

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

INVENSAS CORPORATION,)
)
Plaintiff,)
)
v.) C.A. No. 17-1363 (MN)
)
SAMSUNG ELECTRONICS CO., LTD. and)
SAMSUNG AUSTIN SEMICONDUCTOR,)
LLC,)
)
Defendants.)

MEMORANDUM OPINION

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November 16, 2018
Wilmington, Delaware



NOREIKA, U.S. DISTRICT JUDGE:

Plaintiff Invensas Corporation (“Invensas”) sued Defendants Samsung Electronics Co., Ltd and Samsung Austin Semiconductor, LLC (collectively, “Samsung”) for infringement of U.S. Patent Nos. 6,232,231 (“the ’231 Patent”) and 6,849,946 (“the ’946 Patent”).¹ Presently before the Court are the parties’ disputes over the meaning of three terms that appear in the two patents.² The parties briefed the issues, submitted declarations from experts³ (D.I. 44-48, D.I. 56, 57), and provided tutorials describing the relevant technology (D.I. 49, 50). The Court heard argument on claim construction on October 10, 2018. (D.I. 64) (“Tr.”).

I. LEGAL STANDARDS

A. Claim Construction

“[T]he ultimate question of the proper construction of the patent [is] a question of law,” although subsidiary fact-finding is sometimes necessary. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 837-38 (2015). “[T]he words of a claim are generally given their ordinary and customary meaning [which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc) (internal citations and quotation marks omitted). Although “the claims themselves provide substantial

¹ The ’231 and ’946 Patents share the same specification. For simplicity, the Court, as did the parties in their briefing, cites only to the specification of the ’231 Patent.

² The parties initially submitted five terms for construction, but later reached agreement on two of the terms: “trench” and “conductive lines.” (D.I. 65). The Court adopts the agreed-upon constructions for those terms.

³ Invensas submitted a declaration from Jerzy Kanicki, Ph.D., a Professor in the Department of Electrical Engineering and Computer Science at the University of Michigan, Ann Arbor, Michigan. (D.I. 48). Samsung submitted a declaration from Michael Thomas, Ph.D., a consultant with more than thirty years of experience in interconnect research, development and manufacturing. (D.I. 46).

guidance as to the meaning of particular claim terms,” the context of the surrounding words of the claim also must be considered. *Id.* at 1314. “[T]he ordinary meaning of a claim term is its meaning to the ordinary artisan after reading the entire patent.” *Id.* at 1321 (internal quotation marks omitted).

The patent specification “is always highly relevant to the claim construction analysis . . . [as] it is the single best guide to the meaning of a disputed term.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). It is also possible that “the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs.” *Phillips*, 415 F.3d at 1316. “Even when the specification describes only a single embodiment, [however,] the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (internal quotation marks omitted) (quoting *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004)).

In addition to the specification, a court “should also consider the patent’s prosecution history, if it is in evidence.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). The prosecution history, which is “intrinsic evidence, . . . consists of the complete record of the proceedings before the PTO [Patent and Trademark Office] and includes the prior art cited during the examination of the patent.” *Phillips*, 415 F.3d at 1317. “[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.” *Id.*

In some cases, courts “will need to look beyond the patent’s intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period.” *Teva*, 135 S. Ct. at 841. Extrinsic evidence “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Markman*, 52 F.3d at 980. Expert testimony can be useful “to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.” *Phillips*, 415 F.3d at 1318. Nonetheless, courts must not lose sight of the fact that “expert reports and testimony [are] generated at the time of and for the purpose of litigation and thus can suffer from bias that is not present in intrinsic evidence.” *Id.* Overall, although extrinsic evidence “may be useful to the court,” it is “less reliable” than intrinsic evidence, and its consideration “is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence.” *Id.* at 1318-19. Where the intrinsic record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper. *See Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1308 (Fed. Cir. 1999) (citing *Vitronics*, 90 F.3d at 1583).

