

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INERGY TECHNOLOGY, INC.
Petitioner,

v.

FORCE MOS TECHNOLOGY CO., LTD.,
Patent Owner

IPR2024-00093 (Patent 7,629,634 B2)
IPR2024-00094 (Patent 7,812,409 B2)¹

Record of Oral Hearing
Held Virtually: February 21, 2025

Before GRACE KARAFFA OBERMANN,
CHRISTOPHER L. OGDEN, and MARY C. HOFFMAN,
Administrative Patent Judges.

¹ Although oral arguments were heard in a single hearing, the cases are not consolidated or joined.

IPR2024-00093 (Patent 7,629,634 B2)

IPR2024-00094 (Patent 7,812,409 B2)

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P R O C E E D I N G S

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JUDGE OBERMANN: Good afternoon, everyone. This is the final hearing in Inergy Technology v. Force Mos Technology. There are two IPRs. We have IPR2024-00093, involving Patent Number 7,629,634, as well as related IPR2024-00094, relating to Patent Number 7,812,409. I'm Judge Grace Obermann and appearing with me today, we have Judge Christopher Ogden and Judge Mary Hoffman.

I'd also like to welcome our Board Law Clerk, Josh Shetler, who is appearing on the public line. And I'd like to welcome both the Petitioner and the Patent Owner today, and let's make some introductions. Who do we have on the line for Petitioner?

MR. MCMAHON: Good afternoon, Your Honors. This is Charles McMahon from Benesch on behalf of the Petitioner. With me is Mircea Tipescu, and Kat Lynch is also logged in to assist with slides as a backup. All from Benesch.

JUDGE OBERMANN: Thank you, Mr. McMahon. Will you be providing all the arguments on behalf of Petitioner today?

MR. MCMAHON: No. I will be addressing the '634 patent and Mr. Tipescu will be addressing the '409 patent.

JUDGE OBERMANN: Okay. I just want to put Mr. Tipescu's name down because I don't see him in the briefs. Tipescu. Okay, thank you. And who do we have for Patent Owner?

MR. SAUNDERS: Good morning, Your Honor. This is Michael

1 Saunders of Dickinson Wright for Patent Owner. Also with me is my
2 colleague, Bryan Atkinson.

3 JUDGE OBERMANN: Thank you, Mr. Saunders. Anyone else
4 for Patent Owner on the line?

5 MR. SAUNDERS: I believe that's it, Your Honor.

6 JUDGE OBERMANN: Okay. Mr. Saunders, will you be doing
7 the argument completely or will you be sharing your time with Mr.
8 Atkinson?

9 MR. SAUNDERS: I'll be doing the full presentation for Patent
10 Owner.

11 JUDGE OBERMANN: Thank you very much. And I just want to
12 remind everyone that we do have a public line, so please don't disclose
13 anything that's confidential. Even though you might not see someone, there
14 could be someone public on the line. With that, I'll ask Counsel for
15 Petitioner and Patent Owner whether there are any preliminary matters you'd
16 like to discuss before we go into arguments? Mr. McMahon?

17 MR. MCMAHON: Just a logistical question for Your Honors to
18 consider. I know that you've allocated 90 minutes per side. We would
19 propose that we take the patents in sequence if that works for Your Honors,
20 just for convenience of keeping arguments together, but we're happy to take
21 them all -- take both patents together, if that's what Your Honors prefer.

22 JUDGE OBERMANN: Thank you, Mr. McMahon. You've
23 actually read my mind. The next thing on my list was to remind the parties
24 that these are two cases and that they're not joined, and I don't care how you
25 do it, but I want to make sure that the parties are aware that they can divide

1 their time as they wish, but you have to make clear for the record which case
2 is under discussion at any given time because we particularly don't want to
3 blur the evidence in a way that has us looking at one file when it's really not
4 in the file of the case. So let me ask Mr. Saunders. Do you have any
5 objection to approaching the arguments, as proposed by your friend, Mr.
6 McMahon?

7 MR. SAUNDERS: No, not in theory, Your Honor. We're
8 perfectly fine doing patent by patent. We just want to make sure that time is
9 kept track and we can reserve rebuttal and surrebuttal time separately for
10 each patent. If that can work fine, then that's no issue for us.

11 JUDGE OBERMANN: Okay. Well, then what I'm going to do --
12 we have allotted 90 minutes for each side and I'm going to keep track of the
13 primary time periods here. So I'm going to ask each side before they start
14 speaking how much time they would like to reserve, and then you'll just give
15 me a total amount of time from your 90 minutes that you want to reserve,
16 but I'm going to ask Counsel to keep track, within those parameters, of how
17 much time they're spending on each case.

18 So please don't ask me to give you, you know, 20 minutes on one
19 case, 30 minutes on the next case, and then, you know -- I'd rather that you
20 divide it up -- the total time among the cases and not ask me to stop you to
21 tell you to move to the case file, if that works. Is that okay, Mr. Saunders?

22 MR. SAUNDERS: Yes. That's okay, Your Honor. Just to clarify,
23 you're talking about moving to the next case file. I thought that the proposal
24 from Petitioner was to -- after the Petitioner presented as to the '634 patent,
25 then the Patent Owner would present as to the '634 patent. That was my

1 understanding --

2 JUDGE OBERMANN: Oh, I see.

3 MR. SAUNDERS: -- of the proposal.

4 JUDGE OBERMANN: Was that your thought, Mr. McMahon?

5 MR. MCMAHON: It was, and apologies if I wasn't clear about
6 that.

7 JUDGE OBERMANN: Okay. Well in that case, I will be asking
8 you how much time you want to spend on each case, and I'll be stopping
9 you, you know, so that you can -- okay. We can do that. You just have to
10 be very clear with me how much time you want to devote to each segment of
11 the presentation. So let's see how that goes. We have allotted 90 minutes
12 per side, pursuant to our hearing order, and that means that Mr. McMahon,
13 you have 90 minutes total. And are you going to talk first about the '093
14 case?

15 MR. MCMAHON: Yes, and we plan to split the time in half
16 between the two cases, so 45 minutes per case.

17 JUDGE OBERMANN: All right.

18 MR. MCMAHON: And we intend to reserve 15 minutes for
19 rebuttal in each case.

20 JUDGE OBERMANN: Okay, well, that makes it fairly easy. And
21 I will ask Mr. Saunders to tell me his plans when it's his turn to present his
22 first rebuttal argument, or responsive argument. So that means that I'm
23 going to give you, Mr. McMahon, 30 minutes on the clock. And when you
24 begin to speak, I will start your time.

25 MR. MCMAHON: Thank you, Your Honor. Anything else or

1 should we begin?

2 JUDGE OBERMANN: You may begin when you're ready and
3 this is going to be your 30 minutes to devote to the case-in-chief for the '093
4 case.

5 MR. MCMAHON: Thank you very much, Your Honor. And so
6 for the record, we will begin our argument on behalf of Petitioner today in
7 connection with IPR2024-00093, addressing the '634 patent. And as I said,
8 we will reserve 15 minutes for rebuttal on -- of our 45-minute argument on
9 this petition.

10 I would begin briefly with claim construction. Petitioner's position
11 is that there is nothing that needs to be construed by the Board, but I do want
12 to address a couple of issues briefly. Specifically, starting with the lateral
13 contact layer. Patent Owner would have the Board import limitations into
14 that term, lateral contact layer, and the surrounding limitation in five
15 different ways.

16 First, they would import a dopant concentration requirement that
17 does not appear anywhere in the claim language. Second, they would make
18 that dopant concentration requirement specific to the P* as disclosed in the
19 specification but not recited in the claims. Third, they would make that P*
20 value be not just relative between the P doping of the body layer and P+ of
21 the base contact layer, but they'd make it an absolute value. Not just a
22 relative value between those two things. Fourth, they would import an
23 implantation step into this apparatus claim, suggesting that this apparatus
24 must be created with a particular set of method steps or fabrication steps.
25 That doesn't appear anywhere in the claims.

1 And finally, reaching beyond the words lateral contact layer to the
2 word covered, they would report the requirement that covered must mean
3 that you apply a thin sheet of material, that it can't be anything more than a
4 thin sheet. The claims don't say that either. So that's five different
5 limitations that the Patent Owner would import from the specifications.
6 Some of which don't even appear in the specification. There's nothing about
7 thin sheet in the patent. And we think that is improper. We agree with the
8 Board's preliminary decision that lateral contact layer does not require any
9 specific construction.

10 And I'm addressing this because many of Patent Owner's
11 arguments specific to the grounds of unpatentability hinge on these claim
12 construction positions, and those arguments become moot if the Board elects
13 not to provide Patent Owner's construction for the term lateral contact layer.

14 JUDGE OBERMANN: May I ask a question, Mr. McMahon?

15 MR. MCMAHON: Certainly.

16 JUDGE OBERMANN: Is your position that lateral contact layer,
17 those three words together, have an understood meaning in the art or are you
18 saying that each of those individual words has an ordinary meaning?

19 MR. MCMAHON: We're saying that the -- those three words,
20 individually and taken together, can be read in light of the specification.
21 That there -- we're not saying that there is some established meaning in the
22 art. We're saying that they must be read in light of the specification, but
23 there's nothing in the specification that specifically limits those three words
24 as a phrase or any of those three words individually in the way that Patent
25 Owner proposes.

1 JUDGE OBERMANN: Okay. Are there any references in the
2 applied prior art references that actually refer to a contact layer?

3 MR. MCMAHON: Not using that terminology, Your Honor. I'll
4 get in -- I can get into the specific disclosure, but the answer to your
5 question is no, we're not aware of prior art that uses exactly that phrase. Of
6 course, that's not required under 102 or 103.

7 JUDGE OBERMANN: Yes, thank you.

8 MR. MCMAHON: Did I answer Your Honor's question?

9 JUDGE OBERMANN: Yes.

10 MR. MCMAHON: Thank you. The other claim limitation that
11 has been discussed is the sidewall and whether covering of a sidewall
12 requires covering of the entire sidewall. In its institution decision, the Board
13 preliminarily determined that that term does not need construction. We
14 maintain that that is correct, that it does not need construction, but we did
15 argue in the petition that if it is to be construed, it should be construed in
16 light of comments in the file history, suggesting that it is the entire sidewall
17 that needs to be covered.

18 The reason we think there's no need to construe it is we don't see a
19 reasonable dispute about the scope of the prior art disclosure that turns on
20 that construction, although I think Patent Owner disagrees with us on that,
21 and I'll get to that point briefly when I go through the patentability grounds.
22 So unless Your Honors have any questions on claim construction, I'll move
23 into the patentability grounds.

24 JUDGE OGDEN: Mr. McMahon, this is Judge Ogden. On a more
25 procedural question, you can correct me if I'm wrong, but I don't think

1 Petitioner has expert testimony to support its position that the term lateral
2 contact layer is -- would've been interpreted according to its ordinary and
3 customary meaning. Whereas Patent Owner does have some expert
4 testimony in support of their position. Is Petitioner's lack of expert
5 testimony an impediment for us to side in favor of Petitioner on the meaning
6 of what this term means?

7 MR. MCMAHON: No, Your Honor. Of course, expert testimony
8 is extrinsic evidence, which should only be considered if there is something
9 in the intrinsic evidence to create ambiguity, and we submit that in the '634
10 patent, specific to lateral contact layer, there is no such ambiguity. It's a
11 structural feature of the claim. It's clear on its face. The dependent claims
12 provide additional clarity and limitations on how that limitation appears in
13 the independent claim, but there's no reason to resort to extrinsic evidence,
14 which is why we didn't provide any.

15 JUDGE OGDEN: But would you -- so you would consider Patent
16 Owner's expert testimony extrinsic evidence, or could we look at it as
17 testimony as to how to interpret the intrinsic evidence?

18 MR. MCMAHON: Well, I don't think there's any question that the
19 testimony of an expert is extrinsic evidence. It doesn't appear in the patent
20 itself or in the file history. So in terms of pure categorization, we submit
21 that that is extrinsic evidence. Of course, the patent should be interpreted
22 from the perspective of one of ordinary skill in the art, and Dr. Neikirk has
23 commented on that, but our position is that Dr. Neikirk can't change the
24 meaning or scope of the claims through his testimony when that scope is
25 otherwise unambiguous in the patent itself.

1 JUDGE OGDEN: Sure, but can't Patent Owner's expert provide us
2 with guidance as to how a person of ordinary skill in the art would have
3 looked specifically at the specification or the prosecution history? I'm not
4 sure that that necessarily means that that testimony is itself extrinsic
5 evidence. Maybe it's just guidance to us as to how we should interpret the
6 intrinsic evidence.

7 MR. MCMAHON: I think -- so we're, I think, discussing the
8 merger of two different things. One is, yes, the claims and the entire patent
9 should be interpreted according to the perspective of one of ordinary skill in
10 the art, but the Federal Circuit has been very clear that the order of
11 operations here is to begin with intrinsic evidence and only resort to
12 extrinsic evidence if there is some ambiguity.

13 What Dr. Neikirk is proposing, as I understand it, is a suggestion
14 that this is somehow a coined term that had no meaning whatsoever, and has
15 no meaning, other than a very specific definition that Patent Owner has
16 cherry picked from the embodiments disclosed in the specification. To
17 override the claim language like that based on expert testimony, we submit
18 would be improper use of extrinsic evidence, unless there is some inherent
19 ambiguity in the claim language itself, which we submit there is not.

20 JUDGE OBERMANN: Along those lines, Mr. McMahon, if I
21 understand it correctly, the testimony from their -- the extrinsic testimony
22 from their expert attempts to create an ambiguity in the --

23 MR. MCMAHON: Yes.

24 JUDGE OBERMANN: And you don't have any testimony that
25 counters that, do you? Or are you relying on the intrinsic support, as you're

1 able to do without an expert?

2 MR. MCMAHON: Yes, we're relying on the intrinsic support.
3 We just don't see any ambiguity. These are not crazy words. These are
4 words -- common words that are commonly understood and can be
5 understood in the context of this patent, and what Patent Owner would do
6 is -- I haven't -- I should've counted them before today -- but hang, you
7 know, 15, 20 words on three words in the claim. And we submit there's
8 simply no basis for doing that. Not only that, but one of Patent Owner's
9 arguments is that the patent defines the present invention to require those
10 words.

11 That's entirely inconsistent with the disclosure in the patent. Yes,
12 there is one paragraph that begins with the phrase, according to the present
13 invention, but if you interpret that paragraph the way that Patent Owner has
14 proposed it, then it would read out the inverse polarity embodiments of, for
15 example, Claim 6, because it would define lateral contact layer to require
16 specifically P* doping, and that would exclude the P minus type MOSFET
17 that would have N* doping, according to Patent Owner, in place of the P*
18 doping in that particular configuration.

19 If the paragraph that Patent Owner refers to is taken to be a
20 definition, which we don't think it is, then that would be inconsistent with
21 the other disclosure and the -- it would exclude embodiments of the claimed
22 invention, which is disfavored as a way of interpreting the claims, and just
23 entirely unnecessary in this situation.

24 JUDGE OBERMANN: What do you make of the case that they
25 cited for this idea that -- it was a Federal Circuit case and I'll try to find it if

1 you don't know it off the top of your head, but they did cite a case when they
2 were arguing that the specifications language referring to the present
3 invention, that the Federal Circuit has said that's sufficient to be sort of
4 lexicography language.

5 MR. MCMAHON: Yeah. I think that there are cases in which that
6 may be true, depending on the specific language. Again, if a Patent Owner
7 wants to act as their lexicography -- their own lexicographer -- they need to
8 make it clear to the public that that is what they are doing, and the language
9 in this particular patent, the '634 patent, does not make that clear.

10 And again, if we were to go down that path, it would exclude
11 embodiments, which is not the way the Federal Circuit interprets claims. So
12 yeah, we don't dispute that that case held the way it held, and that in certain
13 cases, Patent Owner can invoke the phrase present invention to define and
14 limit the scope of the invention and act as their own lexicographer.

15 In this particular case, that's not true. The present invention
16 paragraph to which Patent Owner refers recites a number of different
17 features. Not just the lateral contact layer. And if you read that paragraph
18 on its face, it would limit the lateral contact layer to P* doping, which would
19 be inconsistent with, you know, not just superfluous. It would be straight up
20 inconsistent with Claim 6. There would be a disconnect. I want to make
21 sure that I'm making myself clear on that point. I don't want to move on if
22 there are further questions on this issue.

23 JUDGE OBERMANN: Well, you're making yourself clear in
24 terms of your argument, but I'm looking at the case, at least what they cited,
25 and they cite this *Verizon Services* case by the Federal Circuit, and they

1 quote part of it as saying, when a patent describes the features of the present
2 invention as a whole, this description functions as a disclaimer. So why
3 shouldn't we view that as a disclaimer of even of Claim 6? Did you address
4 this in your reply and, you know, what do we do with this case?

5 MR. MCMAHON: We addressed the argument in our reply and I
6 believe that is on -- starting at page 2 of the reply through page 8, and the -- I
7 don't know that we addressed this specific case that you are talking about
8 here, but again, I think you have to read that language in the context of the
9 patent as a whole, and in this case, this is, you know, a paragraph that they're
10 pulling from the summary of the invention.

11 I believe the paragraph that you're invoking is at the top of Column
12 2, and it recites a number of different features, which would -- if we take that
13 present invention language the way Patent Owner would have us do it would
14 mean everything in that paragraph is part of the claimed invention, and that
15 would be inconsistent with Claim 6, among other things.

16 JUDGE OGDEN: Mr. McMahon, I wanted to go back to one thing
17 you mentioned earlier. It seems like you're arguing that there's no ambiguity
18 in the specification as to the meaning of lateral contact layer. Are you
19 arguing that in order to determine that there is an explicit lexicography or a
20 disclaimer, that we need to find that -- or determine that there's an ambiguity
21 in the specification? Or is it plausible to have an explicit definition in the
22 spec or a disclaimer, even if there's something that is not ambiguous in the
23 spec?

24 MR. MCMAHON: I would answer that with by saying you have
25 to have a reason to go beyond the intrinsic evidence, but that reason may

1 take different forms in different patents, but there must be a reason to depart
2 from the intrinsic evidence. Here, we submit that there is no reason. There's
3 no ambiguity on one prong of this, and there is no language sufficient to
4 invoke the lexicography principle in this patent to suggest -- and even if
5 there were, that wouldn't necessarily say to go to extrinsic evidence. If you
6 have a lexicographer statement in a patent, that should provide the answer
7 without further need for extrinsic evidence. But now I'm not sure, Your
8 Honor, if I'm answering your question.

