DSS Technology Management, Inc. v. Intel Corporation et al Doc. 229

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

DSS TECHNOLOGY MANAGEMENT, INC.,	§	
	§	
Plaintiff,	§	
	§	**CIVIL ACTION NO. 6:15-cv-130**
vs.	§	
	§	
INTEL CORPORATION, et al.,	§	
	§	
Defendants.	§	

MEMORANDUM OPINION AND ORDER

This Memorandum Opinion construes the disputed claim terms in United States Patent Nos. 6,784,552 ("the '552 Patent") and 5,965,924 ("the '924 Patent") asserted in this suit by Plaintiff DSS Technology Management ("DSS"). On February 9, 2016, the parties presented oral arguments on the disputed claim terms at a Markman hearing. For the reasons stated below, the court **ADOPTS** the following constructions.

BACKGROUND

The asserted patents generally relate to semiconductor devices and the processes for making those devices. Both patents claim semiconductor structures that allow for higher transistor densities. As transistor density increases, so does performance. But that increase in density can cause problems, especially when transistor components are misaligned during the semiconductor fabrication process. Misalignment can cause electrical shorts between transistor components, thus rendering the transistor inoperable. The patents-in-suit seek to prevent these types of problems using various semiconductor processes.

The '552 Patent relates to improved methods for etching openings in insulating layers and creating semiconductor devices with well-defined contact openings. '552 Patent at 1:9–12.

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The ’924 Patent relates to metal plug interconnects, which connect gates with diffusion regions in a semiconductor device. ’924 Patent at 1:7–8. The method for making the local interconnect of the ’924 Patent saves processing steps and reduces layout area of traditional prior art methods, such as a conventional buried contact method. ’924 Patent at 2:33–41.

APPLICABLE LAW

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’” Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005) (quoting Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc., 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The Court examines a patent’s intrinsic evidence to define the patented invention’s scope. Id. at 1313–1314; Bell Atl. Network Servs., Inc. v. Covad *Commc’ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). Intrinsic evidence includes the claims, the rest of the specification and the prosecution history. Phillips, 415 F.3d at 1312–13; Bell Atl. Network Servs., 262 F.3d at 1267. The Court gives claim terms their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention. Phillips, 415 F.3d at 1312–13; *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

Claim language guides the Court’s construction of claim terms. Phillips, 415 F.3d at 1314. “[T]he context in which a term is used in the asserted claim can be highly instructive.” Id. Other claims, asserted and unasserted, can provide additional instruction because “terms are normally used consistently throughout the patent.” Id. Differences among claims, such as additional limitations in dependent claims, can provide further guidance. Id.

“[C]laims ‘must be read in view of the specification, of which they are a part.’” Id. (quoting Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995)). “[T]he

specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.' " Id. (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)); Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed. Cir. 2002). In the specification, a patentee may define his own terms, give a claim term a different meaning that it would otherwise possess, or disclaim or disavow some claim scope. Phillips, 415 F.3d at 1316. Although the Court generally presumes terms possess their ordinary meaning, this presumption can be overcome by statements of clear disclaimer. See SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1343–44 (Fed. Cir. 2001). This presumption does not arise when the patentee acts as his own lexicographer. See Irdeto Access, Inc. v. EchoStar Satellite Corp., 383 F.3d 1295, 1301 (Fed. Cir. 2004).

The specification may also resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." Teleflex, Inc., 299 F.3d at 1325. For example, "[a] claim interpretation that excludes a preferred embodiment from the scope of the claim 'is rarely, if ever, correct.'" Globetrotter Software, Inc. v. Elam Computer Group Inc., 362 F.3d 1367, 1381 (Fed. Cir. 2004) (quoting Vitronics Corp., 90 F.3d at 1583). But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed language in the claims, particular embodiments and examples appearing in the specification will not generally be read into the claims." Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 1571 (Fed. Cir. 1988); see also Phillips, 415 F.3d at 1323.

Although "less significant than the intrinsic record in determining the legally operative meaning of claim language," the Court may rely on extrinsic evidence to "shed useful light on

the relevant art." Phillips, 415 F.3d at 1317 (quotation omitted). Technical dictionaries and treatises may help the Court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but such sources may also provide overly broad definitions or may not be indicative of how terms are used in the patent. Id. at 1318. Similarly, expert testimony may aid the Court in determining the particular meaning of a term in the pertinent field, but "conclusory, unsupported assertions by experts as to the definition of a claim term are not useful." Id. Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." Id.