B. Indefiniteness

“The primary purpose of the definiteness requirement is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, *e.g.* competitors of the patent owner, can determine whether or not they infringe.” *All Dental Prodx, LLC v. Advantage Dental Prods., Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002) (citing *Warner-Jenkinson Co. v. Hilton-Davis Chem. Co.*, 520 U.S. 17, 28-29 (1997)). Put another way, “[a] patent holder should know what he owns, and

the public should know what he does not.” *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 731 (2002).

A patent claim is indefinite if, “viewed in light of the specification and prosecution history, [it fails to] inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). A claim may be indefinite if the patent does not convey with reasonable certainty how to measure a claimed feature. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1341 (Fed. Cir. 2015). But “[i]f such an understanding of how to measure the claimed [feature] was within the scope of knowledge possessed by one of ordinary skill in the art, there is no requirement for the specification to identify a particular measurement technique.” *Ethicon Endo–Surgery, Inc. v. Covidien, Inc.*, 796 F.3d 1312, 1319 (Fed. Cir. 2015).

Like claim construction, definiteness is a question of law, but the Court must sometimes render factual findings based on extrinsic evidence to resolve the ultimate issue of definiteness. *See, e.g., Sonix Tech. Co. v. Publications Int’l, Ltd.*, 844 F.3d 1370, 1376 (Fed. Cir. 2017); *see also Teva*, 135 S. Ct. at 842-43. “Any fact critical to a holding on indefiniteness . . . must be proven by the challenger by clear and convincing evidence.” *Intel Corp. v. VIA Techs., Inc.*, 319 F.3d 1357, 1366 (Fed. Cir. 2003); *see also Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1338 (Fed. Cir. 2008).

II. CONSTRUCTION OF DISPUTED TERMS

A. “substantially planar” / “substantially co-planar”

Invensas’s proposed construction Plain and ordinary meaning, no construction necessary. Alternatively, “substantially planar” means “substantially flat” and “substantially co-planar” means “substantially at the same elevation.”
Samsung’s proposed construction Indefinite
The Court’s construction “substantially planar” means “substantially flat” and “substantially co-planar” means “substantially at the same elevation”

The parties dispute whether the word “substantially” renders the terms “substantially planar” and “substantially co-planar” indefinite. As an initial matter, the Court notes that the Federal Circuit has never held that terms of degree – *e.g.*, “substantially” – are “inherently indefinite.” *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014). To the contrary, claims using terms of degree are definite where they “provid[e] enough certainty to one of skill in the art when read in the context of the invention.” *Id.*

Invensas asserts that, here, the term “substantially” does “not render [its] patent claims so unclear as to prevent a person of skill in the art from ascertaining the scope of the claim.” (D.I. 47 at 6 (quoting *Tinnus Enterprises, LLC v. Telebrands Corp.*, No. 2017-1726, 2018 WL 2434504, at *6 (Fed. Cir. May 30, 2018))). According to Invensas, when considered in the technological context described in the patent, a person of ordinary skill in the art (“POSA”) would understand that the term “substantially planar” means “substantially flat” and the term “substantially co-planar” means “substantially at the same elevation.” (D.I. 47 at 4-6).

Samsung argues that the two terms are indefinite because the specification provides no guidance and no objective boundaries or standards to measure the degree of flatness required to

practice the claims. (D.I. 44 at 5). Specifically, Samsung asserts that perfect planarization is not possible, and though the specification repeatedly uses the terms “substantially planar” and “substantially coplanar,” there is no guidance in the specification “as to the degree of acceptable deviation from a perfectly flat surface.” (*Id.*). Nor, in Samsung’s view, do the drawings offer any precise proportions from which a POSA could determine the metes and bounds of the claims. (*Id.*).

The Court agrees with Invensas. The record before the Court does not contain clear and convincing evidence of indefiniteness – *i.e.*, Samsung has not demonstrated that the claim fails to inform a POSA with reasonable certainty as to the scope of the claim. Here, the patents describe the “elevational disparities” that can occur as successive layers are deposited across previously patterned layers of an integrated circuit, as well as the problems that those disparities can cause. (’231 Patent at 1:28-48; Fig. 4). They describe the consequences of these elevational disparities in semiconductor fabrication (*id.* at 1:28-48), and how disparities can persist after polishing in the form of dishing and erosion. (*Id.* at 2:30-3:42). The specification further explains that these problems are solved in the claimed invention by forming dummy trenches in the dielectric layer so that conductors form a “substantially planar semiconductor topography.” (*Id.* at 3:43-4:3; *see also id.* at Fig. 7). Based on these disclosures and the specification’s ordinary use of these terms, a POSA would understand that an objective of the invention is to provide a sufficiently flat surface on which to build the subsequent layers of a semiconductor chip. The intrinsic evidence thus suggests that a POSA would understand that the semiconductor topography is “substantially planar” and the conductive and dielectric features are “substantially coplanar” when they provide a level of planarity suitable for the fabrication process applied.⁴

