IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

GREENTHREAD, LLC **Plaintiff,** **vs.** **CIRRUS LOGIC, INC.** **Defendant.**	**Civil Action No. 1:23-cv-00369-DC-DTG** **JURY TRIAL DEMANDED**

GREENTHREAD'S SURREPLY CLAIM CONSTRUCTION BRIEF

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37-2	U.S. Patent No. 8,421,195 to G.R. Mohan Rao (GT-WDTX-CL_0000001-14) ("195 patent")
37-3	U.S. Patent No. 9,190,502 to G.R. Mohan Rao (GT-WDTX-CL_0000015-28) ("502 patent")
37-4	U.S. Patent No. 10,510,842 to G.R. Mohan Rao (GT-WDTX-CL_0000029-43) ("842 patent")
37-7	*Greenthread, LLC v. Intel Corp.*, No. 6:22-cv-00105-ADA (email from Dr. Yi dated Dec. 21, 2022 in WDTX Greenthread case), D. Or. Feb. 8, 2023 (GT-WDTX-CL_0065441-65445) ("WDTX Preliminary Constructions")
37-8	*Greenthread, LLC v. Intel Corp.*, No. 3:22-cv-02001-JR, Dkt. 44, D. Or. Mar. 16, 2023 (GT-WDTX-CL_0065365-65373) ("D. Or. Findings and Recommendation")
37-23	U.S. Patent Publication No. 2003/0042511 ("Rhodes") (GT-WDTX-CL_0018646-18667)
38	Defendant Cirrus Logic, Inc.'s Reply Claim Construction Brief

[1] In this brief, there are no new exhibits. All citations are to Cirrus' Opening Brief (Dkt. 35), Greenthread's Responsive Brief (Dkt. 37), Cirrus' Reply Brief (Dkt. 38), or exhibits thereto. All docket numbers refer to the present case, *Greenthread, LLC v. Cirrus Logic Inc.*, No. 1:23-cv-369-DC-DTG (W.D. Tex.), and all citations to page numbers of CM/ECF documents refer to the page number at the top of the page in the CM/ECF header.

EXEMPLARY CLAIMS 195:1 & 5

Term	U.S. Patent No. 8,421,195, Claim 1 (195:1)
1	A CMOS Semiconductor device comprising: a **surface layer**;
2	a **substrate**;
3	an **active region** including a source and a drain, disposed on one surface of said surface layer;
4 5 6	a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a **graded concentration of dopants** extending between said surface layer and said substrate, said drift layer further having a first static **unidirectional electric drift field** **to aid the movement of minority carriers from said surface layer to said substrate**; and
7	at least one **well region** disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate.

Term	U.S. Patent No. 8,421,195, Claim 5 (195:5)
8	The CMOS Semiconductor device of claim 1, wherein **said graded concentration** follows a quasi-linear gradient.

EXEMPLARY CLAIM 502:8

Term	U.S. Patent No. 9,190,502, Claim 8 (502:8)
	7. A semiconductor device comprising: a surface layer; a substrate; an active region including a source and a drain, disposed on one surface of said surface layer; a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants generating a first static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate; and at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants generating a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate.
9	8. The semiconductor device of claim 7 wherein said first and second static unidirectional electric fields are adapted to respective grading of dopants to aid movements of carriers in **respective active regions**.

EXEMPLARY CLAIMS 842:1 & 9

Term	U.S. Patent No. 10,510,842, Claim 1 (842:1)
10	A semiconductor device, comprising: a substrate of a first doping type at a first doping level having first and second surfaces; a first **active region** disposed adjacent the first surface of the substrate with a second doping type opposite in conductivity to the first doping type and **within which transistors can be formed**; a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed; transistors formed in at least one of the first active region or second active region; and at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the first surface to the second surface of the substrate.

Term	U.S. Patent No. 10,510,842, Claim 9 (842:9)
11 12	A semiconductor device, comprising: a substrate of a first doping type at a first doping level having first and second surfaces; a first active region disposed adjacent the first surface of the substrate with a second doping type opposite in conductivity to the first doping type and within which transistors can be formed in **the surface thereof**; a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed in the surface thereof; transistors formed in at least one of the first active region or second active region; and at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to **aid carrier movement from the surface to the substrate**.

DISPUTED CLAIM CONSTRUCTIONS

#	Claim(s)	Terms[2]	Previous Constructions[3]	Greenthread	Cirrus
1	**195**:1 **502**:7 **222**:44	"surface layer"	Not indefinite. Plain and ordinary meaning.	Not indefinite. Plain and ordinary meaning, where the plain and ordinary meaning is "a layer at the surface"	Indefinite
2	**195**:1 **502**:7 **842**: 1-2, 4, 9-10, 12, 17 **481**: 1-3, 8, 15, 20, 22-23, 32 **222**:1-3, 8, 15, 21, 23-24, 33, 39-42, 44 **014**: 1-3, 8, 15, 21, 23-24	"substrate"	Plain and ordinary meaning	Not indefinite. Plain and ordinary meaning, where the plain and ordinary meaning is an "underlying layer"	Indefinite
3	**195**:1 **502**:7, 8 **842**: 1, 5–7, 9, 13–15, 17, 18 **481**: 1, 4–6, 8, 9, 13, 20, 24–27 **222**: 1, 4–6, 8, 9, 13, 20, 21, 25–28, 35, 39, 40, 41, 42, 44 **014**: 1, 4–6, 8, 9, 13, 20, 21, 25–28	"active region"	Plain and ordinary meaning	Plain and ordinary meaning	"region that forms current path of a device"
4	**195**:1, 5, 6 **502**:7 **842**:1, 6, 8-9, 14, 16 **481**:1, 5, 7, 9, 20, 25, 27, 31 **222**:1, 5, 7, 9, 21, 26, 28, 32, 39–42, 44	"graded concentration of dopants" and other "graded" terms	Related to #s 5 and 6	Not indefinite. Plain and ordinary meaning, where the plain and ordinary meaning is a graded (or varying) concentration of dopants.	Indefinite

[2] All 12 terms were identified by Cirrus.