I. Agreed Terms

Term	Agreed Construction
"contact region" ('739 Patent, claims 1, 11, 20)	"contact openings and/or vias"

II. Claim Construction of Disputed Terms

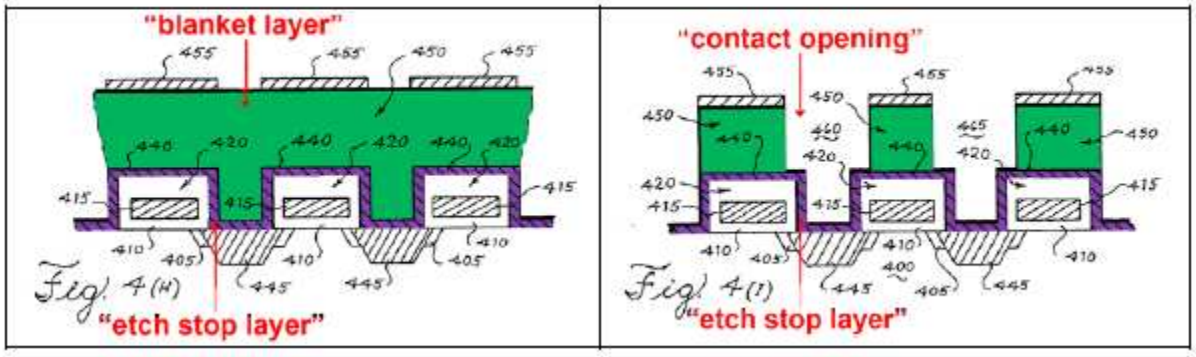
1. "an etch stop material over said first insulating layer and adjacent to the insulating spacer" ('552 Patent, claim 1)

DSS's Proposed Construction	Defendants' Proposed Construction
"an etch stop material around and/or above said first insulating layer" Generally, an etch stop material has an etch rate that is relatively lower than an adjacent or underlying material exposed to a specific etch process and effectively prevents etching of the adjacent or underlying material.	"a material overlying the first insulating layer that is not effectively etched by the etchant used to create the contact region"

The parties initially had two disputes with this term. First, Defendants argue that the etch stop material must be over, rather than around, the first insulating layer. Docket No. 195 at 1. At the hearing, DSS clarified that it is not arguing that an etch stop material that is exclusively to the side of an insulating material is "over" that insulating material. Docket No. 222 at 23:22–25:3. Ultimately, the parties agreed that the claim language mandates the etch stop material is

over the first insulating layer and adjacent to the insulating spacer. Docket No. 222 at 10:18–21, 22:16-19.

Next, the parties dispute whether the recited etch stop material's etching rate is relative to the material to be etched away (as DSS proposes), or the etchant used in creating the contact openings (as Defendants propose). DSS argues that "an etch stop material has an etch rate that is relatively lower than an adjacent or underlying material exposed to a specific etch process and may prevent etching of the adjacent or underlying material." Docket No. 206-1 at 1. Defendants, relying on Figs. 4(H) and 4(I) below, argue that "the only etchant that the etch stop material is described as stopping in the patent is the etchant used to form the contact opening." Docket No. 90 at 12. At the hearing, Defendants clarified this further by stating that an etch stop material can only be defined "with respect to a particular etching process." Docket No. 222 at 28:20–21.



'552 Patent at 12:35-43 (color and labels added). Figures 4(H) and 4(I), where the etching process removes the blanket layer to create the contact openings, yet does not etch away the etch stop layer.

The parties' positions are fairly close. Defendants are correct that the etch stop material in Figs. 4(H) and 4(I) are defined relative to the etch process used to make the contact opening, but DSS's proposed construction accounts for that because the etch stop material lies under the blanket layer, which is the material etched to create the contact openings. That is, in Figs. 4(H) and 4(I), the etch stop material can be defined by either the etchant being used in the specific

etching process, or by the etch stop material having a lower etch rate than the material being etched away in the etching process. However, Defendants' proposed construction goes a step further by requiring it to be the etching process that creates the contact regions, as illustrated in the preferred embodiment of Figs. 4(H) and 4(I). DSS's understanding does not incorporate the limitations from this preferred embodiment to the same extent and is therefore preferred. Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 913 (Fed. Cir. 2004) ("[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.").

