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

DSS TECHNOLOGY MANAGEMENT, INC.,	§	
	§	
v.	§	Civil Action No. 2:14–CV–199–RSP
	§	
TAIWAIN SEMICONDUCTOR MANUFACTURING COMPANY, LIMITED, et al.	§	

CLAIM CONSTRUCTION
MEMORANDUM AND ORDER

DSS Technology Management, Inc. ("DSS") asserts U.S. Patent No. 5,652,084 (hereinafter the "'084 patent")[1] against Taiwan Semiconductor Manufacturing Company, Limited, TSMC North America, Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung Telecommunications America L.L.C., Samsung Semiconductor, Inc., Samsung Austin Semiconductor LLC, and NEC Corporation of America (collectively, "Defendants"). On March 3, 2015, the Court held a hearing to determine the proper construction of the disputed claim terms in the '084 patent. After considering the arguments made by the parties at the hearing and in the parties' claim construction briefing and charts (Dkt. No. Nos. 116, 126, 130, and 131), the Court issues this Claim Construction Memorandum and Order.

[1] References to the '084 patent will be made in the format, "Col:Line"

BACKGROUND

The ‘084 patent is entitled “METHOD FOR REDUCED PITCH LITHOGRAPHY” and is based upon an application filed October 22, 1996 and claims priority to an application filed December 22, 1994. Claims 1–7 and 10 are asserted in the litigation. Each disputed claim term is recited in the first instance in independent claim 1. Defendants assert that one disputed term is indefinite under 35 USC § 112, ¶ 2. The ‘084 patent is the subject of two petitions for *inter partes* review (“IPR”): one filed by Taiwan Semiconductor Manufacturing Company, LTD (“TSMC”) and one filed by the Samsung Electronics Co. Both IPR petitions have been granted and a consolidated review is proceeding.

The ‘084 patent generally relates to the field of lithography processing for semiconductor fabrication. 1:9–12. The disclosed lithographic patterning process uses multiple exposures to provide a reduced pitch for features of a single pattern layer. Abstract. More particularly, a first imaging layer is exposed to radiation in accordance with a first pattern and developed. A second imaging layer is subsequently formed to surround the first patterned layer, exposed to radiation in accordance with a second pattern, and developed to form a second patterned layer. *Id*. The first patterned layer remains with the second patterned layer to produce a single patterned layer. *Id*. The techniques provide a reduced pitch for features, denser semiconductor devices, and smaller-sized semiconductor devices. 1:39–45.

APPLICABLE LAW

1. Claim Construction

“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) (*en banc*) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To determine the meaning of the claims, courts start by considering the intrinsic evidence. *See id.* at 1313; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id*. Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id*. Differences among the claim terms can also assist in understanding a term's meaning. *Id*. For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id*. at 1314–15.

"[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) (en banc)). "[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). This is true because a patentee may define his own

terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id*. 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. But, "'[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.'" *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc., v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent.").

Although extrinsic evidence can be useful, it is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id*. at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are entirely unhelpful to a court. *Id*. Generally, extrinsic

evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id*.

2. Claim Indefiniteness

Patent claims must particularly point out and distinctly claim the subject matter regarded as the invention. 35 U.S.C. § 112, ¶ 2. Whether a claim meets this definiteness requirement is a matter of law. *Young v. Lumenis, Inc.*, 492 F.3d 1336, 1344 (Fed. Cir. 2007). A party challenging the definiteness of a claim must show it is invalid by clear and convincing evidence. *Id*. at 1345. "A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), abrogated on other grounds by *Nautilus v. Biosig Instruments, Inc.,* 134 S. Ct. 2120 (2014).

The definiteness standard of 35 U.S.C. § 112 ¶2 requires that:

> a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty. The definiteness requirement, so understood, mandates clarity, while recognizing that absolute precision is unattainable. The standard we adopt accords with opinions of this Court stating that "the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter.

Nautilus, Inc., 134 S. Ct. at 2129–30 (internal citations omitted).

AGREED TERMS

The parties have agreed to the following terms. (Dkt. No. 131–1 at 1–3.)

Term	Agreed Construction
"first imaging layer"	"a first layer of photoresist or other radiation-sensitive material"
"second imaging layer"	"a second layer of photoresist or other radiation-sensitive material"

At the oral hearing, the parties also agreed to follow construction as proposed by the Court.

Hearing Tr. at 7–8.

Term	Agreed Construction
"patterning the [first/second] imaging layer"	"exposing an imaging layer to radiation in accordance with a specific pattern and developing the imaging layer so that portions of the imaging layer laying outside of the pattern are dissolved in the developer, thereby forming patterned portions and spaces of the imaging layer"

DISPUTED TERMS

1. The Layer Disputes

"patterning the [first/second] imaging layer"[2]

DSS's Construction	Defendant's Construction
"exposing an imaging layer to radiation in accordance with a specific geometric pattern and developing the imaging layer so that portions of the imaging layer laying outside of the geometric pattern are dissolved in the developer"	"patterning" refers to a two-stage process: (1) an imaging layer is exposed to radiation in accordance with a specific pattern, and (2) the imaging layer is developed so that portions of the imaging layer laying outside of the pattern are dissolved in the developer, thereby forming a patterned layer"

"first patterned layer having a first feature" / "second patterned layer having a second feature"

DSS's Construction	Defendant's Construction
"a layer containing the pattern defined by the portion of the first imaging layer that remains intact after the patterning step having a first feature" "a layer containing the pattern defined by the portion of the second imaging layer that	**"**the portions of the [first/second] imaging layer that remain after the first patterning step" Alternatively, Defendants propose the following modified construction:

[2] Though the parties have agreed to the "patterning the [first/second] imaging layer" terms, the Court provides the constructions proposed by the parties to provide further context to the disputes regarding the layer terms. In addition, much of the arguments for "patterning the [first/second] imaging layer," "first patterned layer having a first feature," and "second patterned layer having a second feature" overlap.

remains intact after the second patterning step having a second feature"	"the portions of the [first/second] imaging layer that remain after the [first/second] patterning step including the spaces therebetween"

A number of disputes raised by the parties with regard to these terms have been resolved by the parties either in the briefing or at the oral hearing. DSS originally asserted that Defendants sought to limit "layers" to just the portions of a layer that remain after patterning as opposed to a construction where the layer can include the material that remains after the patterning and the spaces between the material. Defendants clarified in their briefing that features can include both the material remaining and the spaces between the material. (Dkt. No. 126 at 5.) At the oral hearing, the parties also resolved the dispute regarding DSS's inclusion of "geometric" by agreeing not to include such language. Hearing Tr. at 8–10, 31.