9 JUDGE OGDEN: Yeah. I think you're answering my question.
10 And also, I don't really see the situation here as that Patent Owner is arguing
11 that we go to the extrinsic evidence. It seems like they're arguing that we go
12 to the passage in the specification that says that, you know, that sort of they
13 argue defines what the invention is, which is part of the intrinsic evidence.
14 So do you agree with that or is it -- is the extrinsic evidence that you're
15 arguing the expert testimony or something else that I'm not aware of?

16 MR. MCMAHON: So a couple of answer there. One, yes, the
17 extrinsic evidence which I'm referring is primarily, if not entirely Dr.
18 Neikirk's testimony. Second, yes, I understand -- I disagree with, but I
19 understand Patent Owner's position to be that there is a lexicographer, or I
20 think they say a coined term -- statement in the patent.

21 And as I understand it, what they point to is this paragraph at the
22 top of Column 2, which says -- which begins with the phrase, according to
23 present invention. It doesn't say present invention is, and it doesn't say
24 lateral contact layer means, but it recites, essentially, every feature of the
25 independent claim in that paragraph in the context of the invention. They're

1 cherry picking from that a specific parameter that they're tying to the lateral
2 contact layer and there just isn't sufficient disclosure there to suggest that.

3 Again, it would've been very easy if P* were the magical
4 incantation that defines this invention. It would've been very easy to recite
5 that in the claims. They chose not to do that. They claimed this quite
6 broadly, and it's, as the Board noted in the institution decision, it's incumbent
7 on the Patent Owner to make clear to the public what the scope of their
8 invention is.

9 They chose to do that with this broad phrase lateral contact layer,
10 and there's nothing in the claim language and nothing in the specification
11 that says that the only lateral contact layer is one that has P* doping. Or that
12 the only lateral contact layer is one that has been implanted with a specific
13 step during the fabrication stage. Or that the only lateral contact layer is one
14 that is a thin layer -- a thin coating that covers something. None of that
15 appears in the claim language. It could have, had the applicant chosen to use
16 those words, but they can't come back and cherry pick those words from --
17 and read limitations in from the specification to avoid the prior art. They
18 chose a broad claim. There are consequences with claiming broadly.

19 JUDGE OGDEN: Thank you.

20 MR. MCMAHON: Any further questions on claim construction?

21 Okay. One moment.

22 So turning to the unpatentability grounds, and specifically
23 beginning with Ground 1 based on Hirler, as to Claims 1, 2, and 6, and I will
24 share my slides here. Make sure that this works for you. Can you see the
25 slides, Your Honors? Sorry, I couldn't -- I didn't hear. Are you able to see

1 the slides?

2 JUDGE OBERMANN: Yes.

3 MR. MCMAHON: Okay, thank you. So I'll skip ahead to Slide
4 25, which is where we address Ground 1, and there are three challenges that
5 Patent Owner has raised here. The first concerns the epitaxial layer. The
6 second addresses the sidewalls and the lateral contact layer. That's primarily
7 based on the claim construction issues we've just been talking about, and
8 then beyond that, those are the two challenges to Claim 1, as to the other two
9 claims that the challenges are the same. There's no independent basis for
10 challenging Claims 2 and 6.

11 So beginning with the epitaxial layer, the first thing I want to just
12 front is that Patent Owner has suggested that we have some new argument
13 here. We have not. The arguments that we have made were fully contained
14 in the petition. Everything we have cited in the Hirler disclosure was in the
15 petition, including the layer 11 that we submit is -- represents the epitaxial
16 layer, as well as Hirler's language about successively providing layers in
17 11 -- I think it's 10, 11, 12, and 13. So there's nothing new here. If anything,
18 it is a proper rebuttal and reply to questions that Patent Owner raised in their
19 response.

20 So turning to Hirler, you know, the epitaxial layer is a commonly
21 known feature. It is discussed as prior art in the '634 patent and it is
22 disclosed in Hirler exactly where one would expect it to be in the layer 11,
23 which we can see here on the slide. And the -- there's no requirement in the
24 law that Hirler use the word epitaxial or epitaxis -- Judge Ogden, I couldn't
25 tell if you were trying to say something?

1 JUDGE OGDEN: No.

2 MR. MCMAHON: Okay, thank you. No requirement that Hirler
3 used the specific language of the claim as long as it fairly discloses to one of
4 ordinary skill in the art what that feature is. And in this case, the
5 combination of disclosing that layer where it is in the figures and saying that
6 layers 10, 11, 12, and 13 are successively provided tells one of ordinary skill
7 in the art that this is a layer that would be created throughout epitaxis.

8 Patent Owner has come back with two alternative suggestions
9 saying, no, layer 11 could be created in other ways with counter-doping or
10 backside doping. Neither of those would be consistent with -- and let me
11 state that in the affirmative -- those are both inconsistent with Hirler's
12 disclosure that these layers be successively provided. And it's not just our
13 view that that is the way these layers are provided. Dr. Neikirk himself
14 provided a definition of epitaxis -- epitaxy, that -- I just want to make sure I
15 get the exact language here. He said epitaxial layers -- a layer grown -- I'm
16 looking at paragraph 109 of Dr. Neikirk's declaration. A layer that is grown
17 as a result of epitaxial deposition -- or epitaxy is an ordered deposition, a
18 process by which a thin layer of single material crystal is deposited on single
19 crystal substrate.

20 So it's an ordered deposition. That's exactly the -- that mirrors the
21 successively provided language that is in Hirler and that we quoted in our
22 petition. So the -- it's not Petitioner that's being inconsistent here. It is
23 Patent Owner who is being inconsistent in suggesting that Hirler might be
24 referring to other types of other ways of creating layer 11 that are
25 inconsistent with the language in Hirler.

1 So here, just moving on to Slide 28. Here we cite to where in both,
2 the reply and the petition -- the reply at page 10 and the petition at page 28 --
3 we refer to the successively provided language with respect to the epitaxial
4 layer and the other layers disclosed in Hirler. And here on Slide 29 is just
5 the quote of Dr. Neikirk's language from his declaration requiring that --
6 stating that epitaxy is an ordered deposition. That's something with which
7 we agree. And Slide 30 just addresses the two other alternatives that Patent
8 Owner has proposed, but which would be inconsistent with the language in
9 Hirler.

10 That takes us to the second dispute that Patent Owner has raised
11 regarding the discloser of Hirler and it's actually a collection of disputes that
12 all hinge on Patent Owner's proposed construction of lateral contact layer to
13 require P* doping, to require that it be implanted, to require that it be a thin
14 layer covering the sidewalls. None of those things are language that appear
15 in the language of the claims or are otherwise part of a lexicographer's
16 statement.

17 So just moving through this, looking back at the Board's institution
18 decision, this is Slide 32, the Board, at that time, preliminarily discerned no
19 words in Claim 1 and parties hadn't identified any that even remotely touch
20 upon a requirement related to dopant implantation, and we agree with that.
21 That remains true.

22 Turning to Slide 33, this is where Hirler discloses the core layering
23 to the lateral content layer. It uses the language body amplification zone, but
24 the feature, the purpose, the location of that body amplification zone mirrors
25 exactly what the '634 patent discloses in claims as the lateral contact later.

1 And here on Slide 34, we just have a side-by-side comparison.
2 You can see the similarity in the center of the figures between -- I'll call out
3 the relationship of a couple of different features here, so --

4 JUDGE OBERMANN: I just want to let you know, Mr.
5 McMahon, you have three minutes.

6 MR. MCMAHON: Thank you. Then I will skip calling out these
7 specific features right now, but happy to answer any questions that the Board
8 might have about that. With those three minutes, I'm going to jump ahead to
9 Ground 3 and address the Shiraishi reference. And two things to address
10 here. One is that in terms of the lateral contact layer, the arguments also turn
11 on Patent Owner's proposed construction, which we submit is improper.

12 The other dispute is a question of where the source layer is relative
13 to the other features disclosed in Shiraishi. And I think the key point that it
14 seems like Patent Owner might misapprehend is that Shiraishi discloses two
15 layers that are partly overlapping, layers 13 and 14, and Shiraishi teaches
16 that layer 14 is part of layer 13. Layer 13 is the base layer corresponding to
17 the body region. The claims sort of equate those two things, and the source
18 region sits exactly on top of that.

19 Within that body region is layer 14, which has the higher doping
20 concentration of the lateral contact layer and serves the same purpose that
21 the lateral contact layer does in the '634 patent. So even if we were to
22 somehow impose, which the claims don't require a dopant concentration or a
23 dopant, you know, a P^* that's intermediate to the base contact layer
24 concentration and the body concentration -- Shiraishi still has that and so
25 does Hirler, even though those things are not required, and Patent Owner's

1 argument about the source layer not being in the right place just doesn't hold
2 up when you read this disclosure carefully.

3 And finally, I just want to get to this figure on Slide 52, which
4 looks an awful lot like Figure 2G in the '634 patent. And Patent Owner
5 submits that somehow the -- we don't have complete coverage of the entire
6 sidewalls here by layer 14. That's reading an awful lot into a zoomed in
7 image of a patent figure. To my eye, this looks exactly like the arrangement
8 in the '634 patent where layer 14, which we submit is the lateral contact
9 layer, covers the entire sidewalls between the source region and the base
10 contact region of the Shiraishi disclosure. So with that, I'll stop and reserve
11 15 minutes for rebuttal.

12 JUDGE OBERMANN: Thank you, Mr. McMahon. You have 15
13 minutes remaining for rebuttal on the IPR-093 proceeding. And with that,
14 Mr. Saunders, when you're ready, I will ask you how much time you would
15 like to devote to IPR-093.

16 MR. SAUNDERS: Thank you, Your Honor. I will devote 55
17 minutes to the IPR-0093, the '634 patent, and I'll reserve five for surrebuttal
18 on that.

19 JUDGE OBERMANN: Okay. And tell me right now what does
20 that leave you for the other case?

21 MR. SAUNDERS: I believe that's 35 minutes for the '094 case.

22 JUDGE OBERMANN: Okay. And I can ask you later how much
23 you're going to reserve on '094. So that means you're going to have 50
24 minutes from the time you begin speaking, and when you're ready, I will
25 start timing you.

1 MR. SAUNDERS: All right. Thank you, Your Honor. Can you
2 see my slides?

3 JUDGE OBERMANN: Yes.

4 MR. SAUNDERS: All right. We're on Slide 5 of Patent Owner's
5 demonstratives for the '093 case. And so first, I just briefly want to address
6 the construction of the term sidewalls, and said trenches, and said base layer.
7 That was a term that originally was proposed by the Petitioner in the petition
8 itself. At the time of the preliminary response, Patent Owner did not agree,
9 but since then, two district courts over opposition of the Patent Owner
10 adopted that same construction. And therefore, in the Patent Owner
11 response, Patent Owner agreed to that construction.

12 We submit it's procedurally not appropriate to deviate from that
13 construction. That was the construction advanced in the petition, relied on
14 by the Petitioner, and it would be improper to deviate from that in their
15 reply. And it is important and necessary for the Shiraishi grounds that are at
16 issue in this case, and therefore, we request that that construction be adopted
17 as agreed by the parties.

18 Let's turn now to Slide 6. I want to talk a little bit about the lateral
19 contact layer construction. I don't want to read the whole construction here,
20 but I want to address a few of the points made by Counsel. First of all, it's
21 really important to note that Petitioner not only doesn't provide an expressed
22 construction, they never, anywhere in their briefs or in their argument today,
23 provided any real explanation as to what Petitioner's position as to what the
24 term lateral contact layer should mean. And also, they never cite any
25 evidence, intrinsic or extrinsic, as supporting what they believe the term

1 lateral contact layer should mean.

2 And as we cited in the surreply brief, there's a case in the Federal
3 Circuit that tells you what happens when a party is trying to rely on an
4 ordinary meaning, but doesn't cite any supporting evidence, and that's the
5 *Ruckus* case from Federal Circuit. And the Federal Circuit is the
6 consequence if you don't cite any evidence in support of ordinary meaning,
7 is you're stuck with what's in the specification.

8 I also note that Counsel, during the argument, said that we
9 shouldn't look at the expert testimony because that's extrinsic and they didn't
10 submit rebuttal expert testimony and they're saying they relied on intrinsic.
11 They didn't cite to any intrinsic evidence whatsoever to support any
12 construction or to dispute Patent Owner's construction. And in any way --
13 they didn't say how any intrinsic evidence provides a meaning, other than
14 what Patent Owner has proposed for this term.

15 I also want to briefly address where they said there are five issues.
16 We don't see this as five issues. We see this as two issues -- the dopant
17 concentration, in effect, implanted into the source contact trench. Counsel
18 mentioned this thin sheet argument. That's not part of Patent Owner's
19 proposed construction. That's -- what we submit is the ordinary meaning if
20 the Board does not adopt Patent Owner's construction. And as we explained
21 in the briefs, we think thin sheet is consistent with and supports the fact that
22 it's ion implantation into a source contact trench, but that's not part of this
23 proposed construction at all.

24 Moving on to Slide 7, as Your Honors noted, there is un rebutted
25 expert testimony on this issue that lateral contact layer has no established

1 meaning and is a coined term. It does not appear in relevant dictionaries or
2 treatises. In addition, in the Board's institution decision, it noted that there
3 was a lack of ambiguity about this term.

4 Now, Patent Owner's position is that the *Phillips* standard says we
5 don't have to have ambiguity about the term to look at a specification, it's the
6 single best source for claim construction. But anyway, Dr. Neikirk
7 submitted voluminous expert testimony in his declaration here, paragraphs
8 85 through 94, explaining all the various ways this term can be ambiguous.
9 There is no substantive response, certainly no responsive expert testimony,
10 and there's no real substantive response from the Petitioner at all on this
11 issue.

12 All the Petitioner said is well, that's all irrelevant because Dr.
13 Neikirk is opining about how the term could be ambiguous if you don't look
14 to the specification, but the truth -- that's exactly what Petitioner is
15 effectively arguing because as we'll see, the constructions that Patent Owner
16 has submitted come from the specification, and so we're submitting that that
17 is necessary and appropriate, both under *Phillips*, the other Federal Circuit
18 case law, and because we don't know what this term means if we don't look
19 at the specification. And as I said, Petitioners made no effort to explain that.
20 We do know what the term means and here's what it is.

21 JUDGE OGDEN: Mr. Saunders, this is Judge Ogden. Even if the
22 term were ambiguous, that doesn't necessarily mean that we have to go to --
23 that we have to conclude that there's an explicit lexicography or disclaimer
24 of claim scope, right? Because there are plenty of patents that use terms
25 with some level of ambiguity. If it gets to a certain level of ambiguity,

1 maybe the claim term could be, you know, indefinite, you know, as a
2 matter -- which is a matter that we don't address in this proceeding. But just
3 because there's some ambiguity doesn't necessarily mean that we still don't
4 apply what we understand as the ordinary and customary meaning, right?

5 MR. SAUNDERS: I think I have two points on that, Your Honor.
6 So first of all, obviously lexicography or, you know, disavowal, that's a
7 standard that applies even -- whether the term is in any way ambiguous or
8 not. So if there's an expressed lexicography disavowal, that will override
9 any ordinary meaning regardless of whether or not it's ambiguous in any
10 way.

11 The other point as I said -- as I mentioned, the *Ruckus* case from
12 the Federal Circuit, that tells us that, well, what do we do if we don't have
13 that evidence as to what an ordinary meaning is, right? So the, you know,
14 Petitioner here hasn't put in any expert testimony, hasn't cited to any treatise,
15 any dictionary, hasn't done any effort to establish an ordinary meaning.
16 Well, in that case, that special case, you actually go straight to the
17 specification. Whether or not it's an expressed lexicography, whether or not
18 there's expressed disavowal, you go to the specification. And that's
19 consistent with the *Phillips* standard where it says the specification is the
20 single best source in claim construction. It's usually dispositive.

21 So we submit that obviously, there's some cases that fall in a
22 spectrum in between where maybe the term is a little bit like the
23 specification or is a little bit like it, or it seems very close to something that's
24 in the art. Petitioners made no effort to kind of compare that to any of those
25 kind of cases. This is a case where only one side is really presenting claim

1 construction evidence and claim construction arguments, and the other side
2 is not presenting substantive arguments about what the term means and
3 evidence supporting it. *Ruckus* case tells us that you can't do that. You go
4 to -- the default answer is go to the specification, if that's your strategy. Is
5 that -- does that answer your question, Your Honor?

6 JUDGE OGDEN: Thank you.

7 MR. SAUNDERS: So turning to Slide 8 of the demonstratives, as
8 the Court noted -- or as the Board noted in argument with Counsel, the
9 Federal Circuit is quite clear about this use of the language the present
10 invention. It does create the presumption of definitional intent, and that's
11 what we have here. We have the language beginning in the sentence, the
12 present invention, and in that passage in Column 2, it says that the lateral
13 contact layer is P*. It says that P* is less than the P+ and it says it's higher
14 than the P base -- the regular P base.

15 I want to respond to another argument that Counsel made
16 regarding this, that they said it would exclude embodiments if we just
17 adopted this passage as is. And first of all that's an improper new argument.
18 It was not raised in their reply brief, it's therefore forfeited. But secondly,
19 it's just not an accurate characterization of the specification. If you just look
20 two paragraphs down in the specification from this paragraph in Column 2,
21 line 16, it has a paragraph that says, well, we -- everything I said before, you
22 can flip the types, flip the N and P, and -- if you're using a P channel
23 MOSFET. That's what the specification says just two paragraphs down, and
24 that's referring to the discussion above that we're showing in the screen here.

25 And in fact, as I showed earlier, the claim construction from Patent

1 Owner specifically is consistent with that language about inverting the
2 dopant types for P channel MOSFETs because it says if you're dealing with
3 a P channel MOSFET, we use -- we look for N*. That's not really relevant
4 to this case because all of the prior art that's asserted by Petitioner is prior art
5 that is N channel MOSFET. So that's why the focus has been on the P*
6 situation for all the prior art. But in no way does this cause any of the
7 preferred embodiments to be read out or any of the claims to be read out of
8 the invention. Turning now to the second issue --

9 JUDGE OGDEN: Mr. Saunders, same -- back on that issue, that
10 passage in -- I call them 2 of the specification. For us to determine that there
11 are -- that there is either lexicography or a disclaimer of claim scope, we
12 need to determine that there's some sort of a clear expression of that, either
13 lexicography or disclaimer. And I'm just wondering if we can't just interpret
14 this passage as setting out what the applicant regarded as the invention at the
15 time they wrote the specification, but not necessarily specifically putting
16 restrictions on the meaning of lateral contact layer. Perhaps, the applicant
17 wrote this and then when drafting the claims, claimed something that's a
18 little broader than this. Couldn't we interpret it this way? And if we could,
19 then how is it really a clear expression of lexicography or disclaimer?