[3] Dkt. 37-7 (WDTX Preliminary Constructions); Dkt. 37-8 (D. Or. Findings and Recommendation) ("[T]he WDTX's preliminary constructions and summary judgment ruling should govern this case.").

DISPUTED CLAIM CONSTRUCTIONS (continued)

#	Claim(s)	Terms	Previous Constructions	Greenthread	Cirrus
5	**195**:1 **502**:7 **222**:44	"said [drift layer further/well region…] having a [first/second] static unidirectional electric drift field"	Plain and ordinary meaning	Plain and ordinary meaning	"said [drift layer further/well region...] having a [first/second] static electric drift field that is unidirectional over the extent of the [drift layer/well region]"
		"said [drift layer further/well region] having a graded concentration of dopants generating a [first/second] static unidirectional electric drift field"			"said [drift layer/well region] having a graded concentration of dopants generating a [first/second] static electric drift field that is unidirectional over the extent of the [drift layer/well region]"
6	**195**:1 **502**:7 **842**:1, 9 **481**:1, 20 **222**:1, 21, 39, 41-42, 44 **014**:1, 21	"to aid the movement of minority carriers from…to…"	Not indefinite. Plain and ordinary meaning.	Plain and ordinary meaning	"to aid the movement of minority carriers starting from…and reaching…"
		"to aid the movement of carriers from… to…"			"to aid the movement of carriers starting from…and reaching…"
		"to aid carrier movement from… to …"			"to aid carrier movement starting from…and reaching…"
		"to aid carrier movement from…towards…"			"to aid carrier movement starting from…towards…"
		"to aid carrier thereof movement from…to…"			"to aid carrier thereof movement starting from…and reaching…"
7	**195**:1 **502**:7 **842**:1, 9 **481**:1, 20 **222**:1, 21, 39, 41-42, 44 **014**:1, 21	"well region"	Plain and ordinary meaning. Note not for jury: portions of a well are not well regions	Plain and ordinary meaning. Note not for jury: portions of a well are not well regions	"A well, whether formed by single or multiple implants. Portions of a well are not well regions."

DISPUTED CLAIM CONSTRUCTIONS (continued)

#	Claim(s)	Terms	Previous Constructions	Greenthread	Cirrus
8	**195**:5, 6 **481**: 7, 31 **222**: 7, 32 **014**: 7	"said graded concentration" "the graded dopant"	Related to #4	Not indefinite. Plain and ordinary meaning.	Indefinite
9	**502**:8	"respective active regions"	Related to #3	Not indefinite. Plain and ordinary meaning.	Indefinite
10	**842**:1, 9 **481**:1, 20 **222**:1, 21, 39, 41-42 **014**:1, 21	"active region… within which transistors can be formed"	Not indefinite. Plain and ordinary meaning.	Not indefinite. Plain and ordinary meaning.	Indefinite
11	**842**:9 **481**:20 **222**:21 **014**:21	"the surface thereof" "the surface"	Related to #10	Not indefinite. Plain and ordinary meaning.	Indefinite
12	**842**:9 **481**:20	"aid carrier movement from the surface to the substrate"	Related to #6	Not indefinite. Plain and ordinary meaning.	Indefinite

I. INTRODUCTION

In its reply brief, Cirrus reduces itself to (1) belittling the previous claim construction decisions by this Court and the District of Oregon; (2) making baseless attacks against Dr. Rao and Greenthread; and (3) ignoring Dr. Rao's specification in favor of extrinsic evidence that carries little, if any, weight.

For terms 1-3, 5-7, and 10, Cirrus is regurgitating arguments that were already made to this Court and the District of Oregon. When this Court issued its preliminary constructions, it had the full benefit of extensive briefing and technical tutorials. This is why the Court informed the parties that "it is generally unlikely that the Court will select a party's originally proposed construction over the preliminary construction." Nonetheless, Cirrus is urging the Court to do exactly that.

For term 4, Cirrus chastises Greenthread for "burying" the "graded dopant concentration" terms. It is rare to see counsel criticize opposing counsel for simply following the Court's rules. But that is exactly what happened here. Greenthread did nothing wrong when it briefed this term in the order ***specified by the Court***, and if anyone should be chastised it is Cirrus, not Greenthread.

Meanwhile, Cirrus strangely argues the Court should give special attention to this term because it has never been briefed before. To the contrary, the fact that ***no*** other defendant has ever argued this term is indefinite is compelling proof of the weaknesses of Cirrus' arguments. Rather than looking to Dr. Rao's specification—where he clearly explains what he meant by "uniform" versus "graded"—Cirrus makes a host of convoluted arguments that are based on extrinsic evidence that carries little, ***if any***, weight.

Finally, for the antecedent basis terms 8-9 and 11-12, Cirrus makes hyper-techical arguments that defy the surrounding claim language and knowledge of a POSITA. Cirrus is relatively quiet about these terms and seemingly caves on most, if not all of them.