With regard to the "patterning the [first/second] imaging layer," the primary remaining dispute presented in the briefing related to Defendants' inclusion of "thereby forming a patterned layer." Defendants asserted that this language addressed the real issue between the parties. Defendants asserted that the dispute related to whether the result of the patterning step is the patterned layer. (Dkt. No. 126 at 6–7.) That is, whether the first patterned layer is a portion of the imaging layer that was patterned, or whether the patterned layer can be a sub-layer below the imaging layer that was subsequently etched and now is patterned with the pattern that was in the imaging layer. (*Id*.) As to "patterning the [first/second] imaging layer," the construction agreed to by the parties at the oral hearing was proposed by the Court. Hearing Tr. at 7–8. This construction specifically included a conclusion that substantively matched Defendants' proposal by including "thereby forming patterned portions and spaces of the imaging layer." *Id*.

At the oral hearing, the Court also proposed a construction for "first patterned layer having a first feature" and "second patterned layer having a second feature." The dispute

regarding these terms raised the same issue: whether the result of the patterning step is the patterned layer, and, thus is the first patterned layer a portion of the imaging layer that was patterned, or whether the "patterned layer" can include a sub-layer below the imaging layer that was subsequently etched and now is patterned with the pattern that was in the imaging layer. (Dkt. No. 126 at 6–7; Dkt. No. 130 at 1–3.) In particular, the Court proposed: "a layer containing the portions and spaces of the [first/second] imaging layer that remain after the [first/second] pattern step." Hearing Tr. at 8.

Again, the Court's proposal adopted the substance of Defendants' proposal.[3] At the oral hearing, DSS accepted the Court's proposal with a caveat that the "layer" did not have to include the portions (or spaces) of the corresponding imaging layer. Hearing Tr. at 8–9. As discussed below, the Court adopts the construction it proposed at the oral hearing and specifically rejects DSS's caveat. Further, to the extent DSS intends to interpret the construction of "patterning the [first/second] imaging layer" to similarly allow for DSS's caveat, the Court rejects such an interpretation as well.

The construction for "patterning the [first/second] imaging layer" explicitly includes "exposing an imaging layer . . . , thereby forming patterned portions and spaces of the imaging layer." The terms being construed must be read together in the context of the entire step (b) (or step (e)) (Emphasis added). For example, step (b) recites: "patterning the first imaging layer in accordance with a first pattern to form a first patterned layer having a first feature." (Emphasis added). The constructions adopted by the Court for the sub-parts of these phrases as a whole indicate that the "patterning" step forms "patterned portions and spaces of the imaging layer." Further, the patterned layer that results from the claimed "to form" phrase is a layer that contains

[3] Defendants agreed to the Court's proposal at the oral hearing. Hearing Tr. at 10.

"the portions and spaces of the [first/second] imaging layer." Thus, the patterning forms "patterned portions and spaces of the imaging layer" and the "patterned layer" contains these same portions: "a layer containing the portions and spaces of the [first/second] imaging layer that remain after the [first/second] patterning step."

Positions of the Parties

DSS argues the claims merely require the layers to "have a feature" and, thus, the use of the word "having" allows each layer to include more than just a feature. (Dkt. No. 116 at 3.) DSS argues that the claim language does not restrict the location of the "patterned layer" to what remains of the "imaging layer." DSS asserts that the claims do not recite a "patterned image layer." (Dkt. No. 130 at 2.) DSS asserts that the use of an "image layer" and a separate "patterned layer" in the claims strongly suggests that the two layers can be different. (Dkt. No. 130 at 2.) DSS asserts that the claims thus cover both scenarios: where the image layer and pattern layer are the same layer and when those layers are different layers. (*Id.*) DSS asserts that the claims only require patterning an image layer "to form" a patterned layer and, thus, this strongly implies that the image layer and the patterned layer do not have to be the same layer.

At the oral hearing, DSS asserted that the specification passages at 1:23–25 and 5:62–63 support its position that the patterned layer does not have to be the image layer after patterning. Hearing Tr. at 30. DSS also asserts that dependent claims 4 and 5 recite specific examples of patterning (e.g., exposing and developing) thus indicating that claim 1 is broader and not restricted to exposing and developing an image layer to form a patterned image layer. (Dkt. No. 130 at 3.) Defendants further assert that their construction of the first term ends with "thereby forming a patterned layer" because the surrounding claim language makes clear that the image patterning process forms the patterned layer. (Dkt. No. 126 at 6–7.)

In particular, Defendants assert that the claim language states "patterning the [first/second] imaging layer in accordance with a [first/second] pattern to form a [first/second] patterned layer having a [first/second] feature." Defendants thus assert that the full claim language makes clear that it is the patterning of the imaging layer that forms the patterned layer. Defendants assert that DSS's constructions of "[first/second" patterned layers" and "[first/second] patterned layer having a [first/second] feature" would encompass the layers that are formed under the respective imaging layers by subsequent steps, such as etching steps. (Dkt. No. 126 at 6–7.)

Defendants assert that the claims are directed toward forming patterns in the imaging layers, not the subsequent processing steps. Defendants also assert that the '084 patent is directed toward a lithography method for forming patterns and there is no reason to include non-lithographic processes in forming the claimed patterned layer. Thus, Defendants assert the formed "pattern layer" is the patterned imaging layer. (Dkt. No. 126 at 6.) Defendants assert that the overall claim language is "patterning" the image layers to "form" the patterned layers, and thus, the first and second patterned layers are the patterned imaging layers, not the underlying layers. (Dkt. No. 126 at 6–7.)

Defendants also assert that the specification makes clear that the patterned layers are a portion of the imaging layers that remain after the patterning steps. Defendants assert that the specification consistently states that "patterning" (e.g., exposing and developing) the image layers results in the patterned layers. *See* 3:65–4:6 (imaging layer is "developed in a suitable developer to form a first patterned layer 232"), 4:9–24, 6:64–7:12, Figures 2–5. Defendants assert that the specification never describes the underlying layers as the patterned layer.

Defendants object to DSS's construction as defining the patterned layer not as the portions of the imaging layer, but instead as other layers "defined" by the remaining portions of the imaging layer. Defendants assert that the specification distinguishes between what "defines" a layer (i.e., a mask) and the element that contains the pattern (i.e., the patterned imaging layer). (Dkt. No. 126 at 9.) Defendants further assert that DSS's construction effectively reads out the embodiments of Figures 2 through 5 in which the patterned layers are the remaining portions of the respective imaging layer. (Dkt. No. 126 at 9.)

Analysis

The Court's analysis begins with the claims themselves. *Phillips*, 415 F.3d at 1314. The language of the entirety of the claim phrases in question supports Defendants' construction. For example, claim 1 step (b) recites "patterning the first imaging layer . . . to form a first patterned layer." Step (e) has similar language with regard to the second imaging layer. Thus, the claim language indicates that the "patterning" of the imaging layer itself "forms the patterned layer." DSS's positions are in conflict with the natural reading of the claims. DSS seeks to have the "patterned" layer be a layer "containing the pattern defined by" a portion of the first imaging layer. However, such a construction is in conflict with the claim language that states that the patterning of the imaging layer actually forms the patterned layer. Furthermore, the specification also makes clear that the patterning of the image layer forms the patterned layer.