Further, the claim language implicitly defines the etch stop material by the material adjacent to it. For example, claim 1 recites "etch stop material over [the] first insulating layer and adjacent to the insulating spacer" wherein the "first insulating layer" is "on the conductive layer," and the contact region is in the "first insulating layer." Additionally, the specification states that "[i]t will be appreciated that each of the methods described herein can be utilized on a variety of structures and oxide layers, to form any type of opening, and each of the insulating layer etching methods described herein is not necessarily restricted to the structure and/or insulating layer in conjunction with which it is described." '552 Patent at 10:23–28; see also 2:1–21 (describing the relationship between etch rates for silicon nitride and silicon dioxide). It is more true to the intrinsic evidence to define the etch stop material relative to the etching rate of the material that is being effectively etched away, rather than the specific etchant used in a single etching process.

Accordingly, the Court construes "an etch stop material over said first insulating layer and adjacent to the insulating spacer" as "a material over the first insulating layer and adjacent to

the insulating spacer that is not effectively etched by the etch process used because it has an etch rate that is relatively lower than the material that is being etched away."

2. "a side of the insulating spacer has an angle relative to the substrate surface that is either a right angle or an acute angle of more than 85º " ('552 Patent, claim 1)

DSS's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning	a side of the insulating spacer has an angle relative to the horizontal substrate surface that is greater than 85° and less than or equal to 90°

The parties dispute whether the recited angle must be relative to a horizontal substrate surface, as Defendants propose. Docket No. 190 at 15. Defendants contend that the specification expressly states that the substrate surface is horizontal. Id., citing '552 Patent at 7:45–48 ("[T]he etchant etches in one direction-in this case, vertically (or perpendicular relative to the substrate surface) rather than horizontally."); Figs. 2(B), 4(K) (showing the substrate surface as horizontal). DSS acknowledges that those figures teach a horizontal substrate surface. Docket No. 195 at 6. However, DSS contends that "neither the claims nor the specification limits that substrate surface to one that is horizontal." Id. DSS submits the specification uses a disjunctive parenthetical that clarifies the substrate does not necessarily have to be horizontal. Id., citing '552 Patent at 7:46–48 ("[T]he etchant etches in one direction-in this case, vertically (or perpendicular relative to the substrate surface) rather than horizontally.") (emphasis added by DSS).

The claim recites that the reference for measuring the angle is the "substrate surface," not a "horizontal substrate surface." There is nothing in the intrinsic record that limits the substrate surface to one that is horizontal. The closest the specification comes to discussing this requirement is the section cited by both parties that treats the etching direction as perpendicular, but this section provides horizontal and vertical as an example. '552 Patent at 7:46–48. At the

hearing, the parties agreed to use Defendants' proposal with the word "horizontal" removed. Docket No. 222 at 29:25–30:22, 60:11–14.

Accordingly, the Court construes "a side of the insulating spacer has an angle relative to the substrate surface that is either a right angle or an acute angle of more than 85º " as "a side of the insulating spacer has an angle relative to the substrate surface that is greater than 85° and less than or equal to 90°."

3. "insulating spacer" ('552 Patent, claims 1, 4, and 5)

DSS's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning	lateral spacer that electrically isolates the conductive layer from the contact region

At the hearing, the parties disputed whether the insulating spacer is a "lateral" spacer as Defendants contend. Defendants clarified that " 'lateral' merely means 'to the side of.' And that the lateral spacer is providing spacing or insulation with respect to components on either side of it." Docket No. 222 at 35:14–16; see also Docket No. 190 at 21.

Regarding the insulating spacer's positional characteristics, "[t]he invention contemplates that the insulating layer has spacer portions between the conductive layers and the contact opening." '552 Patent at 13:51–33. Specifically, the specification states that "spacers are formed between the polysilicon layer 415 of the gates and the contact openings by depositing an additional of conformal layer of TEOS material 430 over the structure and etching spacer portions extending into the contact openings and adjacent to the polysilicon layer 415 . . . ." '552 Patent at 11:35–39.

This understanding—that the spacer provides spacing or insulation with respect to the components on either side of it—addresses Defendants' main concern. The Court therefore proposed "insulating material located between the conductive layer and the contact opening."

DSS agreed with this language, while Defendants agreed to the extent that it requires a lateral spacer. Defendants then clarified that a lateral spacer separates two components and provides insulation to either side of the spacer. Docket No. 222 at 31:19–20, 35:14–16. The Court's proposal addresses Defendants' concern without introducing the word "lateral," which would necessarily require further construction without providing further clarity.

Accordingly, the specification indicates that the recited "insulating spacer" is an "insulating material located between the conductive layer and the contact opening."