20 MR. SAUNDERS: I would submit, Your Honor, that that would
21 not be appropriate construction consistent with Federal Circuit case law.
22 The -- we cited the *Verizon Services* case. That's a line of precedent that -- I
23 mean, it's not the only case, but it's a line of precedent from the Federal
24 Circuit that says, you know, looking at *Phillips*, *Phillips* says that we don't
25 need to have a definition using the language hereby defined as. That's what

1 *Phillips* says. We can have definitions expressed or implied under the
2 lexicography. And then *Verizon* adds to *Phillips* and says, one of the key
3 ways that you can tell that you have that implicit definition is using that
4 phrase, the present invention. That's exactly what we have here.

5 The other point I'd want to raise, Your Honor, is that this is not like
6 a term where the Patentee in the claims chose to use a different well-known
7 phrase that's well-known in the art, that's different from what it used in the
8 specification, right? That would be an example where, well, we have a
9 question, is what's in the specification matching with claims, but we have the
10 exact same phrase, lateral content layer, in the spec and in the claim. It's a
11 phrase that hasn't appeared anywhere before.

12 The undisputed evidence is it's a coined term. That's exactly the
13 case where we have to take this language, present invention, in the same
14 paragraph describing the property as the lateral contact layer and say that is
15 definitional language under Federal Circuit precedent.

16 JUDGE OBERMANN: Now, Mr. Saunders, I've had an
17 opportunity now to read the *Verizon* case and I really think you're
18 overstating it because right in the first column of that case, they talk about
19 how wrong it is to import a limitation from a spec in this way. And when
20 they get to the part about the present invention, they're not even talking
21 about the specification of the patent that was at issue there.

22 It was in a related application, and they used it to show that there
23 was a disclaimer by the applicants because they secured allowance by
24 contrasting that invention to the one that was in the sister application. So I
25 really do think that you're overstating this case and you're using the word

1 'coined' to try to get around the very clear case law that requires an applicant
2 to access its own lexicographer, whether you want to call it a coined term or
3 a definition.

4 MR. SAUNDERS: Well, I'll just address both those points, Your
5 Honor. So first of all, this *Verizon Services* case, I've -- we've not alleged
6 that it is factually analogous to this case. It's a line of principal cases and
7 you'll see this language from --

8 JUDGE OBERMANN: Where's your line of cases? I see you
9 citing *Verizon*. I don't see a line of cases that supports the way you just
10 characterized that case.

11 MR. SAUNDERS: You're correct, Your Honor. I cited the
12 *Verizon* case -- the case cite. I don't believe that Petitioner cited any
13 contrary case or had any response in their reply as the application of
14 *Verizon*, so we didn't find it necessary to cite the other line of cases, but it is
15 a principle of the Federal Circuit that stands. And we submit that is the
16 correct case law under a number of Federal Circuit cases exemplified by the
17 *Verizon Services* case and the language used in that case, which is the
18 holding of the case.

19 Turning to the issue of coined term, we did cite, again, Federal
20 Circuit cases about coined term. Certainly that is an important issue to
21 consider and it tells us, to what extent do -- when do we look to the
22 specification or how -- how much do we have to look to what is an ordinary
23 meaning versus the specification. And so in a normal case about a dispute
24 about coined term, you would have the other side saying, no, this is not a
25 coined term because here is what the ordinary meaning is and here's our

1 evidence establishing the ordinary meaning. And so there'd be a threshold
2 dispute about is this a coined term or does it have an ordinary meaning as
3 established by other evidence, and that would be a threshold issue to cite it if
4 we're going to the specification.

5 But we don't have a dispute of evidence about that. There is no
6 disputing evidence from the other side about the meaning of this term
7 outside of, you know, what Patent Owner itself has presented. So we don't
8 have that tension about is it coined enough or not to build a specification.
9 It's just there's no contrary evidence from Petitioner on this issue. So that's
10 why it is certainly appropriate to go to what *Phillips* itself calls the single
11 best source. It's usually the source that's dispositive and that's the
12 specification. We submit that is exactly the case here.

13 Turning to, briefly, Slide 9. The Board raised claim differentiation
14 and the decision, the decision the institution, is raising against the P*
15 construction. As we've explained, the presumption for claim differentiation
16 is a weak presumption whereas here, the dependent claims would not be
17 rendered identical in scope to the independent claims. There's really no
18 dispute on that, that the Claim 2 adds a further limitation to Claim 1 that has
19 the specific doping types consistent with an N channel MOSFET. Claim 6
20 recites specific doping types consistent with the P channel MOSFET.

21 So the presumption for claim differentiation would be very weak
22 and that's easily overcome by clear statements and specification. For
23 example, language about present invention. Additionally, that last language
24 there, as we noted, there's been no submission from either other side about
25 what doping is required for the base contact layer, so that also doesn't render

1 that portion of those claims redundant with the Claim 1, as interpreted under
2 Patent Owner's construction.

3 Turning to Slide 10 in the issue of implantation in the sidewalls.
4 As I explained before, we do submit that looking at the language of the
5 claim as a whole, it's consistent with the idea of having this thin sheet at the
6 sidewalls because that's looking at the different usage of region and layer in
7 the claims, and the language of it being covered. That's consistent with the
8 thin sheet. We also still have, as Dr. Neikirk explained, the process of
9 implanting into the sidewalls of the source contact trench is consistent with
10 creating a thin sheet, as opposed to a broad region, but it's also, again we
11 have language here in the specification using that phrase, present invention,
12 when it notes that there's ion implantation in two source contact trenches, up
13 in Column 2, lines 46.

14 And again, repeatedly throughout the specification over and over
15 and over again, whenever it's describing this lateral contact layer and its
16 creation, it's describing it as being creating by ion implantation into the
17 source contact trenches. And again, looking at the *Phillips* standard, that's
18 the kind of implicit definition we can look at in the specification. It doesn't
19 have to be an expressed definition that like lateral contact layer herein is
20 defined as. That's not what's required under the Federal Circuit case law.

21 Turning next to the Hirler in limitation 1A on Slide 12. So this is
22 an issue where in the petition and Petitioner's expert's declaration, there is
23 simply any absence of any explanation or inherency theory for this epitaxial
24 layer. All they say is what we've highlighted here. They say, Hirler
25 discloses they quote the language of N minus drift zone 11, and then there's

1 a conclusory statement by Petitioner's expert that N minus drift zone 11
2 corresponds with an epitaxial layer corresponding with the drain region.
3 That's it.

4 That is the only expert evidence at all from Petitioner on this issue.
5 That certainly is not an inherency theory, and it is not an explanation for
6 why N minus drift zone 11 has to be an epitaxial layer. That failure alone is
7 sufficient and requires rejecting the Hirler grounds. But Dr. Neikirk went
8 above and beyond in responding and in fact, affirmatively disproved
9 inherency. That testimony is un rebutted.

10 He affirmatively disproved inherency by giving two examples of
11 the way of creating that N minus drift zone 11 without epitaxy, counter-
12 doping or backside doping. There is no response from expert on that. No
13 contrary evidence anywhere from Petitioners responding to those points. So
14 again, that requires rejection of Petitioner's argument for the Hirler grounds.

15 Moving to Slide 13, I just want to address briefly the arguments
16 that Petitioner made in their reply onto this limitation. First of all, we do
17 submit that that is an improper new reply argument, that when they argue
18 that the successively provided language of Hirler's Claim 1 necessarily
19 requires it being an epitaxial layer.

20 As we noted in the POR, case law from this Board makes clear that
21 if you're going to make an inherency argument as a Petitioner, it has to be in
22 the petition itself. During argument, Counsel argued that the successively
23 provided language was cited in the petition. That's true, but that's not
24 accurate in regards to new argument. It was not cited in the petition for this
25 limitation. It was cited in the petition in Claim 6 on page 28.

1 Similarly, they cite in their expert declaration successively
2 provided language for Claim 6. On pages 23 and 24 of the petition is where
3 their arguments are presented for Hirler versus limitation 1A, that
4 successively provided language in Claim 1 of Hirler are not cited there.
5 Taking evidence cited for one purpose in one claim in the petition and using
6 it for another purpose in another claim later in the reply is an improper new
7 argument. Moreover, it is an argument that is entirely an
8 (INDISCERNIBLE) argument. It is not supported with any expert
9 testimony at all or even any documentary evidence, any treatise, dictionary.
10 There's just zero evidence supporting that argument.

11 Lastly, it's just not a reasonable interpretation of Hirler. To
12 successively provide a language that's in Hirler's claim is, in context, not a
13 manufacturing step. It's just a description of the order of how the layers
14 appear in the product from one direction to another. Just telling you the
15 order that they appear if they looked at the final product. And certainly, it in
16 no way requires epitaxy. As Counsel admitted, epitaxy requires this thin
17 layer of single crystal deposited on a substrate. There's nothing in the
18 language that's successively provided in Hirler, Claim 1, or the other places
19 where successively provided appears in Hirler, that in any way requires that
20 thin layer of single crystal be deposited. It's simply a logical leap that's
21 completely unsupported by Petitioner. Therefore, their argument for 1A for
22 Hirler failed.

23 As to the P* doping for Hirler, again, that's pretty clear. If the
24 Board doubts their construction, Hirler says that that body amplification
25 zone 19 is P+, as we see on Slide 14 here. Therefore, it's -- as Dr. Neikirk's

1 unrebutted testimony, that means that the claim was not satisfied under
2 Patent Owner's construction by Hirler. Fifteen, again, unrebutted testimony
3 from Dr. Neikirk that the portion of Patent Owner's construction requiring
4 the implantation to source contact trench, that's also inconsistent with Hirler,
5 which demonstrates that we have this broad area that's implanted between
6 gate to gate before the source contact trench is etched.

7 Turning to Slide 16, one of the arguments that Petitioners made is
8 that it's improper -- this argument -- because it's reading in a process step
9 into a claim and it's improper to do that in an apparatus claim. But we
10 submit that these -- as we argued, these are structural differences, not merely
11 issues of process. And what we can see here in Hirler is in Figure 2F there,
12 that purple body amplification zone 19, we see it's a very wide and broad
13 zone. It's not like that thin layer that's created on the sidewalls via ion
14 implantation in the '634 patent.

15 And in fact, Dr. Neikirk explained in unrebutted testimony that this
16 is a structural difference, it's not mere process, and in fact, it has a real effect
17 on the device. By having that lateral extensions reach the vicinity of the
18 channel in Hirler, you're going to affect threshold voltage. And I submit this
19 analogy to this, as we talked about this in the surreply, is you can have
20 limitations in a structural claim composition or an apparatus claim that in
21 some ways invoke process.

22 For example, you could have polished or pulverized rock in a
23 composition of matter claim. Those invoke certain processes, but those are
24 terms that are structural because the process changes the structure of the
25 device. So likewise, the lateral contact layer can appropriately reflect the

1 structure created by a particular process. The process of them implanting
2 into a source contact trench is different from other processes that create
3 different structures, like the broad implantation seen in Hirler.

4 So briefly on Claim 3 -- actually, I'll turn, in the interest of time, to
5 the Shiraishi grounds, in Slide 20. I think Counsel did speak a bit about
6 Shiraishi. Again, this is -- on 1A here, we have a very simple issue, and the
7 issue is what is the base layer in Shiraishi. And on the upper left there, we
8 see the Figure 8, which Petitioner relies on. The red layer there is the source
9 layer. There's no dispute that's a source layer. The purple layer there in the
10 middle is the punch through stopper layer of Shiraishi, which is what
11 Petitioner asserts is the lateral contact layer. At the bottom, we have layer
12 13 in green there of Shiraishi.

13 And so the question is, what is the base? If the base is the green
14 layer, then it doesn't satisfy limitation 1A because we see that the purple
15 layer interposes the green layer and the red source layer. And therefore, you
16 would not have the source layer disposed on top of the base layer. Again,
17 this is an example where we have nothing more than conclusory testimony
18 with the petition, and detailed and unrebutted testimony from Dr. Neikirk in
19 the POR, where he explains that properly considered layer 14 is not part of
20 the base. In fact, he talks about how Shiraishi says that only layer 13 is
21 described as having the channel or acting as a base. Those are the terms that
22 one of skill in the art would understand as indicating that that is the base
23 layer in Shiraishi. By contrast, Shiraishi consistently describes layer 14 as
24 the punch through stopper layer, not part of the base layer or body region.

25 Just to quickly also to address, at the reply argument, I believe

1 Counsel did mention it, they make this argument citing the paragraph in
2 Shiraishi there at the bottom left, paragraph 80, language like that, that
3 appears elsewhere about the region 14 being formed inside the P minus type
4 semiconductor region 13. And say, well that means it's part of 13 and
5 therefore part of the base layer, and that's just not consistent with the actual
6 language that they're citing there.

7 The language that they're citing is mere manufacturing steps. In
8 Shiraishi, how Shiraishi is building up its layer. It's layers keep building up
9 from bottom to top via sequences of ion implantation, so it builds the layer
10 14 and then it builds layer -- or sorry -- it builds layer 13 down below with
11 one implantation, another implantation that doesn't go quite as deep. It
12 builds layer 14. Another implantation over that, it builds layer 15.

13 That's not telling us the key issue in this case, which is what is the
14 base layer in Shiraishi. And as to that issue, the only non-conclusory expert
15 testimony is from Patent Owner's expert. Patent Owner's expert explains in
16 detail why layer 14 is not the base layer or not part of the base layer in
17 Shiraishi, and thus, Shiraishi cannot satisfy limitation 1A of the '634 patent.

18 Lastly, going to this issue of the entire sidewalls, this is another
19 example where, again, the parties agree construction requires entire coverage
20 of the sidewalls. It's very easy to look at Shiraishi here. We've done the
21 colors. Purple is what Petitioner submits is the lateral contact layer in
22 Shiraishi, that layer 14. What we can see is the bottom of layer 14 is above
23 the bottom of the source contact trench. That means there are parts of the
24 source contact trench walls that are not covered in layer 14. Therefore, it
25 does not meet the construction that the parties agree to, as to this term.

1 Responding a little bit about the reply arguments that they also
2 raised in this -- we're on Slide 22 now -- the appropriate understanding -- in
3 their reply brief, they said, well, if they look at the left there, we don't see
4 green touch the sidewalls, and therefore, it's okay, it still satisfies the claim.
5 That's the argument that they made in their reply brief, and we submit that's
6 not an appropriate understanding of the language in said base layer. The
7 claim says it's in said base layer. The appropriate understanding of that
8 language is the vertical extent of the base layer.

9 And we can see on the right why the '634 is different here. We can
10 see on the '634, we have the vertical extent of the lateral contact layer 209 is
11 covering the entire vertical extent of the sidewalls underneath the source
12 layer to affix. So the entire vertical extent of the sidewalls in the base layer
13 are covered by the lateral contact layer in '634. We do not have that in
14 Shiraishi. In Shiraishi, the purple layer stops well above the bottom of the
15 source contact trench.

16 Counsel also made an argument that we're reading too much into
17 these figures. Well, again, that's not the whole argument. Dr. Neikirk didn't
18 just read into the figures. He also read into the text of Shiraishi. He pointed
19 to the claims in Shiraishi and other language in Shiraishi and he said, well,
20 Shiraishi is saying, let's have a very thin layer 14. In fact, probably thinner
21 than it looks here because we want layer -- Shiraishi says we want to have a
22 thin layer 14 rather than doping the entire body region heavily doped with
23 this additional P doping because that would increase threshold voltage.

24 And so we have unrebutted expert testimony from Dr. Neikirk that
25 Shiraishi does not meet that entire sidewall coverage because of that issue of

1 the fact that layer 14 is both depicted and described as being a thin layer and
2 not one that covers the entire sidewalls of a source contact trench underneath
3 that source layer there. That is there's part of layer 14 that is above the
4 bottom of that source contact trench, and so we don't have the entire vertical
5 extent covered by the lateral contact layer.

6 Turning to the issue of P* doping, again, there's no dispute about
7 experts on this issue. If Patent Owner's construction is adopted, Dr.
8 Neikirk's unrebutted testimony is that Shiraishi -- there's no sufficient
9 argument or disclosure that Shiraishi has P* doping, and the reason for that
10 is simple. Shiraishi describes the layer 13 as being P minus type, and you
11 can see that on the left there, paragraph 73. It looks a little bit similar if you
12 don't read the actual images from the patent there, but when it talks about
13 layer 13, it has that minus -- it's above the P there, right? Just like it has that
14 minus above the N.

15 Whereas we look at layer 14, it just says P dash type. And as Dr.
16 Neikirk explains, those are two different types, right? P minus means lightly
17 doped with P. P type is this regular P doping and the claim construction, as
18 the specification requires, requires that P* be between P -- regular P -- and P
19 plus. P minus is less than regular P. And so Shiraishi just says, we're
20 adding some more dopant to something that is P minus, that doesn't tell us
21 that we're going to get past P into the range of P*. Shiraishi's disclosures are
22 entirely consistent with just stopping somewhere between P minus and P for
23 that layer 14.

24 Again, it's undisputed. Dr. Neikirk also looked at the dosing
25 concentration of Shiraishi in the '634 patent that also confirmed that, so it's

1 undisputed evidence here that if the Patent Owner's construction is adopted
2 that we -- that there's no satisfaction -- no satisfying the P* aspect of that
3 construction by Shiraishi. Similarly, there's no dispute really. Shiraishi
4 doesn't implant into a source contact trench.

5 We saw before in the figures, it's a very wide implantation from
6 gate to gate, and Shiraishi is very clear about that, and it occurs before the
7 source contact trenches even exist. And Dr. Neikirk explained, that's a
8 structural difference. Again, having that very wide implantation in this wide
9 region between gate to gate has a structural difference, increases threshold
10 voltage, that's exactly what the '634 patent is trying to avoid with the lateral
11 contact layer, being a thin layer with intermediate doping is to improve that
12 (INDISCERNIBLE) contact without hurting threshold voltage. So clearly,
13 structurally different from Shiraishi. Not just an issue of mere process.

14 I'll turn last briefly to Slide 28 and the arguments about the
15 combination of Kobayashi and Shiraishi, where they make Kobayashi the
16 primary reference and Shiraishi the secondary reference. First of all, this
17 whole argument breaks down from the beginning because their argument is
18 that Kobayashi would benefit from Shiraishi's punch through stopper layer,
19 and as Dr. Neikirk explains, well, you have to explain why Kobayashi would
20 be suffering from punch through, and there is no explanation from Petitioner
21 or their expert why Kobayashi is suffering from punch through. And in fact,
22 as Dr. Neikirk explains, well, you have lots of different things that can be the
23 gating or kind of limiting form of breakdown. One of them is punch
24 through, but there are other kinds, such as inner breakdown.

