

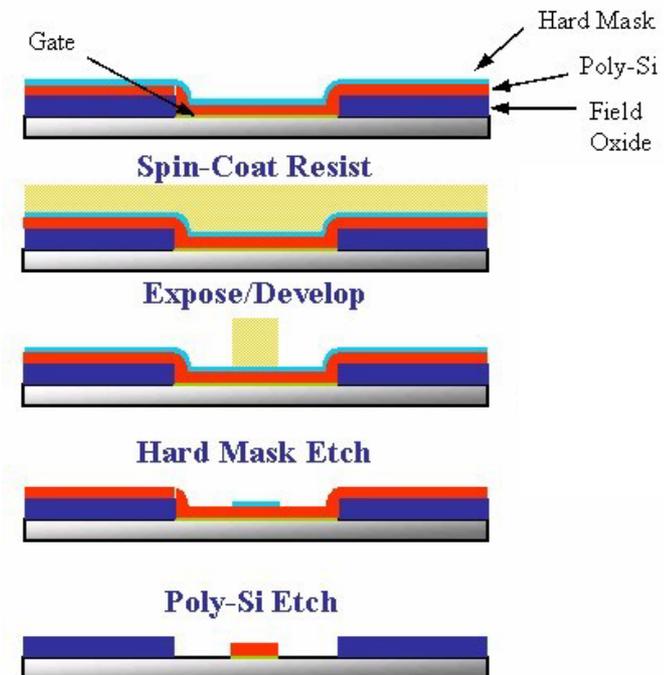


Figure source: http://willson.cm.utexas.edu/Research/Sub_Files/SFIL/Demonstrations/MOSFET/mosfet.php

Precision of Measurement

- Attention to limitations of analytical instruments used in reverse engineering
 - Often determine which feature can be identified through reverse engineering in an infringing product, which may, in turn, determine what features can be included in a claim.
- Example:
 - Secondary ion mass spectrometry (SIMS), often used to determine doping type/concentration, has a spatial resolution up to ~50 nm (e.g., CAMECA NanoSIMS 50L)*.
 - If a device feature having a size < 50 nm, then it would be difficult to determine doping type/concentration of the feature using SIMS.

* <http://www.cameca.com/instruments-for-research/nanosims.aspx>

Observable Parameters

- Consider claiming observable/measurable parameters, e.g., breakdown voltage or threshold voltage.
- Example:
 - Invention: pocket implant (highlighted) in MOSFET devices for improving breakdown voltage*.

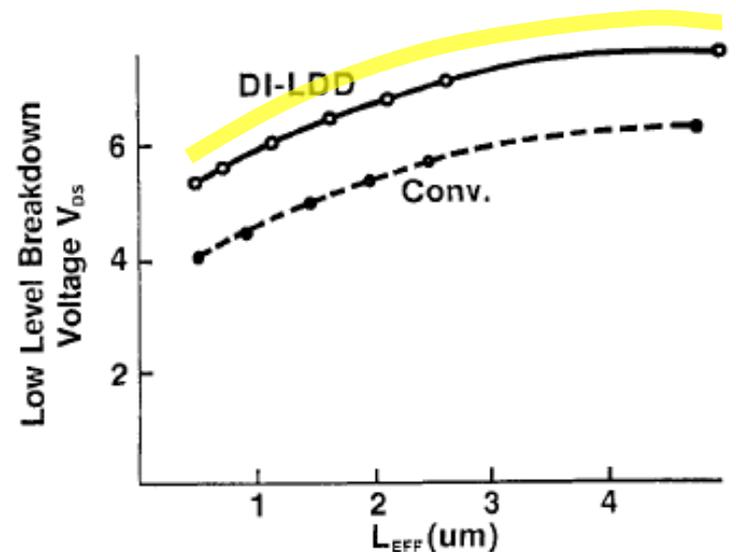
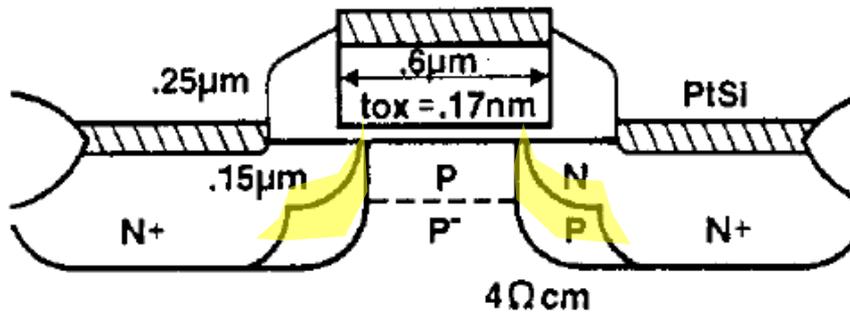