4. "diffusion region formed in said substrate" ('924 Patent, claim 1)

DSS's Proposed Construction	Defendants' Proposed Construction
conductive terminal region such as a source or drain formed in said substrate	conductive terminal region, such as a source or drain, that contains dopants implanted in the silicon substrate

5. "diffusion region in a silicon substrate" ('924 Patent, claim 7)

DSS's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning	conductive terminal region, such as a source or drain, that contains dopants implanted in the silicon substrate

For "diffusion region formed in said substrate," the Court proposed "conductive terminal region such as a source or drain formed in the substrate," and for "diffusion region in a silicon substrate," the Court proposed "conductive terminal region such as a source or drain in a silicon substrate." DSS agreed with these proposals; however Defendants want to include the limitation that the diffusion regions are created by ion implantation.

Specifically, Defendants argue that "[a]t the time of the invention ion implantation was the way that you created diffusion regions." Docket No. 222 at 45:7–8. In the briefing, Defendants rely heavily on the "present invention" language in the '924 Patent at 3:41–51, which they allege limits the invention to diffusion regions with implanted dopants:

> The present invention provides a semiconductor structure that has a metal plug local interconnect (or shunt) for connecting a polysilicon gate to a diffusion region in a structure and a method of forming such a semiconductor structure.
> Referring initially to FIGS. 3A and 3B wherein an enlarged top view and a cross-sectional view of the present invention metal plug local interconnect is shown, respectively. Diffusion regions 70 and 72 of either N+ or P+ doping are first formed by an ion implantation process in the surface of the silicon substrate 74.

'924 Patent at 3:41–51.

The present invention, as the above passage makes clear, is a "metal plug local interconnect." That is the disclosed and claimed invention. How the diffusion regions are doped are ancillary to the metal plug local interconnect. The only requirement is that the substrate has a diffusion region; the claims are agnostic to how it was created. '924 Patent at 5:26, 6:16–17. Therefore, the Court rejects Defendants' argument that the diffusion region must be formed by ion implantation.

Accordingly, the Court construes "diffusion region formed in said substrate" as "conductive terminal region such as a source or drain formed in the substrate" and "diffusion region in a silicon substrate" as "conductive terminal region such as a source or drain in a silicon substrate."

6. "conducting plug" ('924 Patent, claims 1, 4, 5, 6, 10, 11, 12, 13, and 14)

DSS's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning	electrically conducting material deposited into a via and separate from a strapping shunt layer

Defendants initially opposed the plain and ordinary meaning because they were concerned it allows for an electrical communication between the gate and the diffusion region that can be made through a local interconnect strap similar to the prior art systems. Docket No. 190 at 28 (relying on the specification, '924 Patent at 2:56–63, that states the "object of the present invention to provide a metal plug local interconnect between a polysilicon gate and a

diffusion region that does not require the use of a local interconnect strap."). At the hearing, DSS agreed that it would not argue that "that the local interconnect strap was part of the conducting plug." Docket No. 222 at 59:2–4. With that resolution, the parties agreed to the plain and ordinary meaning. Id. at 58:5–59:4.

Accordingly, "conducting plug" is construed consistent with its plain and ordinary meaning, but the Court rejects any argument that the recited electrical communication between the gate and the diffusion region can be made through a local interconnect strap.

SIGNED this 14th day of March, 2016.

Robert W Schroeder III

ROBERT W. SCHROEDER III
UNITED STATES DISTRICT JUDGE

APPENDIX A

United States Patent Number 6,784,552:

Claim Term	Court's Construction
"an etch stop material over said first insulating layer and adjacent to the insulating spacer" claim 1	"a material over the first insulating layer and adjacent to the insulating spacer that is not effectively etched by the etch process used because it has an etch rate that is relatively lower than the adjacent and overlying material"
"a side of the insulating spacer has an angle relative to the substrate surface that is either a right angle or an acute angle of more than 85°" claim 1	"a side of the insulating spacer has an angle relative to the substrate surface that is greater than 85° and less than or equal to 90° "
"insulating spacer" claims 1, 4, and 5	"insulating material located between the conductive layer and the contact opening"
"contact region" claim 1	"contact openings and/or vias"*

* Parties agreed construction

United States Patent Number 5,965,924:

Claim Terms	Court's Construction
"diffusion region formed in said substrate" claim 1	"conductive terminal region such as a source or drain formed in the substrate"
"diffusion region in a silicon substrate" claim 7	"conductive terminal region such as a source or drain in a silicon substrate"
"conducting plug" claims 1, 4, 5, 6, 10, 11, 12, 13, and 14	plain and ordinary meaning