Every example in the specification teaches that the pattern of the imaging layer is what forms the patterned layer, not some undescribed subsequent etching steps. For example, with regard to Figure 3, a "portion of image layer 220 . . . remains to form first patterned layer 232." 4:9–12. Similarly, in another embodiment for Figure 3, a "portion of imaging layer 220 . . . remains to form first patterned layer 232." 4:24–27. Likewise in Figures 4 and 5,

"imaging layer 240 may then be developed . . . to form a second patterned layer that includes features 251 and 253" and "that portion of imaging layer 240 that has not been exposed . . . remains to form features 251 and 253 for the second patterned layer." 6:51–59. Thus, the specification describes the "patterned layer" created by the patterning step as the portions of the image layer that remain after patterning.

As to the underlying layers in the specification examples, the specification states that such layers "are not necessary to practice" the disclosed method. 3:11–19. Furthermore, though not shown in the embodiments, subsequent etching of the underlying layer is described as being separate and distinct from the patterning step: "the single patterned layer illustrated in FIGS. 5, 11, and 16, becomes replicated in the underlying layers." 12:50–53.[4] With regard to DSS's claim differentiation argument regarding "patterning" as it applies to dependent claims 4 and 5, such argument fails for several reasons. First, both parties proposed and agreed to constructions that indicated that "patterning" related to exposing and developing an image layer. Second, claims 4 and 5 add the particular limitation that the "exposed portion dissolves." Thus, these dependent claims add limitations directed toward a positive photoresist system. These claims do not indicate that "patterning" of the imaging layers "to form" the patterned layers encompasses subsequent etch steps.

Defendants' positions conform to the natural reading of the claims. Furthermore, when looking to the specification to provide context to the claim language, the specification also

[4] When asked at the oral hearing to provide examples in the disclosed embodiments that matched DSS's construction, DSS could not cite an embodiment. Rather, DSS cited to one portion of the background of the invention as a counter to the totality of the remainder of the disclosure. Hearing Tr. at 30. However, even that portion describes the "pattern" as being in the photoresist: "the pattern in the photoresist is thus replicated in the underlying layer." 1:23–28. DSS also cited to a portion of the disclosure at 5:62–62. Hearing Tr. at 30. However, that portion of the specification relates to the second imaging layer in relation to the pattern formed in the first imaging layer, not the second imaging layer and the second patterned layer. 5:56–5:65.

supports Defendants' positions. Finally, the Court notes Defendants' arguments are not inconsistent with DSS's argument that the imaging layer and the patterned layer are two terms in the claim, and, thus must be different layers. As shown for example with regard to Figure 2, the imaging layer 220 (before patterning) is a different layer than the patterned layer 232. Though both layers may be formed of the photoresist, one layer is not patterned and one layer is patterned. Thus, the differences provide context for reciting different terminology in the claims. The same can be said with regard to the second imaging layer and second patterned layer of Figures 4 and 5.

The Court adopts as its construction, "a layer containing the portions and spaces of the [first/second] imaging layer that remain after the [first/second] patterning step." At the oral hearing, Defendants' expressed agreement to the construction adopted by the Court herein. Hearing Tr. at 10. The Court further rejects DSS's interpretation of the Court's construction it proposed at the oral hearing. The Court's construction explicitly states that the layer contains "the portions and spaces of the [first/second] imaging layer that remain. . . ." (Emphasis added). DSS's interpretation is not consistent with the requirements of the Court's construction. Accordingly, the Court construes

"first patterned layer having a first feature" / "second patterned layer having a second feature" to mean "a layer containing the portions and spaces of the [first/second] imaging layer that remain after the [first/second] patterning step."

2. Patterns

"first pattern"

DSS's Construction	Defendant's Construction
"a first geometric pattern according with which the first imaging layer is selectively irradiated"	"a pattern in accordance with which the first imaging layer is selectively irradiated"

"second pattern"

DSS's Construction	Defendant's Construction
"a second geometric pattern— separate from the first pattern—in accordance with which, the second imaging layer is selectively irradiated"	"a pattern in accordance with which the second imaging layer is selectively irradiated"

At the oral hearing, DSS agreed to remove "geometric" from its construction. Hearing Tr. at 31. The only issue remaining between the parties is whether the first pattern and the second pattern have to be different as, for example, DSS interprets its "separate from the first pattern" language to require the two patterns to be different.

Positions of the Parties

DSS asserts that by reciting "first" and "second" patterns, the claims raise a clear implication that the patterns are different from one another. DSS asserts that the specification teaches that the first and second patterns are not the same. DSS points to Figure 2 (opaque feature 222 and clear features 221 and 223) in contrast to Figure 4 (opaque features 242 and 244 and clear features 241, 243, and 245). Thus, DSS asserts the claims and specification show that the two patterns must have "different" shapes." (Dkt. No. 116 at 12.) DSS also asserts that the geometry of each "feature" is determined by the patterns and, thus, the patterns must also be distinct because, as the claim later recites, that the second pattern layer has "a second feature distinct from the first feature." (*Id.*)

Defendants assert that the specification repeatedly states that the first and second imaging layers may be exposed using "any suitable pattern of opaque and clear features that may depend, for example, on the desired pattern to be formed in [the] imaging layer." 3:59–62, 6:23–25, 8:11–14, 8:65–9:1, 10:61–64, and 11:49–52. Defendants assert that while different shapes would be allowed, there is no support in the specification requiring the use of different shapes.

Defendants assert that in semiconductor lithography, the transferred pattern depends upon the arrangement of the features in the mask and the orientation of the mask in relation to the imaging layer. Defendants assert that two masking steps involving the same pattern, but shifted with respect to each other, could render two sets of patterns on a wafer. (Dkt. No. 126 at 13.)

Defendants assert that just because the "first" and "second" patterns are listed does not mean that the patterns have to be shaped differently, but rather it merely is a use of common patent convention for identifying the "first" and "second" elements in a claim. (Dkt. No. 126 at 13–14.) Defendants assert that they do not contest that the first and second patterns are separate elements; just that the two patterns do not have to be different. (Dkt. No. 126 at 14.) Defendants assert that is well recognized in patent law convention that "first" and "second" can mean repeated instances of an element. (Dkt. No. 126 at 14) (citing *Free Motion Fitness, Inc. v. Cybex, Int'l, Inc.*, 423 F.3d 1343, 1347–48 (Fed. Cir. 2005)). Defendants assert that the claim language merely associates the first pattern with the first imaging layer and the second pattern with the second imaging layer. Defendants also assert that "first" and "second" are also used with regard to the imaging layers and there is no dispute that the two imaging layers can be two similar layers of the same type of photoresist.