Figure 9

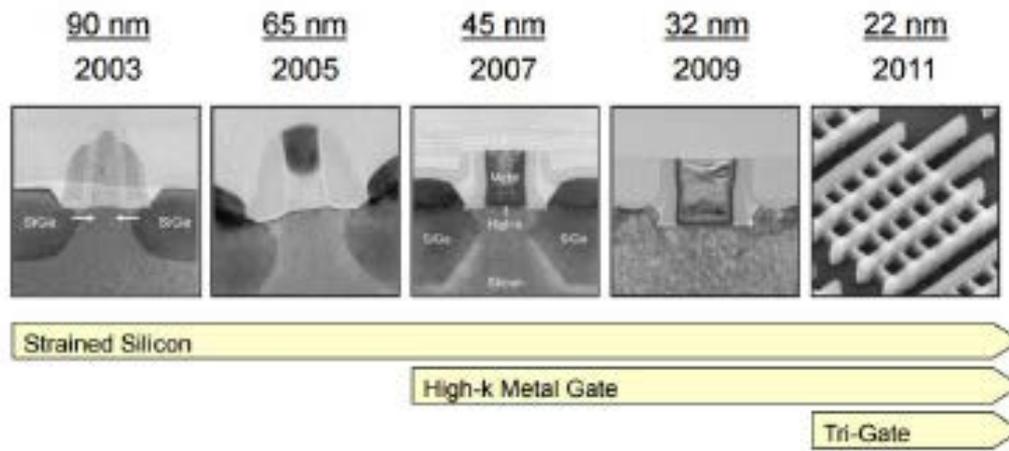
Low-level avalanche breakdown voltage comparison (V_g is adjusted to maximize I_{Sub} ; $I_{Sub} = 1\mu\text{A}/\mu\text{m}$).

* IBM: A Half Micron MOSFET Using Double Implant LDD, Ogura et al. IEDM 1982.

Robust Specification

- Claims must be supported by adequate written description
 - Substantive specification enables patent owner to draft new claims in continuation applications or re-issue proceedings to strengthen validity and infringement positions.
 - Particularly important for inventions in the semiconductor industry, where new generation of devices appear every couple years.

Non-Classical Scaling



* Figure source: Advance Device Concepts for 7nm Node and Beyond, IEDM 2015.

Valuable Claims: Damages Perspective

Evolving Issues in Damages Law

- **Apportionment**
 - Entire Market Value Rule (EMVR)
 - Smallest Salable Patent Practicing Unit (SSPPU)
 - Smallest Patent Practicing Feature (SPPF)

Entire Market Value Rule

- Under EMVR, damages can be based on value of the **whole article** without apportionment. See *Crosby Steam-Gauge & Valve Co. v. Consol. Safety-Valve Co.*, 141 U.S. 441, 453 (1891).
 - Patented component must be part of a single assembly of parts or complete machine, or function together as a unit. See *Cornell Univ. v. Hewlett-Packard Co.*, 609 F. Supp. 2d. 279, 286–87 (N.D.N.Y. 2009) (Rader, J.).
 - Infringing components must create substantial basis for product demand. See *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1326–27 (Fed. Cir. 2014).

Smallest Salable Patent Practicing Unit

- SSPPU is defined as smallest salable infringing unit with a “close relation” to the claimed invention
- The **general rule** for patented components is that royalties are based on the SSPPU. See *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 67 (Fed. Cir. 2012).
- EMVR is a “**narrow exception**” to general rule.
- Sometimes further apportionment of the SSPPU may be required. See *Ericsson*, 773 F.3d at 1227.

Smallest Patent Practicing Feature

- “[T]he requirement that a patentee identify damages associated with **the smallest salable patent-practicing unit is simply a step toward meeting the requirement of apportionment.** Where the smallest salable unit is, in fact, a multi-component product containing several noninfringing features with no relation to the patented feature . . . , the patentee must do more to estimate what portion of the value of that product is attributable to the patented technology.” *VirnetX*, 767 F.3d at 1327.
- “[A] patentee’s **obligation to apportion damages** only to the patented features **does not end with the identification of the smallest salable unit** if that unit still contains significant unpatented features. . . . In the end, *VirnetX* should have identified a **patent-practicing feature** with a sufficiently close relation to the claimed functionality.” *VirnetX*, 767 F.3d at 1329.

Point of Novelty & Apportionment in Microchips

- **One Approach**

- “Assuming for the sake of argument that dynamic logic circuits are the single most important part of Intel's microprocessors, it is still a long haul to conclude that they ‘drive demand’ for the entire microprocessor. [The expert] report provides little, if any, basis for allowing his testimony about a royalty based upon Intel’s sales of microprocessors.” *AVM Techs., LLC v. Intel Corp.*, 2013 WL 126233, at *3 (D. Del. Jan. 4, 2013).

- **Another Approach**

- “In light of that failure of proof [to credibly apportion the value of the Wi-Fi chip down to the patented features], the court has no choice based on the record but to calculate a royalty based on the Wi-Fi chip.” *In re Innovatio*, 2013 WL 5593609, at *14 (N.D. Ill. Oct. 3, 2013).

Reciting Combinations & Downstream Products

- “**[C]ursory recitation of the entire device** in the asserted claims does not foreclose the component that directly implements the invention from being the smallest salable patent-practicing unit for reasonable royalty purposes.” *GPNE*, 2014 WL 1494247, at *12.
- “[Defendant] asserts . . . that damages should not turn on claim draftsmanship such that the owner of an improvement patent may deliberately add dependent claims directed to unimproved conventional devices to expand the royalty base. We do not disagree. . . . [I]f the claimed invention only adds an incremental value to the conventional element(s), the damages awarded must also be so limited. **But, if the claimed invention adds significant value to the conventional element(s), the damages award may reflect that value.**” *Univ. of Pittsburgh of the Commonwealth Sys. of Higher Educ. v. Varian Med. Sys., Inc.*, 561 F. App’x 934, 947 (Fed Cir. 2014) (non-precedential).

Draft Valuable Patents

- **Patent Drafting**

- Draft detailed specification that includes discussion of benefits to downstream products
- Carefully tie points of novelty to improvements in downstream products
- Include claims to downstream products

Questions?

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