25 And so you have to have some articulation for why you think some

1 implementation of Kobayashi is going to have punch through as a problem
2 to be solved. There is no articulation from that from Petitioner, and so their
3 whole theory about Kobayashi would be motivated to modify Kobayashi to
4 add a punch through stopper layer, it simply lacks any factual support.

5 Moreover, when we actually look at the details of Kobayashi and
6 Shiraishi, we see that the references teach away from this combination.
7 Most importantly, Kobayashi repeatedly says our focus is we do not want
8 increased impurities -- so in other words, for dopants -- in this channel
9 region. In fact, we're going to very precisely set the depth of our source
10 contact trenches so that P+ layer there at the bottom of the trenches is not
11 going to fuse out and reach the channel region. That's one of the main
12 focuses of Kobayashi, but Petitioner's proposed combination is to stick
13 additional dopants all the way between gate to gate, including in the channel
14 region. They have no response or explanation why this is obvious, despite
15 these disclosures.

16 And again, in fact, it's not only inconsistent with Shiraishi. We see
17 the proposed combination, to the extent they're saying it would satisfy the
18 language for entire coverage required in the party's agreed constructions.
19 That is also inconsistent with both references. Shiraishi says -- just like
20 Kobayashi -- we do not want to increase threshold voltage. That's why
21 Shiraishi is saying, let's not make layer 14 too deep. That's what Dr. Neikirk
22 points out. We don't want layer 14 to be too deep because that's the same as
23 layer 13. Just doping that whole thing increased dopant, if we're just doping
24 the whole thing there. So it wants a thin layer 14 so it's not increasing the
25 threshold voltage.

1 Similarly, as we just pointed out, Kobayashi also says, we don't
2 want more dopants in the channel region. That's going to increase threshold
3 voltage. Both of these references are saying, do not do what Petitioners are
4 proposing in this combination, which is stick a bunch of dopants all the way
5 in, gate to gate, so they're -- and they're deep enough that they're covering
6 the entire sidewalls in the source content trenches. Both references teach
7 against that because of an increased threshold voltage. Again, it's unrebutted
8 testimony from Dr. Neikirk, no response from Petitioner.

9 And as we noted in the brief, all of the reasons I discussed, why
10 Shiraishi doesn't satisfy 1A or 1G, apply equally to the proposed
11 combination where Shiraishi's punch through stopper layer is added to
12 Kobayashi. In particular, in Kobayashi, we have, you know -- sorry -- in
13 Shiraishi, they're taking the punch through layer 14 as is in Shiraishi and just
14 putting into Kobayashi, so it has the same problem when it comes the doping
15 concentration is not P^* . It has the same problem that they're not implanting
16 into a source contact trench but implanting it broadly across the entire
17 semiconductor from gate to gate, which doesn't satisfy the implantation into
18 a source contact trench.

19 They have the same problem with limitation 1A. They're showing
20 that it's interposing the source layer and the base layer. For the same reasons
21 that we talked about why Shiraishi's layer 14 is not a part of the base layer in
22 Shiraishi, it would not be part of the base layer in this proposed combination.
23 It's a lateral -- it's a punch through stopper layer and that's distinct from a
24 base layer. And as I said, there's no motivation to combine the entire
25 sidewalls of the trenches in the base layer in this proposed combination. It's

1 simply a conclusory statement by Petitioner and the Petitioner's expert that it
2 would be done, and they have no support for that.

3 Given I have the time, I'll just briefly address the Claim 3
4 arguments. In essence, the issue here with Claim 3 for both of these, which
5 recites the barrier metal layer, and the contact metal plugs. Throughout
6 these, basically, Petitioner makes a consistent argument that we're going to
7 look to Kobayashi for all their combinations because Kobayashi teaches that
8 if we flatten the tops of the devices, we can -- after putting in metal into the
9 source contact trenches, then we can have a flatter source metal layer on top,
10 and that would let us improve the bonding.

11 That's their argument that they have. The problem is that there's
12 this assumption, this disconnect that, well, if we use plugs, that's what results
13 in that benefit. As Dr. Neikirk explained in unrebutted testimony, again, it's
14 actually not the plugs that provide the benefit. It's having a two-step
15 process, right? Having a filling of the trenches, then doing some kind of
16 planarization and then putting the metal layer on top.

17 And so whether in Shiraishi, Shiraishi has an embodiment, which
18 is open cell. Dr. Neikirk in unrebutted testimony says that's inconsistent
19 with plugs, and there's no articulation in any of the briefing from Petitioner's
20 expert why it's choosing from one of Shiraishi's embodiments for another,
21 the one that's compatible with plugs or incompatible with plugs, when it's
22 combining with Kobayashi. It's just -- it's unsupported assumption that,
23 well, of course we're going to use plugs and therefore, let's use tungsten
24 plugs and let's use a barrier layer.

25 It's a similar issue in Hirler. Hirler says, well, not just tungsten

1 plugs. It says we could just fill it all with aluminum or we could use
2 polycrystalline, which is not even a metal. But the starting point in the
3 analysis from Petitioner in the petition itself is, well, Hirler discloses
4 tungsten plugs and let's combine that because we want to use this part from
5 Kobayashi. And again, that's not appropriate.

6 Again, there doesn't have to be a lot of reasoning, but there has to
7 be some reasoning why Petitioner picks and chooses different parts from
8 different references. Hirler has a number of embodiments, including
9 embodiments which don't use contact metal plugs, and they have to
10 articulate some reason why they're going to use those plugs, especially given
11 that's the basis for their motivation to combine to add a barrier layer to
12 what's disclosed in Hirler and Shiraishi.

13 So for those reasons, we similarly submit that there's insufficient
14 evidence and argument as to the motivation to combine for Claim 3 for all of
15 the grounds. And unless Your Honors have any further questions, I'll
16 reserve the remainder of my time. I'm sorry. I can't hear you, Your Honor.

17 JUDGE OBERMANN: I'm not seeing any questions from my
18 panelists, so you have about 10 minutes, if you'd like to add it to your five
19 on rebuttal.

20 MR. SAUNDERS: Okay.

21 JUDGE OBERMANN: And we have Mr. McMahon coming up
22 for 45 minutes of -- I'm sorry -- 15 minutes of rebuttal, and I'll start your 15
23 minutes running when you begin speaking.

24 MR. MCMAHON: Thank you, Your Honor. So I'll go through
25 the claim construction issues first and then come around to the patentability

1 questions. On claim construction, you know, Patent Owner's position is
2 they're reading in limitation -- reading in an embodiment from the
3 specification. And as I said earlier, that's directly inconsistent with Claim 6.
4 Patent Owner said that's a new argument. It's not. We addressed that on
5 page 5 of our reply.

6 And on that point, I'll note that Patent Owner makes a lot of
7 sweeping statements about what the Federal Circuit case holds or what Dr.
8 Neikirk's unrebutted testimony says, or what arguments we've made that are
9 new. I will simply say the record speaks for itself, in terms of what the
10 evidence is. I am not going to try and go through every one of the points
11 where we rebutted Dr. Neikirk, but we have.

12 Speaking of expert testimony, Patent Owner seems to have
13 different and somewhat inconsistent positions on how to interpret lateral
14 contact layer. On the one hand, they say in their response that there are
15 ambiguities in the claim language that require clarification. On the other
16 hand, they're reaching to what they claim to be a definition in the spec and
17 relying heavily on Dr. Neikirk to support that. There either is or there is not
18 a definition in the spec. What Dr. Neikirk says about it doesn't change that.

19 The Patent Owner has or has not acted as their own lexicographer
20 and Dr. Neikirk can't change the record to make it so, which seems to be
21 what they're suggesting. That purported definition at the top of Column 2
22 would exclude the P type embodiments, where the lateral contact layer
23 wouldn't necessarily need to be an N type. And I'd also say that the
24 construction that Patent Owner has proposed doesn't mirror that paragraph,
25 which they claim is limiting to the present invention. They've expanded

1 their definition to try to capture that other embodiment, and in doing so, they
2 are directly contradicting the very paragraph upon which they rely.

3 So for all of those reasons, their importation of implantation, P*
4 doping, specific doping concentration absolute values is just not supported
5 by the record. At the end of the day, they're trying to read in a preferred
6 embodiment. And we addressed -- I'm sorry, I covered that.

7 So in terms of Hirler, the epitaxial layer, again, I addressed this -- I
8 previewed this before, but this is not a new argument. We -- all of the
9 evidence that we are citing on the epitaxial layer and Hirler, we cited in the
10 petition. What we said in reply was proper rebuttal to what -- to the
11 arguments that Patent Owner presented in their response. They were on
12 notice of that. They had an opportunity to respond to it in their surrebuttal
13 and they did.

14 There's no new argument at issue here. And it comes down to, you
15 know, what does Hirler say. They're throwing out suggestions of ways to
16 interpret Hirler that would not be epitaxial, but those alternatives are
17 inconsistent with the very disclosure in Hirler. We're not arguing inherency.
18 We're saying simply read Hirler for what it discloses and what we said it
19 disclosed in our petition.

20 With respect to Shiraishi, I'd point you to our reply at pages 17 to
21 18. I think we've addressed this elsewhere, too, but Shiraishi is very clear
22 that the semiconductor layer 14 is part of the semiconductor layer 13. So in
23 that sense, layer 15 is on top of layer 13 and the fact that it's on top of the
24 part of 13 that contains 14 doesn't change the fact that 15 is on top of 13.

25 So Shiraishi meets that limitation in terms of the sequence of the

1 layers, and as for Shiraishi covering the entire sidewall, I'd point you back to
2 Patent Owner's Slide 22, where they compare the Shiraishi disclosure to
3 Figure 2G of the '634 patent. They look very similar. Their argument is
4 there's a portion of the bottom of the contact trench, the source contact
5 trench, that is in Shiraishi covered by the equivalent of the base contact
6 layer, not by layer 14. Same is true in '634, Figure 2G.

7 There is a portion of that source contact trench at the bottom that is
8 not covered by the lateral contact layer. It's covered by the base contact
9 layer, if you interpret that figure that way. According to Patent Owner's
10 argument and Dr. Neikirk's reportedly unrebutted testimony, he would
11 interpret the claims to exclude Figure 2G. That doesn't make any sense. To
12 see the similarity of disclosure between Shiraishi and the '634 patent, all you
13 have to do is look at Patent Owner's Slide 22.

14 With respect to Kobayashi and Shiraishi, and this is kind of just a
15 general comment on obviousness, Patent Owner criticizes our use of
16 Kobayashi saying, there's nothing in Kobayashi that says I need a punch
17 through stopper. That's not the way obviousness works. There's nothing in
18 the law that says, Kobayashi needs to, in its disclosure, raise its hand and
19 say, hey I have a problem that needs to be solved. The problem is identified
20 in Shiraishi. Shiraishi provides the solution, and for the very same reasons
21 that Shiraishi discloses, that punch through stopper layer would provide the
22 same benefit in Kobayashi. It does not matter that Kobayashi does not say,
23 hey, I need a punch through stopper. The motivation is provided in Shiraishi
24 itself.

25 And again, a global comment about obviousness, Patent Owner

1 argues that there are different embodiments in Shiraishi and in Kobayashi
2 that -- and some of them may or may not be compatible with, for example,
3 the punch through stopper. That's fine. They're, you know, one of ordinary
4 skill in the art is assumed to bring their common sense and their level of
5 knowledge of ordinary skill in the art with them when they look at these
6 references.

7 And to know that if this feature is incompatible with an
8 embodiment, I'm not going to use it there, but that doesn't mean I can't use it
9 with an embodiment where it is compatible. And we're not talking about
10 rocket science here. We're talking about a barrier metal layer. It's a routine
11 feature that's used frequently. One of ordinary skill in the art would know
12 how and where to apply that. Same with tungsten plugs, and I think those
13 are the two examples that they used.

14 With that, I have not spoken that much about the obviousness
15 combinations. We covered this in our papers, but I did want to give Your
16 Honors a chance, if you had any questions about that or anything else that I
17 can answer for you in my limited time, I'm happy to do so.

18 JUDGE OGDEN: Mr. McMahon, I'd like to go back to the Hirler
19 ground. And specifically, the limitation about the requirement of if there's
20 an epitaxial layer.

21 MR. MCMAHON: Yes.

22 JUDGE OGDEN: We've got expert testimony from Patent Owner,
23 you know, suggesting that just because Hirler discloses that layers are
24 successively provided on that substrate, that doesn't necessarily mean that
25 you've got an epitaxial layer. And we don't have expert testimony, I don't

1 think, supporting Petitioner's view. So what evidence do we need to look to
2 in support of Petitioner's view if we don't, you know, in order to, you know,
3 otherwise, it seems like we're just left with Patent Owner's expert's
4 testimony.

5 MR. MCMAHON: So, I mean, you're exactly right. We did not
6 submit a rebuttal declaration from Dr. Liu or anyone else, but Dr. Liu
7 supported his declaration -- his opinion of why Hirler discloses an epitaxial
8 layer, and we responded to Patent Owner's argument with that same
9 evidence, including the successively provided language.

10 And the issue here is that Dr. Neikirk has identified two other ways
11 that you could create that N minus layer, which is number 11, the drift zone
12 in Hirler, and those other ways would require there being a layer there
13 already, which is being modified, either through backside doping or counter-
14 doping. That is inconsistent with Hirler's language that the layers be
15 successively provided. To successively provide layer 11 on top of layer 10,
16 it needs to provide it there epitaxially and Patent Owner has not identified
17 any other interpretational example of Hirler that would say otherwise.

18 JUDGE OGDEN: Well, I understand that, but be that as it may,
19 it's Petitioner's burden of persuasion here, and it seems to me like there
20 needs to be evidence from Petitioner that Hirler's disclosure -- because we're
21 talking about an anticipation ground here -- evidence that Hirler's disclosure
22 that layers are successively provided would -- is equivalent to a disclosure
23 that there's an epitaxial layer. So where is that evidence from Petitioner?

24 MR. MCMAHON: Well, again, I can only point you back to Dr.
25 Liu and point out that what we did was respond to the specific criticisms that

1 Dr. Neikirk offered. He provided two examples which are inconsistent with
2 Hirler's disclosure, and so we have pointed to a layer and explained that
3 Hirler says those layers are successively provided. We maintain that that
4 means that is an epitaxial layer. We believe that meets our burden of
5 persuasion. Patent Owner is free to come back and criticize that. They've
6 done that, but they've done that with two examples that make no sense.
7 They have not offered any example of a way that 11 -- that layer 11 would
8 be created -- that is successively provided, other than epitaxial.

9 JUDGE OGDEN: Well, can we get it from Hirler's disclosure, you
10 know, without ourselves having, you know, specific technical expertise in
11 this area? Can we get it from Hirler's -- their disclosure to your argument
12 that there's an epitaxial layer or do we -- would we need to -- need
13 something else?

14 MR. MCMAHON: I don't think you need anything else. I think
15 that the disclosure of that layer in that location successively provided tells us
16 everything we need to know about that layer being an epitaxial layer. And
17 I'd encourage you to ask Patent Owner, you know, if you provide -- if you
18 use counter-doping or you use backside doping, is that successively
19 providing layers or is that modifying a layer that's already there. That we
20 have to -- whatever interpretation we apply to Hirler has to be consistent
21 with the disclosure in Hirler, and Patent Owner is urging a reinterpretation of
22 Hirler that is inconsistent with the disclosure that's there.

23 JUDGE OGDEN: Well, again, it seems like you're putting a
24 burden on Patent Owner here rather than pointing to something in the record
25 that we can go to, to make that leap from Hirler's disclosure to there being an

1 epitaxial layer. I haven't seen you point to evidence on the record for us to
2 make that leap, unless I'm missing something.

3 MR. MCMAHON: And I don't mean to shift the burden in any
4 way, Judge Ogden. What we're saying is that the evidence in the record is
5 drift layer 11 and Hirler's explanation that that layer, along with the other
6 layers, be successively provided. That is our evidence. We submit that that
7 meets our burden. Patent Owner is free to come back and challenge that,
8 criticize that, provide some explanation for why that doesn't make sense.

9 They have attempted to do that, but the examples they have given
10 don't make sense, so you know, if they had provided an example that
11 actually made sense, we could've responded to that. They didn't. We've met
12 our burden with our disclosure of what is in Hirler. Admittedly, it does not
13 say epitaxial, but there's nothing in the law that says it must use the same
14 language at the claim.

15 We submit that we've met our burden there and that the only thing
16 Patent Owner has done in response is to throw up two nonsensical counter
17 examples that just are inconsistent with the disclosure in Hirler. And I guess
18 I would -- I mentioned this earlier, but the other thing I would point to in
19 terms of evidence in the record is Dr. Neikirk's explanation that epitaxy
20 means an ordered deposition of materials and that's perfectly consistent with
21 Hirler's disclosure of successively providing these layers.

22 JUDGE OGDEN: Okay, thank you.

23 MR. MCMAHON: Any other questions? Okay. Thank you, Your
24 Honors.

25 JUDGE OBERMANN: Thank you, Mr. McMahon. And thank

1 you for the two minutes that you've devoted back to us. We have 15 minutes
2 for Patent Owner, if you would like to rebut, and I will start your time
3 running when you begin speaking.

4 MR. SAUNDERS: Yes. Thank you, Your Honor. So first, I'll
5 talk about claim construction for the '634 patent. Counsel criticized Dr.
6 Neikirk's -- criticized the relevance of Dr. Neikirk's testimony on this. And
7 what Dr. Neikirk did was he testified about the ordinary meaning or
8 particularly, the lack of ordinary meaning about these terms, and he also
9 looked at the individual words within the term lateral contact layer and the
10 various different things that they could potentially mean in the field.

11 That is exactly the normal and appropriate use of expert testimony
12 in connection with claim construction. It's how we -- what does this term
13 means outside of the patent, does it have a particular meaning that we would
14 already have in mind before we go look at the specification, or is this the
15 term that I have no sense of where to begin because there are so many
16 different meanings. And that's an example where we have un rebutted
17 testimony of.

18 Well, there's a lot of different ways that we could interpret this if
19 we didn't get the guidance from specification. There's a lot of different ways
20 lateral could be used in the context of this invention. There's a lot of
21 different ways that contact can be used in the context of this invention.
22 There's different ways that layer can be used. And that's why it is
23 exceptionally important to look at the specification here. And that's not the
24 only reason why you can look at the specification per definition.