Defendants assert that in the related U.S. Application 08/740,014—sharing a common specification with the '084 patent—DSS attempted to explicitly require the first and second patterns be different:

> 12. A lithography method for semiconductor fabrication using a semiconductor wafer, comprising the steps of: …(d) patterning the imaging layer in accordance with a second pattern to form a patterned layer, *said second pattern being different than said first pattern*, wherein the patterned layer has adjacent feature which are formed relatively closer to one another than is possible through a single exposure to radiation.

(Dkt. No. 126 Ex. F '014 File History, at 36) (italics emphasis added). Defendants assert that the examiner rejected DSS's amendment under 35 USC § 112 because the specification did not support a first pattern different from the second pattern. (*Id.* at 39.) Defendants assert that Court should not now rewrite the claim to import a limitation that the Patent Office found was not disclosed in the specification. (Dkt. No. 126 at 15.) Defendants also assert that the PTAB has also rejected DSS's proposal, explicitly finding that the first and second patterns did not have to be a different geometry:

> The geometry of the second pattern, however, is not necessarily different from the first pattern. See, e.g., Figs. 7–11, 13–16. The Specification provides, and Patent Owner acknowledges, that: "The second mask may include any suitable pattern of opaque and clear features that may depend, for example, on the desired pattern to be formed in imaging layer 240." Ex. 1001, 6:23–25; Prelim. Resp. 14. Patent Owner does not specify why a second mask that duplicates the geometry or pattern of the first mask would not be suitable.

(Dkt. No. 126 Ex. G at 7–8.)

As to DSS's argument that Figures 2 and 4 show different patterns, Defendants assert such an argument is at a minimum an invitation to commit clear error by importing exemplary embodiments contained in the figures. (Dkt. No. 126 at 16) (citing *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.")). Defendants further state that it is not clear that the masks used to form the patterns in Figures 2 and 4 are actually different masks, as the figures could merely depict the same mask shifted horizontally.

Defendants also cite to Figures 7–10 that depict first and second patterns that create identically shaped features, demonstrating that masks with identical geometries can create distinct features. (Dkt. No. 126 at 16–17.) Finally, Defendants assert that DSS's argument

regarding the figures is contradicted by the specification that repeatedly states that the first and second patterns may be "any suitable pattern." 3:59–62, 6:23–25, 8:11–14, 8:65–9:1, 10:61–64, and 11:49–52.

Analysis

It is common patent law convention to use "first" and "second" to reference repeated instances of a similar element. *See Free Motion Fitness, Inc. v. Cybex, Int'l, Inc.*, 423 F.3d 1343, 1347–48 (Fed. Cir. 2005). The claim terms themselves, "first pattern" and "second pattern," are not indicative of a deviation from such convention. Such a conclusion also matches the context of the surrounding claim language that references a patterning step of a "first imaging layer" and a patterning step of a "second imaging layer." In context, the use of "first" and "second" more appropriately references the two-step aspect of the claimed process.

DSS would have this Court import an embodiment from the specification. Such a conclusion is wrong for multiple reasons. First, there is no disavowal or clear disclaimer of the well understood claim language. In contrast, the specification clearly states repeatedly that "any suitable pattern of opaque and clear features that may depend, for example, on the desired pattern to be formed in [the] imaging layer." 3:59–62, 6:23–25, 8:11–14, 8:65–9:1, 10:61–64, and 11:49–52. In this regard, the specification could not be clearer: a particular pattern is not required for the first and second patterns. Second, it is not even clear that in the exemplary specification embodiments, the first and second patterns are different. For example, the first and second patterns shown in Figures 2–5, 7–11 and 13–16, respectively, may each be the same pattern, just merely shifted horizontally.

The conclusion that the first and second patterns do not have to be different is also supported by the prosecution history. As noted above, the Patent Office has twice rejected DSS's

construction. First, the PTAB has specifically rejected DSS's position in the IPR. In addition, the Patent Office rejected the "different" requirement as not being supported by the specification in a related case having a common specification. *See Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003) (looking to the prosecution history in other applications). Accordingly, the Court construes

"first pattern" to mean "a pattern in accordance with which the first imaging layer is selectively irradiated" and construes "second pattern" to mean "a pattern in accordance with which the second imaging layer is selectively irradiated."

3. "a second feature distinct from the first feature"

DSS's Construction	Defendant's Construction
"a second feature that has a different geometric shape than the first feature" The difference in geometric shape is determined from a top-down view (e.g., in the x-y plane of the semiconductor wafer).	"a feature of the second patterned layer that is not in contact with and does not overlap with the first feature of the first patterned layer"

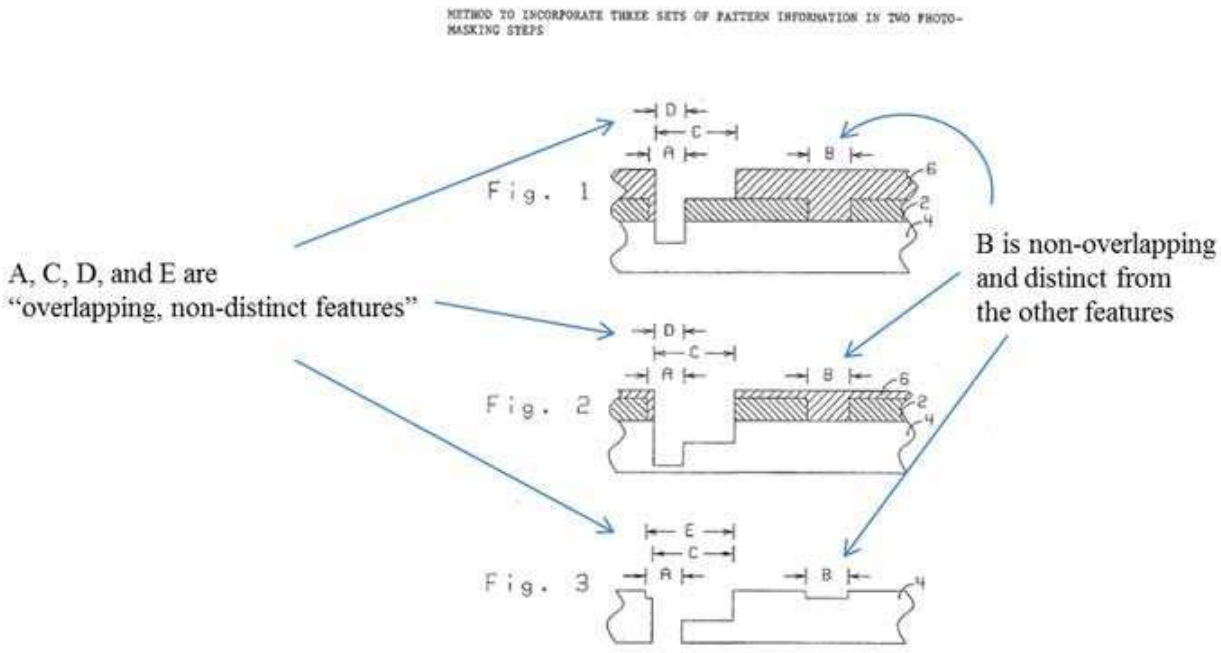
At the oral hearing, the Court proposed a construction of "a second feature distinguishable from the first feature." The Court's proposed construction further expressly rejected DSS's "geometric shape" proposal and expressly rejected Defendants' proposal that the feature "does not overlap." At the oral hearing DSS agreed to the Court's construction. Hearing Tr. at 37. The primary issue left in dispute is what does "distinct" features mean and more particularly, does the prosecution history limit the term to mean features that do not overlap.