⁴ The Court notes that this conclusion is also supported by Invensas’s expert. (*See, e.g.*, D.I. 48, Ex. 1 ¶¶ 34-37).

B. “dummy conductors”

Invensas’s proposed construction

Plain and ordinary meaning, no construction necessary. Alternatively, “conductive structures that are not connected to any active or passive devices that function as an integrated circuit.”

Samsung’s proposed construction

“conductive structures that can carry power or ground voltages but are not connected to any active or passive devices that function as an integrated circuit.”

The Court’s construction

“conductive structures that are not connected to any active or passive devices that function as an integrated circuit”

The dispute between the parties with respect to this term involves Samsung’s addition of the phrase “can carry power or ground voltages.” Quoting Invensas’s brief, Samsung argues that this additional language “simply follows verbatim” from the specification passages relied upon by Invensas to support its proposed construction, namely columns 4 and 8:

“Dummy conductors 68 are not connected to any active or passive device which forms an integrated circuit of the semiconductor topography shown in FIG. 7. While *dummy conductors can carry power or ground voltages*, they do not carry transitory voltages or current associated with an operable circuit.” ’231 Patent, 8:4-9 (emphasis added).

“The dummy conductors are electrically separate from electrically conductive features of the ensuing integrated circuit . . . The dummy conductors therefore do not contain transitory voltages and/or current associated with or connected to active and passive devices within the semiconductor topography. Most likely, the *dummy conductors are connected to a power supply or ground . . .*” *Id.*, 4:35-44 (emphasis added).

(D.I. 56 at 13) (emphasis in original). Samsung argues that this language demonstrates that the dummy conductors must have the capability of carrying power or ground voltages. Further, according to Samsung, “the only way you can have that capability . . . is that it has to be connected to power or ground. It has to be connected to a source that can supply a power or ground voltage.” (Tr. at 53).

Invensas does not dispute that the language proposed by Samsung is included in descriptions of dummy conductors in the specification but asserts that this is an “optional feature” and does not require that the dummy conductors be connected to power or ground. (D.I. 57 at 7). Invensas points to the language Samsung did not highlight – “[m]ost likely” – as indicating that the language is optional. Further, Invensas argues, the specification provides that “the dummy conductors *preferably serve no purpose* except to improve the planarization of the interconnect level in which they reside.” (D.I. 57 at 7 (emphasis in original); *see also* ’231 Patent at 3:35-44).

The Court agrees with Invensas. Read in its entirety, the specification discloses that the dummy conductors may be connected to a power supply or ground, but it does not *require* that they be connected to anything. As discussed in the patents, “dummy conductors” are structures that are inserted between the narrow and wide interconnects to improve the planarity of the semiconductor topography, including the planarity of the interconnects. (’231 Patent at 5:26-30 (“Whatever polishing technique is applied to the conductive material, the presence of the plurality of dummy conductors between the series of relatively narrow interconnect and the relatively wide interconnect provides for global planarization of the topography employing the trenches.”)).

The patents specify that dummy conductors are not functional devices. The specification provides that dummy conductors are “electrically separate” and, as Invensas points out, “preferably serve no purpose except to improve the planarization of the interconnect level in which they reside.” (’231 Patent at 4:35-40). And, “[w]hile dummy conductors *can* carry power or ground voltages, they do not carry transitory voltages or current associated with an operable circuit.” (*Id.* at 8:4–12 (emphases added)). Further, as noted by Invensas, the specification states that dummy conductors are “most likely” connected to a power supply or ground – not that they are *always* connected, as Samsung’s proposal would require. (*Id.* at 4:43-47; 8:4-12). Samsung’s

proposed construction ignores the words “most likely” in describing dummy conductors in the passage quoted above, and it improperly reads into the claims a limitation contrary to the specification.