25 As we said, the language, present invention, is a reason to look at

1 the specification; the fact that it's a coined term is an appropriate reason to
2 look at the specification, and the fact that Petitioner has provided no
3 alternative, rooted any evidence for any definition of the term, other than the
4 one provided by the specification is also an appropriate reason to look at the
5 specification. Dr. Neikirk's role in providing testimony as to claim
6 construction is fully consistent with the normal and appropriate role of claim
7 construction, as provided under *Phillips* and other Federal Circuit cases.

8 Next, I'll turn to the issue of the epitaxial layer and Hirler in this
9 successively provided argument. So Counsel said it was not an inherency
10 argument and it's an argument in the petition. And I submit if that's true,
11 then that language will be reflected in the section of the petition where it
12 compares Hirler to limitation 1A, and we would have some discussion about
13 successively provided and how that relates to the N minus drift zone 11 that
14 they are relying on for satisfying the epitaxial layer. It's simply not there.
15 It's also not in the declaration from Dr. Liu, as we put up on the slides.

16 Dr. Liu's testimony as to N minus drift zone 11 is entirely
17 conclusory. He just says that corresponds to the epitaxial layer. He doesn't
18 say why, and he certainly doesn't cite that successively provided language to
19 support that. So if Petitioner was appropriately relying on successively
20 provided, that would appear in the petition and Petitioner's expert
21 declarations in the sections comparing Hirler to limitation 1A. It's not there.
22 It's a new argument.

23 Secondly, as to the issues of Dr. Neikirk's alternative -- again, Dr.
24 Neikirk had no burden to affirmatively dispute an inherency argument that
25 was not made and was not preserved, but if the Board reaches that point in

1 the analysis, it's -- Dr. Neikirk is absolutely correct, and his opinions are
2 fully consistent with that successively provided language in Hirler.

3 And in fact, as I argued and Counsel did not respond to this point,
4 is that the appropriate reading of successively provided in Hirler is not
5 saying manufacturing steps. It's saying, here is how the order of the layers
6 look once you have a final device. What is the arrangement of that? And
7 what Dr. Neikirk explained is here are two ways, if I start with a substrate, a
8 heavily doped substrate, how do I end up with another layer above it,
9 consistent with the language in Hirler about N minus drift zone 11 without
10 depositing an epitaxial layer.

11 He gave detailed testimony supported by sources, explaining two
12 ways, the backside doping and the counter doping. He says affirmatively,
13 both of those ways are consistent with Hirler's disclosure and would get you
14 that N minus drift zone layer above the epitaxial layer. Now, he didn't
15 explain how you would go on and build the rest of the layers. That is not
16 required for this issue.

17 In fact, Hirler tells you how we're going to build the rest of the
18 layers. That's already in Hirler. That's not part of the dispute at all. Hirler
19 says we're going to have ion implantation to create the rest of these layers on
20 top of the N minus drift zone. The whole reason why you have this dispute
21 is because Hirler just starts with the starting point of I'm walking in with an
22 N+ layer and an N minus layer on top of it, which raised the question, is this
23 N minus drift zone 11 layer an epitaxial layer, which is one created by
24 epitaxy or not.

25 The other point about this is Counsel keeps re-emphasizing only

1 part of the definition of epitaxy that Dr. Neikirk pointed out. Counsel
2 pointed out the part of that definition that talks about ordered deposition, but
3 it's not just an order. Yes, successive is an order in the word order as an
4 order, but he's missing the rest of what it means to be an epitaxial layer. It's
5 an order of deposition. That means putting on molecules on top of an
6 existing surface and it's an order process where we're growing crystal, a
7 layer of crystals on top of an existing layer of semiconductor material.

8 There's absolutely nothing in the language successively provided
9 that's telling us that crystal growing process is happening, as opposed to
10 some other way of creating layers in order. And all Petitioner has on this is
11 attorney argument and it is attorney argument that doesn't even explain why
12 we would have crystal growth because we have a language successively
13 provided. It's just a non-sequitur.

14 As to the issue of Shiraishi in that layer 13 and 14 and whether it's
15 part of the base layer, again, all Counsel did was point back to the same
16 disclosure we noted before. They say Shiraishi says that layer 14 is part of
17 layer 13. Well, that's not exactly what Shiraishi says. We showed you what
18 Shiraishi says. We said it's formed in layer 13, but regardless of that exact
19 wording, that's not the ultimate legal question. The legal question is what is
20 the base layer in Shiraishi because that's the claim language.

21 The claim language says we have to have a source layer disposed
22 on top of the base layer. There's no dispute what the source layer is. It's that
23 red layer 15 we saw in Shiraishi, so the question is, applying the appropriate
24 understanding of a term base layer, as one of skill in the art would have, in
25 the claim of the '634 patent, what would one of skill in the art understand as

1 being a base layer in Shiraishi. This is an example where there is nothing in
2 the petition other than conclusory testimony from the Petitioner.

3 That's all the evidence they've identified as to why they believe
4 that layer 13 and 14 together must be a base layer, and that language about
5 being inside is a non-sequitur. That's telling us, well, there's a relationship
6 between those two, but that doesn't mean what maps up to the claim. On
7 that point, we have unrebutted testimony from Dr. Neikirk that says layer 14
8 is not part of the base layer. Because of that, Shiraishi cannot satisfy
9 limitation 1A because layer 14 interposes layer 13 and layer 15.

10 Lastly, it's the issue of motivation in combining the Kobayashi and
11 Shiraishi and other grounds. Counsel made a point about, well, Kobayashi
12 doesn't have to say that it has a punch through problem and that's true, but
13 that's not what Patent Owner's argument is. Patent Owner's argument is not
14 that the particular reference has to somehow call out for the combination.
15 The issue is, is the Petitioner's burden on motivation to combine.

16 The Petitioner has a burden to articulate the reasons for the
17 motivation to combine. It has to have a reason for all of the picking and
18 choosing it's doing, and in particular, when we get to the Kobayashi and
19 Shiraishi combination where it's sticking in layer 14 of Shiraishi into
20 Kobayashi, there's a threshold burden there that says, you have to articulate
21 some reason why there's a motivation, why there's a benefit, right?

22 And they've stopped at that first step and said, well in Shiraishi,
23 Shiraishi says layer 14 helps Shiraishi's design, but Kobayashi is a different
24 MOSFET. It has a different decision. Are there similarities? Yes. Are
25 those similarities analyzed by their expert? No. There's no analysis by their

1 expert that says, oh, because of the similarities and design between
2 Kobayashi and Shiraishi, one of skill in the art would naturally understand
3 that Kobayashi would have the same punch through stopper layer problem
4 that, you know, punch through problem that Shiraishi has and therefore,
5 would want the same thing. There's none in that analysis.

6 In fact, as we've explained in the briefing, there's a very specific
7 reason Shiraishi is using its punch through layer. Shiraishi's focus is let's
8 shorten the gates in Shiraishi so that we have less capacitance, right? That's
9 the articulated reason in Shiraishi. We're going to shorten the gates and
10 well, if we shorten the gates, that's going to create a bigger problem with
11 punch through because the channel is going to be shorter.

12 And what do we have in Kobayashi? Kobayashi is telling us we
13 want to have less threshold voltage, we want to shrink the design. It's not
14 saying anything about shrinking the gate depth. It's not saying anything
15 about that. So you can't just map to the reasons that exist in Shiraishi for
16 having a punch through stopper layer to Kobayashi without some articulated
17 reasoning, preferably in the form of expert testimony, that would explain
18 why taking something from Shiraishi and putting into Kobayashi is going to
19 have a benefit in the combination, in the device of Kobayashi.

20 There just is not that articulation in expert testimony, or in any
21 argument, in fact, that that is actually going to result in a benefit to the
22 device that's combined, to the device that is basically Kobayashi plus the
23 punch through stopper layer. Without that very basic threshold explanation
24 of this actually going to solve a problem that exists in the device of
25 Kobayashi, the whole combination lacks motivation. And unless the Board

1 has any further questions, I have nothing else in surrebuttal.

2 JUDGE OBERMANN: Okay. I see no questions from Counsel. I
3 think it makes sense to take a short break before we address the next case.
4 It's now 2:41. Let's convene at 2:55 and we'll start from there. See you then,
5 Counsel.

6 MR. MCMAHON: Thank you, Your Honors.

7 MR. SAUNDERS: Thank you, Your Honor.

8 JUDGE OBERMANN: Hello. I think we're back. Thank you so
9 much, Counsel, for your presentations. We are going to turn now to
10 argument in the second case, IPR2024-094. Petitioner has 45 remaining for
11 this and Patent Owner has 35 minutes. I'll ask Mr. McMahon, would you
12 like to reserve any time for rebuttal?

13 MR. TIPESCU: Actually, Your Honor, it's Mr. Tipescu who will
14 be arguing --

15 JUDGE OBERMANN: Oh, thank you. Thank you for --

16 MR. TIPESCU: -- the '409.

17 JUDGE OBERMANN: -- for reminding me. Mr. Tipescu, I
18 apologize. You did mention that -- Mr. McMahon did mention that you
19 would be arguing for us. Thank you.

20 MR. TIPESCU: Of course.

21 JUDGE OBERMANN: Would you like to reserve any of your 45
22 minutes for rebuttal?

23 MR. TIPESCU: I'll reserve 15 minutes for rebuttal, please.

24 JUDGE OBERMANN: Fifteen. Okay. That will leave you 30
25 minutes right now. So when you begin speaking, I will start your clock

1 running.

2 MR. TIPESCU: All right. Thank you, Your Honors. May it
3 please the Board. I think we can just dive into the issues here. We are
4 looking today at the '409 patent. This is Mircea Tipescu on behalf of
5 Petitioner, Inergy. And if we can move to Slide 2, please. Petitioner has
6 challenged the claims of the '409 and that's Claims 1 through 6 on six
7 grounds, and we are doing this because there's really critical prior art that
8 Force MOS did not disclose during prosecution, and which renders these
9 claims invalid.

10 And as a sort of overarching statement here, I would say for its
11 part, Force MOS seems to try to avoid the ultimate conclusion of invalidity
12 by ignoring and by reading out the teachings of the prior art, and that's really
13 the theme here, I think. I'll go through these points, or I'll address these
14 points as I go through the grounds, although -- or I may skip around a little
15 bit to focus on the issues that we believe are most significant in the matter.

16 So with that said, if we can go on to the next slide, Slide 3.
17 Actually, let's go on to Slide 4. I want to begin with a few brief comments
18 regarding claim construction for this proceeding. And there are two terms
19 that the parties have raised for claim construction. I will suffice it -- one of
20 then, I should say, is substantially square shaped cells with rounded corners.
21 That phrase is -- or that term is part of the limitation of Claim 1, said trench
22 gates surrounding such transistor cells as closed cells, constituting
23 substantially square shaped cells with round corners.

24 With regard to this term -- if we can go on to the next slide, please,
25 Slide 5. While the Petitioner and the Patent Owner have proposed different

1 constructions for this term, the Board in its institution decision declined to
2 adopt either party's proposed construction and determined instead that
3 they're -- the term doesn't deviate from its ordinary and customary meaning,
4 and that's where we are today.

5 I will, during the argument, time permitting, address both the
6 invalidity of Claim 1 under the Board's construction of ordinary and
7 customary meaning, as well as I will speak to the rejected constructions, but
8 basically, at the end of the day, under any of these constructions we believe
9 that Claim 1 is invalid. And likewise, the second term, if we go on to the
10 next slide -- let's go on to the next slide, Slide 7, please.

11 On Slide 7, the next term that the parties had briefed on claim
12 construction is substantially square shaped cells with truncated corners. This
13 is out of Claim 6. The limitation is similar to the limitation of Claim 1, the
14 trench gates surrounding the transistor cells as closed cells, constituting in
15 this case, substantially square shaped cells with truncated corners.

16 Here, also the Board found that the parties had made similar
17 arguments as for Claim 1 and once again determined that the plain and
18 ordinary meaning applies in this case, as well. We are willing to -- or
19 concede that that ordinary -- the plain and ordinary meaning applies, and
20 which they also, regardless of ultimately which construction is adopted,
21 Claim 6 also would be invalid at the end of the day.

22 So if we could then, just let's go on to Slide -- we can skip to Slide
23 10, please, if you can turn to Slide 10. Looking at the first ground here,
24 which is Kobayashi anticipating Claims 1 and 3 to 5. So with respect to
25 Ground 1 -- moving on to the next slide, Slide 11 -- there are three issues

1 that I'd like to address. First being the limitation we just looked at in the
2 context of the claim construction, that being the substantially square shaped
3 cells with rounded corners. Then there is the additional limitation of Claim
4 5, which I will address. And then lastly, we will look at Claims 3 to 4, but
5 only briefly because I don't believe there's any arguments apart from what
6 has already been presented for Claim 1 with respect to those Claims 3 and 4.

7 So let's start with this first limitation of Claim 1. I believe that
8 Patent Owner does not dispute that Kobayashi teaches all the limitations of
9 Claim 1, except for this limitation, the trench gates being surrounded by the
10 transistor -- surrounding the transistor cells as closed cells, constituting
11 substantially square shaped cells with rounded corners.

12 If we go on to the next slide, please, Slide 12, I did want to just
13 point out that in its institution decision, with regards to this limitation of
14 rounded corners -- the rounded corners limitation -- the Board disagreed
15 with, as I said, both parties constructions because it found that they both had
16 improperly imported limitations from the specifications, so the Board found
17 that the construction does not require -- the plain and ordinary meaning does
18 not require that -- does not require that the quarters be rounded via any
19 particular process, nor did it find that all corners of the cell have to be
20 rounded from a top view perspective.

21 So if we move on to the next slide, please, Slide 13, under the
22 Board's construction of the term substantially square shaped cells with
23 rounded corners as having a plain and ordinary meaning, with respect to
24 Kobayashi, there are two examples in Kobayashi that the Petitioner believes
25 anticipate Claim 1. The first is a square unit cell layout of Figure 3A and the

1 second is the hexagonal unit cell layout of Figure 4A. Both of those have
2 trenched gates that surround the cells as closed cells that constitute
3 substantially square shaped cells with rounded corners, and I'll address each
4 one now in turn.

5 I will say, though -- if we can go on to the next slide, please, Slide
6 14. I'll start with the square cell embodiment of Kobayashi. I don't believe
7 that there is any dispute that Kobayashi in this embodiment with cells 101,
8 which are square cells -- discloses a substantially square shaped cell. I will
9 add, though, here that whereas the Figure 3A that we have here on Slide 14
10 depicts the square cells with square contact holes, the Board recognized that
11 Kobayashi disclosed that the contact holes, which are labeled here 112, and
12 again, they're shown as square in Figure 3A, the Board recognized that the
13 contact holes may have a circular shape according to Kobayashi. And that's
14 in the institution decision at page 13.

15 So any argument by Patent Owner that the square cell embodiment
16 of Kobayashi does not meet other -- the other claim limitations that require
17 circular, a circular contact hole, is contradictory to the explicit teachings of
18 Kobayashi that the Board referred to in its decision. So really then, the
19 dispute I think boils down to whether or not the square cell example of
20 Kobayashi teaches that the square cells have rounded corners, and we firmly
21 believe that it does and I'll address those reasons at this point.

22 So if we go on to the next slide, which is Slide 15. So at the outset,
23 I think what is important to note is that the cells of Kobayashi are defined by
24 the surrounding trench gates. This is the same relationship that was
25 disclosed in the '409 patent. You can see here, this is from our reply, but

1 we're quoting from Kobayashi that the cells, including the cell in the figure
2 we just looked at, cell -- let me make sure I get that right, cell -- yes, cell
3 101 -- that cell 101, as well as 201 and 301 in the figures of Kobayashi can
4 be defined as structural units separated by trenches, 106, 206, and 306, and
5 we saw those -- the trenches, 106, in Figure 3 that we just looked at.

6 And again, we pointed out that this relationship between the
7 trenches and the cells is the same as in the '409 patent and we have, in fact,
8 Patent Owner's expert admitting that the trenches in these MOSFETs
9 surrounding the unit cell define the shape of the cell. Again, this is
10 consistent with the '409 patent, which I will point out. It describes the
11 purpose of the invention in the specification. Always in the context of the
12 spacing between the trenched gate and the metal contact, so that is in the
13 metal. And so we, again, in the '409, we see the distance that is at issue
14 being between the trench gates and the metal contact.

15 We also saw in the Patent Owner's response, the Patent Owner
16 itself characterized the primary purpose of the '409 patent as improved
17 uniformity of this spacing between the trenched source contact and the
18 trench gates, and that's at Patent Owner's response, page 17. And so
19 throughout the '409 patent, it is the trenched gates that are described as
20 being -- having rounded corners, and that lend themselves to the purpose of
21 the patent, which is this uniformity of spacing between the trench source
22 contacts and the gate trenches.

23 So if we -- actually, let's stay on this slide. We can see that
24 relationship between the trench gates 106 and the cell 101 of Kobayashi in
25 this Figure 3A. We have highlighted in red the corners of the openings of

1 Kobayashi's trenches or trench gates 106, in red here in Figure 3A, and you
2 can see, again, that those openings of the trenches define the shape of the
3 cells.

4 So turning now then -- if we go on to the next, Slide 17. Turning
5 now to the question of whether Kobayashi discloses rounded corners. As we
6 can see from the slide here and as we pointed out in both Dr. Liu -- that's
7 Petitioner's expert -- Dr. Liu pointed out in his declaration and as we pointed
8 out in the petition, Kobayashi has a figure, Figure 6C, showing corners of
9 the trench -- the trenches that we have been talking about, and it discloses --
10 Kobayashi does -- that the corners of the trenches at the bottom are rounded,
11 and also the corners of the trenches at an opening portion may be rounded.
12 And that is really the key here, that the opening -- the corners at the opening
13 of the trenches are taught as being rounded, because by rounding those
14 corners of the trenches, which correspond at their opening -- which
15 correspond to the corners of the cell that is defined by the trenches,
16 Kobayashi is teaching substantially square shaped cells with rounded
17 corners.

18 Now, granted as -- and we point this out in this slide here -- the
19 figures of Kobayashi -- and I know Patent Owner has made this argument --
20 the figures of Kobayashi do not illustrate this optional rounding at the
21 opening of the corners, at the opening of the trenches. But what the figures
22 do show us is where the corners are located at the opening, and again, that's
23 what defines the shape of the cell. And not only that, but if we can go on to
24 the next --

25 JUDGE HOFFMAN: Mr. Tipesu, this is Judge Hoffman. I just

1 wanted to clarify your --

2 MR. TIPESCU: Yes.

3 JUDGE HOFFMAN: -- comments. So is it your position that the
4 side view rounding of the openings in Kobayashi that we see in Figure 6C,
5 which correspond to the edges of the square cell, that that rounding would
6 also be visible as rounded corners of the square shaped cell from the top
7 view or top view perspective or cross section?