Position of the Parties

Defendants assert that while "distinct" is not found in the specification, it can be understood in the context of the claims as a whole, the specification, and the prosecution history.

Defendants assert that the stated purpose of the '084 patent is to provide a "relatively reduced pitch for features" for the fabrication of "relatively denser" semiconductor devices. 1:39–42. Defendants assert that this is reflected in claim 1 as "the first and second features . . . are formed relatively closer to one another than is possible through a single exposure to radiation." Defendants assert that when determining if two features are "relatively closer" to one another, the parameter of interest is the distance between the two features. Defendants assert that in this context "distinct" features means not in contact, separate features. (Dkt. No. 126 at 18.)

Defendants assert that statements made by the Applicant during prosecution further limit the term "distinct" to non-overlapping features. In particular, Defendants point to the arguments made to overcome a rejection based on the IBM Technical Disclosure volume 32, number 8A ("Disclosure 1"). DSS reproduces portions of Disclosure 1 and highlights the overlapping and non-overlapping features:



(Dkt. No. 126 at 21) (annotating Disclosure 1). Defendants assert that the examiner's rejection focused on the "coincident" or overlapping features formed by the openings A, C, D, and E. (Dkt. No. 126 Ex. H '084 File History at 5.) Defendants assert that features A, C, D, and E are distinguishable in several respects: for example, they are of different widths and are defined by different layers of photoresist. Defendants assert that despite DSS's suggestion that "distinct" means "distinguishable to the eye or mind as discrete" (Dkt. No. 116 at 8), that definition cannot be squared with the prosecution history. Defendants assert that if any distinguishable characteristic rendered a feature distinct, features A, C, D, and E would be distinct from each other. Defendants assert that the Applicant argued that these features were not distinct because they were overlapping:

> Disclosure 1 does not disclose exposing a portion of a first imaging layer to form a first feature and subsequently patterning a second imaging layer to form a second **distinct** feature. As previously discussed, disclosure 1 forms **overlapping** openings A, C, D, and E in order to incorporate three sets of patterns in two photomasking steps. Thus, Disclosure 1 teaches away from amended claim 1, because openings A, C, D, and E are **overlapping non-distinct** features.

(Dkt. No. 126 Ex. H '084 File History at 12–13) (emphasis added). Defendants assert that no reasonable person would read this statement and understand that the patentee meant to emphasize the shapes of openings A, C, D, and E. Instead, the patentee argued that overlapping features were non-distinct. Defendants further note that opening B and opening A are rectangles of the same size from a top-down perspective yet are nevertheless distinct, not because of their shape but because B is separate from and does not overlap the other openings. (Dkt. No. 126 at 22.)

Defendants further point to an interview with the examiner that occurred prior to the amendment that added "distinct." (Dkt. No. 126 Ex. H at 8.) Defendants assert that the Interview Summary states that the Applicant's amendment was meant to clarify the relationship between

the claimed features. (*Id.*) The Applicant made two changes in this regard: applicant replaced the term "adjacent" with the term "distinct" and specified that the first and second features must be formed relatively closer to one another than is possible through a single exposure to radiation. (*Id.* at 10.) Defendants assert that "adjacent" is understood to mean immediately next to or abutting. Defendants assert that when coupled with the amendment to clarify the relationship between the features—i.e., that there must be a measurable distance between the two features—the substitution of the term "distinct" for the term "adjacent" makes clear that distinct means not in contact with.

As to the dependent claim 12 and claim differentiation arguments presented below by DSS, Defendants assert that prosecution history disclaimer rebuts the presumption of claim differentiation. (Dkt. No. 126 at 22–23) (citing *Biogen Idec, Inc. v. GlaxoSmithKline LLC*, 713 F.3d 1090, 1097 (Fed. Cir. 2013) and *TecSec, Inc. v. IBM*, 731 F.3d 1336, 1345–46 (Fed. Cir. 2013) ("Claim differentiation is not a rigid rule and it cannot overcome a construction required by the prosecution history.").

DSS asserts that Defendants' position that "distinct" means features that do not overlap is contradicted by dependent claim 12 that adds the limitation that the features of independent claim 1 "do not overlap." DSS asserts that "overlap" and "distinct" are different inquires under the claims. DSS asserts that the claim language thus indicates that whether two features are "distinct" from each other is a different inquiry as to whether the features are spaced apart or overlapping. DSS asserts that the ordinary meaning of "distinct" means that two items are "distinguishable to the eye or mind as discrete." (Dkt. No. 116 at 8) (citing Ex. 4, Webster's Dictionary at DSS-001016).

DSS notes that in prosecution, some claims were amended to add the "distinct"

requirement (claim 1) and some claims were amended to state that the features "do not overlap" (added dependent claim 12). (Dkt. No. 116 Ex. 1 at DSS-0000126–32, 140–46.) DSS asserts that the inventor added these claim elements to overcome Disclosure 1 (that disclosed four openings (A, C, D and E) that are "overlapping non-distinct features"). (*Id.*) at DSS-0000129–130, and 143–144. DSS asserts that the inventor distinguished the reference on two grounds: first, that Disclosure 1 teaches overlapping features (a limitation added to dependent claim 12) and second, that Disclosure 1 discloses features that are non-distinct and as a result did not disclose distinct features (a limitation added to independent claim 1). (Dkt. No. 116 at 10.) DSS asserts that from a top view, openings A, C, and D are each subsumed within opening E and, thus, from a top-down view, those openings are part of the same geometric shape within E. DSS asserts that "distinct" must have some meaning and cannot be read out of the claims. DSS asserts that the ordinary meaning should apply.