C. “plurality of laterally spaced dummy trenches”

Invensas’s proposed construction Plain and ordinary meaning, no construction necessary. Alternatively, “two or more dummy trenches arranged with spaces between their sides.”
Samsung’s proposed construction “two or more separate dummy trenches arranged with spaces between their sides.”
The Court’s construction “two or more dummy trenches arranged with spaces between their sides”

The dispute between the parties with respect to this term involves Samsung’s addition of the word “separate” in its construction. Samsung argues that the word “separate” is necessary to give meaning to the claim term “plurality” – *i.e.*, if the trenches were connected to each other in any way, they would be a single trench rather than a plurality. (*See* D.I. 44 at 19-20). In support of its proposal, Samsung notes that the specification never discloses or suggests that the dummy trenches could be connected to each other and, further, the figures of the patents show the trenches as being separate. (*Id.* at 20).

Invensas argues that the word “separate” is never used in connection with describing the relationship the dummy trenches have with each other. (D.I. 47 at 16-17). Instead, the specification and the claims refer to the dummy trenches as being “laterally spaced,” which would require some space between the trenches, but not necessarily complete separation. (*Id.*; *see also* D.I. 57 at 9-10).

The Court agrees with Invensas. The specification and claims of the patents use the term “separate” in two contexts – stating that (1) dummy *conductors* are “electrically separate” from

the electrically conductive features of the integrated circuit ('231 Patent at 4:35-47) and (2) the series of narrow trenches and the wide trench are “laterally separated” by a region of dielectric material (*id.* at 2:40-42). Neither of these contexts address the physical connectedness of the dummy conductors relative to each other. Moreover, as Samsung acknowledged at the claim construction hearing, although the figures do not show any connections, they also do not preclude any such connections. (Tr. at 78-79).

Finally, the Court is not convinced that it is necessary to read “separate” into the claim to give meaning to the word plurality. As the parties discussed at the claim construction hearing, hypothetical connections between the trenches may be small or large. (*See, e.g.*, Tr. at 71-72, 78-80). Whether any particular degree of connection would be enough to transform what would otherwise be multiple trenches into one trench (and thus not a plurality) is a question of fact that can be left to the jury.

V. CONCLUSION

The Court construes the disputed terms as explained above. An appropriate Order follows.

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SAMSUNG AUSTIN SEMICONDUCTOR,)
LLC,)
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Defendants.)

ORDER

At Wilmington, this 16th day of November 2018:

For the reasons set forth in the Memorandum Opinion issued on this date,

IT IS HEREBY ORDERED that the disputed claim terms of U.S. Patent Nos. 6,232,231 and 6,849,946 are construed as follows:

“substantially planar” / “substantially co-planar” – “substantially planar” means substantially flat and “substantially co-planar” means substantially at the same elevation;

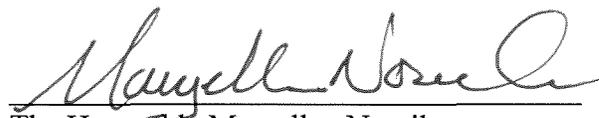
“dummy conductors” – conductive structures that are not connected to any active or passive devices that function as an integrated circuit; and

“plurality of laterally spaced dummy trenches” – two or more dummy trenches arranged with spaces between their sides.

IT IS HEREBY FURTHER ORDERED that the Court adopts the following agreed-upon constructions submitted by the parties at D.I. 65:

“trench” – Plain and ordinary meaning, no construction necessary, provided that a “trench” does not require any particular shape, including “elongated,” nor any particular depth; and

“conductive lines” – Interconnects. Note: “Interconnect” or “interconnects” may be used interchangeably as the plural form of the singular term “interconnect.”

A handwritten signature in cursive script, reading "Maryellen Noreika". The signature is written in black ink and is positioned above a horizontal line.

The Honorable Maryellen Noreika
United States District Judge