8 MR. TIPESCU: Absolutely. That is -- I don't think there's any
9 dispute that the corners that we are -- that we see circled here on Figure 6C
10 at the opening of the trenches would be corners that are visible in the top
11 plan view.

12 JUDGE HOFFMAN: Okay, thank you.

13 MR. TIPESCU: So if we can go on to the next slide. Actually, I'm
14 sorry. Let's stay on Slide 18 for a minute. The other thing that I will point
15 out is, again, even though the figures don't show the rounded corners, the
16 specification -- the disclosure in Kobayashi is clear and explicit. It may be
17 optional, but the corners at the opening of the trench gates are taught to be
18 rounded in Kobayashi, so I just -- I wanted to make that point because I
19 know Patent Owner has made an argument that the figures don't show the
20 rounding, and the figures don't have to show the rounding. And the
21 specification of -- in disclosure of Kobayashi explicitly provides for that.

22 So let's go on to the next slide. So I wanted to briefly touch on the
23 other example of Kobayashi, which is hexagonal unit cells. Again, in our
24 opinion, this embodiment also, and separately from the square unit cell
25 embodiments, anticipates Claim 1 and 3 to 5 of the '409 patent. Here we see

1 on Slide 19 the hexagonal cell layout of Kobayashi. These are substantially
2 square cells with truncated corners. And so unlike the other embodiment of
3 Figure 3A, it would show the cells being perfectly square, these cells here
4 are substantially square, again, by virtue having been truncated and are
5 shown in this hexagonal shape in Figure 4A. So if we go on to the next
6 slide, which is Slide --

7 JUDGE HOFFMAN: Actually, Mr. Tipescu --

8 MR. TIPESCU: Yes.

9 JUDGE HOFFMAN: -- if you could go back to that previous
10 slide, I did have a question.

11 MR. TIPESCU: Sure.

12 JUDGE HOFFMAN: So you have here the truncated corners,
13 which truncated is in Claim 6, not in Claim 1. So I wanted to confirm. Are
14 you saying that the hexagons that we're seeing here show rounded corners,
15 truncated corners, or both?

16 MR. TIPESCU: We're saying that these show truncated corners,
17 Your Honor. These are square cells that have been truncated at the corners.
18 They become hexagons and -- at that point. And then on top of this
19 teaching, and I have further slides that we would -- we don't have to repeat
20 entirely because it's the same argument I just made, but all the teachings of
21 Kobayashi regarding rounding the corners apply equally to Figure 3 and 4A,
22 so if you start with this example in Kobashi and the truncated corners, these
23 corners also will be rounded for the teachings of Kobayashi that we saw with
24 respect to the other example, the square unit cell example.

25 JUDGE HOFFMAN: Okay. Understood, thank you.

1 MR. TIPESCU: Sure.

2 JUDGE HOFFMAN: Another question for the truncating, is what
3 we see here with the hexagon -- that is what you're using for truncated and
4 there's no teaching other than under this theory of the hexagons?

5 MR. TIPESCU: That is correct. That is correct. Yes, Your
6 Honor.

7 JUDGE HOFFMAN: Okay.

8 MR. TIPESCU: So if we could just move -- does that answer your
9 question? I don't want to move on unless I --

10 JUDGE HOFFMAN: It does.

11 MR. TIPESCU: -- answered it.

12 JUDGE HOFFMAN: Thank you.

13 MR. TIPESCU: Okay, sure. So if we move on to Slide 20, I think
14 it's worth noting here that the shape that is obtained in Figure 4A by
15 truncating the corners, I know Patent Owner says that is not substantially
16 square because it's a hexagon, but if we look at the shape that you achieve in
17 the '409 patent by truncating the corners, well that is an octagon, and just
18 simply because the perfectly square cell changes its shape after truncating
19 the corners doesn't mean that you don't have a substantially square shaped
20 cell, which ultimately then will have a rounded corner.

21 So with that said, I know I'm running a little bit short on time, so
22 perhaps we can move on -- and again, the arguments about rounding the
23 corners in Kobayashi apply equally to the hexagon cells and the square cells,
24 so --

25 JUDGE HOFFMAN: Mr. Tipescu, let me ask you very quickly,

1 just about -- I'm wondering about the reasonableness of this interpretation.
2 So for example, what would prevent me from calling a circle a substantially
3 square shaped with rounded corners?

4 MR. TIPESCU: I don't think -- no, good question, Your Honor.
5 But I don't think a circle -- you can get a circle by truncating the corners.

6 JUDGE HOFFMAN: Or rounding the corners?

7 MR. TIPESCU: Well, I think the question of whether or not you
8 round sufficiently to achieve a different shape is not what the claim requires,
9 but I think the question -- the proper question to ask is do I have a square
10 shaped cell, and then do I round its corners. And if the answer is yes, then I
11 meet the claim limitation. What I achieve at the end of the day may be
12 round, may be a hexagon, may be an octagon, but I don't know that it
13 matters because I have a square shaped cell which now has rounded corners.
14 I hope that answers the question.

15 JUDGE HOFFMAN: Yes, thank you.

16 MR. TIPESCU: Okay. So --

17 JUDGE OGDEN: I've got a follow-up question.

18 MR. TIPESCU: Sure.

19 JUDGE OGDEN: It seems like having a square shaped cell, the
20 more that you truncate it, it seems like the less substantially square shaped it
21 becomes. So that if you do a bunch of truncating, you know, making it a
22 hexagon or an octagon or decagon or however number of corners you want
23 to cut off, what's the point where it stops being substantially square shaped
24 and becomes more like a circle than a square?

25 MR. TIPESCU: Well, I -- if we can't answer that question, I guess

1 this -- these claims have a problem in that there may be an indefinite issue,
2 right? Because certainly we see the patent itself, an example of a shape
3 that's been truncated and is nonetheless presumably substantially square
4 shaped. And so I don't know that -- again, that is the question -- the -- I don't
5 know that the question to ask is at what point does it stop being substantially
6 square shaped. Perhaps the better question to ask is do I have a square
7 shaped cell, and have I rounded or truncated its corners, regardless of what I
8 come up with.

9 Because if we look at it the other way, I do think you would
10 eventually run into a 112 issue because you don't know where to draw the
11 line. And so that's how I would address that question, but I would also say
12 there's no dispute that the square unit cell example of Kobayashi with its
13 rounded corners is a substantially square shaped cell. I don't believe Patent
14 Owner has disputed that, and I don't know that we have any evidence to
15 suggest that it wouldn't be. It's --

16 JUDGE OGDEN: My question --

17 MR. TIPESCU: I think your question goes to this -- to the
18 hexagon, so --

19 JUDGE OGDEN: That's assuming, you know, if we're looking at
20 the square -- at least the square top view embodiment of Kobayashi, and
21 that's assuming that we agree with you that flipping the view and looking at
22 the cross section and calling those corners, those -- the corners of relevance
23 for these claims counts, right?

24 MR. TIPESCU: And I --

25 JUDGE OGDEN: And as you said, you can combine that

1 rounding that you're -- that rounding or truncating that you're talking about
2 with the square top view version in Kobayashi, right?

3 MR. TIPESCU: You're correct, and I -- what I should be perhaps
4 more clear on is I don't think there's any dispute that Kobayashi's square cell
5 layout shows a square cell in top view. And then the only question really
6 there becomes, can you round those corners of the cell, and I think the
7 answer is absolutely yes because Kobayashi explicitly tells you to do that.
8 And it says round -- you are rounding the corners at the opening of the
9 trenches, of the gate trenches, and when you're doing that, you're rounding
10 the corners of the cell across the entire cell.

11 I don't think there is any evidence to dispute that you would not be
12 rounding the corners of the cell in the top view, square or hexagon, in
13 Kobayashi based on that teaching, because it says rounding the corners at the
14 opening of the trenches. And the opening of the trenches go all the way
15 around the cell. It doesn't say only round the corners in one spot or, you
16 know, this edge and not that edge, no. It's rounding the corners of the
17 openings.

18 JUDGE OGDEN: I guess what I'm saying is your argument -- it
19 depends on our construing the term corner to include a corner as viewed
20 from a side view perspective?

21 MR. TIPESCU: I don't think so. No, I don't think it does.
22 Kobayashi says construe the corners -- you round the corners at the
23 openings. It shows them in side view, but the figure is not -- it doesn't -- it
24 never says you round the corners in side view and only in side view. It says
25 you round the corners at the opening. Well, that's the critical part of

1 Kobayashi. Yes, it shows a cross-section, but that device doesn't live in a --
2 or exist in a two-dimensional world.

3 It's a cross-section of a three-dimensional device, and so when you
4 ask yourself, what is the trench, the gate trench, that is referred to in that
5 disclosure of Kobayashi, that trench surrounds, as Kobayashi tells us, the
6 cell. It goes all the way around the cell, and so you're not just rounding the
7 corner in that one slice that you're seeing in Figure 6 in that side view.
8 Kobayashi says you round the corners at the opening of the gate trenches.
9 So yes, it goes -- you're rounding all the way around the gate trench.

10 JUDGE OGDEN: So I guess we're going back to the claim
11 construction issue. It seems a little bit of a departure from the disclosure of
12 the challenged patent, which when it talks about the rounding or truncating
13 of corners, you're looking at that from the top view and you're saying that a
14 person of ordinary skill in the art would also consider rounding from the side
15 view, as well. Is there anything in the intrinsic evidence to support that
16 that's -- that a person of ordinary skill in the art would go there, rather than
17 just looking -- rather than just judging rounding or truncating from the top
18 view?

19 MR. TIPESCU: Oh, absolutely. I mean, I -- again, I think the
20 plain disclosure of Kobayashi tells us that the corners that each trench sits --
21 I'm sorry -- the corners that each trench sits at an opening portion may also
22 be rounded. So it's not just the bottom corners, but the opening portion that
23 is rounded. That is simply -- just because Kobayashi shows us a side view,
24 doesn't show us a top view, right? I think that's what this comes down to is,
25 is the lack of a top view figure in Kobayashi fatal to argument, and

1 absolutely it is not because Kobayashi never says that that rounding that it
2 describes in the specification is only, again, to be in the side view or to be in
3 that slice that we see in Figure 16. It is rounding of the corners at the
4 opening of the gate trenches. And so that is, I think, the intrinsic evidence.

5 And then we also have, of course, Dr. Neikirk, the Patent Owner's
6 own expert, admitting that the gates trenches are -- I want to make sure I get
7 this right -- that the gate trenches surrounding the cell define the shape of the
8 cell. So I don't think we need a figure in Kobayashi showing the
9 anticipatory disclosure, as long as the specification tells us that -- or gives us
10 that information, or gives us that disclosure. There's no requirement, I don't
11 think, for a figure showing it, which it's clear from the text of Kobayashi that
12 it's disclosing rounding of the corners all in the gate trenches, not just in one
13 slice, but in the opening of the trenches all the way around.

14 So I don't think it's a claim construction issue where you have to
15 interpret the claims to say, oh, it -- claims mean that there's rounding in the
16 sideview. Absolutely not. It's -- rounding of the corners is rounding of the
17 corners and Kobayashi teaches it.

18 JUDGE OGDEN: The -- I believe Claim 1 says that it's the cell --
19 it's the cells that are substantially square shaped with rounded corners. Can
20 you just look at -- don't you need to look at the cell as a whole in order to
21 determine whether there's rounding? And it seems like if you're looking at
22 the cell as a whole and you're looking down from the top view, even if
23 there's some rounding on the very rim of the cells, it seems like the cell as a
24 whole is going to be just square without any truncation or rounding, right?

25 MR. TIPESCU: I don't think so, Your Honor, because the claim

1 says the -- as you pointed out, that the cells have rounded corners. Well,
2 first of all, it doesn't say which corners. And as the Board preliminary -- in
3 its preliminary institution decision found that it doesn't require -- it doesn't
4 require all corners be rounded.

5 It just says with rounded corners, so we don't even -- first of all, on
6 its face, you're right, if you look at the claim on its face, I'm not even sure it
7 requires a specific corner to be rounded. But if you look at the specification,
8 as you said in light of the -- I'm sorry -- if you look at the claim in light of
9 the specification and you say, all right, it's got to be the corners that I can see
10 from top view, the other corners of the square shaped cell from the top view,
11 then I would say, absolutely, Kobayashi has it because you are -- we are --
12 because we are learning or just Kobayashi teaches us, that the corners of the
13 trench gate openings are being rounded. Those openings define the corners
14 that you're asking about.

15 Those openings -- the trench gate openings define -- and Dr.
16 Neikirk has admitted this, and we see that in the '409 patent, those openings
17 define the shape of the cell, the entire shape of the cell. So if I'm rounding
18 the corners of the trench gate openings, I am rounding the corners of the cell
19 as I see it in top view.

20 JUDGE OGDEN: Aren't you getting the substantially square
21 shaped part of that limitation from looking down on the top view, and then
22 you're getting the rounding corners aspect of that from a different
23 perspective?

24 MR. TIPESCU: Only if you limit yourself to the figure -- what's
25 shown in the figure, which is a side view. But again, that -- Kobayashi

1 doesn't limit itself to that figure and the slides shown in that figure. That
2 figure is showing one aspect of what Kobayashi discloses. Yes, it's a side
3 view, but Kobayashi clearly says the corners at the opening of the trenches
4 can be rounded. It doesn't say --

5 JUDGE OBERMANN: I'm sorry. You are --

6 MR. TIPESCU: -- only the side view.

7 JUDGE OBERMANN: -- now four minutes into your rebuttal
8 argument. Do you want to continue or would you like to continue going into
9 your rebuttal?

10 MR. TIPESCU: You know, I will -- thank you for letting me
11 know. I will --

12 JUDGE OBERMANN: (CROSSTALK).

13 MR. TIPESCU: If I may, I just want to spend five minutes on the
14 obviousness combination for Claim 1 and --

15 JUDGE OBERMANN: Okay.

16 MR. TIPESCU: -- and save the rest of the rebuttal -- save it -- the
17 rest of the time for rebuttal.

18 JUDGE OBERMANN: Okay. You're only going to have about
19 four minutes on rebuttal then if you do that.

20 MR. TIPESCU: That's --

21 JUDGE OBERMANN: Okay, go ahead.

22 MR. TIPESCU: That's fine.

23 JUDGE OBERMANN: Thank you.

24 MR. TIPESCU: Sure. And thank you for the reminder. So if we
25 could just -- let's skip ahead to Ground 4 and that -- and with respect to

1 Ground 4 -- perfect. We are Slide 43 and Ground 4 is an obviousness
2 ground for combining Kobayashi with the Hshieh reference, so as to
3 anticipate this limitation, disclose this limitation, a substantially square
4 shaped cell with rounded corners.

5 So if we assume then, for purposes of the argument here that
6 Kobayashi does not disclose rounded corners, but only discloses the
7 substantially square shaped cells -- for example, the embodiment we just
8 talked about with the square cells -- then this argument provides that Hshieh
9 does in fact disclose the rounding of the corners and it would be obvious to
10 combine Kobayashi and Hshieh to achieve the square shaped cells with
11 rounded corners in Kobayashi.

12 So if we could go on to the next slide, which is Slide 44. In fact,
13 let's go on to the next slide, which is Slide 45, because I want to get to the
14 teaching of Hshieh. We know the teachings of Kobayashi, I think, at this
15 point. It's more important to look at the teachings of Hshieh. On Slide 45
16 here, we see the teachings of Hshieh that are relevant in the combination, as
17 well as the recognition by the Board that Hshieh teaches cells with rounded
18 corners. And I don't think that there's any dispute that those corners in
19 Hshieh are rounded, whether it's two of the corners being rounded in Figure
20 7A -- I'm sorry, in Figure 6B -- or all of the corners being rounded in Figure
21 8A.

22 And what I wanted to really then focus on is the motivation to
23 combine Hshieh and Kobayashi, and really, I -- this -- the record is replete
24 with argument from Petitioner -- from Patent Owner -- about the 3D
25 diffusion effect of Hshieh not being applicable to Kobayashi. Patent Owner

1 says it's nice and good that Hshieh has rounded corners, but its rounded
2 corners deal with this effect called a 3D diffusion phenomenon effect, and
3 that effect does not apply to Kobayashi because the structures are different.

4 Well, I think first of all -- its argument relies heavily on the Yilmaz
5 reference that is being discussed in Hshieh, and that's really barking up the
6 wrong tree because that reference is not the one we're relying on for
7 purposes of the combination. What Petitioner -- I'm sorry -- what Patent
8 Owner ignores is that there's explicit disclosure in Hshieh of rounding the
9 corners of a trenched MOSFET. That is the Claim 3. The Board recognized
10 this, I believe. This is the last claim of Kobayashi -- sorry, of Hshieh -- that
11 discloses the trenched MOSFETS with rounded corners.

12 And in doing so, Hshieh is applicable entirely to Kobayashi. And
13 whether Dr. Neikirk believes that the 3D diffusion effect applies or doesn't
14 apply is entirely undermined by the fact that Hshieh tells us that its rounding
15 of the corners applies and should be carried out in trenched MOSFETS.
16 That's the only motivation we need to combine Hshieh with Kobayashi.
17 Hshieh implicitly recognizes and undermines Dr. Neikirk's argument that
18 this effect that it discusses doesn't apply to Kobayashi, because it tells us
19 round the corners of a trenched MOSFET.

20 And again, Patent Owner is entirely focused on differences
21 between the other structures disclosed in Hshieh and in Yilmaz, as well, vis
22 a vis the Kobayashi reference, but it doesn't ever really address head on the
23 disclosure of trenched MOSFETs with rounded corners in Hshieh.

24 JUDGE OBERMANN: You've now gone on for five minutes, and
25 if you would like to keep 10 minutes, I'll need to stop you now.

1 MR. TIPESCU: Perfect. I will do that. I will reserve 10 minutes
2 for rebuttal. Thank you.

3 JUDGE OBERMANN: Okay, thank you. And let's see. Patent
4 Owner reserved 35 minutes. Would you like to save any time for a
5 surrebuttal?

6 MR. SAUNDERS: Yes. Can I save five minutes for surrebuttal?

7 JUDGE OBERMANN: Sure. So you will have 30 minutes in
8 your presentation that I'll start timing when you begin to speak.

9 MR. SAUNDERS: All right. Thank you, Your Honor. I'm going
10 to start with claim construction. I'm on Slide 7 of Patent Owner's
11 demonstratives for the IPR on the '409 patent. And so again, the term is
12 substantially square shaped cells with rounded corners and there's one key
13 claim construction issue is what are the corners we're talking about here,
14 right? And are they the corners of that square shaped cell as Patent Owner
15 says, or are they any corners of the trench gates, which is what Petitioner's
16 position appears to be. And the correct answer is they are the corners of the
17 substantially square shaped cell, and we can see that from the structure of
18 the claim language itself.