DSS asserts that Defendants misread the prosecution history. DSS asserts that the Applicant added "distinct" in claim 1 and "overlapping" in claim 12. DSS asserts that the Applicant argued that Disclosure 1 had two deficiencies: "overlapping non-distinct" features. (Dkt. No. 116 Ex. 1 at 129–31.) DSS asserts that the Applicant did not argue that the features were "non-distinct" because they were "overlapping," but rather the Applicant highlighted two shortcomings. (Dkt. No. 116 at 12.)

Analysis

The parties do not dispute that the ordinary meaning of "distinct" does not mandate "non-overlapping." However, Defendants assert that the Applicant's prosecution arguments limited claim 1 to both "distinct" and "overlapping." Prosecution arguments by nature are often not clear. *Phillips*, 415 F.3d at 1317 (noting that the prosecution history represents an "ongoing

negotiation" and "often lacks the clarity of the specification"). The prosecution history must show that the patentee clearly and unambiguously disclaimed or disavowed the proposed interpretation during prosecution to obtain claim allowance. *Middleton Inc.*, 311 F.3d at 1388. Thus, statements will constitute disclaimer of scope only if they are "clear and unmistakable statements of disavowal." *See Cordis Corp.*, 339 F.3d at 1358. Here, such disclaimer or disavowal is not present. Moreover, when viewed in context of the entirety of the argument and accompanying claim amendments, the prosecution history tends to support the conclusion that "distinct" and "non-overlapping" are two different grounds Applicant separately argued and that "distinct" is not required to be "non-overlapping." At a minimum, the prosecution history provides no clarity that "distinct" was meant to mean "non-overlapping."

The parties agree that the relevant arguments are found in a September 24, 1996 Amendment After Final Action. (Dkt. No. 116 Ex. 1.) In that Amendment, the Applicant amended claim 1 to include among other things "having a second feature distinct from the first feature." In addition, a new application claim 25 (now issued claim 12) was added: "The lithography method of Claim 1, where the first and second features do not overlap." (*Id.* at 1–3.) The accompany argument to the claim amendments stated:

> Disclosure 1 does not disclose exposing a portion of a first imaging layer to form a first feature and subsequently patterning a second imaging layer to form a second distinct feature. As previously discussed, disclosure 1 forms overlapping openings A, C, D, and E in order to incorporate three sets of patterns in two photomasking steps. Thus, Disclosure 1 teaches away from amended claim 1, because openings A, C, D, and E are overlapping non-distinct features.

Id. at 4–5. Though Defendants assert that this paragraph equates distinct and non-overlapping, the Amendment as a whole does not make such an interpretation clear. The arguments could be read to refer in the first sentence to one ground of patentability (i.e., Disclosure 1 does not disclose "distinct" features). Then, the second sentence describes a second ground of

patentability (i.e., Disclosure 1 does not form overlapping openings). Though the passage does conclude with the phrase "overlapping non-distinct features," it would be plain error to not consider the Amendment as a whole. The claim amendments to which the arguments refer specifically added "distinct" to claim 1 and "do not overlap" to issued dependent claim 12. Considering the entirety of the Amendment, it is not clear that "distinct" is equated to "non-overlapping."

Though Defendants' characterize dependent claim 12 as an example where the tenet of claim differentiation is merely a rebuttable presumption, here the claim amendments provide context and scope to the very arguments at issue. Thus, the different usage of the terms in the claims provides a fuller context and understanding of the accompanying arguments. When considered in its entirety, the Amendment does not create a disavowal or disclaimer as to the meaning of "distinct."[5] The Court thus finds that the term "distinct" is used in its ordinary meaning to indicate that the features are distinguishable from each other. Accordingly, the Court construes

"a second feature distinct from the first feature" to mean "a second feature distinguishable from the first feature."

4. "stabilizing the first patterned layer"

DSS's Construction	Defendant's Construction
No construction is necessary. Plain and ordinary meaning.	"subjecting the first patterned layer to a process to render the first patterned layer able

[5] At the oral hearing, Defendants argued that absent the phrase "do not overlap," the claims would be invalid. Hearing Tr. at 38–39. Invalidity raises additional issues and does not necessarily mandate a particular construction. For example, page 5 of the Amendment included an argument that Disclosure 1 did not teach the relatively closer limitation of claim 1. Furthermore, arguments may exist as to whether in Disclosure 1, opening A—though overlapping with opening C—is or is not distinct under the ordinary meaning of distinct.

Alternatively: "subjecting the first imaging layer to a process that when completed results in a first patterned layer that (1) is able to withstand chemical transformation from any subsequent exposure to radiation, (2) may be subjected to solvents of the subsequent imaging layer, and (3) may be subjected to a subsequent developer with relatively minimal, if any dissolution"	to withstand subsequent lithographic processing steps, such as exposure to radiation, exposure to a solvent, or exposure to a developer"

The differences between the parties' proposals focus on DSS's inclusion of the imaging layer being subjected to a process that results in the patterned layer being stable and whether the processes described should be described by the "or" verses "and" conjunction. At the oral hearing, the Court proposed a construction of "performing any process that renders a material able to withstand subsequent lithographic processing steps."

The Court's proposed construction conformed to the PTAB's construction for "stabilizing." (Dkt. No. 126 Ex. G at 7.) DSS agreed to the Court's construction. Hearing Tr. at 44. Defendants objected to the construction as lacking reference to the first pattern layer. In particular, Defendants noted that the PTAB merely construed "stabilizing" and that the term presented to the Court for consideration is "stabilizing the first patterned layer." Defendants asserted that thus the construction should include "first patterned layer." Hearing Tr. at 46–47. DSS agreed that the "material" in the Court's proposed construction was the "first patterned layer" and that DSS was amenable to change the Court's proposal to replace "material" with "first patterned layer." Hearing Tr. at 53–54. Defendants also agreed that at a minimum, the Court's proposal should replace "material" with "first patterned layer." Hearing Tr. at 55–56.

At the oral hearing, Defendants sought to further include "first patterned layer" in the construction twice, agreeing to the following construction: "performing any process on the first

pattern layer that renders the first pattern layer able to withstand subsequent lithographic processing steps." Hearing Tr. at 55–56. Presumably Defendants concerns relate to (1) the "patterned layer" dispute above with reference to whether the pattern layer includes portions and spaces of the imaging layer, and (2) DSS's inclusion in its original construction that the process is performed on the imaging layer and not the patterned layer. Defendants' first concern has been more properly resolved above with regard to the "patterned layer" terms. As to the second concern, DSS has acknowledged that "DSS agrees with the Defendants that the limitation is 'stabilizing the first patterned layer,' not the imaging layer." (Dkt. No. 130 at 8.) Thus, any remaining concerns raised by Defendants have been addressed. Accordingly, the Court construes

"stabilizing the first patterned layer" to mean "performing any process that renders the first patterned layer able to withstand subsequent lithographic processing steps."