II. DISPUTED CLAIM TERMS

Terms 1-3, 5-7, and 10 were previously decided by this Court and the District of Oregon. While not technically a "Previously Decided" term," term 4 was part of larger terms that were given their plain meaning. Terms 8-9 and 11-12 are the "Antecedent Basis" terms. Cirrus' reply brief does not raise any new arguments that cannot be summarily resolved in Greenthread's favor.

For terms 1, 2, 4, and 8-12, none of the terms are indefinite and all of the terms should be given their plain meaning. When the specification is properly read through the eyes of a POSITA, Cirrus cannot possibly prove by ***clear and convincing evidence*** that any of them are indefinite. *Warsaw Orthopedic, Inc. v. NuVasive, Inc.*, 778 F.3d 1365, 1371 (Fed. Cir. 2015). In fact, Cirrus filed IPRs showing that Cirrus' expert understood the meaning of these terms.

For terms 3 and 5-7, Cirrus ignores the ordinary meaning of the terms. These terms are simple terms that don't need construction. Instead of giving them the full scope of their plain meaning, Cirrus seeks to add self-serving limitations that are inconsistent with the intrinisic record.

A. Claim Terms Found in Exemplary Claims 195:1 & 5

1. *Previously Decided*: "surface layer" (195:1; 502:7; 222:44)

Cirrus does not make any new arguments that Intel didn't. This Court already concluded this term is not indefinite, and Cirrus cannot possibly prove otherwise. "Surface layer" ordinarily means "a layer at the surface," and the claims, specification, and prosecution history ***all*** confirm this is exactly what Dr. Rao meant. When "surface layer" is read correctly, the claims line up perfectly with the preferred embodiment in Fig. 5B. Cirrus, on the other hand, would have the Court ignore the intrinsic record in favor of a nonsensical reading that excludes the preferred embodiment. But a construction that excludes the preferred embodiment is rarely, if ever, the correct one. *SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365, 1378-79 (Fed. Cir. 2013).

Cirrus' arguments hinge on "disposed on," but Greenthread has already shown that this

phrase specifies where in the "surface layer" the "active region" is located. There is no plausible reason for the "active region" to be on top of the "surface layer." This reading does not make any sense, and it does not square with Dr. Rao's preferred embodiment.

In its opening brief and its reply, Cirrus is fixated on attacking Greenthread's "ceiling fan" analogy with citations to extrinsic evidence having little, if any, relevance to what is meant by "surface layer." While the "ceiling fan" analogy shows how Intel (and now Cirrus) misused the words "disposed on," it was never meant to be anything more than an analogy. All of Cirrus' criticisms of it are red herrings. The test for indefiniteness is not whether a semiconductor layer can have a "ceiling," but rather whether a POSITA, in light of the intrinsic record, would have understood "surface layer." The claims, specification, and prosecution history all confirm that Dr. Rao used "surface layer" consistent with its ordinary meaning to mean "a layer at the surface."

Finally, Cirrus makes the fallback argument that even if "surface layer" is a "layer at the surface," it is still indefinite because Dr. Rao did not specify the exact dimensions of the "surface layer." But the Supreme Court made clear that "patents are 'not addressed to lawyers, or even the public generally,' but to those skilled in the relevant art." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 899 (2014) (cleaned up). The definiteness standard "recogniz[es] that absolute precision is unattainable." *Id.* at 910. The exact dimensions of the "surface layer" will depend on the specific implementation or application. Dr. Rao cannot reasonably be expected to specify the exact dimensions for every "surface layer" across every application. Dr. Rao's invention does not depend on a specific shape or size, as long as the other claim limitations are met (*e.g.*, the graded dopants aid the movement of minority carriers from the surface layer to the substrate).

Courts have routinely recognized that claims are not indefinite merely because the specification does not specify the size or shape of a particular layer or region. In *Collins v. Western*

Digital Techs., Inc., the patents related to microscopic films used for coating objects to improve resistance to wear. 2011 U.S. Dist. LEXIS 108973, at *7 (E.D. Tex. Sept. 23, 2011). Some of the asserted claims related to creating a visual appearance called "Newton's rings of interference." *Id*. at *8. Much like here, the defendants argued the asserted claims were indefinite because the patent did not specify the "form or shape of the material" that creates the appearance of rings. *Id*. at *27. Judge Ward disagreed, recognizing that the particular form or shape will depend on a number of factors, and the claims do not require "a specific thickness of the film" as long as it creates the claimed visual appearance. *Id*. at *28. The same is true here. The claims do not require the "surface layer" to be a "particular form or shape," as long as the other limitations are met.

Similarly, in *Cies*, the defendants argued "transparent protective coating" "would be indefinite without a limitation that the thickness be 5 millimeters or more." *Cies Bisker, LLC v. 3M Co.*, 2009 U.S. Dist. LEXIS 110055, at *8-9 (E.D. Tex. Nov. 25, 2009). But Magistrate Judge Craven disagreed, recognizing the functionality of the claim element does not depend on a "specific thickness," but whether it achieves the claimed function. *Id.* at *15. The same is true here. Dr. Rao's invention does not depend on a particular size or shape of the "surface layer" as long as it achieves the claimed function of aiding the movement of the minority carriers from the surface layer to the substrate.

2. *Previously Decided*: "substrate" (195:1; 502:7; 842:1-2, 4, 9-10, 12, 17; 481:1-3, 8, 15, 20, 22-23, 32; 222:1-3, 8, 15, 21, 23-24, 33, 39-42, 44; 014:1-3, 8, 15, 21, 23-24)

Like "surface layer," Cirrus cannot meet its burden of proving that "substrate" is indefinite. Cirrus does not dispute that "substrate" is ordinarily used to mean "an underlying layer," and it is a relative term. Nonetheless, Cirrus argues incorrectly that because Dr. Rao did not specify the exact dimensions of the "substrate," it is indefinite. But this is not the law. The Supreme Court made clear that "absolute precision is unattainable." *Nautilus*, 572 U.S. at 910. Like "surface

layer," the exact dimensions will depend on the specific implementation or application. Dr. Rao's invention does not depend on a specific shape or size, as long as the other claim limitations are met (*e.g.*, aid the movement of minority carriers from the surface layer to the substrate).

Cirrus' criticisms miss this point. The shape or size of the "substrate" will depend on the context. Cirrus misses that in Fig. 5, Dr. Rao correctly uses "substrate" to refer to both the (1) bottom-most layer (*i.e.*, P^- substrate); and (2) layers below active devices (*i.e.*, CMOS substrate).

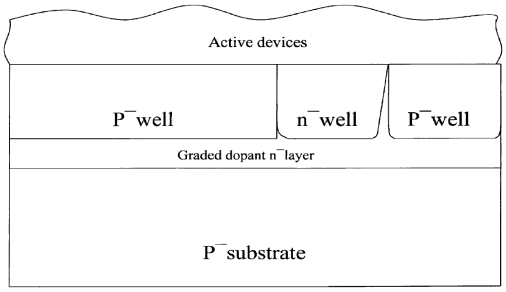


FIGURE 5(a) A CMOS Substrate for digital, mixed, signal, and senors IC's

Dkt. 37-2, Fig. 5A. This is entirely proper because both are "underlying layers." More specifically, the "P^- substrate" is an underlying layer for the graded dopant and other layers, and the CMOS substrate (*i.e.*, wells and lower layers) is an underlying layer for the "active devices." Fig. 5 confirms Greenthread's construction is correct. The exact shape or size of the "substrate" will depend on the context. This does not mean, however, that "substrate" is indefinite. Every time "substrate" is used in the asserted claims, it is consistently used to mean "an underlying layer." There is nothing wrong with this, and courts have routinely recognized that claims are not indefinite merely because the specification does not specify the size or shape of a particular layer or region. *Collins*, 2011 U.S. Dist. LEXIS 108973, at *7; *Cies*, 2009 U.S. Dist. LEXIS 110055, at *8-9.

3. *Previously Decided*: "active region" (195:1; 502:7-8; 842:1, 5-7, 9, 13-15, 17-18; 481:1, 4–6, 8-9, 13, 20, 24–27; 222:1, 4–6, 8-9, 13, 20-21, 25-28, 35, 39-42, 44; 014:1, 4–6, 8-9, 13, 20-21, 25-28)

Intel argued that "active region" means the "region that forms the current path of a device."

The Court disagreed and gave this term its plain meaning. Now, Cirrus argues for the same construction that has already been rejected.

An "active region" is a doped silicon region at the surface of a semiconductor device where a transistor can be formed. Dkt. 37-1, ¶¶69-73. This is how the term is used in the claims and the intrinsic record. *Id.*, ¶69. There is no need to construe the term, and to do so would only introduce ambiguity where there is none. *W. Union Co. v. MoneyGram Int'l, Inc.*, 2008 U.S. Dist. LEXIS 108129, at *15-16 (W.D. Tex. Nov. 6, 2008). Cirrus does not raise any new arguments that have not already been addressed. ***First***, Cirrus insists that Greenthread conflates the active and well regions. This is not true. The claims contain additional limitations that differentiate the "active region" from the other regions. ***Second***, Cirrus tries to sugarcoat its construction as not requiring the transistor to ***always*** be turned "on." Dkt. 38, 19. Cirrus misses the point. Claim 842:1 requires two active regions, and that transistors are formed in at least one of them. Dkt. 37-4, 4:48-56. This means some, but not necessarily all, of the active regions will have a transistor. If the active region does not have a transistor, there is no transistor to turn "on," and the active region will not form the current path of a device. This means Cirrus' construction is wrong.

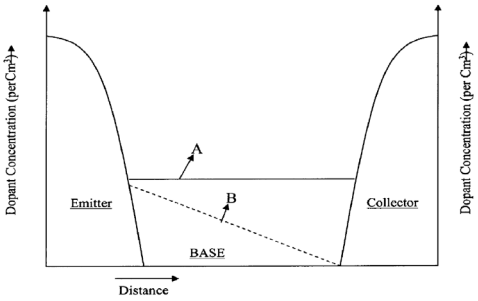
4. "graded concentration of dopants" and "graded" terms (195:1, 5, 6; 502:7; 842:1, 6, 8, 9, 14, 16; 481:1, 5, 7, 9, 20, 25, 27, 31; 222:1, 5, 7, 9, 21, 26, 28, 32, 39–42, 44)

Cirrus cannot possibly prove all of the "graded" terms are indefinite. Cirrus overlooks that the test is whether the claims, ***viewed in light of the specification and prosecution history***, inform a POSITA about the scope of the invention with reasonable certainty. *Nautilus*, 572 U.S. at 910.

There is a good reason that ***no*** other defendant has ever argued this term is indefinite.[4] It

[4] While not technically a previously decided term, this term was part of larger terms that the Court determined should be given their plain meaning.

is hard to imagine how Dr. Rao could have made it any clearer ***exactly*** what he meant by "graded dopant concentration." The claims themselves specify that the graded dopants generate a "first static unidirectional electric field" that "aids the movement of minority carriers." In order for the graded dopants to do this they must change or vary (as opposed to being uniform). Dkt. 37-1, ¶76. Dr. Rao even provided an illustration of what a "graded" concentration of dopants looks like.



Dkt. 37-2, Fig. 1. Line "A" illustrates a "uniform" concentration, and line "B" illustrates a "graded" concentration. *Id.*, 2:13-15. Even a lay person can tell that for line A, the concentration stays the same; while for line B, it varies or changes. Dr. Rao used the word "varies" when he described the "graded" concentrations. Dkt. 37-2, 2:35-36. Dr. Rao went on to explain: "The relative ***slope*** of the ***donor concentration*** throughout the base creates a suitable aiding drift ***electric field***…" *Id.*, 2:42-45. Anyone that has taken high school math knows that "slope" measures how much the line changes. If there is zero slope, the line is flat. On the other hand, if there is slope, the line goes up or down (*i.e.*, it varies or changes). Dr. Rao made clear that it is this variation or change that creates an electric field. *Id.* Throughout the remainder of the specification, Dr. Rao repeatedly distinguishes between "uniform" and "graded." Dkt. 37-2, Figs. 2, 4, 5A-C; 2:39-40, 2:51-53, 3:3-13. And the Examiner consistently pointed to "graded" concentrations as those that varied or changed. Dkt. 35-7, 56-57, 113; Dkt. 37-23 (regions 160, 170, 180; Fig. 5).

Faced with the hard realities of the intrinsic record, Cirrus is forced to make baseless attacks against Dr. Rao and Greenthread, and rely on extrinsic evidence that carries little, if any, weight.

All of Cirrus' arguments can be quickly dismissed. ***First***, Cirrus argues Greenthread merely used a synonym for "graded," and there is no objective guidance for ascertaining the claim scope. Dkt. 38, 11. This is not true. In his own words, Dr. Rao explained that a "graded" concentration is one that "varies." Dkt. 37-2, 2:35-40. He even provided specific examples of the concentrations, and how much they vary from one end of the region to the other. *Id*.

Second, Cirrus acknowledges Dr. Rao distinguished between "graded" and "uniform," but argues a POSITA would not be able to distinguish between them. This is not true. To put it simply, a "graded" concentration is one that varies or changes; a "uniform" one does not. Dr. Rao even provided an illustration and specific examples of the concentrations at each end of the region. Nothing more is required. *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1336 (Fed. Cir. 2010) (not indefinite due to "the examples in the specification").

Third, Cirrus makes baseless attacks against Greenthread, and resorts to extrinsic evidence that carries little, if any, weight. Cirrus asserts that Greenthread refuses to address the technical authority that it cites in its opening brief. Dkt. 38, 12. This is a red herring. None of this so-called "technical authority" is part of the intrinsic record, and it is not relevant to the question at hand. The test for indefiniteness involves reading the claims ***in light of the specification and prosecution history***. The intrinsic record makes it abundantly clear that a "graded" concentration is one that varies or changes. None of Cirrus' extrinsic evidence can possibly trump the intrinsic record.

Fourth, Cirrus argues that lines A and B are not sufficient because there are no numerical units on the axes, and the figure is not drawn to scale. *Id*. Again this is not true. No numerical units are necessary to understand that line A is flat, and line B is ***not***. Nothing more is required to understand that line B has slope and the dopant concentration varies. But Cirrus is wrong for the additional reason that the specification ***does*** provide numerical units. Dr. Rao explained that the

concentration in the "graded" base region may vary from 10^{14} to $10^{16}/cm^3$, and the concentration at the emitter end may be 10 to 100 times more than the concentration at the emitter end. Dkt. 37-2, 2:32-40. These specific examples—that Cirrus fails to mention—are more than sufficient to overcome an indefiniteness challenge. The cases cited by Cirrus (*Hockerson* and *Starhome*) miss the point because (1) the drawing did not sufficiently explain the term (here, the drawing clearly shows the difference between "graded" and "uniform"); and (2) there were no "quantitative values" in the specification (here, Dr. Rao provides specific values for the "graded" region).

Fifth, Cirrus makes another baseless attack that Greenthread argued in an IPR that a "rough drawing" in the prior art was not sufficient. Dkt. 38, 12-13. Cirrus fails to mention that Greenthread ***never*** argued the drawing was insufficient to determine whether there was a "graded" concentration. Rather, Greenthread pointed out it was insufficient to determine whether the change in concentrations was sufficient to effect carrier movement. This is a very different inquiry.

Sixth, Cirrus makes another baseless attack that none of the uses of "graded" provide objective guidance. Again, not true. Dr. Rao provided specific examples of the range of concentrations across the "graded' region. Dkt. 37-2, 2:32-40. Next, Cirrus faults Greenthread for an inadvertent error that did not affect any of the *Intel* claim constructions, and it certainly has no bearing here. Greenthread does not contend Kamins' layer 21 is not graded. Dkt. 37, 34. And Dr. Rao never made this argument during prosecution. With the suspect use of ellipses (*see* last line of Dkt. 38, 13), Cirrus fails to mention that Dr. Rao distinguished Kamins on the basis that there was no "single drift layer" that aids movement of "minority carriers from said surface layer to the substrate." Dkt. 35-7, 235, 238. This is certainly different from saying there was no "single drift layer." By hiding this critical point with ellipses, Cirrus paints a very misleading picture.

5. *Previously Decided*: "unidirectional electric drift field" terms (195:1; 502:7; 222:44)

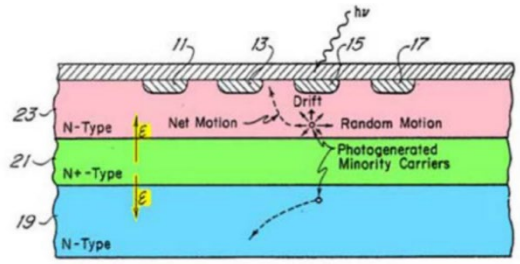
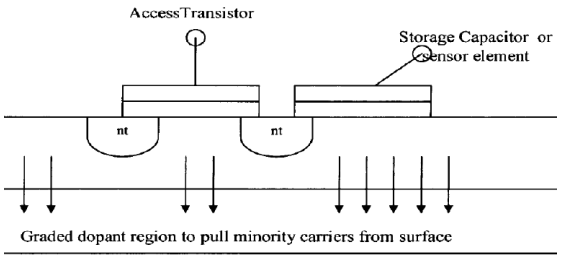
Cirrus argues this term should be rewritten to read: "said drift layer further having a first static electric drift field that is unidrectional **over the extent of the drift layer**." This Court rejected a similar argument by Intel and decided it should be given its plain meaning. Nonetheless, Cirrus continues to fight for essentially the same construction that has already been rejected. It does not contend that "electric drift field" or "unidirectional" need to be construed. Instead, it contends the straightforward language should be rewritten to add "over the extent of the drift layer." Dkt. 35, 9-10, 31. There is no justification for rewriting the claim to add this limitation.

Cirrus makes three arguments that can be summarily dismissed in Greenthread's favor. ***First***, Cirrus contends there was prosecution disclaimer where there was none. *Cordis Corp. v. Boston Sci. Corp.*, 561 F. 3d 1319, 1329 (Fed. Cir. 2009) ("A disclaimer must be 'clear and unmistakable,' and unclear prosecution history cannot be used to limit claims"). When, as here, there is another explanation for the amendment, Cirrus cannot meet the high bar for prosecution disclaimer. *Baxalta Inc. v. Genentech, Inc.*, 972 F.3d 1341, 1348-49 (Fed. Cir. 2020) (finding the patentee's claim amendment did "not clearly establish disclaimer" where another "plausible" explanation for the introduction for the amendment was presented).

Cirrus' one-sided description of the prosecution history omits key facts and is misleading at best. Cirrus never mentions that when the "unidirectional" limitation was first added, the claim language was very different than what is at issue here. Cirrus also fails to mention the claims went through a series of amendments, getting progressively narrower and then progressively broader. The amendments along the way confirm that Cirrus' construction cannot possibly be correct.

When the Examiner cited Kamins, Dr. Rao realized it was quite different from his invention. Cirrus would have you believe that is because layer 21 created two electric fields. That

was certainly not the case. The difference had to do with the fact that there was no drift layer to "pull" minority carriers from the surface layer to the substrate. Dkt. 37-2, Fig. 5B. In fact, Kamins did the opposite by propelling minority carriers into the surface layer. This propulsion was not in a single direction, but a random curved path towards the nearest photosensor. The following table highlights this difference between Kamins and Dr. Rao's invention.

Kamins, Fig. 2 (annotated)	195 Patent, Fig. 5B (excerpt)
	

In Dr. Rao's preferred embodiment, there are a number of arrows pulling minority carriers from the surface. There are no corresponding arrows in Kamins. In an unsuccessful attempt to explain this difference to the Examiner, Dr. Rao amended the pending claim as follows:

> said drift layer having a graded concentration of dopants extending between said surface layer and said substrate to create a <u>unidirectional</u> drift field drawing <u>all</u> minority carriers from said surface layer to said substrate

Dkt. 35-7, 235. Even a cursory review indicates the pending claim was significantly narrower than the present term. For starters, it said graded dopants ***created*** a unidirectional drift field, and that it drew ***all*** of the minority carriers from the surface to the substrate (the present term doesn't say either). Cirrus asserts "unidirectional" means ***only*** one field, and that it must continue for the entire drift layer. This is just wrong. "Unidirectional" means exactly what it says: "one direction." This means a given field pulls in ***only*** one direction (as opposed to a random path). "Unidirectional" does not mean there cannot be additional fields. The following amendment drives this point home:

> said drift layer having a graded concentration of dopants extending between said surface layer and said substrate to create <u>and maintain</u> a <u>single static</u> unidirectional

> electric drift field to aid the movement of ~~drawing all~~ minority carriers from said surface layer to said substrate

Id., 287. Cirrus never mentions the word "single" because it proves Cirrus is wrong. Cirrus even used ellipses to hide it. Dkt. 38, 22 (hiding in reply); Dkt. 35, 34 (hiding in opening brief). If "unidirectional" necessarily meant the layer could ***only*** have one field, there would have been ***no*** reason to add the additional limitation that the layer creates and maintains "a ***single*** static unidirectional electric drift field." But then it gets worse for Cirrus. Cirrus fails to mention that the claims were subsequently amended to remove the word "single" and ***broaden*** their scope.

> said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first ~~to create and maintain a single~~ static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate; and
>
> at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric field to aid the movement of minority carriers from said surface layer to said substrate.

Id., 316. This amendment is significant because not only did it get rid of the single field requirement, but it confirms the drift layer has at least two electric fields (one in the drift layer, and one in the well region disposed in the drift layer). Moreover, the amendment severed the drift layer from the electric field. While the previous claims specified the drift layer has graded dopants that create a unidirectional field, the allowed claim says something very different. It says the drift layer has graded dopants (comma), and then the layer ***further*** has a unidirectional field. The point is the layer can have additional fields, and these fields may or may not point in the same direction.

When the prosecution history is properly viewed in its entirety, it is fatal to Cirrus' construction. Cirrus would have you believe the first amendment was the only one that mattered. But these subsequent amendments paint a very different picture that Cirrus sought to hide. There was no reason for Dr. Rao to limit his invention to a single field over the entire layer. His claims were allowed for a different reason. Kamins never disclosed a field that aids the movement of

carriers from the surface layer to the substrate, and there is nothing in the prosecution history that precludes additional fields. In fact, the face of the claim and the prosecution history confirm this.

Second, Cirrus never rebutted Greenthread's point that a unidirectional field does not have to continue over the entire drift layer. Dkt. 38, 22. Instead, Cirrus makes the conclusory statement that "'unidirectional' excludes electric fields pointing in opposite directions." Dkt. 38, 22. For the reasons above, this is simply not true. In fact, the prosecution history indicates the opposite. "Unidirectional" means one direction, ***not*** one field. As long as there is at least one field aiding the movement of minority carriers from the surface layer to the substrate, there is nothing precluding additional electric fields in the same or a different direction.

Finally, Cirrus argues the specification does not show any layer with fields pointing in opposite directions. Dr. Rao did, however, show a drift layer that has a field that pulls carriers from the surface (Fig. 5B) and another field that accelerates carriers towards the surface (Fig. 5C). Dr. Rao clearly contemplated fields going in both directions, and there is nothing in the specification that says they can't. Furthermore, the claims were amended to allow for multiple fields. When, as here, the claims use open-ended "comprising" language, the claims allow for additional fields, even fields in different directions.

6. *Previously Decided*: "to aid the movement" terms (195:1; 502:7; 842:1, 9; 481:1, 20; 222:1, 21, 39, 41-42, 44; 014:1, 21)

Intel argued these terms are indefinite. This Court disagreed and determined they should be given their plain meaning. Now Cirrus goes a different route and attempts to rewrite the claim: "to aid the movement of minority carriers **starting** from said surface layer ~~to~~ **and reaching** said substrate." Cirrus is simply adding limitations without identifying any disclaimer that would justify the change. The only justification Cirrus offers is the Court must "ensure that questions of the scope of the patent claims are not left to the jury." Dkt. 38, 23. But Cirrus does not explain

how a jury might be confused, or how Greenthread might "expand" the term. *Id*. This Court has rejected the argument that *O2 Micro* allows adding more words "to better explain a claim term." *Pisony v. Commando Constr., Inc.*, 2019 WL 928406, at *5 (W.D. Tex. Jan. 23, 2019).

All of Cirrus' arguments can be dismissed. ***First***, Greenthread never distinguished Kamins on the basis that it did not aid the movement of carriers "starting from said surface layer," as Cirrus suggests. Rather, Greenthread pointed out Kamins moves them from a sublayer to deeper in the substrate. Cirrus falsely alleges Greenthread agrees with Cirrus' construction. This is not true, and Greenthread's statements about Kamins do not support this erroneous conclusion. ***Second***, Cirrus misreads the specification to mean that when a drift field aids the movement from one location to another location, it aids the movement ***during the entire path*** between the locations. Dr. Rao never used the words "during the entire path" and there is no logical reason to misread the specification like Cirrus does. The same is true for the prosecution history. Dr. Rao never used the words "during the entire path," "starting from," "and reaching" or anything remotely close. Cirrus' self-serving *ipse dixit* certainly does not warrant rewriting the claims like Cirrus does.

7. *Previously Decided*: "well region" (195:1; 502:7; 842:1, 9; 481:1, 20; 222:1, 21, 39, 41, 42, 44; 014:1, 21)

Cirrus is needlessly creating a dispute for this term. The parties agree "portions of a well" are not "well regions," but Cirrus oddly takes issue with it being handled as a "note not for the jury." Cirrus ignores that Greenthread is merely following the Court's construction in the *Intel* case. Dkt. 37-7, 5. As to the remainder of Cirrus' argument, Cirrus ambiguously argues without any specifics that something "may" happen in the future. Dkt. 38, 24. But these vague allegations certainly do not warrant Cirrus' "single or multiple implants" language. This additional language will only create unnecessary confusion for the jury. Given the simplicity of the term and the ambiguity of Cirrus' construction, the Court should maintain its previous construction.

8. *Antecedent Basis*: "said graded concentration"/"the graded dopant" (195:5-6; 481:7, 31; 222:7, 32; 014:7)

Greenthread showed that a POSITA would have known that "said graded concentration" refers to the drift layer and well region. Dkt. 37, 41. Unable to rebut this, Cirrus crafts a new argument that these regions do not necessarily have the same gradient. Dkt. 38, 27. This argument misses the mark. Even if, there are different gradients, this does not prevent the dependent claims from applying to both regions. Dkt. 37-1, ¶¶91-92. The cases cited by Cirrus support Greenthread, ***not*** Cirrus. In *Summit 6*, the claim recited "said identification," yet the antecedent claim recited *both* "identification of digital content" and "identification of a user." *Summit 6 LLC v. HTC Corp.*, 2015 WL 11117868, at *18-20 (N.D. Tex. Mar. 21, 2015). There, the context indicated "identification of digital content" was the relevant antecedent. *Id*. at *20. Here, a POSITA would understand from the context that "said graded concentration" applies to both regions. *General Atomics* also supports Greenthread. There, the claim recited two "analyte[s]." Cirrus' argument that they were the same "analyte" does not change the fact that "said analyte" referred to both of them. *Gen. Atomics v. Axis-Shield*, 2006 WL 2792428, at *7-8 (N.D. Cal. Sept. 27, 2006).

B. Claim Term Found in Claim 502:8

9. *Antecedent Basis*: "respective active regions" (502:8)

Cirrus makes another hyper-technical argument that is without merit. Cirrus argues that base claim 7 only mentions an "active region" (singular). Dkt. 38, 27. But in a "comprising" claim, "use of 'a' or 'an' before a noun naming an object' requires that the phrase be construed to mean 'one or more' unless the context sufficiently indicates otherwise." *ABS Glob., Inc. v. Cytonome/St, LLC*, 84 F.4th 1034, 1040 (Fed. Cir. 2023) (cleaned up). Claim 7 is a "comprising" claim, and Cirrus has not shown that the "one or more" rule does not apply here. Therefore, Cirrus' primary argument comes up short. Cirrus makes a fallback argument that "a POSITA would not

understand which of those active regions the 'respective active regions' refer to." Dkt. 38, 27. But there is no expert declaration (or any other support) for this conclusory statement. This self-serving *ipse dixit* is not sufficient to meet the high burden for indefiniteness.

C. Claim Terms Found in Exemplary Claims 842:1 & 9

10. *Previously Decided*: "active region…within which transistors can be formed" (842:1, 9; 481:1, 20; 222:1, 21, 39, 41-42; 014:1, 21)

Intel previously argued this term is indefinite. This Court disagreed and determined it should be given its plain meaning. Now, Cirrus makes the ***exact*** same indefiniteness argument that has already been rejected. In its opening brief, Cirrus copied Intel ***verbatim***, even though it contained glaring mistakes and improperly used ellipses to hide portions of the file history. In its reply, Cirrus scrambles to save face, but all of its arguments can be dismissed. ***First***, Cirrus alleges "within which transistors can be formed" does not make sense in an apparatus claim. This is not true. Apparatus claims frequently contain limitations that describe the functionality or capability of certain structures. Here, "within which transistors can be formed" is one of the capabilities of the "active region." ***Second***, Cirrus argues the specification describes where transistors ***are*** built. Cirrus misses the point. The active regions are the regions where these transistors could be formed. But there may be active regions, where transistors have not been built yet or might never be built. ***Third***, Cirrus misrepresents Greenthread's construction for "active region," and then argues it is inconsistent with this term. This is not true. To be clear, Greenthread believes "active region" should be given its plain meaning. Furthermore, an "active region" being a "doped region at the surface of a semiconductor device where a transistor can be formed" is entirely consistent with an "active region…within which transistors can be formed." They both accurately reflect that an active region is a region where a transistor can be formed. Cirrus' citation to *Synchronoss* misses the point. Greenthread has not rewritten this term or any other term. To the contrary, Greenthread

has merely explained why the terms are not indefinite and should be given their plain meaning. ***Fourth***, Cirrus quibbles about transistors being turned "on." Cirrus misses the point. There is more to forming a transistor than just doped regions (*e.g.*, there have to be terminals connected to the source, drain, and gate, and a voltage applied to the gate). Dkt. 37-1, ¶71. ***Finally***, Cirrus makes more convoluted arguments about the prosecution history. Dr. Rao never said the active region is the current path of an existing transistor. Rather, he repeatedly indicated it is the doped region at the surface where the transistor may be built. Dkt. 37-1, ¶¶99-101, 104-105.

11. *Antecedent Basis*: "the surface thereof"/"the surface" (842:9; 481:20; 222:21; 014:21)

Again, Cirrus makes a meritless argument. Claim 842:9 requires an "active region…within which transistors can be formed in the surface thereof." Greenthread showed this means a transistor can be formed in the surface of the active region. Dkt. 37-1, ¶106. This is exactly what is shown in the preferred embodiment in Fig. 5C, where there is a source and drain at the surface of the active region. Unable to rebut this, Cirrus devotes a mere seven lines to this term in its reply. Dkt. 38, 26-27. To save face, Cirrus alleges a POSITA would not understand which surface or active region it is referring to. *Id*. This bald assertion is insufficient to prove indefiniteness.

12. *Antecedent Basis*: "aid carrier movement from the surface to the substrate" (842:9; 481:20)

Greenthread showed a POSITA would have understood "surface" refers to the "surface of the active region." Dkt. 37, 47. When read correctly, this term lines up perfectly with the preferred embodiment. Unable to rebut this, Cirrus alleges a POSITA would not understand which surface or active region, it is referring to. But Cirrus does not provide any support for this statement.

III. CONCLUSION

For the reasons above, terms 1, 2, 4, and 8-12 are not indefinite, and all of the terms should be given their plain and ordinary meaning.

Dated: January 11, 2024

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing document has been served on all counsel of record via the Court's ECF system on January 11, 2024.

/s/ *Alan L. Whitehurst*
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