19 Looking at the claim language with rounded corners follows
20 immediately after the phrase substantially square shaped cells. As we see
21 here, under the doctrine in the last antecedent, that tells us that the phrase
22 'with rounded corners' is modifying the immediately previous phrase
23 'substantially square shaped cells'. So that's telling us it's the cell's corners
24 that are being rounded.

25 The other key point in this claim language for resolving this

1 dispute is the word square. Square is a two-dimensional shape. It's not a 3D
2 shape, and as we see in the patents, that square is something that you see in
3 the top view. So what we're talking about, looking just at this claim
4 language, it immediately tells you that this claim language requires
5 something that looks essentially like what's depicted in Figure 3 of the '409
6 patent. Something that is generally a square shape, but we've taken those
7 four 90-degree corners and we've rounded them. That's what this claim
8 language immediately evokes from looking at the language square and the
9 location of with rounded corners after the phrase 'substantially square shaped
10 cells'.

11 Turning to Slide 8, though, we see that it's also supported by the
12 specification. What's the problem that the '409 patent is trying to solve?
13 Well, it points to this prior art. Here's the prior art that has these square
14 inside square structure. We have a square contact and square shaped cells.
15 And it notes this problem with these distances A and B, that these distances
16 A and B are different.

17 Those distances A and B are distances that are measured invisible
18 in the top view, and we see exactly what corner it's talking about. It's that
19 corner that B is pointed to right there in that picture. That is the corner that
20 we need to move on, and we see that explained further in -- when we get to
21 the embodiments of the invention Figure 2. This is one of the ways that the
22 truncated corner embodiment, and we see the text of the patent.

23 We're on Slide 9 here. It says specifically, top view of a closed
24 cell configuration. So the invention is something that is defined by -- we're
25 improving the prior art, based on changing the shape of that cell, and that

1 cell shape is defined in the top view. So in this embodiment, this is the
2 truncated corner embodiments. It says, we're making the A and B closer,
3 about equal, because we brought in that corner there.

4 Turning to Slide 10, there we see Figure 3 of the patent, which is
5 the rounded corners embodiment. And again, we see this moving in those
6 visible corners of those squares towards that contact in the center. And so in
7 this embodiment, we have both the circular contact and the circular -- the
8 rounded corners combined, and so the result is that we get -- what it says is
9 B and A are substantially the same. Those distances measured in the top
10 view are substantially the same. So we submit both --

11 JUDGE HOFFMAN: Mr. Saunders, this is Judge Hoffman. I just
12 want to confirm that on the previous slide in Figure 2, are we looking --
13 we're looking at the mask layout used to create the semiconductor; is that
14 correct? Not the actual semiconductor?

15 MR. SAUNDERS: So the specification does say mask layout at
16 some points, and then it has another portion in the specification that talks
17 about, well, how can that mask layout be changed into an actual
18 semiconductor device. And so this is an issue more heavily litigated when --
19 in the petition, they -- Petitioner had advocated a claim construction position
20 about mask layout, design layout, and require rounding corners afterwards,
21 so our position is that yes, this is an example of a design layout, but the
22 patent basically tells us, you can, optionally, in photolithography, round the
23 corners after, starting with a truncated design layout, but that's not
24 mandatory. That's not a requirement.

25 So if you, in process, don't use a process that's going to round the

1 corners during photolithography, then what you see in Figure 2 is both, the
2 design layout and the final cell shape. And we see that consistent with how
3 the patent repeatedly describes rounded corners. This is more briefed in the
4 preliminary response, but it repeatedly describes it as truncated and rounded
5 corners as two embodiments of the cell, and when we talk about cell, we're
6 no longer talking about layout. We're talking about the actual device.

7 So when we get to the claims, claims are talking about layout and
8 Petitioners have withdrawn that argument, so Claim 6 says truncated
9 corners. It means the actual corners as we see in the device. In Claim 1, it
10 says rounded corners. That means the actual corners as we see in the device.

11 JUDGE HOFFMAN: And just so I understand, you're saying that
12 those corners -- or photolithography doesn't necessarily result in rounded
13 corners in all instances?

14 MR. SAUNDERS: Yes. It's Patent Owner's position that
15 basically, there's a number of options that you're choosing in the process of
16 turning a mask layout into a final device, that's going to affect how closely
17 the device hews to the mask layout, right? And so with a photolithography
18 process, it's going to be a finer resolution in the parameters of, for example,
19 the trench etching and things like that. It's going to be very close to what
20 you see in Figure 2. If you change those parameters a little bit, it could be
21 like what you see in Figure 3.

22 JUDGE HOFFMAN: Okay, thank you.

23 MR. SAUNDERS: So we submit that the appropriate construction
24 of this term essentially requires something that looks like Figure 3 of the
25 '409 patent. We have a square shape in the top view and those corners of

1 that square have been rounded in the top view. That's both what the claim
2 and the specification tells us.

3 So turning now to Kobayashi and Petitioner's anticipation theories,
4 and their obvious theories where they're relying only on Kobayashi for
5 Claim 1. And I think this can be really summed up with this picture here.
6 On the left, we have Kobayashi in Figure 6C, which is what Petitioners rely
7 on, and that is side view rounding. That's what both the picture of 6C and
8 the description in the text is describing. We're rounding these shapes in the
9 side view, and what we see on the right is, as we've said, the appropriate
10 construction of the language in limitation 1A.

11 It requires something that essentially looks like Figure 3 of the '409
12 patent, a square shape or substantially square shape, and we've rounded
13 those four corners of that square. We're bringing in those corners from the
14 top view, such that B and A become closer to each other. That kind of
15 shape.

16 JUDGE HOFFMAN: Mr. Saunders, so on this point, this object
17 exists in three dimensions, and so we're seeing it in two dimensions from
18 different perspectives, but the rounding that we see in Figure 6 from the side
19 view, when applied to the openings, which are forming the edges and
20 corners of the cell, is it your position that that rounding would not create
21 those rounded corners that we can see from the top view perspective?

22 MR. SAUNDERS: Yeah. It would certainly not result in a figure
23 that satisfies the claim because it would not result in something that looks
24 like Figure 3, and I'm going to address exactly your point in a little more
25 detail when I get to the next slide here.

1 So going on to Slide 13, this is Dr. Neikirk's opinions on this exact
2 issue about what -- is this side view rounding matching with what the claim
3 requires, and he says, no, this is not the type of rounding that's going to
4 result in changing the cell shape, which is something defined in the top view.
5 I want to note also, it makes sense to understand this issue to understand
6 how the arguments developed. In the petition, it was very conclusory as to
7 this limitation 1A.

8 Basically, the petition -- the Petitioner's expert just threw three
9 disclosures together without explaining how they understood together a
10 conjunction to disclose the limitation. They said, let's look at the squares of
11 Figure 3 of Kobayashi, let's look at the hexagons of Figure 4 of Kobayashi,
12 let's look to this rounding of Figure 6C of Kobayashi, and then it says, well
13 it's going to satisfy this limitation, as they originally proposed to be
14 construed, which conflated truncated and rounded corners.

15 And you know, our best understanding of that is well, let's look at
16 the square corners and look at 16, and somehow they're saying that's
17 combined, and that's what Dr. Neikirk responded to. The testimony is
18 unrebutted. Again, there's no responsive expert declaration with Petitioner's
19 reply. The only thing the Petitioners did in their reply is they submitted
20 attorney argument, and their attorney argument was that somehow, the side
21 view rounding in Kobayashi would be visible in top view. Again, no expert
22 testimony on that, and they don't actually support any specific disclosure in
23 Kobayashi that says this kind of rounding is going to change the shape of the
24 cell. It's going to be the type of rounding that's going to be visible on the top
25 view.

1 We also note it's not an argument made in the petition, but more
2 importantly, as Dr. Neikirk has already explained, that theory is going to fail
3 because it doesn't result in changing the shape of the cell to something that
4 looks essentially like Figure 3 of the '409 patent. It's not rounding those
5 kind of four corners of the patent. It's not rounding even two corners of the
6 patent -- or sorry -- of the square as shown in the patent. It's just rounding
7 an edge. I also --

8 JUDGE HOFFMAN: Does it need to be the shape of what we see
9 in the '409 patent? So the claim just says it's a substantially square shaped
10 cell with rounded corners.

11 MR. SAUNDERS: It is Patent Owner's position that it does. That
12 was the original claim construction argument walkthrough was looking at
13 the structure of the claim text that we have that rounded corners is the last
14 antecedent there, modifying a term that uses the word square, which is a 2D
15 shape shown in the top view. That's telling us it's those square's corners that
16 are being rounded, not other corners.

17 And also, that's exactly what the specification tells us, too, of the
18 '409 patent. I do want to address a point about this that Counsel made an
19 argument that Dr. Neikirk made an admission that the cell shape is defined
20 by the gate trenches. And I think that argument is a bit misleading because
21 Dr. Neikirk's testimony wasn't that all parts of the gate trench define the
22 cell's shape. The truth is, the cell's shape is defined by some parts of the gate
23 trench, but not all of them. In particular, it's that inner side there.

24 Whereas that inner side of that gate sidewall and oxide -- that's
25 going to define where that cell ends and where the gate begins, right? And

1 that's what we see in the Claim 2 of the rest of the claim, the '409 patent,
2 where it talks about the circumferential shape. But the location of that edge
3 there is what defines it. Not rounding of the top and bottom.

4 And so similarly, there's no argument, for example, from Petitioner
5 that how deep the gate is defines the shape of the cell. But Dr. Neikirk did
6 address the two points, they said, that these roundings in the top and bottom
7 define the shape of the cell, and he just said, they do not, and then
8 Petitioners have no response other than attorney argument.

9 I think this can best be understood with a bit of an analogy here.
10 And so my analogy is you can have a woodworker with a table, right? You
11 can start with a table -- with a square shaped table -- with all of the edges
12 sharp and all of the corners sharp, right? And the woodworker can take a
13 router edge and run that router bit around the top edges of that square, and
14 they can run the router bit around the bottom edges of that square to make
15 the edges less sharp. And if you kneel down and put your eyes directly
16 looking at that side of that square tabletop, you'd see something that looks
17 like Kobayashi's Figure 6C. You'd see those top and bottom rounding.

18 But if you stood up and looked from above the table, you'd see
19 something that still looks like Figure 1A of the '409 patent. Those corners of
20 that square can still be sharp, even if you have rounded the top and bottom
21 edges. Those are just different corners and the corners of the claim requires
22 are the squares corners, not these openings and closings of the gate trenches.
23 And again, the argument that somehow that this is enough is based on
24 attorney argument and not expert testimony from Petitioner.

25 Dr. Neikirk also explained looking at the rest of the claim

1 limitation, it doesn't make sense to look at side view because the rest of the
2 claim limitation says trench gate surrounding said transistors is closed cells,
3 right? If we look at the side view, we're not only not seeing a square with
4 rounded corners, we're not seeing the gate surround the cells. The gates only
5 surround the cells in the context of that top view. So that's the part of the
6 relationship where the gates define the shape of the cell. It's in the top view
7 where they are surrounding it.

8 In the side view like Kobayashi has rounding here, the gates aren't
9 surrounding the cell. We just see these two gate trenches that are kind of
10 in -- the perspective of the rest of the gate is going in a Z direction in and out
11 of the diagram, but we don't see it surrounding the cells. But that's another
12 indication that the relevant rounding is the rounding in the top view because
13 that's the rounding that is occurring when -- based on the shape of the gates
14 surrounding the cells. They only surround the cells in a top view. Again,
15 this testimony is also unrebutted from Dr. Neikirk. This is Slide 14.

16 So next, I want to move on to the obviousness combination. I'll
17 start a little bit on Slide 17 about what their expert said. So they had two
18 main theories in the petition. One is essentially a theory of, well, '409,
19 Kobayashi and Hshieh, they're all about the same kind of thing. They're all
20 about corners and problems at corners, and they all have solutions to that
21 and therefore, it's obvious to combine Kobayashi and Hshieh. Their other
22 argument was more specific. It's kind of a specific disclosure that said,
23 specifically, Hshieh has an expressed motivation to combine.

24 Just briefly addressing the argument that they have, well, it's all the
25 same thing. Dr. Neikirk explained in detailed testimony, that's just not true.

1 So for example, their expert says, well, the problem with '409 is this
2 parasitic MPM lashing. Well, that's not really the whole story. The whole
3 story of the '409 is parasitic MPM lashing caused by non-uniformed gate to
4 contact spacing in the top view.

5 Similarly, he says that Kobayashi also discloses rounding corners
6 of the trench to the square cells, but as we saw, that's some very fine
7 wording there. It's not rounding the corners of a square like the '409 patent.
8 It's rounding the side view gate trenches of cells that can be square or
9 hexagon or other things.

10 And then lastly, he talks about Hshieh and he says, oh, it's the
11 same corner effect that's at issue in Kobayashi and the '409. That's simply
12 not true. As Counsel heard -- as Counsel said, it is the three-dimensional
13 diffusion problem that is the effect in Hshieh, and that is a different effect.
14 It's not mentioned in Kobayashi, it's not mentioned in the '409. It's an
15 entirely different issue. And so that turns us to the issue of what is the
16 motivation to combine with Hshieh because Hshieh and the 3D problem and
17 whether there is a motivation to combine is a key issue.

18 But just quickly, I'll got to Slide 19. We can see the explanation
19 from Dr. Neikirk why Kobayashi's rounding is just very different, and this is
20 un rebutted testimony. They don't even respond in the argument that the side
21 view rounding in Kobayashi is all about this issue of gate leakage and there's
22 a thinning of gate oxide, right? And so one thing to note, 6C is not showing
23 you the full device. The gate oxide hasn't been put in there yet. That's why
24 they're rounding. We're rounding so we don't end up with thin gate oxide
25 that's going to have leakage. Nothing to do with the '409 patent, nothing to

1 do with Hshieh. So the argument that somehow it's similar is unsupported
2 and there's no rebuttal on this.

3 So turning to Hshieh, to understand why Hshieh does rounding, it's
4 a little bit important to understand the overall purpose of Hshieh. In Slide 20
5 here, the basic objective of Hshieh is to use a layout involving non-
6 orthogonal parallelograms. That is not square, shapes that are four-sided,
7 and we're tilting them. And it says by tilting these into these non-orthogonal
8 parallelograms, we're going to get better packing density.

9 And it specifically says better than squares. And we submit this is
10 a teaching away, even if it's -- and teaching away is not a binary issue under
11 Federal Circuit case law. There can be degrees of teaching away, and this is
12 at least some teaching away, and it is the basic objective of Hshieh. We
13 submit that that's a reason not to combine Hshieh in a form -- in a shape that
14 results in a substantially square shaped cell with rounded corners.

15 But also, this parallelogram issue is telling us, well, why is Hshieh
16 talking about rounding and blunting corners? Well, we go on to Slide 21.
17 We see Dr. Neikirk, and we see Hshieh. And what Hshieh tells us is it's
18 preventing a corner vulnerability where punch through weak points may be
19 formed at sharp corners due to a three-dimensional diffusion effect, and it
20 cites Yilmaz. And that's the reason why we have parallelograms, we're
21 making those shapes sharper, and we really -- there's some really sharp
22 corners now. And so we know that there's this problem called a three-
23 dimensional diffusion effect, and let's go look at the other references.
24 They've already taught us how to address that.

25 Counsel criticized us going to Yilmaz on it. The reason why we're

1 going on to Yilmaz is because that's what Hshieh cites to. It cites to Yilmaz
2 repeatedly as saying, here's this description of what the three-dimensional
3 diffusion effect is, so we don't need to tell you in more detail about it. We
4 see on the right here, Dr. Neikirk has provided unrebutted testimony that
5 what the three-dimensional diffusion effect is, it's a phenomenon in a
6 particular type of MOSFET cells that can cause a short channel link. He
7 says that's completely unrelated to the problems in Kobayashi, but what
8 we're going to see is it's not only unrelated to the problems of Kobayashi. In
9 fact, it has absolutely nothing to do with Kobayashi structure. 3D diffusion
10 effect doesn't even affect Kobayashi structure at all.

11 And it's important to understand here how different the
12 embodiments of Hshieh that are described and depicted as using rounded
13 corners are from the structure of Kobayashi. And they're really different in
14 two important ways, Dr. Neikirk points out. One of which is you see in the
15 upper left here, Hshieh Figure 4B, those gates in green, they are sitting
16 above the surface of the semiconductor. Those are planer gates. They're not
17 trenched.

18 But there's another important difference there, and that's the source
19 contact. Counsel didn't mention that in their argument, but we see in
20 Kobayashi that center rectangular there, Figure 5A in the bottom left, that's
21 Kobayashi's trenched source contact. You don't see that in Figure 4B above
22 and that's because the source contact in Hshieh's rounded embodiments -- in
23 fact, in all of Hshieh's embodiments, even his trench gate embodiment, all of
24 its embodiments use non-trench source contacts. And instead of where the
25 source contact would appear, it would appear in that Figure 4B in the top

1 there between the green, so the metal from the source metal layer on top will
2 flow in between the oxides of the gates and flow in and touch the N and P on
3 the top there in Figure 4B.

4 And so we see on the right here what Dr. Neikirk is talking about.
5 This is a very different structure than what's in Kobayashi. Kobayashi has
6 that structure with both trench gates and trenched source contacts. Turning
7 now to Slide 23, it is important to note that Hshieh's embodiments that are
8 trench gates, in the description of the specification and all the figures, it
9 never says those embodiments have rounded or blunted corners. It just
10 doesn't say that. It never has any explanation of why it would be appropriate
11 to round or blunt the corners of trench gates. When it describes or depicts
12 trench gates in Hshieh 914, it depicts sharp corners. Not blunted or rounded
13 corners.

14 JUDGE HOFFMAN: Mr. Saunders, isn't that what Mr. Tipescu
15 brought up regarding Claim 37, that Claim 37 does teach having trench gates
16 and rounded sharp corner cells?

17 MR. SAUNDERS: Yes, that is true, and I have two responses to
18 that, Your Honor. So first of all, there is no -- again, it's Petitioner's burden
19 and motivation to combine, right? They have not provided any explanation
20 why it would be beneficial to use blunting or rounding of a trench gate.
21 That's point number one. It is not sufficient in their reply brief to then point
22 to a claim, or in argument today, point to a claim and say, there's a claim that
23 has both. There still has to be a motivation to combine.

24 The second thing is the very important point that, as I noted -- the
25 other difference -- that all of Hshieh's embodiments lack a trenched source

1 contact, and so we're going to talk a little bit about what the 3D diffusion
2 problem is, but as Dr. Neikirk explained, it is very significant that Hshieh's
3 embodiments all lack trench source contacts. I mean, because what we can
4 see here is even in Hshieh's embodiments that have trench gates, there's still
5 a horizontal boundary between dopant regions. In Figure 10B there, you see
6 those N⁺ regions. At the very top there of the semiconductor, they have a
7 horizontal boundary with the P body there in the middle there.

8 But what Dr. Neikirk explains is when you get to Kobayashi and
9 you're using both trench gates and trench source contacts, you've completely
10 taken away all of those horizontal boundaries between doping regions, right?
11 All of the doping regions in -- I'll turn back to Slide 22. We have Figure 5A
12 of Kobayashi here. You can see all of the doping regions where we have a
13 junction between P and N, which is what the 3D diffusion problem is about,
14 that the difference in horizontal diffusion between P and N.

15 We've eliminated that because we've eliminated those horizontal
16 boundaries between the N and P. There are not horizontal boundaries.
17 They're all vertical boundaries, and so that differential -- the difference
18 between horizontal diffusion of P and N, which is what the 3D diffusion
19 problem is, it has zero applicability when you get a structure like Kobayashi
20 that because of its use of both trench gates and trench source contacts, has
21 eliminated all horizontal boundaries between the P and N doped regions.

22 JUDGE OBERMANN: You have five minutes.

23 MR. SAUNDERS: So I'll get a little bit to explain a little bit about
24 what the 3D diffusion problem is visually. So in Slide 24, we're using
25 Yilmaz. Again, Yilmaz, we're not allowing on this --

1 JUDGE OBERMANN: Sorry. You actually have seven minutes.
2 Seven minutes.

3 MR. SAUNDERS: Okay. Thank you, Your Honor. Yilmaz is
4 illustrative. It -- Hshieh definitely tells you, hey, Yilmaz has the description
5 of this problem and Yilmaz has figures that are easy to illustrate this
6 problem, but the testimony from Dr. Neikirk, it's the same problem. He's
7 talking about the 3D diffusion problem as described in Hshieh, and
8 described in Yilmaz, it's the same problem.

9 And so on the left here, what we have is Figures 3 and 4 from
10 Yilmaz, and all we've done is just added colors and added P and N labels to
11 those, but that's how they appear in the figure. And what we can see is
12 Yilmaz's Figure 3. It's giving an example of this problem by -- we're going
13 to cut through the very center of the cell, right? The center of the cell is
14 going to give us the cross-section we see below, the lower left, Figure 4 of
15 Yilmaz, and what we've highlighted there is what Yilmaz's 44, the channel
16 region.

17 So Yilmaz, like Figure 4B of Hshieh, which is the side view used
18 for all of Shieh's embodiments disclosed in the specification, the written
19 description in the figures, as being rounded. They all have this planar
20 MOSFET. Particularly, it's a double diffused vertical draining MOSFET,
21 and what we see there is that channel 44 is horizontal and that length of that
22 channel is defined as the distance between that source red 52 and that pink
23 drain region 54. It's a part of the body, that little blue body between those
24 two.

25 And what we can see is the red and the pink, those are both N

1 doped. P is -- the body 50 is P doped in blue. So what we've done on the
2 right is given you an illustration of what it looks like at the corners, and so
3 Dr. Neikirk had an explanation of the same kind of figure on the bottom
4 right. We've also shown you the textual description in the upper right of
5 where we're cutting through those corners, and you can actually see, it's
6 already in Yilmaz there in that -- the region we have in the yellow in
7 Yilmaz. You can see that it's already narrower in the top view in that corner.

8 And so what we've done in the bottom right is we illustrated the
9 3D diffusion problem, but we've taken Yilmaz's Figure 4 and we've just
10 shrunken the blue down, because that's what Yilmaz describes and Hshieh is
11 not inconsistent. The 3D diffusion problem is the difference in horizontal
12 diffusion of P and in at corners. At corners, P diffuses less horizontally than
13 N. And so what we've shown you is that the channel there that's horizontally
14 defined is now much shorter when we've got to the corners. That is what the
15 3D diffusion problem is and that's the only expressed motivation in Hshieh
16 that Petitioner's point to as their theory.

17 What happens when we turn to Kobayashi? Dr. Neikirk's
18 unrebutted testimony is the 3D diffusion problem has no applicability of
19 Kobayashi. And in particular, it's two reasons. One is in the trench gate
20 embodiment of Kobayashi. That's the only embodiments it has. We have a
21 vertical channel, right? So that short channel problem is not effecting
22 Kobayashi because the depth of that channel is defined by the depth of
23 implantation of the body region and the source region. And that's the way
24 that we define the channel there, and so this difference of horizontal
25 diffusion is not affecting it.

1 But Dr. Neikirk did continue on in his declaration, which we cited,
2 and he explained, well, when we get -- the source contact is also very
3 important. The source contact shape is what causes us to lose those
4 horizontal defined boundaries between P and N. In particular, the trench is
5 going down through the source contact, as opposed to being layered above a
6 semiconductor, like we saw in Figure 10B of Hshieh or Figure 4B of Hshieh,
7 which would be both, Hshieh's gate, trench, and planar gate embodiments by
8 putting that source trench in there, the source contact is being made
9 vertically. It's going down through the source and into the body. And so
10 that relationship between N and P, which used to be horizontally defined,
11 even in Hshieh's trench gate embodiments, is now purely vertically defined.

12 So the issue of horizontal diffusion, of difference in that horizontal
13 diffusion of P and N types at the corners, the specific issue of the 3D
14 diffusion phenomenon has no applicability to Kobayashi. That is undisputed
15 testimony from Dr. Neikirk. They have no response. They have no
16 responsive argument disputing that, they have no responsive expert
17 declaration. So the sole motivation to combine that really the Board relied
18 on in its institution decision, and really the only one that they point to as
19 being supported by some disclosure in the reference is completely
20 inapplicable to Kobayashi and there's no contrary evidence to Dr. Neikirk's
21 testimony on this.

22 Turning to the last bit, so what are we left with what -- after
23 dispelling all of the motivation to combine? What are we left with in how
24 the issue has been assembled to create a claim with their obviousness
25 combination? We see from the '409 patent this is a particular combination

1 of a circular contact, and rounded corners is creating a benefit. It's creating
2 improved uniformity of contact to distance. We're on Slide 26 here and at
3 Figure 3 in the middle here. But let's look at what -- first of all, what
4 Petitioners have selected. We submit that this process of selection and what
5 they've chosen not to select evidences arbitrary cherry picking with
6 hindsight bias, so what --

7 JUDGE OBERMANN: You have one minute.

8 MR. SAUNDERS: What have they selected from Kobayashi?

9 Square cells, circular contacts, and that trench gate/trench contact structure.
10 Twenty-eight, what did they get from Hshieh? Four rounded corners. But
11 what did they not select from Kobayashi? They didn't select the hexagon
12 cell through the other cells that aren't square. They didn't select the square,
13 hexagonal, or octagonal contact shapes. And what do they not select from
14 Hshieh? They didn't select Hshieh's planar MOSFET, its trench gate
15 MOSFET, its embodiments blunting corners or only two corners.

16 We submit that the combinations that the Petitioners have
17 advocated are only the result of arbitrary cherry picking and hindsight
18 disclosure because there's no explanation in the petition or Petitioner's
19 declaration for all these various choices they had to make to end up with the
20 particular combination that you get in the '409 patent with that beneficial cell
21 shape with improved uniformity of contact to distance.

22 I'll go into my rebuttal time very briefly on Claim 6. Claim 6 is
23 very simple. Kobayashi, the anticipation ground, rounding in side views is
24 not truncating, and hexagons are not squares. And that is all you need to
25 know for the anticipation ground for Kobayashi against Claim 6. And for

1 the obviousness ground for Kobayashi in Claim 6, all the reasons I discussed
2 about rounded corners in Hshieh, they equally say that there's no motivation
3 to combine blunted corners in Hshieh with Kobayashi. There being no
4 further questions, I'll reserve the rest of my time. I'm sorry. I can't hear you,
5 Your Honor.

6 JUDGE OBERMANN: I'm sorry. I was just asking if any of my
7 co-panelists have any questions, but it does not look like they do. So thank
8 you very much, Mr. Sanders -- or Saunders, and we will turn it back over to
9 Petitioner for four minutes. When you start speaking, I'll start timing you.
10 I'll give you five minutes, if you want, and your friend can have an extra
11 minute, too.

12 MR. TIPESCU: Thank you, Your Honor. Hopefully we don't
13 need it, but if we do, it's nice to know that we have it. So I will say simply
14 on the issue of Kobayashi and anticipation that we do not disagree that the
15 corners of the cell -- that the corners of the cells are being rounded and that's
16 what the claim calls for, the corner of the cells being rounded.

17 However, as the claim points out, the trench gates surrounded the
18 cells, and as the evidence shows, both from Petitioner and Patent Owner, the
19 trenches, those gate trenches surrounding the cells define the shape of the
20 cell. So we do not dispute that the cells need to have rounded corners, but
21 Kobayashi teaches just that, by virtue of teaching that the trench gate
22 openings have -- the corners of the trench gate openings are rounded.

23 So again, I think it's a red herring to say that we are somewhat
24 disagreeing with the plain language of the claims that require that the cells
25 have rounded corners. We do not, so I just wanted to make that clear. We

1 just believe that Kobayashi teaches cells with rounded corners.

2 Mr. Saunders also brought up an analogy with a desk and some
3 woodworking. I don't know if Mr. Saunders is an expert in woodworking or
4 not, but thinking about his example, I would challenge him to buy a router
5 and round the edges of his desk, all the way around, without rounding the
6 corners. I don't see how that's possible, but beyond that, I don't have
7 anything else to say on Kobayashi in anticipation.

8 Turning to obviousness and perhaps we can -- well, put up -- let's
9 go to -- put up Slide 51. So Mr. Saunders pointed out that the '409 patent
10 and Kobayashi don't have certain teachings when it comes to the motivation
11 to combine, but again, that misses the mark. The question is not whether the
12 '409 or certainly -- or even Kobayashi provides the motivation to combine. I
13 think Patent Owner misses the point. What we're saying is -- and this is
14 perfectly acceptable under the law -- the express teaching to the disclosure
15 and teaching to combine is in a secondary reference. It's in Hshieh. Hshieh
16 tells you why you should round the corners of a sharp -- the sharp corners of
17 a cell, and it tells you, you should do that for trenched MOSFETs. And we
18 see that in the footnote.

19 Again, this is addressed only in a footnote in Mr. -- in Dr. Neikirk's
20 declaration, so he tries to brush it aside, but it's there and he can't escape it.
21 The claims of Hshieh tells us that there are trenched MOSFETs with
22 rounded corners, and those trenched MOSFETs with rounded corners
23 address a problem at the corners of the cells, the weaknesses that are present
24 at the corners of the cells. And whether or not Dr. Neikirk disagrees with
25 Hshieh that those trenched MOSFETs may suffer from 3D diffusion

1 phenomenon and also should have rounded corners just like the other
2 embodiments of Hshieh, is neither here nor there.

3 The teachings of Hshieh are what they are. Mr. -- I mean -- I keep
4 saying Mr. -- but Dr. Neikirk can't undo those teachings just simply by
5 offering his opinions that he disagrees with that. Hshieh tells us there is a
6 3D diffusion problem and he says, go ahead and solve that problem by
7 rounding the corners, both in the embodiments that Patent Owner has looked
8 at, but also in trenched MOSFETs.

9 And that's why you would go to Kobayashi and round the corners.
10 And Kobayashi doesn't -- and by the way, the claims don't say anything
11 about why the corners are rounded, because now Patent Owner is trying to
12 tell us not only that you should look at the claims and perhaps import some
13 limitations, top view and so on from the specification, but we should also
14 import the purpose into the claims. The claims don't tell us to round the
15 corners to minimize the distance or anything else. They just say rounded
16 corners.

17 They claim broadly, they got what they asked for, and now they
18 have to live with the consequences, and those consequences are we have a
19 combination, Kobayashi and Hshieh, that teaches square cells with rounded
20 corners. That's precisely what the claim requires, and nothing more as
21 needed. So really, looking at what Kobayashi teaches in terms of the
22 motivation to combine in what the '409 teaches is beside the point. And so I
23 don't have much time left and I want to make sure that I have some time to
24 answer any questions that the Board may have, so I welcome any questions
25 at this point.

1 JUDGE HOFFMAN: I do have one question, Mr. Tipescu, about
2 what you were just talking about, so Patent Owner's position, if I understand
3 correctly, is that Hshieh's structure is fundamentally different from
4 Kobayashi because it has -- Kobayashi has a trench source contact and
5 Hshieh does not. So can you speak to that, as well?

6 MR. TIPESCU: Sure, and again, I think we have to look at it in
7 the context of the claims, which say square shaped cells -- substantially
8 square shaped cells with rounded corners. It doesn't say to minimize the
9 distance between the metal contact and the trenches, right? And so yes, the
10 structure may be different in that respect, but that doesn't take away from the
11 teaching of Hshieh of having rounded corners in a trenched MOSFET. And
12 because Kobayashi is a trenched MOSFET, and again, Patent Owner may
13 disagree that the 3D diffusion phenomenon applies to Kobayashi, but Hshieh
14 sure tells you that you should apply those teachings to a trenched MOSFET.

15 And so a POSITA looking at Hshieh would know based on the
16 teachings and the reasons provided by Hshieh that they should try and
17 minimize weaknesses at the corners, at sharp corners by rounding them in
18 trenched MOSFETs. Once you do that, in Kobayashi, you have the claim.
19 Nothing more is required, so yes, there may be differences in structure, but
20 none of that stops or teaches a POSITA from making the combination and
21 rounding the corners based on the teachings of Hshieh.

22 JUDGE HOFFMAN: Okay, thank you.

23 MR. TIPESCU: Sure.

24 JUDGE OBERMANN: Hearing no other questions, I'll thank you
25 very much for your presentation and we will turn it back over to Mr.

1 Saunders for five minutes.

2 MR. SAUNDERS: Thank you, Your Honor. I'll start with the
3 obviousness combination of Kobayashi and Hsieh. So Counsel made some
4 arguments about, well, the motivation to combine and locate the claim in the
5 '409 patent. And so it's important to step back. The motivation to combine
6 is Petitioner's burden. It's not something we're going to find in the '409
7 patent, and in fact, when we were talking about the '409 patent, we were
8 talking about that because the petition and Petitioner's expert compare the
9 '409 patent to Kobayashi and Hsieh, and we pointed out those comparisons
10 aren't correct comparisons.

11 That testimony from Dr. Neikirk about that is unrebutted. The
12 problem with the '409 patent does inform the appropriate construction of the
13 claim limitation 1A, which is primarily an issue related to the anticipation
14 grounds. But let's get to the actual issues in the motivation to combine the
15 obviousness grounds.

16 What Counsel pointed out is Hsieh tells you rounding corners to
17 solve the 3D diffusion problem. That's what Hsieh says. Hsieh doesn't
18 say that the 3D diffusion problem applies to every MOSFET. Of course it
19 couldn't. There are many different types of MOSFETs out there, and the
20 examples it gave about the 3D diffusion problem were all about planar gate
21 MOSFETs which did not have trench source contacts. No trench gates and
22 no trench source contacts.

23 Counsel pointed to one claim in Hsieh. A claim itself is not a
24 motivation to combine. It certainly wasn't what was cited by the Petitioner
25 or its expert with the petition, and Hsieh does not tell us anything about that

1 claim or why that claim is there, it has a trench gate with rounded or blunted
2 corners. But even putting that at past, there was -- Counsel was asked
3 questions about the issue of the trench source contact and I didn't hear any
4 response on that issue that actually addressed the merits.

5 If we're going to say that there's express disclosure in Hshieh of a
6 motivation to combine, we have to look at what Hshieh says, because
7 Hshieh says round or blunt corners to address 3D diffusion problems. The
8 gap there is if Kobayashi is not susceptible to the 3D diffusion effect, then
9 that expressed motivation to combine does not apply, and the combination
10 falls apart.

11 And what evidence do we have on whether Hshieh suffers from the
12 3D diffusion problem? The only evidence of -- sorry -- whether Kobayashi
13 suffers from the 3D diffusion problem. The only evidence of record as to
14 whether Kobayashi suffers from the 3D diffusion problem is the testimony
15 of Dr. Neikirk unrebutted, which says Kobayashi does not suffer it. It is not
16 suffered due to the gate structure, but also to the use of a trenched source
17 contact, which in combination with the gate, both being vertical, removed all
18 of the horizontal boundaries.

19 And therefore, there simply is no 3D diffusion effect in Kobayashi
20 that could be benefited by the problem in Hshieh of rounding and blunting to
21 address the 3D diffusion effect. Simply, the whole motivation to combine
22 falls apart because the undisputed evidence from Dr. Neikirk is that it does
23 not benefit Kobayashi. Take what's in Hshieh and add those rounding and
24 blunting corners.

25 Quickly on the anticipation ground. I think it's simply a non-

1 sequitur. They point to various different points and hope it adds up. They
2 point to the fact that trench gates do define the cell shape, but they don't
3 know -- it's very specifically, the top view perspective of the trench gates
4 defines the top view perspective of the cell shape. They note that the cell
5 shape is where corners are -- some of the cell's corners are, the ones they
6 care about, but not all of them. And then they note that Kobayashi rounds
7 some corners of the gate in the side view.

8 Now, we're mixing and matching different things. The claim
9 requires one thing. It requires the claim, it requires the gates surround the
10 cell, such that we have a square shaped cell with rounded corners. There is
11 no disclosure of that in Kobayashi and therefore, Kobayashi does not
12 anticipate. Unless the Board has any other questions, I have nothing further.

13 JUDGE OBERMANN: Any questions from my co-panelists?
14 No? Okay. Well, Counsel, thank you so much. We really do appreciate
15 your level of preparedness today. It was very helpful for us, and we will
16 issue our final written decision in due course. The case is submitted. Please
17 have a great weekend and although the panel will be leaving, please remain
18 on the line for the Court Reporter as they may have some questions about
19 spellings. Take care now, Counsel, and thank you.

20 MR. SAUNDERS: Thank you.

21 MR. TIPESCU: Thanks, you, too.

22 MR. SAUNDERS: Have a good weekend.

23 (Whereupon, the above-entitled matter went off the record at 4:19
24 p.m.)

IPR2024-00093 (Patent 7,629,634 B2)

IPR2024-00094 (Patent 7,812,409 B2)

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