5. "the second patterned layer and the first patterned layer form a single patterned layer"

DSS's Construction	Defendant's Construction
No construction is necessary. Plain and ordinary meaning. Alternatively: "single layer of patterned features, even if the patterned features are from more than one imaging layer"	Samsung: "the first patterned layer remains with the second patterned layer thereby forming a single patterned layer" TSMC and NEC: No construction necessary. Plain and ordinary meaning. Alternatively, same as Samsung.

In the briefing, the parties' dispute focused upon whether the first and second patterned layers can be etched underlying layers and, therefore, whether the "single patterned layer" can include patterned photoresist imaging layers and etched underlying layers. That dispute is really a dispute regarding the meaning of "patterning the [first/second] imaging layer" and

"[first/second] patterned layer." The "patterning" and "patterned layer" terms construed elsewhere herein are the more appropriate terms under which to resolve the dispute.

At the oral hearing, Samsung raised the concern that DSS's alternative construction creates the implication that the "single patterned layer" may be formed from only one layer. In particular, Samsung expressed concerns that DSS's language "even if the patterned features are from more than one imaging layer" implies that only one layer could be utilized to form the "single patterned layer." Hearing Tr. at 56–57. Samsung's concerns are well founded. The claim language clearly requires that two layers form the single patterned layer: "the second patterned layer and the first patterned layer form a single patterned layer." This is plain from the claim language itself and can be understood without any further construction and any assertion by DSS otherwise is expressly rejected herein.

As to what are the "second patterned layer" and the "first patterned layer," the constructions provided above define those terms ("a layer containing the portions and spaces of the [first/second] imaging layer that remain after the [first/second] patterning step"). Thus, in the term "the second patterned layer and the first patterned layer form a single patterned layer," no further construction of the first/second "patterned layer" is needed. What remains of the disputed claim term needs no further construction. Accordingly, the Court finds

"the second patterned layer and the first patterned layer form a single pattern layer" requires no further construction beyond the constructions provided for the "first/second patterned layer" terms.

6. "wherein the first and second features which are formed relatively closer to one another than is possible through a single exposure to radiation"

DSS's Construction	Defendant's Construction
No construction is necessary. Plain and ordinary meaning. Alternatively, "wherein the first and second features are formed closer to one another than is possible through a single exposure to radiation"	Indefinite

The Defendants assert that the term in question is indefinite. In their response brief and at the oral hearing, Defendants asserted that it is uncertain as to "what is possible through a single exposure" because "what is possible" may depend upon a number of lithography process techniques and the resolution for a "single exposure" may change depending upon what techniques are used.

Positions of the Parties

DSS asserts that the claim recites two patterning steps, each involving exposing the semiconductor to radiation. 1:19–36, 3:30–4:30, 5:57–7:14. DSS asserts that the '084 Patent teaches multiple examples of radiation: UV, DUV, vacuum UV, x-ray, e-beam, and ion beam radiation. 3:42–47, 4:44–64, 7:23–35, and 12:21–28. DSS cites to its expert declaration to assert that regardless of the type of radiation used, for those skilled in the art, the resolution limit was a well-known attribute of every lithography tool in December 1994. (Dkt. No. 116 at 19) (citing Ex. 9 Mack Declaration at ¶¶ 20–22 and Ex. 8 Mack Deposition at 172:7–173:5).

DSS also notes that TSMC's expert testified that lithography equipment makers would supply the resolution limit and that the formula for calculating such a limit was well known to

depend on a process constant, the wavelength of the radiation, and the numerical aperture. (Dkt. No. 116 at 19) (citing Blanchard Deposition at 104:7–105:2, and 168:23–170:9). DSS asserts that its expert testified similarly and further stated that for such lithography tools, there was a well-known physical limit on the resolution of repeating patterns. (Dkt. No. 116 at 19.)

DSS asserts that the resolution limits for lithographic tools defines the distance that is "possible through a single exposure to radiation." DSS asserts that it is improper to maintain that some other unspecified technique would provide the baseline distance. DSS asserts that the claim calls out two patterning steps and that the patent ties the resolution limit for the radiation used in those imaging layers to what is "possible through a single exposure." DSS points to the specification passage: "features for the resulting single patterned layer . . . may be formed relatively closer to one another as the resolution of the lens for the lithographic patterning of an imaging layer through a single exposure to radiation does not limit the pitch for adjacent features of the single patterned layer." 12:29–35.

DSS notes that even TSMC's expert testified that for the distance to be "relatively closer to one another than is possible through a single exposure," the distance must be "smaller than the resolution distance of a system that is being used to perform the patterning steps." (Dkt. No. 116 at 20–21) (citing (Dkt. No. 116 Ex. 7 Blanchard Decl. at ¶ 24)). DSS cites to its expert to support its position that there is no basis in the patent or otherwise to compare the distance of the features to a distance achievable by some third system to determine "what is possible." (Dkt. No. 116 at 21.) DSS cites to its expert for asserting that one skilled in the art could access with reasonable certainty whether the limitation was met and that the distances could be readily measured, calculated, or determined for every lithography tool. (Dkt. No. 116 at 21–22.) As to Defendants' objections that the claims are not limited to particular lithography techniques, DSS asserts that

those types of limitations are immaterial to determining the bounds of the claim given the clear claim language and the examples of lithography techniques disclosed in the specification. (Dkt. No. 116 at 22.)

DSS also asserts that the prosecution history shows that the term is definite. DSS notes that the term was subject to discussion with the examiner and that the examiner referenced the term in the Reasons For Allowance, counseling that the examiner understood the term. (Dkt. No. 116 at 23.) DSS notes that the limitation in question was argued as a point of distinction over the cited prior art. DSS also notes that in such arguments, the Applicant cited to the specification at 11:65–13:4 and stated "given that the first and second features are formed relatively closer to one another than is possible in a single exposure to radiation, the density with which semiconductor devices may be fabricated may be increased." (Dkt. No. 116 at 24.) DSS asserts that the examiner then allowed the claims specifically noting:

> Disclosure 2 forms two distinct patterns in two different layers but the patterns are not formed closer to one another than possible in a single exposure. Rather images are forme[d] []in one layer using one method which produces a certain resolution and then a second pattern is formed in the second layer where resolution is less critical.

(Dkt. No. 116 Ex. 1 at DSS–000152–53.)

DSS asserts that Defendants also misread the claims as requiring a reference to what is possible through a single exposure without reference to the lithography system that is employed. DSS asserts that Defendants' expert Blanchard rejected that position by testifying that "relatively closer" is met when the distance is "smaller than the resolution distance of a system that is being used to perform the patterning steps." (Dkt. No. 116 Ex. 7 Blanchard Decl. at ¶ 24.) DSS also cites to its own expert as explaining that the intrinsic record ties the single exposure limit for the

systems used in the claimed patterning steps to what is "possible through a single exposure to radiation." (Dkt. No. 130 at 10.)

Defendants assert it is not possible to determine whether two features are closer than otherwise possible. Defendants assert that forming features that are "closer" than what is possible through a single exposure depends on several factors in addition to the resolution of the lithography system including any image correction techniques utilized, mask techniques (e.g., phase shifting masks), and the transmission medium through which the radiation passes. Thus, what is possible through a single exposure to radiation is not a fixed target because the minimum resolution for a single exposure changes. (Dkt. No. 126 at 27–28) (citing (Dkt. No. 126 Ex. J Blanchard Depo at 164–165)). At the oral hearing, Defendants introduced an article published by DSS's expert in which DSS's expert stated that "the resolution limit of optical lithography is not a simple function" and is a function of various process characteristics. (Dkt. No. 137 Ex. A at 3–4); Hearing Tr. at 69–70.

Defendants assert that where a claim requires a comparison to some numerical limitation and there are multiple methods for measuring the number, the claim is indefinite for failing to disclose which method to use. (Dkt. No. 126 at 28) (citing *Halliburton Energy Services, Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008)). Defendants assert that to determine the "relatively closer" limitation, the person skilled in the art must choose the system and all the correction and improvement techniques to determine what is "possible" for a single exposure. Defendants assert that the specification does not instruct what system or techniques to use. (Dkt. No. 126 at 28.)

Defendants note that the claim states that the comparison point is "what is possible through a single exposure." Defendants assert that the claim does not state "what is possible

using a given system under a given set of conditions." Defendants assert that DSS is in essence arguing that the claim recites "for a given set of lithography tools." Defendants assert that DSS is asking the Court to change step (b) to "patterning the first imaging layer **using a first lithography system**," and step (e) to "patterning the second imaging layer **using a second lithography system** . . . relatively closer to one another than is possible through a single exposure to radiation **using the first or second lithography systems**" (added material in bold). Defendants assert the claim construction must focus on the claims themselves and the plain language describes a comparison to what is possible through a single exposure to radiation without references to the limitations of the lithography system that is employed. Defendants further assert that nothing in the specification teaches that the comparison is supposed to be with the lithography system used in the first or second patterning steps. (Dkt. No. 126 at 30.)

Analysis

The analysis and evidence cited by DSS is supported in both the intrinsic and extrinsic evidence. In context of the claims and the specification, it is clear to a reasonable certainty that the term "that is possible through a single exposure to radiation" is with reference to the exposures of the first and second patterning steps: "patterning the first imaging layer" and "patterning the second imaging layer." The claims teach this implicitly by calling out two individual patterning steps (that the parties agree each require "exposing an imaging layer to radiation") and then concluding with the description that the features are formed "closer to one another than is possible through a single exposure to radiation." This is also confirmed by the specification that repeatedly in all embodiments (e.g., Figure 1 embodiment, Figure 6 embodiment, and Figure 12 embodiment) describes a two-exposure process that provides closer

features than would result from one of the two exposure steps. Further, the specification provides the conclusion:

> For the methods of FIGS. 1, 6, and 12, features for the resulting single patterned layer, such as the patterned layer illustrated in FIGS. 5, 11 and 16 respectively may be formed relatively closer to one another as the resolution of the lens for the lithographic patterning of an imaging layer through a single exposure to radiation does not limit the pitch for adjacent features of the single patterned layer. As these features maybe be formed relatively closer to one another, the density with which semiconductor devices may be fabricated may be increased. . . .

12:29–35. It is clear that the resolution of the system for the patterning of the image layers shown in the figures is the relevant resolution, not some abstract, unknown, and undefined system. In context of the disclosure, the impact of surrounding process variables does not change the fact that the disclosed techniques, and what is claimed, allow for relatively closer features than could be provided in a single patterning step. The prosecution history, in which the term in question was a point of focus, further supports that the term was understandable to one skilled in the art.

Defendants make many assertions that what is possible through a single exposure depends on several factors in addition to the resolution of the lithography lens system including any image correction techniques utilized, mask techniques (e.g., phase shifting masks), and the transmission medium through which the radiation passes. That these factors, in addition to lens resolution, may impact "what is possible," does not seem to be disputed. In context of the claims, "what is possible" is with reference to the two individual patterning steps.

It is instructive to note that even Defendants' extrinsic evidence of one skilled in the art emphasizes that the impact of the surrounding process conditions would not render the meaning indefinite. In fact, TSMC's expert Blanchard states in his declaration:

> When describing a conventional photolithography system using a single exposure to radiation, the '084 patent states that "the minimum resolution capability of the lithography process determines the minimal pitch with which features for a patterned layer may be printed." '084 patent at 1:31–33. **Accordingly, it is my opinion that one of ordinary skill would understand**

> **that "wherein the first and second features which are formed relatively closer to one another than is possible through a single exposure to radiation" means that the features must be a distance apart that is smaller than the resolution distance of a system that is being used to perform the patterning steps.** To one of ordinary skill, this represents the maximum distance between features that would be considered to be "closer" than is possible through a single exposure to radiation. But the claim and the specification fail to identify the system that is being used for the first patterning step, the system that is being used for the second patterning step, and whether they are the same system.

(Dkt. No. 116 Ex. 7 Blanchard Dec at ¶ 24) (emphasis added). It is instructive that Blanchard acknowledges that one skilled in the art would understand that the resolution of the system being used to perform the patterning steps is what is relevant. Such an understanding conforms to DSS's expert's statements. (Dkt. No. 116 Ex. 9 at 4–6); (Dkt. No. 116 Ex. 8 at 133–34, 135–136, and169–173) Further, it is instructive that Blanchard does not state that one skilled in the art would not understand what system to consider (i.e., the systems of the first and second patterning steps). Rather, Blanchard merely states that the claims and specification do not identify the particular system that is being used for the first and second patterning steps. Such an identification of the particular system (e.g., lens, wavelength, photoresist, and other system variables) is not, however, required to render the claim definite to a reasonable certainty.

The overall context of the claims, specification, and prosecution history make clear that the "single exposure" is not an exposure with some unknown, abstract system. Rather, what is relevant is the lithography processes used for the first and second patterning steps. Further, the extrinsic evidence of one skilled in the art supports this conclusion. In context of the claims, specification, prosecution history and the understandings of those skilled in the art, the term is reasonably certain and does not require additional construction. Accordingly, the Court finds that

“wherein the first and second features which are formed relatively closer to one another than is possible through a single exposure to radiation” is definite and has its plain and ordinary meaning requiring no further construction.

CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the '084 patent.

The parties are ordered that they may not refer, directly or indirectly, to each other's claim construction positions in the presence of the jury. Likewise, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 8th day of April, 2015.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE