

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INNOSCIENCE (ZHUHAI) TECHNOLOGY COMPANY, LTD.,
AND
INNOSCIENCE AMERICA, INC
Petitioner,

v.

EFFICIENT POWER CONVERSION CORPORATION
Patent Owner.

IPR2023-01382 (Patent 9,748,347 B2)
IPR2023-01384 (Patent 10,312,335 B2)

Held: January 7, 2025

Before: JON B. TORNQUIST, JEFFREY W. ABRAHAM, and
KIMBERLY McGRAW, *Administrative Patent Judges*.

IPR2023-01382 (Patent 9,748,347 B2)
IPR2023-01384 (Patent 10,312,335 B2)¹

APPEARANCES:

ON BEHALF OF THE PETITIONER:

LUKE MACDONALD, ESQUIRE
Finnegan, Henderson, Farabow, Garrett, & Dunner LLP 1875
Explorer Street
Suite 800
Reston, VA 20190-60
(571) 203-2700
luke.macdonald@finnegan.com

ON BEHALF OF THE PATENT OWNER:

MARK MASHACK, ESQUIRE
BlankRome
1825 Eye Street NW
Washington, D.C. 20006
(202) 420-2782
mark.mashack@blankrome.com

WALTER DAVIS, ESQUIRE
walter.davis@blankrome.com

The above-entitled matter came on for hearing on January 7, 2025,
commencing at 9:00 a.m., via video teleconference.

P R O C E E D I N G S

- - - - -

JUDGE ABRAHAM: Good morning, everyone. We are here for the consolidated hearing of two IPRs, IPR 2023-01382 regarding U.S. Patent Number 9,748,347 and IPR number 2023-01384 regarding U.S. Patent Number 10,312,335. I am Judge Abraham, joined today by Judges Tornquist and McGraw.

I'd like to begin by taking appearances, starting with counsel for Petitioner. Do we have counsel for Petitioner? I see familiar names, but I don't hear anyone. We seem to be having some technical difficulties. We have counsel for Patent Owner on.

MR. DAVIS: Yes, Your Honor. Walter Davis on behalf of Patent Owner and with me is Mark Mashack, who will be presenting today under the LEAP program.

JUDGE ABRAHAM: Okay, great. Welcome.

MR. DAVIS: Thank you.

JUDGE ABRAHAM: Let's see if we have counsel for Petitioner. Can you hear us? Can you see us?

CHARLIE: This is Charlie from the VTC. I was going to suggest for them to drop out and then connect again, and I guess they did right now. So, they should be connecting back shortly.

JUDGE ABRAHAM: Okay. Well, then let's give them a second. All right. Can you hear us, Mr. MacDonald?

MR. MACDONALD: We can. Thank you.

1 JUDGE ABRAHAM: All right. So, we got appearances from
2 Patent Owner. We'd like to get appearances from Petitioner. Whenever
3 you're ready.

4 MR. LAVENUE: Hello, Your Honor. Sorry for that delay. Our
5 end, something happened on the IT, and we fixed it just now. Lionel
6 Lavenue from Finnegan for the Petitioners. Also with me, who will be
7 arguing today, is Luke MacDonald under the LEAP program. And also
8 sitting in the room with me is one of my colleagues, Deanna Smiley. And
9 that's it on our side for this morning. Good morning.

10 JUDGE ABRAHAM: Okay, great. Thank you. No worries about
11 the technical difficulties. We'll blame it on the snow and just leave it at that.
12 All right. So, we've got, according to our order, we have allotted 75 minutes
13 per side. But since we do have two LEAP practitioners, each side will get an
14 additional 15 minutes. So, each side will have a total of 90 minutes to
15 present their case today for both IPRs.

16 We'll begin with Petitioner, followed by Patent Owner. Petitioner
17 may reserve time for rebuttal, and Patent Owner may reserve time for sur-
18 rebuttal. And we'll ask you before you start how much time you'd like to
19 reserve for rebuttal, if any. We do have a public line going, just so
20 everybody's aware. I don't believe there's confidential information involved
21 in the case, but if there is confidential information that you feel you need to
22 discuss, just let us know beforehand and we can take care of the public line
23 if necessary. Since we are doing a virtual hearing, we ask that if you are not
24 speaking, please mute your microphone so we can avoid any feedback.

25 And then if there are any additional technical difficulties, if we

1 don't notice, you know, by loss of video or something like that, just try and
2 contact our technical support team. We'll also pause the hearing. So, rest
3 assured that if anything like that happens, we will definitely take care of it.

4 So, unless there are any questions, I'll invite Petitioner to begin and
5 ask if you'd like to reserve time for rebuttal, and if so, how much?

6 MR. MACDONALD: Thank you, Your Honor. We'll reserve 15
7 minutes for rebuttal.

8 JUDGE ABRAHAM: Okay. And so, I'll be keeping time on my
9 end, since we don't have a shared clock, you know, I just suggest you keep
10 time on your end as well. I'll do my best to give you a five-minute warning
11 when you come up against the time that you've allocated to start with. But
12 as you know, you're free to use the time as you see fit. The panel does have
13 all of the demonstratives and the full record at our disposal. So, we ask that
14 if you're going to use your slides, please refer to the slide number so we can
15 follow along. If you want us to look at anything in the record, just please
16 identify the paper number and we can get to it quickly.

17 So, with those preliminaries out of the way feel free to begin
18 whenever you're ready.

19 MR. MACDONALD: Thank you, Your Honor. And again, this is
20 Luke MacDonald on behalf of Petitioners. I'm sharing my screen. I have
21 Petitioner's demonstratives uploaded. Does everyone see that on their
22 screen?

23 JUDGE ABRAHAM: Yes, I can see it.

24 MR. MACDONALD: Great. Thank you. And I'm just going to
25 adjust my window momentarily. Once I share, all the windows got very

1 small. There we are. Okay. So, today we'll be talking about the IPRs for
2 two patents, the '347 and '335 patent. Shown here on my screen on Slide 2 is
3 a table of contents for today's presentation. And so, if at any point Your
4 Honors would like to jump to a section, this could be a handy guide to allow
5 you to find what you might be looking for.

6 Moving to Slide 3, let's get into the overview of the '347 and '335
7 patents and the admitted prior art. The '347 patent is the parent to the '335
8 patent. And the '347 patent claims a method for manufacturing an
9 enhancement-mode GaN transistor. The '335 patent claims the
10 corresponding device for that method. And as shown on Slide 4 here on our
11 screen, we see the independent Claim 1 from both patents. And the
12 schematic shown on the screen highlights the purported inventive feature.
13 On the screen, you'll see a green highlighted p-GaN material. And above
14 that, you'll see a gate metal, which is shaded in purple. Now, on either sides
15 of that gate metal, we've circled in pink the horizontal ledges, which the
16 patents purport to invent. And as we'll see from the admitted prior art, that
17 is the only inventive feature in either patent.

18 Moving to Slide 5, on the left, we see the alleged invention. That
19 shows a pair of self-aligned ledges again, circled in pink. And on the right,
20 we see figures from the patents, which are the admitted prior art. You'll see
21 the purple gate metal, the green p-GaN material, as well as the sloped
22 sidewalls that's a claimed feature, and all of that is found in the admitted
23 prior art in the patents themselves.

24 Moving to Slide 6, we see the priority application Lidow, which is
25 Exhibit 1011 in both proceedings. Now, Lidow is the priority application

1 because these two patents are continuations in part to that earlier application.
2 Shown in pink circles are the ledges from that prior art reference Lidow.
3 And the only aspect of those ledges that Lidow does not admit is prior art,
4 because this is a prior art Figure from Lidow, is that these ledges, whether or
5 not they are self-aligned. And so, in sum, on Slide 7, we see the alleged
6 invention. We see those self-aligned ledges circled in pink. That is the only
7 thing that is not found in the admitted prior art in both patents. And as a
8 result, as summarized on Slide 8, every feature of independent Claim 1 of
9 the '347 patent is found in the admitted prior art. The only feature claimed
10 in the '347 patent that is not admitted, it appears in dependent Claim 3,
11 which is the self-aligned feature.

12 For the '335 patent, we see the same pattern on Slide 9. Every
13 feature of independent Claim 1 is found in the admitted prior art. And the
14 only thing not admitted is the self-aligned feature, which appears in
15 dependent Claim 2, as well as on Slide 10 in the independent Claim 5. But
16 as a preview for the '335 patent, self-aligned carries no patentable weight. It
17 just describes a particular method of making the claimed ledges. And there
18 are other ways to make those ledges. So, the prior art does not need to
19 disclose or render obvious this limitation, as long as it discloses or renders
20 obvious the structure, which is the case here. And so, the claims are invalid,
21 whether or not the patents are made according to the self-aligned method.

22 Moving to Slide 11, we see the statement of material facts
23 submitted under 37 C.F.R. § 42.22(c). These were submitted with the '347
24 petition. On the left of this screen, you'll see a list of facts, which
25 correspond to the limitations of the claims, including that self-aligned gate

1 structures were known. Now, Patent Owner never disputed any of these
2 facts on the merits. And thus, all facts are admitted, as shown here with the
3 cited case law. Instead, Patent Owner sidestepped the merits and asked the
4 Board to ignore the statement because it didn't cite to the record. But under
5 the law 42.22(c), a statement only preferably cites to the record. The law
6 does not require citations in the statement itself. And in any event, the
7 petition repeatedly showed, as we just covered, that the prior art -- that the
8 patent admitted the prior art disclosed these facts, as well as the petition
9 presented prior art references that had all of these features.

10 Now, moving to Slide 12, we see the same thing for the '335
11 patent. Here is a statement submitted for that petition. And again, Patent
12 Owner never disputed these facts on the merits. They only asked the Board
13 to ignore them for a legal technicality on which they were incorrect. And
14 that's on Slide 12.

15 So, in summary, moving to Slide 13, a pair of self-aligned ledges
16 on that p-type gate material is the only feature claimed in the '335 patent
17 that's not admitted, and it only appears in dependent Claim 2 or in
18 independent Claim 5.

19 And moving to Slide 14 for the '347 patent, we see the same thing,
20 that self-aligned is the only feature that the patent claims to invent, and it's
21 only found in dependent Claim 3. But as we will see today, horizontal
22 ledges on p-type gate material were well known as of April 8th, 2009.
23 Shown on Slide 15 are five different prior art references that have those
24 same ledges, including the Yoshida reference, which is used in the grounds
25 presented today. And notably, Yoshida was published 10 years before the

1 patents' earliest priority date. In 1999, Yoshida was published, and the
2 patents claim priority to 2009. And in addition, Saxler, which is shown here,
3 is a prior art ground -- reference used in the grounds in the petitions that
4 we'll discuss today.

5 Besides those self-aligned ledges -- besides those ledges, the self-
6 aligned method was well known. Now, shown on Slide 16 on the right, we
7 see the patents' description of a self-aligned approach. And in that self-
8 aligned approach, both the gate metal in purple and the p-GaN layer in green
9 are first deposited and then etched sequentially under a single photo mask
10 that's in Figures 6A and then 6B. And then in 6C, we see that the photo
11 mask in red is undercut to shrink the gate metal on either side and make
12 those self-aligned ledges. Beach, as shown on the left, is one method of
13 making two gate layers under a single photo mask. And Ahn, also shown on
14 Slide 16, is another way. And Ahn describes, in fact, three different ways to
15 use that same photo resist. That's in column 7 of Ahn. And it's shown here
16 in Figures 4A, 4B, and 4C, resulting in a stepped stacked gate structure that's
17 the same as the one shown in the '335 and '347 patents.

18 JUDGE ABRAHAM: Counsel, could you go back to that last
19 slide, Slide 16. And on the right-hand side, between 6A and 6B, is it known
20 in the art or is your position that it's known in the art how to get the sloped
21 sidewalls using the mask, the red mask, the single mask step?

22 MR. MACDONALD: It is, Your Honor. And so in the
23 combinations we present here, Saxler shows one way to make those sloped
24 sidewalls. And Ahn, which is prior art, shows another.

25 JUDGE ABRAHAM: But the Saxler doesn't use a single mask,

1 right? It's a multi-step masking process?

2 MR. MACDONALD: Saxler is a two-step masking process. But
3 Saxler will etch the gate metal and then it will etch the p-type GaN
4 underneath it and create those sloped sidewalls. The fact that it removes the
5 masks in between those steps doesn't change that it would result in those
6 sloped sidewalls.

7 JUDGE ABRAHAM: Right. I understand that. I guess my
8 question is the patent here, at least the '335 patent, I can't recall if the '347
9 describes it as well, but when it's talking about 6A to 6B, it talks about, you
10 know, you etch to get the self-aligned -- using the self-aligned process. But
11 it's not straight down like you see in Beach, right? You've got the sloped
12 sidewalls. So, I'm just curious, what evidence is in the record, if any, that
13 talks about how you make the sloped sidewalls using a single mask self-
14 aligned process?

15 MR. MACDONALD: Certainly, Your Honor. And so, just as a
16 point of clarification, for the patent it doesn't describe any particular ways of
17 making those sloped sidewalls because they were conventional. But to
18 address your question, Figures 4A, 4B, and 4C of Ahn show exactly what
19 you're asking for, which is a way of etching two different layers and
20 obtaining sloped sidewalls. Shenoy's mathematical model explains why this
21 is the case, and Shenoy is quite an old reference. So, these techniques were
22 long known, that as you etch down in Shenoy, the etching proceeds from the
23 top down, and then once you start to undercut the gate metal, for example, it
24 starts to etch sideways. And that same process would occur when you reach
25 the next layer in a single mask process where you're etching down and then

1 you're starting to slope sideways on that type layer as you're performing that
2 etch, whether it's, you know, whatever the chemistry of that etch is. There's
3 dry etches, there's wet etches, and all these are found in the prior art.

4 JUDGE ABRAHAM: Okay. Thank you.

5 MR. MACDONALD: So, moving on to claim construction, Slide
6 17 and now Slide 18, there were only two terms construed in the petitions.
7 For the '335 and '347 patents, there's a term requiring side surfaces that
8 extend horizontally towards a source and drain for that green shaded p-type
9 GaN material. And for this petition, Petitioners presented a construction,
10 Patent Owners did not, although they had construed the claim before the
11 ITC, and the Board decided that no construction was needed to resolve the
12 dispute. So, for this proceeding Petitioners adopt the Board's construction,
13 and there's no longer any need to address that. Notably, because it's a plain
14 and ordinary meaning construction, any horizontal extension will satisfy this
15 limitation.

16 Now, the other term proposed to be construed in the petition for
17 the '335 patent is the self-aligned limitation, which is what we were just
18 speaking about in the last slide. And for the '335 patent, it's a device claim
19 and self-aligned refers to a particular method of making it. There are other
20 ways to make the same ledges and the features that Patent Owner identifies
21 as being unique and specific to self-aligned, the patent itself tells you you
22 can get those features with a two-mask process. One of those is the width of
23 the gate metal being minimum, that's a minimum critical dimension. The
24 two-mask process according to the patent yields that result. In addition, the
25 substantially equal or symmetric ledges can be achieved by the two-mask

1 process according to the patent because it only results in the possibility of
2 misalignment, which thereby acknowledges that alignment may occur.

3 So, with that, we'll skip ahead to the invalidity grounds.

4 JUDGE ABRAHAM: Counsel, but before you do that, I'd just like
5 to back up to the '33 -- sorry, yeah, the '335 construction of self-aligned.
6 You say the patent -- the only structural feature that the patent talks about
7 for self-alignment is the minimum critical dimension, right?

8 MR. MACDONALD: So, the Patent Owner identifies that as one
9 of the two features it believes is specific, the other being the substantially
10 equal or symmetric ledges.

11 JUDGE ABRAHAM: Okay. So, talking about the minimum
12 critical dimension, if you look at, if you have it handy, Column 3, about line
13 65 of the '335 patent, right, it talks about the self-aligned manufacturing
14 process enables the creation of a p-type gate with the minimum critical
15 dimension.

16 MR. MACDONALD: Okay.

17 JUDGE ABRAHAM: And then, I can wait, if you want to pull it
18 up so that you can follow along, okay. And then in Column 4, it talks about
19 using a process of separate masks, so we're no longer on the self-aligned
20 manufacturing process. And it talks about the first mask used to pattern and
21 etch the gate metal to a minimum critical dimension. But then it says a
22 second mask is then used to pattern and etch with a wider critical dimension
23 than the gate metal. So, doesn't this language actually suggest that the self-
24 aligned manufacturing process does actually give you a smaller critical or
25 minimum critical dimension than a process using separate masks?

1 MR. MACDONALD: No, Your Honor, I don't believe that's
2 correct. In that sentence where it says a second mask is used to pattern and
3 etch the p-type gate material with a wider CD than the gate metal, it's just
4 acknowledging that the underlying p-type material, which we shade in green
5 in our Figures, is wider than the gate metal. So, critical dimension is not a --
6 it only refers to the width of those two layers. And so, to get the ledges, then
7 it has to be wider, and that's all that that sentence says.

8 JUDGE ABRAHAM: But it talks about a -- use the term, the same
9 term, minimum critical dimension that we see in Column 3, and then it says
10 it has a wider critical dimension than the gate metal. So, it sounds like the
11 entire gate has, you know, a wider critical dimension than the minimum
12 critical dimension of the gate metal, whereas under the other process, you've
13 got the entire gate has this minimum critical dimension.

14 MR. MACDONALD: The patent describes a critical dimension
15 for each layer separately in this passage, and then if we move up to Figure
16 6B, you can see that that's the same for the self-aligned method, which the
17 underlying gate material has to be wider. So, it has to have a wider critical
18 dimension than the gate to get those ledges. There's no other way. If the p-
19 type material had a smaller critical dimension, you may not get those ledges.
20 And the patent doesn't give any metes and bounds to what it means by
21 minimum either, and it's not a claimed feature.

22 JUDGE ABRAHAM: So, I guess that's where I'm having a little
23 bit of trouble, right? Because when the patent's talking about the self-
24 aligned manufacturing process, it refers to the minimum critical dimension
25 of the p-type gate. I guess I took that to mean the entire structure, whereas

1 in Column 4, it talks about the critical dimension of the gate metal and then
2 the critical dimension of the p-type material. So, are you saying that, well, I
3 guess, are those two clauses talking about the same thing, even though
4 they're referring to it in two different ways?

5 MR. MACDONALD: Yes, I believe that that is true. It doesn't
6 say that the p-type material is not at its own minimum. It just says that it's
7 wider than the gate metal. And so, of course, you could, in the two-mask
8 process, continue to etch that green layer to wherever that minimum fell.
9 So, I don't see any conflict between these two statements, that the critical
10 dimension of both gates is described distinctly in Column 4, and the critical
11 dimension of the entire structure may be referenced in Column 5, but it says
12 here in Column 4 that the gate metal, which is the one that really matters for
13 getting those ledges, that's the supposed inventive feature, is etching that
14 gate metal down. You can make that same minimum critical dimension in
15 the two-mask process.

16 JUDGE ABRAHAM: Okay. Thank you.

17 MR. MACDONALD: So, jumping ahead now to the invalidity
18 grounds, let's get into it for the '335 patent. Moving to Slide 30, we see the
19 grounds presented in the '335 petition fall under two camps. We have the
20 primary reference Saxler for Grounds 1 to 3, and the primary reference
21 Yoshida for Grounds 4 through 6. And the Board need not reach Grounds 3
22 and 6 if it agrees that self-aligned is a product-by-process limitation for the
23 '335 patent.

24 Moving to Slide 31, we see an overview of Saxler. In the center of
25 the slide, the colored schematic shows Saxler's Figure 1A. Now, Saxler here

1 depicts a depletion-mode transistor with a recessed gate. The gate metal
2 contact is again shaded in purple with the underlying cap layer which can be
3 doped p-type, shaded in green, and that recess goes through the cap layer.

4 Now, the petition shows that POSITA would have removed
5 Saxler's recess based not only on Saxler's expressed teachings to do so, but
6 also to achieve an enhancement-mode device. And so, if the Board agrees
7 on claim construction for self-aligned, to find the claims invalid over Saxler
8 itself or that's Ground 1, Saxler-Yoshida, which is Ground 2, the only factual
9 determination that the Board needs to make is that Figure 1A would have
10 been obvious as modified here and is in enhancement-mode. And then, as a
11 legal matter, the Board should agree that Saxler's drawings can be relied on
12 to disclose the substantially equal ledges. There is no factual dispute that the
13 ledges that we're all looking at here are substantially equal, only whether or
14 not this drawing can be relied on to disclose that feature under the law.

15 Similarly, on Slide 32, we see an overview of the Yoshida grounds.
16 Now, Yoshida depicts an enhancement-mode device that has every feature
17 of the claims except for the horizontally extended sidewalls. So, Yoshida's
18 device is shown in Figure 1 here. And the petition showed, as supported by
19 Dr. Shealy, that a POSITA would have found horizontally extended
20 sidewalls obvious over Yoshida because perfectly vertical sidewalls were
21 rare in practice when making real devices. And at institution, the Board
22 agreed with this evidence that Yoshida sidewalls would have a wider bottom
23 surface than a top. Now, again, if the Board agrees on claim construction,
24 there's just one factual determination that the Board needs to make regarding
25 the Yoshida alone ground to find the claims invalid. And that is that

1 horizontally extended sidewalls were obvious because perfectly vertical
2 sidewalls were rare in practice when making real devices. And again, the
3 Board should agree on the legal dispute that Yoshida can be relied on to
4 disclose substantially equal ledges. But there is no factual dispute, only a
5 legal one that the drawings can be relied on under the Hockerson precedent.

6 So, moving to Slide 33, we've summarized those disputes for the
7 Board here, showing a dispute on the enhancement-mode aspect for Saxler,
8 the side surfaces horizontal extension aspect for Yoshida, the substantially
9 equal widths legal dispute for all grounds, and the self-aligned horizontal
10 ledges, which is a claim construction dispute for all grounds. And we note
11 that at institution, the Board found Petitioners' arguments persuasive on all
12 of these disputes.

13 So, the Slide 34 shows where these disputes appear in the first
14 claim set for the '335 patent, that's Claims 1 through 5. We can see that all
15 four features that we just spoke about appear in Claim 1 and Claim 2. But
16 for Claim 5, the substantially equal dispute does not appear. As shown on
17 Slide 35, there are only three disputes between the parties regarding Claim 5
18 because Patent Owner never disputed that Claim 7's symmetric ledges were
19 disclosed or obvious by any of the grounds.

20 Moving to Slide 36, we note that Patent Owner disputes the
21 motivation to combine for each of the combinations presented in the
22 petition. Let's begin with Ground 1 of Saxler. Shown on Slide 37, again,
23 just a reminder that the only factual determination the Board needs to make
24 to find the claims invalid is that modified Figure 1A would have been
25 obvious and is an enhancement-mode if the Board agrees on claim

1 construction and agrees on the legal dispute regarding the substantially equal
2 ledges.

3 And as a result, as summarized on Slide 38, every feature of the
4 independent claims as well as Claim 2 self-aligned are rendered obvious
5 over Saxler because that self-aligned feature carries no patentable weight.
6 And the disputes are summarized again on Slide 39 and 40 for Claims 1 and
7 5.

8 We'll begin with that first dispute, the enhancement-mode dispute
9 for Saxler and the motivation to modify Saxler as presented in the petition.
10 Moving to Slide 42, as stated, we'll see that Saxler's modified Figure 1A is
11 an enhancement-mode and a POSITA would have made that modification
12 based on Saxler's express teachings and for the benefits of enhancement-
13 mode. Those benefits are not in dispute. The enhancement-mode renders
14 the transistor suitable for high-power applications.

15 Moving to Slide 43, in summary for the petition, the petition does
16 show that that gate recess is optional based on Saxler's teachings and a
17 POSITA would have removed it to achieve those enhancement-mode
18 benefits.

19 Slide 44 shows where in Saxler, it expressly teaches removing the
20 recess of any figure where the recess is shown. Paragraph 52, as highlighted
21 here in green and underlined in red, says that the recess may not be included
22 in any of these Figures. And so, for this sort of express, explicit suggestion
23 to modify, single reference obviousness has been upheld previously. The
24 *B.F. Goodrich* case cited on Slide 44 is one such example, as well as the
25 *Boston Scimed*.

1 Moving to Slide 45.

2 JUDGE MCGRAW: Excuse me, before you move on, could you
3 address Patent Owner's argument that Saxler doesn't teach removing the
4 recess from Figure 1A. Instead, it teaches two different embodiments. You
5 can have the recess in Figure 1A or a non-recessed embodiment shown in
6 Figure 1B.

7 MR. MACDONALD: Certainly, Your Honor. And maybe we
8 could hold that question. We're about to just jump right into that if you want
9 me to proceed with the next sets of slides.

10 JUDGE MCGRAW: That's fine. Thank you.

11 MR. MACDONALD: Okay. Excellent. So here, Dr. Shealy
12 motivates the combination. This is Slide 45, and we'll move on in the next
13 slide to the very question you just asked. And in Slide 45 confirms that
14 Saxler's device is in enhancement-mode when doped p-type without the
15 recess, as Dr. Shealy testified.

16 So, we'll get into those arguments right now. Slide 46 summarizes
17 the arguments that Patent Owner advanced in the Patent Owner response.
18 And then that first dispute is whether or not Saxler discloses two distinct
19 embodiments, Figures 1A and Figures 1B. But Patent Owner can't get
20 around paragraph 52, and we'll see why in just a moment. Figure 1A on the
21 left shows a recess gate. Figure 1B on the right clearly shows a gate that's
22 not recessed. But that doesn't mean that that recess of Figure 1A would not
23 have been obvious to remove based on Saxler's teachings.

24 So first, Patent Owner attempts to argue that there's a difference
25 between Figures 1A and 1B based on these parameters. But each parameter

1 that Patent Owner identifies is actually a similarity. The quoted range for
2 cap layer thickness, the doping layer thickness, the doping concentration,
3 and the thickness of increased aluminum concentration overlaps between
4 those two recessed and non-recessed embodiments. So, there's no
5 substantial evidence supporting the idea that they're distinct somehow and
6 that they don't overlap. They do, in fact, overlap.

7 And what's more, Patent Owner cites Saxler at paragraph 12 to just
8 say that the doping concentration is different between the two embodiments.
9 But paragraph 12 only addresses n-type dopant ranges. Paragraph 13 is the
10 p-type dopant range. And Patent Owner never corrected that mistake. In
11 paragraphs 13 and 71, Saxler shows only one range of dopant concentration
12 that applies to both recessed and non-recessed embodiments. So, there's
13 total overlap between recessed and non-recessed.

14 Moreover, Patent Owner tries to undermine the idea that one
15 would remove that recess by attacking Dr. Shealy and his testimony as being
16 hindsight. But when we examine his statements, none of it is hindsight. I
17 mean, first of all, Saxler in paragraph 52, as Dr. Shealy testified, as well as
18 some other paragraphs, says that the recess is optional. And so, that's not
19 hindsight. Dr. Shealy is just following the reference itself. But his specific
20 statement in his deposition to take all the embodiments, as quoted on Slide
21 49, simply reflects the law. Prior art needs to be taken for everything it
22 teaches. And his statement to modify the reference depending on what
23 you're trying to accomplish, also quoted on Slide 49, also reflects the law.
24 That means a POSITA may modify with reason to do so. A POSITA would
25 have removed Saxler's recess to obtain the benefits of enhancement-mode.

1 Those benefits aren't in dispute.

2 And Slide 50 further illustrates why paragraph 52 is relevant.

3 Patent Owner relies on flawed testimony from Dr. Schubert. Dr. Schubert,
4 as summarized on Slide 50, first says that Saxler must be limited to what is
5 actually disclosed. So, Patent Owner is attempting to rebut the argument
6 with legally flawed expert testimony. The reference does not need to be
7 literally limited to exactly what's disclosed. "Saxler does not mention
8 anything about combining features with recessed and the non-recessed
9 embodiments", end quote, he's thinking that, well, one would never have
10 reason to do so. But that's not the law. *KSR* says a person of ordinary skill
11 is a person of ordinary creativity, not an automaton. And obviousness
12 accounts for inferences and creative steps. And this is a really small creative
13 step in light of Saxler's teaching to remove that recess.

14 Moving to Slide 51, Dr. Schubert, his only defense against
15 paragraph 52 is he says, well, it doesn't mean what it says because it was
16 written by a patent attorney. But that's not a reason to ignore it. Saxler in 52
17 does say Figures 1A through 6 have an optional recess. When we look at
18 this paragraph, it describes the other embodiments. What it's saying is, I
19 show you one with a recess, but another embodiment from what I showed
20 you might not have that recess. And that's what we have here with modified
21 Figure 1A.

22 So, I think that may have addressed your question, Your Honor.

23 JUDGE MCGRAW: Not entirely. However, Paragraph 52 states
24 that embodiments are illustrated in Figures 1A through 6. And then it goes
25 on to state that while these embodiments described herein show a recessed

1 gate or a non-recessed gate, other embodiments of the present invention may
2 or may not include the recessed gate. So, I do believe it's Patent Owner's
3 argument that paragraph 52's statement that other embodiments may or may
4 not include a recessed gate does not apply to Figure 1A.

5 MR. MACDONALD: With all respect, Your Honor, I think Patent
6 Owner's argument is very weak on this point. I mean, so to follow Patent
7 Owner's reasoning, what they're trying to say is that the other embodiments
8 of paragraph 52 refer to embodiments that Saxler never even bothered to
9 draw. So, the simplest explanation for this is that I drew an embodiment
10 with a recess. And then I'm going to tell you that, well, another embodiment
11 might not have a recess. So, of course, I'm referring to what I've already
12 disclosed. I think that's the simplest way to understand paragraph 52. And
13 that's how Dr. Shealy understood it.

14 JUDGE MCGRAW: And is paragraph 52 the only paragraph in
15 Saxler that you rely on for teaching that Figure 1A can be modified to not
16 have a recess?

17 MR. MACDONALD: No, Your Honor. In the petition, as well as
18 the reply, we cite other paragraphs that a POSITA would have considered in
19 totality. And at the top of my head right now I can't recall, but there is at
20 least one other disclosure in the petition that describes this optional recess
21 that we cited in the papers. And so, I'd have to refer to the documents, but
22 we can get that answer to you later.

23 So, moving to Slide 52, the Patent Owner incorrectly alleges the
24 reply is inconsistent with the petition that's found in Patent Owner's sur-
25 reply. But here on Slide 52, we see passages where the petition lays out an

1 obviousness theory that Saxler discloses or at least renders obvious modified
2 Figure 1A. There's no dispute that modified Figure 1A isn't in the reference,
3 and the obviousness rationale is written throughout the petition. I mean, the
4 grounds are obviousness. And there are statements that Dr. Shealy made in
5 the petition as cited here that talk about the obviousness of making this
6 specific modified figure, Figure 1A.

7 On Slide 53, we see more on this point that here in the petition, the
8 petition reasoned a POSITA would have been motivated to remove Saxler's
9 recess to achieve the benefits of enhancement-mode, just like the reply. This
10 statement here on page 33 stands alone, and it says quite clearly, a POSITA
11 would have been motivated to remove that recess for enhancement-mode.
12 And by the way, those benefits aren't in dispute. So, that's the motivation.
13 Those are known benefits, and Patent Owner doesn't challenge those known
14 benefits.

15 So, in summary, what we've just covered is all of those attacks
16 shown on Slide 54 that Patent Owner launched against the modification
17 don't stand up. All of those arguments fail.

18 And so, we'll next address the other aspect of Patent Owner's
19 arguments that Saxler is not enhancement-mode, that even if you make the
20 modification, that this structure is somehow not in enhancement-mode when
21 doped p-type. Those are summarized on Slide 55. And on Slide 56, we'll
22 start with the first one. Saxler's device is in enhancement-mode when doped
23 p-type without the recess, as Dr. Shealy testified. Now, one of the bases that
24 Patent Owner uses to attack this reference combination and modification is
25 to say that the cap layer extends from source to drain, but that's just flat out

1 wrong. As anyone can see looking at this Figure, the barrier layer does
2 separate the p-type GaN material from the source contact and the drain
3 contact, just like the patent.

4 Patent Owner also, shown on Slide 57, says more on this point,
5 analyzing Figure 1B, but that is not the combination. The combination is a
6 modification of Figure 1B and Figure -- I'm sorry, the combination is a
7 modification of Figure 1A. And Figure 1B does show a cap layer that
8 extends all the way from source to drain, but that's not the modification that
9 Dr. Shealy opined on. That's not what was in the petition. It's not relevant.

10 Moving on to Slide 58, Patent Owner has a theory that the
11 modified Saxler has these so-called access regions, which remain depleted
12 even at positive voltage. Now, Patent Owner, just as an aside, changes the
13 modified Figure of 1A found in the petition to shrink that gate metal further
14 to exaggerate their point. But setting that aside, this access region theory
15 contradicts the patent. The patent has the same geometry. There are
16 shoulders on either side of the gate metal, there's a space under the p-GaN
17 that has no gate metal above it, and then there's a horizontal extension going
18 out to the source and drain. And so, if Saxler doesn't work because of these
19 access regions, then the patent doesn't work either. And so, Patent Owner's
20 arguments that contradict the patent should be ignored. Patent Owner will
21 say that we misunderstand the horizontal extent of the access regions, but
22 wherever they want to draw those regions, they can't get around the fact that
23 the two geometries have those same features. And moreover, Patent Owner
24 accepts it.

25 JUDGE ABRAHAM: And Counsel, before you move on, if you

1 could just go back to Slide 58, I apologize for the interruption. The two
2 figures here, I accept that there may be access regions both in Patent
3 Owner's drawing here and then the one from the '335 patent. But doesn't the
4 size of access region matter for the theory about how much electricity is
5 required to operate this as an enhancement-mode device? And so, even
6 though there may be access regions based on the structure in both, the access
7 region in the figure in the '335 patent seems to be much smaller, at least
8 proportion-wise, as compared to the access region in the modified version of
9 Saxler. So, is it really fair to say that if it doesn't work in the Saxler
10 modified figure, it's not going to work in the patent when the sizes are really
11 not comparable?

12 MR. MACDONALD: That's right, Your Honor. So, Dr. Schubert
13 came up with this theory and Patent Owner is relying on it about the size of
14 these access regions, but he provides a quantitative analysis of the Figure to
15 show whether or not it's too large or too small. And that's because the exact
16 horizontal extent is unknown of this figure. And so, he can't do that
17 analysis. This is a representation of the spatial arrangement between parts
18 and features like symmetry and what's above and below can be relied on.
19 But as Dr. Shealy testified in his deposition shown right here, he came up
20 with a different analysis of those access regions and he showed, which
21 Patent Owner ignored in their sur-reply, that the 2DEG would not be
22 depleted when voltage is applied. So, quite clearly in the drawing Dr.
23 Shealy showed, he shows here on the right of Slide 59, the concentration of
24 the electrons at no voltage applied, that's section B in the Figure, and then
25 what happens when you apply voltage. And Patent Owner didn't have a

1 response for that.

2 And so, at a minimum here, we have two experts looking at the
3 same Figure coming to different conclusions. But Dr. Schubert's analysis
4 relies on this theory of how wide is too wide and whether or not that would
5 work. And he doesn't have any support for that theory regarding Saxler's
6 specific schematic.

7 JUDGE ABRAHAM: Okay. So, the position you're making,
8 when you're talking about there's no real quantitative analysis of how wide it
9 is, you're talking about Saxler's figure, right?

10 MR. MACDONALD: Yes. Yeah.

11 JUDGE ABRAHAM: And Dr. Schubert's analysis of Saxler's
12 figure. Okay.

13 MR. MACDONALD: That's right. Yeah.

14 JUDGE ABRAHAM: Thank you.

15 MR. MACDONALD: You're welcome, Your Honor. Thank you.
16 So, moving on to Slide 60, Patent Owner's final attack regarding whether
17 Saxler's device is in enhancement-mode pulls Saxler at paragraph 49 out of
18 context. And so, this is worth going through briefly, that Saxler at paragraph
19 49 is talking about what happens to its p-type dopants at crystal dislocations.
20 So, those are places where the crystal is imperfect and the p-type dopants
21 might migrate there. And as Saxler points out, at those dislocations, they
22 would act as deep-level dopants. And so, they would further assist with the
23 problem of gate leakage. But they use this to say that p-type dopants can
24 never act as electron acceptors and can never deplete the 2DEG. And that's
25 wrong, because as shown on Slide 61, Saxler specifically says that what it

1 references to p-type dopants refer to the characteristics of the dopants in the
2 bulk crystal rather than when they're at that dislocation. And so, in the bulk
3 crystal p-type dopants behave normally, and they reduce -- and deplete the
4 2DEG just like they would normally do, allowing the device to function in
5 enhancement-mode. And Patent Owner, in its sur-reply, never addresses
6 these arguments that Petitioner raised in the reply.

7 So, moving on to Slide 62, then in summary, each of those points
8 that we've just covered, Patent Owner's arguments don't stand up. All
9 arguments fail. And Saxler would be in enhancement-mode for the reasons
10 we just discussed. So, and then in summary, we've already covered both of
11 those two arguments regarding the enhancement-mode dispute, whether a
12 POSITA would be modified to make the proposed modifications and
13 whether or not the device as modified as an enhancement-mode. And on
14 both fronts, all Patent Owner's arguments have failed.

15 Let's go to the next dispute starting on Slide 63.

16 JUDGE MCGRAW: Before you move on, could you clarify if
17 your position is that Saxler discloses an enhancement-mode or that it would
18 have been obvious to modify Saxler Figure 1A to arrive at an enhancement-
19 mode?

20 MR. MACDONALD: Yes, Your Honor. It's an obviousness
21 theory because you need to make that modification. You know, in the
22 petition, it's labeled as modified Figure 1A, and Dr. Shealy says a POSITA
23 would have been motivated to remove that recess in order to achieve the
24 benefits of enhancement-mode.

25 So, regarding the substantially equal width grounds argument,

1 Patent Owner only advances a legal dispute. And as we'll see, there's no
2 factual dispute as summarized on Slide 65 that Saxler's drawings do disclose
3 the ledges. So, it's undisputed that the drawing we're looking at on Slide 66
4 shows horizontal ledges. The only dispute is whether or not Saxler can be
5 relied on to disclose this. And at institution, the Board reasoned
6 substantially is a common term of approximation or degree in patent claims.
7 And at that time, Patent Owner hadn't disputed it. And so, *Hockerson* does
8 not apply and drawings can disclose this limitation. That's on Slide 66.

9 And so, on Slide 67, we can see why this is true. On the left, we
10 have Saxler's original Figure 1A, and on the right, we have the modified
11 Figure 1A with the horizontal ledges. And anyone can see looking at this
12 that those are plainly substantially equal on either side of the gate. No
13 factual dispute.

14 So, let's get into the arguments summarized on Slide 68 that Patent
15 Owner announced advances regarding the legal disputes. First, as an
16 overview for *Hockerson*, shown on Slide 69, *Hockerson* holds that drawings,
17 not to scale, cannot disclose precise proportions or dimensions. And again,
18 at institution, the Board thought that *Hockerson* wouldn't apply to
19 substantially equal. Patent Owner's only argument is substantially is precise.
20 But as we'll see, that is incorrect.

21 First, in the Petitioner's preliminary response, as summarized on
22 Slide 70 and noted in the reply at 15, the Petitioner argued that *Seattle Box*
23 and the MPEP showed that this term was indeed approximate or a term of
24 degree. And therefore, *Hockerson* would not apply. And again, at
25 institution, the Board found that persuasive.

1 On Slide 70, we see Patent Owner's attempt to examine this
2 specific limitation of substantially equal and attack the *Ex Parte Bjorn*
3 decision, which Petitioner relies on. Now, in *Ex Parte Bjorn*, the reasoning
4 supports Patent Owner -- does not support Patent Owner, I'm sorry, and it
5 supports Petitioner because *Ex Parte Bjorn* made numerous factual finding
6 that drawings disclose substantially equal. And it's true that the Board was
7 looking at a term which involved less than or substantially equal. But the
8 Board didn't say in *Ex Parte Bjorn* that the drawings disclosed less than
9 equal. They only disclose that the drawings had substantially equal
10 dimensions between the two drawings and therefore rendered the claims
11 invalid.

12 Those -- Slide 72 shows where the Board made those
13 determinations. It's page 11 of the decision and 17. The Board says here are
14 two diameters with, quote, "substantially equal size". Others so clearly
15 show substantially equal. And all those findings are factual findings about
16 drawings which weren't to scale involved not less than equal, but
17 substantially equal. And I think it's worth looking at Slide 73 on one of the
18 drawings that's found in *Ex Parte Bjorn* itself. So, the surface 119 color
19 coded in red from Figure 22 and the maximum thread diameter for the
20 threads color coded in blue on Slide 73, which are labeled 120, the Board
21 looked at this drawing and said, yep, those are substantially equal. And that
22 is a factual finding the Board made on this drawing, which is not to scale.
23 The same holds here. Anyone can look at Saxler and know that those ledges
24 are equal in either sides, so of course, they render the limitation obvious.

25 Instead, what Patent Owner focused on is a case where a

1 calculation was required to determine whether or not the drawings met the
2 figures. And then the Board found that Hockerson applied. So, the Board
3 looked in one instance at one drawing for one prior art reference where the
4 two diameters, one was definitely larger than the other. And the Board said,
5 well, hey, we need to make a calculation about how much larger it is to
6 determine whether it meets less than or substantially equal. And because we
7 can't make that calculation based on imprecise drawings, *Hockerson* applies.
8 So, this particular drawing doesn't render the claims obvious. But that in
9 every other case where the drawings plainly showed what anyone can see as
10 the case with Saxler that we have equal ledges, the Board found that the
11 prior art drawings invalidated the claim.

12 So, moving to Slide 75, Patent Owner relies on Saxler's optional
13 offset in its arguments in paragraph 65 of Saxler. Now, this describes an
14 offset that's optional. Saxler in 65 uses non-limiting language. It says the
15 recess shown in say Figure 1A may be offset. Now, it's not offset in Figure
16 1A, it's centered. So, that's -- so clearly other embodiments like Figure 1A
17 would not have that offset. But moreover, the offset that's referred to in 65
18 is not the one that describes the relative offset between the gate metal and
19 the green p-GaN material, which defines those ledges. It's the offset
20 between the source and the drain of the whole structure. And so, that's the
21 wrong feature to focus on for this claim limitation of substantially equal
22 widths.

23 So, Slide 76 summarizes those arguments. And as we just
24 discussed, each argument fails. And the prior art drawing Saxler renders
25 obvious this claim limitation.

1 Moving on to Slide 77.

2 JUDGE ABRAHAM: All right. Before you move on, for -- in
3 Saxler, is there any discussion about the Figures other than what you've
4 shown here on 75 talking about the offset? Is there any other discussion that
5 you can direct us to that talks about, you know, whether these are schematic,
6 whether they're to scale, anything?

7 MR. MACDONALD: So, Saxler does note in paragraph 42, and
8 this is relevant for the Yoshida grounds, that things that are represented as
9 rectangles will typically have rounded, curved, or tapered features, which
10 supports the Yoshida obviousness rationale. There are a lot of descriptions
11 of the figures. So, if you're looking for something specifically describing the
12 ledges, nothing comes to mind right now. But the point that Petitioner is
13 making is the figures speak for themselves. The references incorporated by
14 reference into Saxler, like Smith, which Patent Owner will talk about in their
15 slides, show gates that are not -- is centered, and talks about for that
16 particular structure, the problem that might be posed when the gate is
17 centered. And so, what that tells a POSITA is that, you know, when Saxler
18 and its other incorporated by reference prior art references, when it shows a
19 picture with a gate in a particular location, that's what it means. And so, for
20 Smith, which is a different invention, getting that gate to the side was
21 important. For Saxler, it showed the gate in the center, and so that's what it's
22 disclosing. It's disclosing what it shows.

23 JUDGE ABRAHAM: So, the concern that I have is Patent
24 Owner's argument, at least one of them, is that, you know, sometimes
25 Petitioner's relying on the Figures for what they show. Sometimes Petitioner

1 says, you can't rely on the Figures for what they show. And how can we
2 have it both ways? Can you address that argument?

3 MR. MACDONALD: So, as a general proposition, obviousness
4 means that as long as sometimes the reference discloses the claim limitation,
5 then it's obvious over the reference. And so, that's what we have with the
6 Yoshida grounds, which we'll talk about later, that a POSITA can look at
7 perfectly symmetrical and aligned drawings and know that in practice, it's
8 obvious that there would be flaws, right? And that's not a big leap. I think
9 even like a non-POSITA understands that leap, that you have an idealized
10 drawing, that's the target. But when you actually make it, you might not
11 make it perfectly. And so, that's the argument with Yoshida. But for Saxler,
12 and as well as Yoshida's substantially equal widths, the argument is like, this
13 is the idealized target. This is what we're trying to make. And so, a
14 POSITA would find it obvious that sometimes you do make that. And that's
15 all that's required for obviousness.

16 JUDGE ABRAHAM: So, then to find in your favor, are you
17 saying we have to say that we have to recognize that the Figure is idealized,
18 but that sometimes in practice, it's actually made that way? And that's
19 sufficient to establish the elements of obviousness?

20 MR. MACDONALD: Well, certainly, sometimes in practice, the
21 target is achieved. And sometimes in practice, due to manufacturing
22 tolerances, it's not. So, yes, I think that that's fully consistent with
23 obviousness. It doesn't need to disclose that in every instance, the drawing
24 looks exactly like the final product, only that the final product that looks like
25 the drawing is obvious.

1 JUDGE ABRAHAM: And is there evidence in the record that
2 supports that in practice, the idealized figure and modified Saxler, Saxler
3 Figure 1A that's modified? Sorry, let me start again. Is there evidence that
4 the structure that's shown in Saxler Figure 1A modified by Petitioner would
5 actually have these symmetrical or substantially equal ledges?

6 MR. MACDONALD: Well, certainly, there's Dr. Shealy's
7 testimony that he opined about what a POSITA would understand to be
8 obvious looking at the figure. I mean, these figures are communicating to a
9 POSITA how to arrange the parts. And so, Saxler itself in its figures
10 discloses the gate contact where it discloses it. And in addition, Saxler talks
11 about the arrangements of parts throughout its disclosure. So, I think that's
12 all the evidence that would be needed to show that in practice, one would try
13 to make that figure. That's why it's drawn.

14 JUDGE ABRAHAM: Thank you. Thank you.

15 MR. MACDONALD: Thank you. Okay. So, moving on to Slide
16 77. So, Patent Owner never disputed for any grounds whether or not the
17 prior art disclosed the pair of self-aligned ledges are symmetric. And so, the
18 Board notices at institution and asked the parties to brief whether *Hockerson*
19 applies to Claim 7's symmetric ledges. And Petitioner's briefed this issue.
20 Patent Owners did not and therefore forfeited any response. But in
21 Petitioner's undisputed reasoning in the reply, we pointed out that
22 substantially equal and symmetric are equivalent in the patent. So, on Slide
23 77, we see a quote from the patent where it says, substantially equal widths,
24 i.e., the respective ledges are symmetric. And so, the terms mean the same
25 thing, and *Hockerson* does not apply to symmetric for the same reasons as

1 for substantially equal.

2 So, moving on to Slide 78, then we've already addressed all of the
3 legal arguments that Patent Owner advanced regarding Saxler's drawings
4 and all of them fail. And Saxler's drawings can be relied on to disclose this
5 limitation. So, briefly on Slide 79, we'll hit the self-aligned disputes. And
6 so, as we discussed during the claim construction section, this term self-
7 aligned refers to how it's made. It is a product-by-process term. And Saxler
8 therefore renders the claims obvious by disclosing the claim structure.

9 And so, in summary for Ground 1, we've addressed all the disputes
10 that the Patent Owner has raised regarding the petition. And all those
11 arguments fail. And as a consequence, each limitation of a Figure -- of
12 Claim 1 and Claim 2 shown on Slide 82 are met.

13 We'll talk about Yoshida now. So, the Saxler in view of Yoshida
14 Ground 2 is summarized on Slide 83. Ground 2 is the same as Ground 1
15 with the additional motivation added by Yoshida to make Saxler's device
16 enhancement-mode. And it would have been obvious based on Yoshida to
17 further remove Saxler's recess and receive those benefits of enhancement-
18 mode.

19 On Slide 84, pictorially, the combination is represented. We see in
20 the top left Saxler's recess gate structure. On the bottom left, we have
21 Yoshida's enhancement-mode device that has every feature except for those
22 horizontally extended sidewalls. And then the combination would have
23 resulted in this modified Figure 1A shown on Slide 84. A POSITA would
24 have removed Saxler's recess based on Saxler's express teachings, as we
25 talked about, and Yoshida's teachings, and a POSITA would do so in order

1 to achieve the enhancement-mode benefits that are not in dispute.

2 So, on Slide 85, we address the only new argument that Patent
3 Owner presents is that the alleged change to Saxler changes its principle of
4 operation. But, as we discussed, Saxler teaches its recess is optional. Saxler
5 discusses p-type doping. And the proposed modification doesn't alter its
6 principle of operation. This modification is found and motivated in the
7 reference itself. And so, Patent Owner's arguments to the contrary fail.

8 Moving on to Ground 3, as we've already discussed, the Board
9 only needs to reach this if the claim construction -- if the Board disagrees on
10 claim construction about product-by-process. And so, we'll talk about that
11 more when we get to the '347 patent, which is a method claim.

12 Slide 87, we'll start with the Yoshida grounds. If the Board agrees
13 on claim construction, the only factual finding the Board needs to make to
14 find the claims obvious over Yoshida is that perfectly vertical sidewalls were
15 rare in practice when making real devices. And, again, the Board should
16 agree that Yoshida's drawings can be relied on to disclose the substantially
17 equal ledges. And there is no factual dispute that they do.

18 On Slide 88, we see a summary of limitation -- I'm sorry, claim
19 limitations for Claim 1 and 2. And the disputes that appear for the Yoshida
20 ground just involve the side surface limitation, the substantially equal width
21 limitation, and the self-aligned limitation. It's not disputed that Yoshida
22 discloses an enhancement-mode transistor. And as a reminder, for that side
23 surface, any horizontal extension will satisfy the claims.

24 For Claim 5, the other independent claim of the '335 patent, the
25 only disputes are the self-aligned dispute and that side surface extension

1 dispute. We'll begin with the first dispute on side surface extension. And as
2 we'll see and mention on Slide 91, Yoshida discloses side surfaces extending
3 horizontally because they extend at least slightly on the bottom due to
4 manufacturing tolerances and perfectly vertical sidewalls were rare in
5 practice.

6 On Slide 92, we go over there are three pieces of evidence that the
7 Board found persuasive that show that perfectly vertical sidewalls are rare in
8 practice. So, first, Saxler states that vertical sidewalls typically have tapered
9 features. That's in paragraph 42. We just mentioned that a few minutes ago.
10 Second, the background reference Uemoto shows drawings that are perfectly
11 vertical, but that device, when shown a TEM image, has sloped sidewalls
12 when implemented. And the third piece of evidence is, of course, Dr.
13 Shealy's testimony that perfectly vertical sidewalls were rare. They arise
14 due to manufacturing tolerances.

15 Beginning with Slide 93 and the Saxler evidence, Saxler at 42
16 states, quote, "for example, an etched region illustrated as a rectangle will
17 typically have tapered, rounded, or curved features." And again, the Board
18 found this persuasive at institution. Uemoto on Slide 94 shows perfectly
19 vertical drawings. On the left, we have Uemoto's drawings. Uemoto's a
20 background reference. This is a GaN HEMPS device. It has a gate metal. It
21 has a p-GaN material underneath the gate metal, and then it has a barrier
22 layer underneath that, just like the patent and just like the references. And it
23 has the horizontal ledges as well.

24 Now, Uemoto includes a microscopic image of its device when
25 implemented. And in that image, we see what Saxler expresses, that the

1 sidewalls are slightly sloped. And so, the horizontal extension to sidewalls
2 typically arise when making that. And as an aside, you know, Patent Owner
3 argues that, well, its gate is not centered. And so, that means that you can't
4 be relied on -- that the drawings can't be relied on to disclose centered gates.
5 But of course, that identifies the problem that the combinations address.
6 And the problem is misalignment. And so, repeatedly in the petitions for
7 both the '335 and '347, we have motivated the combination. Dr. Shealy has
8 testified that a POSITA would make those changes, use the self-aligned
9 approach to get better alignment. And Uemoto shows the problem that
10 needs to be fixed, which is that that gate metal is misaligned.

11 Now, regarding the perfectly vertical sidewalls, Dr. Shealy noted
12 that manufacturing tolerances would mean that the sidewalls would extend
13 at least slightly, as we just saw with Uemoto. And perfectly vertical
14 sidewalls were not impossible, but they were rare in practice. And so, it is
15 his opinion, here on Slide 95 and highlighted in green, it is my opinion that
16 sloped sidewalls were common and obvious over Yoshida, at least because
17 perfectly vertical sidewalls were rare in practice. And that's what the
18 petition relies on as its third piece of evidence.

19 Now, Patent Owner irrelevantly attacks this with the law of
20 anticipation. But Petitioner advanced an obviousness rationale, as we just
21 saw, Dr. Shealy said perfectly vertical sidewalls were rare and a horizontal
22 extension would have been obvious over Yoshida. On Slide 97, then, we see
23 that in summary, those arguments that Patent Owner launched have failed.
24 Yoshida alone renders obvious this limitation.

25 We'll move to the next dispute, which is on Slide 98 and now 99.

1 And this is a recap of the Saxler discussion we just had. And so, everything
2 we said with respect to Saxler's drawings apply to Yoshida's drawings.
3 Substantially equal is not precise, and so *Hockerson* does not apply. And a
4 POSITA looking at this would understand that it renders obvious what it
5 shows, which is symmetric sidewalls, even if in practice sometimes you
6 can't get there. It's obvious over the Figure that that's the target.

7 Now, Slide 100 shows a summary of what we just said, that the
8 arguments regarding substantially equal failed. We'll move on to Slide 101.
9 And this is similar to what we just talked about with Saxler, that because
10 self-aligned is product-by-process, Yoshida discloses limitations for Claims
11 2 and 5[f].

12 Let's now bring in the Saxler grounds. So, this is Ground 5 for the
13 '335 petition. Now, the grounds are shown pictorially here on Slide 103.
14 And again, we're making a modification of Yoshida's device. So, in the top
15 left of Slide 103, we see Yoshida's enhancement with a transistor. It doesn't
16 have the sloped sidewalls in its drawings. And Saxler does, however,
17 disclose a similar structure with the p-GaN material and sloped sidewalls,
18 and a POSITA would have implemented Saxler's known option to etch
19 sloped sidewalls in the p-GaN layer to reduce gate leakage. This was a
20 known option that would lead to a known benefit, which would reduce gate
21 leakage. That benefit is not disputed by Patent Owner.

22 So, on Slide 104 is a summary of the petition's position that Saxler
23 and Yoshida render the horizontally extended sidewalls obvious because
24 Saxler provides that known option, and it would have been obvious to use it
25 to reduce the problem of gate leakage. Those sloped sidewalls provide

1 longer leakage paths. The petition presented evidence supporting that
2 rationale summarized on Slide 105. It was known that leakage in transistors
3 include mesa edge currents and that sloped sidewalls led to longer leakage
4 paths and thereby lowered gate leakage.

5 A POSITA would have understood that Saxler's geometries
6 provided the longer paths, and those benefits are not in dispute. Dr. Shealy
7 testified about them, cited here on paragraph 189 of his declaration. And he
8 cited the prior art background references, Xu and Kanda, which teach this
9 same teaching that the gate leakage is reduced with this kind of structure.
10 And so, this improvement makes Saxler's sidewalls a suitable option, and it
11 motivates the combination under *KSR* and then the more recent *Intel v.*
12 *PACT* decision. It's on Slide 105.

13 So, moving on to Slide 106, we see the same thing as we saw with
14 Ground 3 for Ground 6, which is that Yoshida in view of Saxler, Beach, and
15 Shenoy only comes into play if the Board disagrees on claim construction
16 for self-aligned, and we'll talk about that for the '347 patent. And so, in
17 summary for the '335 patent, we've gone through all the grounds and shown
18 that the claims are invalid over the proposed combinations.

19 We'll move to the '347 patent invalidity grounds. And before I get
20 into that, Your Honor, I do have from my colleagues here that there are other
21 cites regarding where the gate recess is optional that were cited on page 31
22 of the petition. And so, I just wanted to direct you if you wanted to at some
23 point to paragraphs 12, 13, 27, 52, 64, 70, 71, and 73, which are all cited on
24 page 31 of the petition regarding the optional nature of the gate recess. And
25 this is for Judge McGraw.

1 JUDGE ABRAHAM: Thank you.

2 MR. MACDONALD: Thank you. For the '347 patent, we see
3 similar grounds shown on Slide 109 as with the '335 patent. And any
4 disputes that we've discussed regarding Saxler or Yoshida or their
5 combinations, we've already gone over for that other patent. And so we'll
6 focus today on the additional grounds with Beach and Shenoy and with Ahn.
7 And so, the only factual determination besides those ones that we've
8 addressed that the Board needs to make regarding the '347 patent, the degree
9 that would have been obvious to use those methods for the target structures
10 disclosed by Saxler or Yoshida or their combinations. And that same
11 statement is summarized here on Slide 110, where we see all claims of the
12 '347 patent. There are just three claims and all disputes regarding
13 independent Claim 1 have already been addressed and those track the '335
14 grounds. And of course, the product-by-process doesn't come into play for
15 the '347 patent.

16 So, the thing we'll focus on is Claim 3 self-aligned technique. And
17 so, on each of these disputes at institution, as summarized on Slide 111, the
18 Board found Petitioner's arguments persuasive to reach institution.

19 Slide 112, we'll begin with the Saxler-based grounds, that's
20 Grounds 1 and 2. Slide 113 pictorially shows that combination. This is the
21 base combination that then motivates the later combination of bringing in
22 Beach and Shenoy's techniques. We see the same thing we discussed with
23 respect to the '335 patent that one would have modified Saxler's Figure 1A
24 as shown in the top left to make this non-recessed embodiment shown on the
25 right of Slide 113 over Saxler's expressed teachings and/or over Yoshida's

1 teachings to achieve the benefits of an enhancement-mode device.

2 MR. DAVIS: Your Honor, I truly apologize for interrupting. I
3 just received a note from my colleague, Mr. Mashak, that he's having a
4 technical issue. He's logging back in right now, but he's unable to hear
5 what's going on. I think it should just be a moment.

6 JUDGE ABRAHAM: Okay. Apologies, Mr. MacDonald. We'll
7 stop the clock.

8 MR. MACDONALD: Sure. No problem.

9 JUDGE ABRAHAM: Let's pause and let's give him a second to
10 get back on. And once he's back on, we'll restart.

11 MR. DAVIS: Hopefully, it'll just be a moment.

12 MR. MACDONALD: Okay. No problem.

13 MR. DAVIS: I'm going to go check on him. We're both actually
14 in the office today. So, I'll -- he's just down the hall from me. So, I'll double
15 check.

16 CHARLIE: This is Charlie from the VTS team. I still see him
17 connected still. Maybe you tell him to disconnect and reconnect one more
18 time. I still see him on the list just to be sure.

19 MR. DAVIS: Yeah, I see him as well. So, I'm not sure what's
20 going on. I'll go walk down to see what's happening. Thank you.

21 MR. MASHACK: Apologies. I'm not sure if you can hear me, but
22 I'm back online. My workstation, certain plugs are plugged in vertically.
23 So, sometimes when I move, I kick it and it gets unplugged. Apologies for
24 the delay.

25 MR. MACDONALD: I hear you, Mark. Your Honor, should I

1 continue? What I'd like to do maybe is back up a couple slides to see where
2 Mark dropped off and then we could pick up wherever that was.

3 JUDGE ABRAHAM: Yeah, that works out fine as long as you've
4 got everybody. And if you want to, Mr. Mashack, do you recall where we
5 were when you dropped off?

6 MR. DAVIS: I'm back.

7 MR. MASHACK: The exact slide -- but Wally is back as well.
8 You can just start, just go back a couple slides and restart if that's what you
9 need.

10 MR. MACDONALD: Sure. Okay. So, we're getting now into the
11 '347 patent grounds. And I'm on Slide 112, which summarizes Grounds 1
12 and 2 that involve the Saxler reference as the base combination, bringing in
13 Yoshida for Ground 2 to make that modification and then the Beach and
14 Shenoy techniques as a particular way of making that device.

15 So, Slide 113 pictorially summarizes that base combination, which
16 we already talked about for the '335 patent. We see in the top left, Saxler's
17 depletion-mode gate transistor with a recessed gate. And a person of
18 ordinary skill would have been motivated to modify it as shown on the right
19 of Slide 113 to achieve the enhancement-mode device that does not have a
20 recess. In the bottom left is Yoshida's enhancement-mode device that has
21 every claim feature, except for the horizontally extended sidewalls. And so,
22 a POSITA would have been motivated to make this modification, not only
23 over Saxler's express teachings, which we've discussed, but also over
24 Yoshida's teachings, which we've also discussed, to get those benefits of
25 enhancement-mode, and those benefits are not in dispute.

1 That target structure is shown on the left of Slide 114. That's the
2 modified Saxler Figure 1A. And Beach and Shenoy just provide a different
3 way to make that same structure. And a POSITA would have made the
4 combination to simplify the process and improve alignment. In the
5 combination, as shown on Slide 115, the Beach's self-aligned single mask
6 approach is compatible with Saxler's same etching.

7 Now, first of all, Sheppard, which is incorporated by reference in
8 Saxler, notes that operations described as multiple steps could be combined
9 into a single step. And that's exactly what we're doing by introducing
10 Beach's single mask. Instead of using two masks to etch those two layers,
11 we just use one mask to etch those two layers. And we retain Saxler's
12 sidewalls because we're using that same etching technique. The motivation
13 to maintain Saxler's sidewalls is especially true for the Yoshida combination,
14 which we'll talk about later, because, of course, we're only bringing in Saxler
15 for that feature.

16 But regardless, if we look at the motivation in the petitions, we
17 never once say, as Patent Owner contends, that we use Beach's etching. For
18 the '335 petition, that's pages 59 to 63. For the '347 petition, that's pages 31
19 to 35. We only talk about as Petitioners using Beach's single mask for that
20 approach. And then to make that target structure, Shenoy provides a long-
21 known technique. Shenoy's quite an old reference that just describes a
22 simple undercut. And we'll talk a little bit about Shenoy in a few moments
23 and why any of Patent Owners' theories on Shenoy are incorrect.

24 JUDGE MCGRAW: But doesn't the petition talk about using
25 Beach's self-alignment process? It doesn't really say to just use the mask

1 and use Saxler's etching process. And if it does, could you point to it --

2 MR. MACDONALD: Well, self-aligned is one mask. That's what
3 it is. And so, once you have that mask, you will be using, as a POSITA
4 would know, the etching that's appropriate for the materials, which Saxler
5 has already disclosed. So, there's nothing special about Beach's etching.
6 One of ordinary skill would use the combinations that are identified in the
7 petition, that we're using Beach's mask with the underlying combination.

8 So, on Slide 116, we're addressing a summary of all Patent
9 Owner's arguments. Slide 117, we'll start with the first one. The Patent
10 Owner incorrectly contends that the petition did not provide the specific
11 process sequence for the proposed combination. But as we just discussed,
12 it's a simple combination. The petition explained a POSITA would have
13 implemented Beach and Shenoy's known masking and etching methods. It's
14 Beach's single mask with Shenoy's undercut to get back to that target
15 structure. That's the idea, is that you want to make that structure, which
16 we've already motivated would have been obvious, with a simpler method
17 that improves alignment and symmetry.

18 Now, with respect to Patent Owner's next argument, on Slide 118,
19 we're addressing Patent Owner's attacks that cite the wrong type of case law.
20 So, Patent Owner misunderstands obviousness. First of all, citing *In re*
21 *Dembiczak*, which applies the teaching suggestion motivation test to
22 somehow suggest the proposed combination would not be obvious. Now,
23 *KSR* firmly rejected that teaching suggestion motivation test. Patent Owner
24 also cites a series of cases, *InTouch* and *ActiveVideo* and *Belden*. And in
25 each of those cases, the Board dealt, or the Federal Circuit dealt with experts

1 who simply said a POSITA could have made the combination. But that's not
2 what we have here. What we have here is a proposed combination that
3 would have been made to achieve known benefits. And that's a simpler
4 process, a better aligned structure. Those are the benefits. And so, Dr.
5 Shealy has testified that the combination is obvious over that motivation,
6 unlike the *ActiveVideo* and *InTouch* and *Belden* cases.

7 Patent Owner next, on Slide 117, irrelevantly argues that Beach
8 etches the n-type materials when Saxler has p-types. In that Beach's
9 approach would cut off Saxler's sloped sidewalls. As we just discussed, it's
10 irrelevant that Beach etches n-type. The combination only relies on Beach
11 for its single mask to etch two layers. That's the alignment. And the
12 combination wouldn't cut off the sidewalls because Saxler has already
13 disclosed making them with its conventional techniques. And as also noted
14 with the Shenoy reference, shown here on the next slide, the etching process
15 will often achieve the sloped sidewalls that we saw in the Uemoto reference
16 and so on.

17 So, on Slide 120, we'll address Patent Owner's argument that Dr.
18 Schubert advanced, which is that Shenoy would somehow not undercut the
19 gate metal, but would also etch the underlying p-GaN layer.

20 So, I'd like now to go to Dr. Schubert's declaration. Okay, I think
21 we'll do it in screen mode. So, this here shown on your screen should be the
22 cover of Dr. Schubert's declaration. And we'll jump to paragraph 170, which
23 I've highlighted on your screen. In paragraph 170, Dr. Schubert is
24 addressing Dr. Shealy, Petitioner's expert, and Dr. Schubert's addressing Dr.
25 Shealy's arguments that Saxler would create -- Saxler's p-GaN layer would

1 not be etched by Shenoy's techniques, but only the gate metal would be
2 etched. And Dr. Schubert says, quote, "I disagree with this statement
3 because neither Saxler nor Beach teach any passivating of the GaN
4 material." Now, as we just discussed, it's irrelevant what materials Beach
5 has because we're not relying on Beach's etching methods or Beach's
6 materials.

7 Further, Dr. Schubert is wrong about Saxler, as we pointed out in
8 the reply. Here is the cover page of Saxler. And I've highlighted in the title
9 itself, it talks about passivation. And as we go down to Saxler at paragraph
10 16, we see that the CAP layer comprises a GaN material. And paragraph 25
11 talks about forming a passivation layer directly on or at least a portion of a
12 surface of a region of the group 3 nitride semiconductor material of this
13 group 3 nitride semiconductor device. And that's referring to the CAP layer.
14 If we go down to paragraph 26, Saxler further says that furthermore, the
15 group 3 nitride material may be GaN-based. And moving on to paragraph
16 67, Saxler discloses a conventional passivation layer for Figure 1A, which is
17 the modified Figure that's in the proposed combination.

18 Now, Dr. Schubert doesn't stop there. So, in addition to not being
19 correct on what Saxler discloses, if we go to paragraph 175 of Dr. Schubert's
20 declaration, he says that Shenoy reports that the etching process is isotropic.
21 So, if we trust this disclosure, then the etching process proceeds in all
22 directions at the same rate, absent an insulator, and the GaN materials below
23 the metal would be etched as well. But as we'll see, that contradicts the
24 patent.

25 Let's go now to the '347 patent. This is the cover page of the '347

1 patent on your screen. And we'll jump to Figure 6A. This is the self-aligned
2 method. We're depositing all the layers in Figure 6A. Figure 6B is when the
3 etching of both layers is performed to get those sloped sidewalls. And in the
4 patent, Figure 6C shows the undercut. And the patent describes that
5 undercut in Column 4 as isotropic. So, as shown in 6C, I'm quoting from
6 lines 20, starting at line 20 of Column 4, as shown in Figure 6C, the gate
7 metal 604 is then etched isotopically, which results in the gate metal having
8 a width less than the planar upper surface of the p-type gate material. And
9 so, Dr. Schubert's testimony that Shenoy wouldn't work because it's isotropic
10 contradicts the patent and should be ignored. And his testimony that Saxler
11 doesn't describe passivation is also incorrect.

12 In contrast, Dr. Shealy explained that the p-GaN material etches
13 more slowly than the gate metal. In his deposition, he explained why. And
14 that then would result in the Saxler-Yoshida gate structure under the
15 proposed combination.

16 JUDGE ABRAHAM: Counselor, just so you know, you're
17 approaching about five minutes left of your original time.

18 MR. MACDONALD: Okay. Thank you. So, jumping ahead then,
19 we'll address the Saxler and Ahn grounds briefly. So, Patent Owner
20 advances several attacks against the Saxler-Ahn grounds, which are shown
21 on Slide 126, with additional attacks on the Yoshida-Ahn grounds. And all
22 of these attacks, as we'll see on Slide A -- Slide 127, listed here as A and B,
23 relate to a thinly-veiled analogous art argument.

24 So, Petitioner's preliminary reply showed on is analogous. Patent
25 Owner makes the same argument in its Patent Owner response, but drops the

1 term analogous. In the pre-institution, Petitioner's preliminary reply showed
2 that Ahn is in the same field of endeavor as the patent and reasonably
3 pertinent to the problems of the patent. And the law says that once it's
4 analogous, once it's established it's analogous, a POSITA would have looked
5 to Ahn to address the problems. And the art here cited in the space of
6 transistor is much closer than the case cited in the Petitioner's preliminary
7 reply, which is *In re Bigio*, where a prior art toothbrush was found to be
8 pertinent to a patented hairbrush. And that was found to be analogous art.
9 We're much closer than that, especially considering the definition of a
10 POSITA.

11 Petitioner advanced a definition of POSITA in which a person of
12 ordinary skill had two years of experience in semiconductor design and
13 fabrication. Patent Owner advanced a similar definition in which a POSITA
14 had three years of experience, but said that the disagreement doesn't matter
15 for the analysis. So, under Patent Owner's -- Petitioner's two years or Patent
16 Owner's three years of experience, Ahn is certainly within the realm of
17 references that a POSITA would consider to get to this targeted gate
18 structure more efficiently to improve alignment and symmetry. Ahn
19 discloses in particular dry etching both layers under a single mask and then
20 wet etching to undercut the top layer. That's found in Ahn at column 7,
21 where Ahn teaches three different ways to use one mask to etch two
22 different layers to get that stacks and steps gate structure found in the
23 original Saxler modified Figure 1A.

24 So, in summary for the Saxler-Ahn grounds, all Patent Owner's
25 arguments have failed regarding whether a POSITA would look to Ahn and

1 use its techniques. And we'll move ahead to the Ahn -- I'm sorry, the
2 Yoshida-Ahn approach.

3 So, let's hit just briefly on Slide 135. We'll talk about the Yoshida
4 in view of Beach and Shenoy, the Yoshida-Saxler. So, we have here on
5 Slide 135 that target modified Yoshida structure where we brought in Saxler
6 sloped sidewalls to solve that problem of gate leakage. And Patent Owner
7 misunderstands obviousness, arguing that there would be no motivation to
8 apply the self-aligned technique of Beach because Yoshida is allegedly
9 specific. That is incorrect on the law. First of all, it's also incorrect on the
10 facts. As the Board noted, Yoshida has a flexible fabrication method. And
11 Patent Owner advances a theory of obviousness here that *KSR* has rejected.
12 Yoshida's gate formation is so specific that a POSITA would not seek to
13 change it. That's wrong because obviousness accounts for inferences and
14 creativity, and a POSITA as a person of ordinary creativity, not an
15 automaton. A POSITA would have formed Yoshida's gate in any order, as
16 Dr. Shealy testified, because of that ordinary creativity.

17 Patent Owner also argues that Yoshida teaches away. That's
18 shown here on Slide 136. That's incorrect. Nothing in Yoshida rises to the
19 level of discrediting or disparaging the proposed combination. Yoshida
20 mentions conventional photolithography and etching. It never disparages it.
21 It never disparages anything. It even uses the conventional approach. So,
22 that doesn't satisfy the legal requirements for teaching away.

23 A third argument Patent Owner advances for this Yoshida
24 combination is that Yoshida is gate last. But when you examine paragraph
25 22, as well as paragraph 23, as mentioned here on Slide 137, Yoshida

1 specifies no order of gate and ohmic contact formation. And it actually
2 teaches finishing the gate before the ohmic contact, as Dr. Shealy testified.
3 That's certainly not gate last. And Dr. Shealy noted that a POSITA would
4 have formed Yoshida's gate in any order. And he explained the benefits of
5 making the proposed combination to form Yoshida's gates. So, all those
6 arguments that Patent Owner has advanced against the Yoshida-Saxler with
7 Beach and Shenoy have failed. That's summarized in Slide 138.

8 And finally, we'll hit the Yoshida and Ahn grounds. Now --

9 JUDGE ABRAHAM: Counsel, just so you know, you're using up
10 your rebuttal time now, but you're welcome to, you know, it's your
11 discretion.

12 MR. MACDONALD: Thank you, Your Honor. We'll keep going.
13 We'll finish this. I appreciate that.

14 Slide 140 shows the target structure, which is Yoshida's device,
15 Figure 1. It's an enhancement-mode device. The only feature it lacks is a
16 sloped sidewalls for the claimed structure. Now, Ahn's approach provides a
17 simpler way of getting at that structure that a POSITA would have found
18 obvious. And as summarized on Slide 141, it notes that Ahn discloses dry
19 etching both gate layers under a single mask and then wet etching to
20 undercut the top layer, which results in Yoshida's structure. And a POSITA
21 would have found it obvious to use this approach to improve alignment and
22 precision. This combination was just a simple substitution that could be
23 predictably implemented as Dr. Shealy testified.

24 And we'll address now Patent Owner's arguments to the contrary,
25 summarized on Slide 142. Now, on Slide 143, we see Patent Owner's

1 arguments that, again, the petition didn't specify how to make the
2 combination. But as with Saxler, Dr. Shealy explains why you would use
3 Ahn's approach. The passage from the petition cited here on Slide 143 lays
4 it all out. Yoshida discloses a two-mask process. So, to reduce steps, Ahn
5 teaches using a single mask with two etches. That would improve
6 alignment. That would improve symmetry. And this Slide shows where Dr.
7 Shealy explains it, and a POSITA would have been motivated to make this
8 modification.

9 Now, on Slide 144, Patent Owner makes a similar thinly veiled
10 analogous art argument that, as we've discussed, should be rejected. Ahn is
11 absolutely prior art within the skill level of a person of very ordinary skill.
12 And a POSITA would have looked to Ahn under the law to solve these
13 problems in gate structure formation.

14 Regarding Patent Owner's third argument, it's similar that Ahn
15 does not apply to Yoshida. And again, as we've discussed, Ahn discloses a
16 simple method that could be used in Yoshida's approach. It discloses three
17 different ways to use that single mask to reach that same stacked and stepped
18 gate structure. And this approach would have been obvious for the reasons
19 Dr. Shealy articulated.

20 Finally, Patent Owner's argument against the combination is that a
21 POSITA would have no reason to improve precision alignment because
22 Yoshida already draws it. And this misunderstands the combination. The
23 petition provide reason that Ahn provided a known way to make the
24 structure which is drawn by Figure 1. And everyone -- and as Dr. Shealy
25 has testified, manufacturing challenges can arise when making these devices.

1 He talked about the sloped sidewalls. And a POSITA would have found it
2 obvious to make Yoshida's device using Ahn's approach to address those
3 problems. In fact, that's the problem that Patent Owner notes for Uemoto,
4 that the gate can be slightly misaligned when it's drawn in the center. A
5 POSITA would have used Ahn's approach to get back to that idealized
6 drawing of Figure 1 to reduce those kinds of errors. That's exactly the
7 motivation that Dr. Shealy provided for this combination. And we were just
8 on Slide 146.

9 So, in summary on Slide 147, all the arguments against this
10 combination have failed. And the combination would have been obvious.
11 And when it's obvious, we see that all claims are invalid as summarized on
12 Slide 148 under the grounds presented in the '347 petition, just like as
13 summarized on Slide 149, the grounds under the '335 petition.

14 And with that, we'll reserve the rest of our time, Your Honors.
15 Thank you.

16 JUDGE ABRAHAM: Great. Thank you. I have you with about
17 just over 10 minutes left for rebuttal.

18 MR. MACDONALD: Okay.

19 JUDGE ABRAHAM: Great. So, we can invite Mr. Mashack to
20 begin. Just let me know if you'd like to reserve any time for rebuttal.

21 MR. MASHACK: Great, Your Honor. Thank you very much for
22 having me. Luke, can you unshare your screen? I'm not sure if I can just
23 take over. Thank you. Now, can everybody see my screen?

24 JUDGE ABRAHAM: Yes.

25 MR. MASHACK: Again, as Luke indicated, this case number,

1 these are case numbers, IPR2023. Oh, I'm sorry. I'd like to reserve 15
2 minutes for rebuttal.

3 JUDGE ABRAHAM: Okay.

4 MR. MASHACK: And I apologize. I'm getting over a cold. So,
5 I'm popping cough drops just so I'm not coughing in the presentation.
6 Thanks for your patience.

7 So, again, we're discussing case numbers 2023-01382 and 2023-
8 01834 and discussing patent numbers 9,748,347 and 10,312,335. And my
9 name is Mark Mashack and I'm representing EPC, Efficient Power
10 Conversion Corporation.

11 So, first, a couple of notes on Petitioner's slides and oral
12 arguments. Petitioner phrases the issue as elements being disputed and
13 undisputed, which is inappropriate. Petitioner based this on their
14 background discussion where they cite alleged admitted prior art and other
15 references that are relied on the grounds. And also, on Slides 8 through 10,
16 the Petitioner indicates that all of the elements in the independent claims are
17 admitted prior art, which is not correct. For example, as we'll go through, at
18 least the etching of the p-GaN and substantial equal ledges are not known in
19 the prior art among other features and other combinations of features.

20 Furthermore, the Petitioner attempts to propose a new rationale for
21 modifying Saxler and Yoshida, and oral arguments characterizing the
22 transistor schematics as idealized. That wasn't presented in the petition or
23 any of the papers. Nowhere is this motivation or a rationale presented in the
24 papers, as we will discuss later. The petition is based purely on disclosure
25 for at least the self-aligned ledges, which is improper.

1 Again, as the Board is aware, IPRs are based on patents and
2 printed publications, and specifically the grounds laid out in the petition.
3 And in addressing the grounds, we'll first go through -- first touch on the
4 '335 patent and go through why Petitioner cannot rely on schematic
5 drawings for substantially equal or self-aligned ledges. The case law says
6 you can't.

7 The prior art says that the transistor schematics are not intended to
8 show an actual device. The Petitioner and Dr. Shealy specifically rely on the
9 fact that you can't rely on these drawings for claiming features, in addressing
10 other features. This is just the first example of the duplicative nature of
11 Petitioner's positions, where they rely on the schematics when they help
12 them, but completely discredit the schematics when they don't. These
13 contradictions are all an attempt, as Dr. Shealy put it, trying to accomplish
14 the claimed invention.

15 We'll then discuss the issues that overlap the '335 and '347 patents,
16 and how the petition relies on disclosure for a number of grounds. Then the
17 Petitioner improperly backtracks the obviousness when the Patent Owner
18 points out the flaws in the grounds. In doing so, Petitioner improperly
19 attempts to bring in motivation from other grounds, which is improper.
20 We'll then talk about enhancement-mode and depletion-mode transistors and
21 why they're different, and why Petitioner lacks any technical support for the
22 proposed modification, at least because it would produce not an ideal device,
23 as their own ITC expert indicates.

24 We'll then discuss the process steps of '347 and '335 patents. We'll
25 discuss how Petitioner improperly attempting the reverse engineer transistor

1 schematics with substantial hindsight. Again, the same transistor schematics
2 that Petitioner describes repeatedly. Along those lines, relying on what is
3 shown in transistor schematics that they discredit, the Petitioner attempts to
4 modify Yoshida by adding unnecessary etching steps to reduce ledges that
5 have no function in the gate-first approach that Petitioner proposes.
6 Petitioner fails to address this issue.

7 We'll then discuss how Petitioner proposed application of Beach
8 would cut off or not form the side surfaces that Petitioner relies on, and the
9 self-aligned process of Beach produces self-aligned sidewalls, which directly
10 undercuts Petitioner's proposed modification.

11 We'll then discuss how Shenoy would etch the underlying GaN
12 material, which would again undercut Petitioner's proposed modification.
13 We'll finally discuss Ahn, which is directed to an unrelated transistor with
14 unrelated challenges and unrelated application methods. And Ahn
15 specifically relies on Ahn's disclosure of the transistor formed by differential
16 etching rates, which is because of the etching material and metals that Ahn is
17 using. And Yoshida and Saxler have completely different materials, so the
18 teaching compliance is not relevant to form the intricate gate structure that
19 they're trying to produce.

20 So, first of all, we'll go through a brief overview of the patents. As
21 Luke indicated, the '347 patent is a method patent -- or has method claims.
22 And there's two etching steps. At first, in the left-hand figure, the gate metal
23 and the gate material are layered on top of the barrier 602. And then a
24 photoresist 605 is a deposit on the gate metal. And then both the gate metal
25 and the gate material are etched to form those horizontally extending

1 sidewalls, as shown in the middle figure. We're on Slide 3. And then the
2 gate metal is then etched to form self-aligned ledges, as shown in the right
3 figure.

4 And then moving to Slide 4, we're transitioning to the '335 patent,
5 a brief overview of the '335 patent, which is directed to the product produced
6 by the method of the '347 patent, where the '335 patent defines these
7 elongated surface lengths specifically based on ledges and horizontally
8 extending sidewalls. And those ledges are defined to be substantially equal
9 or self-aligned so that there's two equal paths of electron to find two
10 elongated paths on the other side of the gate metal to reduce gate leakage of
11 that gate metal.

12 And this is a TEM image pulled from the patent, which show these
13 substantial equal ledges, which are very precise, as shown in this drawing,
14 where the substantial equal ledges, as shown in the illustrated environment,
15 are between 34 nanometers and 35 nanometers on the other side. Again, this
16 is the reduced critical dimension produced by the self-aligned features that
17 we can make these dimensions very small and very -- substantially equal or
18 equal.

19 So, moving on to the claims. First, we're on Slide 7, where we
20 show independent Claim 1 of the '347 patent. And as shown, highlighted in
21 green, again, there's these two etching steps of etching the gate metal in the
22 p-type gate material, wherein this first etching step forms these horizontal
23 extending sidewalls. And then there's a second etching step of etching the
24 gate metal to form a pair of ledges below the gate metal.

25 And then moving on to Slide 8, where we show independent Claim

1 1 of the '335 patent. So, this claims a product produced by the process of the
2 '347 patent, where first, as indicated in element [1d], again, we find this
3 horizontally extending side surfaces. And then on element [1f], you find
4 these horizontal ledges, where they're specifically claimed as substantially
5 equal widths.

6 And then moving on to Slide 9, showing an independent Claim 1
7 of the '335 patent. Similar to the previous two claims, they claim the side
8 surfaces in element [5g]. And then the [5f], instead of the substantially
9 equal ledges, it's claimed as self-aligned ledges.

10 So, we can skip over claim construction for now and go straight to
11 summary of grounds, which is on Slide 15. And then starting at 16, as Luke
12 indicated, these are the grounds for the '347 patent. There's some Saxler-
13 based grounds and some Yoshida-based grounds. And for -- so, in Grounds
14 1 and 3, Saxler is relied on by itself to disclose the structure. And they only
15 bring in Beach and Shenoy and Ahn to teach supposed method steps to
16 recreate that structure or re-engineer it. And then only in Ground 2 do they
17 bring in Yoshida to modify Saxler to produce enhancement-mode transistor.
18 But again, they rely on Beach and Shenoy for those method steps. And
19 similarly, in Grounds 4 and 5, they bring in Beach and Shenoy and Ahn for
20 the method steps.

21 Moving on to Slide 17, showing the grounds for '335 patent. Two
22 set of Saxler-based grounds, and a set of Yoshida-based grounds. And in
23 Ground 1, they only relied on Saxler by itself. And in Ground 4, they relied
24 on Yoshida by themselves. And then they make various modifications of
25 Saxler in view of Yoshida and Yoshida in view Saxler.

1 So, first going through the cited prior art on Slide 18, and then we
2 discuss Saxler in Slide 19. So, Saxler discloses two gate structures. It has a
3 recessed embodiment, as shown in the left-hand Figure, where the gate
4 contact is a t-gate, which has a stem extending between the cap layers,
5 dividing them into two separate layers. And then the top of the t-gate covers
6 the cap layers on either side. And as shown in the top left-hand figure, the
7 cap layer extends substantially the entire way between ohmic contacts. It
8 may not extend entirely the way, but it extends extensionally the entire
9 length between ohmic contacts.

10 And Saxler also discloses in Figure 1B a non-recessed
11 embodiment, where the cap layer does extend entirely the way between
12 ohmic contacts, and the gate contact sits on top of the cap layer.

13 As Petitioner admits, both these environments are a depletion-
14 mode. Both these cap layers are in depletion-mode. So, they completely
15 disregard the embodiments actually disclosed by Saxler. Rather, they
16 photoshop that figure on the bottom and name it Figure 1A as modified.
17 And certain embodiments, or certain grounds, they rely on disclosure for this
18 structure. They say Saxler's transistors are enhancement-mode, and this is
19 disclosed by Saxler. But after some pushback by the Patent Owner, they
20 backtrack to obviousness. Later, the Petitioner admits in their reply that the
21 gate structure is not disclosed by Saxler.

22 That's by Dr. Shealy's admission that the proposed photoshop
23 transistor is based on mixing, matching, and taking all the embodiments and
24 bringing in which ones you want, depending on what you're trying to
25 accomplish. This is Dr. Shealy looking backwards and trying to see what

1 he's trying to accomplish, and he's trying to mix and match embodiments
2 just for the pure purpose of trying to meet our claim language.

3 And we're on Slide 20, first discussing Yoshida. So, Yoshida is --
4 Saxler's in depletion-mode, and on the other hand, Yoshida's enhancement-
5 mode. So, Yoshida, as we term it, as we call it, is formed by a gate-last
6 approach. But the critical part of the gate-last approach is that you etch that
7 p-type material, as shown in that first and second Figures on the left, before
8 you deposit the gate metal. So, as you can tell from the figures, Yoshida has
9 ledges, but that's only a byproduct of etching that p-type material before
10 depositing that gate metal. There's no other purpose for those ledges. On
11 the other hand, actually, on the bottom of the right Figure, it says the pn
12 junction. This is the purpose of Yoshida, to form that pn junction, as
13 highlighted in red, immediately under the gate electrode G, for voltage
14 control of a small amount of carrier injection. So, Yoshida wants perfect
15 alignment between the gate electrode and the pn -- or the pn junction,
16 specifically, which is formed by the p-type material. So, those ledges are
17 just purely a byproduct of a gate-last approach, where the p-type material is
18 etched before the gate metal was deposited. That's not refuted by Petitioner.

19 And so, we term Yoshida as gate-last because the p-type material
20 is etched before the gate material is deposited. And Yoshida, on the other
21 hand, is gate-first, which we determine where both layers of the gate are
22 deposited on the barrier layer, and then they're both etched at the same time.
23 So, as Beach indicates, these form self-aligned sidewalls. And all the self-
24 alignment techniques that Petitioner relies on for the GaN material are,
25 including Beach, Beach-II, and Smith, they're all intended to form self-

1 aligned sidewalls. None of them have laterally extending surfaces because
2 they're intended to form self-aligned sidewalls.

3 So, next, moving to Shenoy. Shenoy is, as Luke indicated, it's
4 purely a mathematical model. Shenoy is a mathematical model based on a
5 photoresist layered above a metal film and an insulator layered below the
6 metal film, as shown in the model development on the left-hand side. We're
7 on Slide 22. It indicates that insulator is relied on for creating that undercut,
8 where the etching proceeds downwards until it meets the insulator, and then
9 it proceeds sideways. And again, in that bottom right-hand figure, or the
10 formula, Shenoy indicates that this etching is based on current distribution,
11 where the insulator is perfectly -- the insulator -- its model is a perfect
12 insulator in the mathematical formula.

13 So, there's no current distribution, so no etching in the insulator,
14 only etching in the metal film. And this is Ahn. Ahn is a thin film
15 transistor. Ahn is a completely different structure, a completely different
16 function, a completely different fabrication method from Saxler and
17 Yoshida, specifically. As shown on the bottom left-hand figure, Ahn is
18 directed to a double-layer metal gate, which is layered onto substrate 41.
19 And then there's specific layers on top of the gate structure that allow it to
20 work. There's a semiconductive layer, 25, and ohmic contacts, 29 and 31.
21 And then the concern for Ahn is this thin oxide layer, which is between the
22 gate and the semiconductive layer. And Ahn is really concerned about the
23 deterioration of that thin oxide layer, because if there's any deterioration
24 between that layer, there'd be a direct communication between the gate and
25 the semiconductive layer, which would produce a short-circuited transistor.

1 And this is Slide 23.

2 Moving to Slide 24, we'll go over two general concepts. First,
3 Slide 25 is that we're seeing an enhancement-mode and depletion-mode.
4 With an enhancement-mode or depletion-mode first on the left-hand side,
5 Slide 25, is normally on. So, there's continuous two-dimensional electron
6 gas extending between the ohmic contacts. So, it's normally on and the
7 function of the gate is to pinch the 2DEG off. So, it just needs to pinch that
8 2DEG immediately underneath that gate structure to turn off in function.
9 So, that cap layer, the length of the cap layer is completely immaterial. It
10 doesn't really matter because it only functions to pinch that 2DEG off. It can
11 extend entirely the way between the ohmic contacts. It can extend
12 substantially the entire length between the ohmic contacts shown in Figure
13 1A. It just doesn't matter. The length is immaterial to the function of the
14 depletion-mode.

15 And then on the right-hand side is enhancement-mode. So,
16 enhancement-mode is a little more complex. It requires more intricacies in
17 its fabrication. And it's normally off, and unlike depletion-mode, you have
18 to replenish that entire 2DEG underneath the cap layer to turn it on. So, as
19 Yoshida puts it, it's produced by etching the p-type GaN layer everywhere
20 except where the gate electrode is to be produced. So, again, they want a
21 very close relationship between that p-type material and the gate electrode,
22 so you don't have to pump a ton of voltage to replenish that 2DEG. And this
23 is specifically, as Yoshida indicates, that they want voltage controlled with a
24 small amount of carrier injection. Again, you don't have to pump a ton of
25 voltage into that gate metal, because it would produce lots of leakage and

1 completely be an inefficient enhancement-mode circuit. As Dr. Schubert put
2 it, the modes are intended, they're designed to minimize the 2DEG that
3 needs to be replenished to turn the transistor on.

4 And the second distinction is gate last versus gate first. Again, on
5 the left-hand side is Yoshida with the gate last approach, where those ledges
6 are a byproduct of depositing the gate electrode after the ledges are
7 produced, or after the ledges are cut, after the p-type materials will cut. And
8 we're on Slide 26. So, again, the p-type material is cut, and then the gate
9 electrode is later deposited, and you need a bigger platform to allow -- to
10 make sure you can deposit that gate electrode onto that p-type material
11 without any falling off, or to make sure that that gate electrode is received on
12 that p-type material. That issue is not in the gate first approach, which we
13 indicated. It's not an exact science, but with the p-type material, the -- both
14 the ledges, both the layers of the gate material are deposited and layered
15 first, and then they're both etched together. So, as shown on the right-hand
16 figure, there's no ledges. There's only self-aligned sidewalls as
17 (INDISCERNIBLE).

18 So, turning to Slide 27, diving into the substance of the grounds.
19 First, we'll talk about Grounds 1 through 6 of the '335 patent. So, all the
20 grounds of '335 patent, specifically independent Claim 1 first. So, if you
21 look at element [1f], where it defines horizontal ledges, and it specifically
22 recites that a pair of horizontal ledges have substantially equal widths.

23 And first, diving into the petition on Slide 29. The petition relies
24 purely on disclosure for these substantially equal widths. On the left-hand
25 side is Saxler, and the specific part of the petition for Saxler. And they're

1 relying on Saxler depicts a gate structure of a certain -- of a certain structure
2 and with substantially equal widths, as shown again in Figure 1A below
3 Saxler Figure 1A. So, they're relying solely on Figure 1A to show these
4 ledges that they circle in pink on the bottom left-hand image. And they do
5 mention, they use the word -- they do use the word obvious on the bottom,
6 but that's only to try to build a bridge between what's shown in Figure 1 or
7 what's depicted in Figure 1A, and what should also be shown in this
8 photoshop version, their Figure 1A modified next to Figure 1. So, they're
9 just saying that it's shown, it's depicted in 1A, and it would obviously be
10 depicted in their photoshop version of Figure 1A, just because. There's no
11 rationale that they're saying just because of the obvious. I mean, which
12 makes sense, because they're just photoshopping 1A to produce the 1A
13 modified by cutting off the stem. So, if they just cut off the stem without
14 changing what's the ledges, it would also, the same ledges would be depicted
15 in Figure 1A modified, as modified by the Petitioner.

16 And then, similar on the right-hand side is their discussion of
17 Yoshida, where, again, they say Yoshida discloses the electrodes narrow
18 within gate 5 -- or layer 5. These ledges are symmetric on the other side of
19 the gate metal, as illustrated in Figure 1. So, they're relying purely on the
20 drawings that show substantial equal ledges of Yoshida and Saxler.

21 Looking at the rule that was established by the Petitioner and
22 Patent Owner of *Hockerson*, where *Hockerson* in general is, you can't rely
23 on drawings for, on Slide 30, for particular sizes and ratios, specifically it
24 says, absent any written description in the specification of quantitative
25 values, arguments based on measurement of a drawing are of little value.

1 Again, that's Slide -- on Slide 30, addressing *Hockerson*.

2 And in Slide 31, the Petitioner's own case law that they cite to
3 support their position actually contradicts their position. So, on the middle
4 of the second paragraph is the rule. It says that even if we determine what
5 percentage ratio of an oversized abutment diameter is permitted within the
6 scope of the claim, the drawings cannot be relied on to disclose such precise
7 relative proportions. Now, the first paragraph, they address the issue. So,
8 the issue is whether Lazzara's abutment portion can be considered
9 substantially equal to the maximum thread diameter. So, the first paragraph
10 is the issue of whether you can rely on drawings for substantially equal, and
11 the second paragraph is the rule where you can't rely on drawings for
12 substantially equal. Petitioner --

13 JUDGE ABRAHAM: Counsel, let me, let me pause you real
14 quick.

15 MR. MASHACK: Yes.

16 JUDGE ABRAHAM: The -- this *Ex Parte Bjorn* case, it's not
17 precedential, right?

18 MR. MASHACK: No, it is not.

19 JUDGE ABRAHAM: And so, we're not bound by what's, what the
20 Board did in that case?

21 MR. MASHACK: No, it's not precedential.

22 JUDGE ABRAHAM: Okay.

23 MR. MASHACK: Petitioner -- sorry, go ahead. I didn't mean to
24 cut you off.

25 JUDGE ABRAHAM: No, no, go ahead. Say what you're going to

1 say.

2 MR. MASHACK: Well, Petitioner did cite it to support their case,
3 and that's the closest reference -- closest case law they could find to support
4 their case. So, if anything, this just blows a hole in their case law case,
5 which they don't have any -- it's their burden of persuasion.

6 JUDGE ABRAHAM: Okay. If we jump back to your previous
7 Slide 30, the *Hockerson* case talks about patent drawings with respect to
8 precise proportions and showing particular sizes. And the issue that we
9 addressed in the institution decision was that substantially equal doesn't fall
10 under a precise proportion or particular size. And I believe Petitioner said
11 that Patent Owner doesn't ever challenge that determination that
12 substantially equal is not a precise proportion or a particular size. Can you
13 address that? I mean, do you disagree with that statement that our initial
14 preliminary determination that substantially equal is not a precise proportion
15 or a particular size?

16 MR. MASHACK: By going back to Slide 31, the Board did find
17 that the issue was substantially equal, and the Board did find that they're
18 precise or relative proportions. So, the Board in *Ex Parte Bjorn* found that
19 the substantially equal is precise or relative proportions. So, the Board
20 found that it falls under *Hockerson*. So, we believe that the Board in this
21 case should also follow the same rule.

22 JUDGE ABRAHAM: Okay. So, there were some specific facts in
23 the *Bjorn* case. It was less than or substantially equal to, and then there's
24 another portion of *Bjorn* that talks about, you know, something -- the figure
25 showed it was greater than the size. So, and in that case, they did not apply

1 *Hockerson*, or it might be vice versa. But there are two instances where the
2 phrase substantially equal was part of a claim. In one instance, the Board
3 did, you know, follow *Hockerson*. In the other instance, the Board didn't.
4 So, it's not clear to me how we can just say, well, you know, substantially
5 equal is a precise proportion because another panel found it was in one
6 instance in a non-precedential case. I mean, don't we have to look at the
7 specific facts here and make that determination based on what's in front of
8 us here?

9 MR. MASHACK: So, going back to *Ex Parte Bjorn*, they do
10 make a distinction between an open-ended range of less than or substantially
11 equal, where they do not apply it -- or they do not apply to *Hockerson*, and
12 they distinguish that from when the issue is substantially equal. So, they
13 acknowledge that difference -- that distinction between an open-ended range
14 and being substantially equal, where an open-ended range, you cannot apply
15 *Hockerson*, but when the claim is directed to substantially equal, and that's
16 the issue of substantially equal, then *Hockerson* is applied.

17 And as far as Petitioner's argument about the application of the
18 facts of *Ex Parte Bjorn*, where they say which is larger in diameter than the
19 maximum diameter, again, here it says that we agree with the examiner that
20 even if it's larger, it could still be substantially equal. So, they're saying that
21 kind of -- that fact lends towards the examiner's interpretation of *Hockerson*
22 not applying. But the hook is down in the second to last paragraph, where it
23 says we cannot make the determination which illustrates the bump in
24 diameter as larger than the maximum third diameter, but Figure 9 is not
25 disclosed as being to scale or having any particular dimensions. So, they

1 shoot down that argument down here, saying that it can be greater than and
2 still be substantially equal, but it doesn't matter because we're not -- we can't
3 rely on the drawings for substantially equal. So, that kind of addresses
4 Petitioner's argument about they're trying to limit this holding to the facts of
5 the case of being larger than.

6 And as far as they also address other, with other case law, I think
7 one case law, I think *Seattle Box*, which just holds that substantially equal is
8 a definite term. And they also cite MPEP, which says that substantially
9 equal defines a particular dimension. So, there's -- I mean, substantially
10 equal is, if we go back to the beginning showing our illustrative
11 embodiment, substantially equal is a definite term. It's very precise,
12 especially with these narrow diameters where we're looking at a difference
13 between one nanometer between sides. So, it's not an overly broad term --
14 or it's a very precise term to find these very precise dimensions in nanometer
15 terms. So, it's not completely over broad term that you can just rely on
16 drawings for.

17 JUDGE ABRAHAM: Right. But isn't there case law that says the
18 term substantially is not precise? It can, you know, I mean, I think the term
19 equal would be precise, but we have case law, you know, binding case law
20 from the Federal Circuit that addresses the term substantially that would
21 suggest it's not precise.

22 MR. MASHACK: But other case law that Petitioner cites didn't
23 have anything to do with the drawings or whether you can rely on the
24 drawings for dimensions. They just said that it's a definite term and that it
25 can be relative. It's not -- it doesn't have to be exact. Like as the Board

1 indicated in addressing this one holding, it says substantially equal doesn't
2 have to be equal. It has to -- it says, because claiming it recites substantially
3 equal rather than equal, we agree that the diameter can be larger. So, it
4 doesn't have to be exactly equal. It can be larger or smaller, but it's still a
5 precise term, especially, specifically with in our application where in our
6 definition where we define substantially equal as being formed by a self-
7 aligned -- as it's alleged is being formed by self-aligned technique, which are
8 within like nanometers. That's how we show it. And it's self-aligned
9 technique forms -- that provides that type of precision.

10 JUDGE ABRAHAM: Where is that evidence in the record that
11 substantially equal formed by self-aligning is, you know, within nanometers
12 of each other?

13 MR. MASHACK: We don't say within nanometers, but we, in
14 Paper 10, I think this is the paper -- this is the quote where we define self-
15 aligned -- or substantially equal based on the self-aligned technique -- or
16 alleges as formed by the self-aligned technique. So, that, that imparts the
17 precision required by self-aligned technique. And that defines what
18 substantial equal ledges are, ledges as performed by, as fabricated by self-
19 aligned technique.

20 JUDGE ABRAHAM: I guess that's my difficulty by saying self,
21 some -- ledges formed by self-aligning are substantially equal. That doesn't
22 help quantify what substantially equal means if you're saying it has to be a
23 precise parameter. I mean, with the process that's used to make it, but it
24 doesn't help in terms of claim construction, understand what substantially
25 equal means. If we're going to say that substantially is not -- or that

1 substantially is a precise proportion in this case.

2 MR. MASHACK: I mean, substantially equal is a term of art,
3 which is defined by a POSA. So, as we'll go through, we show substantially
4 equal and we'll later show Uemoto, which doesn't, as Dr. Schubert indicated,
5 doesn't show substantially equal ledges.

6 So, a POSA would understand what substantially equal is, what the
7 boundaries of what substantially equal is, because we acknowledge that it
8 doesn't have to be equal. But we define substantially equal as, i.e., being
9 performed, forming ledges as produced by a self-aligned technique. It
10 doesn't have to be produced by self-aligned technique, but it's similar ledges
11 as produced by self-aligning technique.

12 JUDGE ABRAHAM: Okay. Thank you.

13 MR. MASHACK: So, again, the Board in this previous case
14 differentiated substantially equal relative to the open-ended range of less
15 than substantially equal. And before the institution, Petitioner only provided
16 this case law. They didn't cite to this case -- this holding. They only cited
17 this holding. And this was their primary case law behind *Hockerson* saying
18 that you can't rely on drawings for substantially equal because of this open-
19 ended range as held here.

20 And again, so Petitioner, again, cites allegedly the Board applying
21 the drawings to substantially equal to. But that's just based on this ruling.
22 The holding is, drawings don't apply this limitation. So, they're applying
23 this holding to the prior art saying that the prior art shows it's substantially
24 equal, even though they don't mention the less than substantially equal, it's
25 applying this holding where *Hockerson* doesn't apply. And all -- that's

1 consistent with all of the pin cites that they cited for *Ex Parte Bjorn*. And
2 even if, even in cases where *Hockerson* doesn't apply, the Board and the
3 Court has to consider the prior art and the accuracy of the drawings. The
4 prior art, the Petitioner, and Dr. Shealy repeatedly discredit the drawings --
5 the same drawings that they rely on.

6 As indicated in paragraph 42, which it says that regions illustrate in
7 the figures of schematic in nature and their shapes are not intended to
8 illustrate the precise shape or region of the device. So, you can't rely --
9 Saxler itself says you can't rely on the drawings for substantially equal
10 because it says the precise shape of the device is not intended to be
11 illustrated in the drawings. This is right there.

12 And then Petitioner ran with this on paragraph 42 of Saxler and
13 applied to Yoshida, which it says that the drawings are shown in Figure 1 is
14 inaccurate and it doesn't illustrate an actual transistor as produced. So, even
15 if *Hockerson* doesn't apply, that if you look where it ends, Slide 33. So, if
16 you read *Hockerson*, when it doesn't apply, *Hockerson* is directed to
17 screwing a screw into a fixture, an implant. So, they rationalize saying, oh,
18 these dimensions have to be here, have to be present for that screw to fit in
19 that fixture. That's not present here. It's not a mechanical device and the
20 prior art specifically says you can't rely on the drawings because they're not
21 intended to be accurate.

22 JUDGE ABRAHAM: But is it -- sorry, if you just go back to
23 Saxler, is Saxler -- sorry, yeah, Slide 33.

24 MR. MASHACK: Thirty-three?

25 JUDGE ABRAHAM: Saxler is talking about the shape of its

1 device. It seems that you're extending that so you can't rely on anything
2 about the figures for an understanding of what they're depicting, right?
3 Petitioner seems to argue that there are certain things that a schematic
4 drawing can show and they represent accurately, and there are other things
5 that a schematic drawing cannot. And so, we're relying on this symmetry or
6 substantially equal. That's, yes, it may be a schematic drawing, but you can
7 rely on the schematics to show that part of the figure. Why is that wrong?

8 MR. MASHACK: So, this shape, they say the precise shape of an
9 originated device, and the shape -- they're basing their opinion on
10 substantially equal based on the shape of the p-type on each side of the gate
11 material. So, those are the shapes that they're identifying for substantially
12 equal ledges because the ledges are defined in the p-type material and the
13 shape defines the ledges on opposite side of the p-type of the gate metal. So,
14 it's specifically saying that those shapes, like the form -- the shapes of the
15 ledges on each side of the gate metal are not accurate, not intended to be
16 illustrated to show an actual transistor, if that answers your question.

17 JUDGE ABRAHAM: So, it's your position that here, Saxler at
18 paragraph 42, when it's talking about the shape, that includes how the
19 different shapes line up to be substantially equal, to form a substantially
20 equal ledges?

21 MR. MASHACK: Yes, the ledges are defined by the shape of the
22 p-type material and on opposite sides of the gate metal. And that's exactly
23 what it's saying. It's those shapes of those ledges are not accurate -- or not
24 intended to be accurate. And you -- I mean, we're not completely
25 discrediting the drawings. I mean, the drawings still have features. They

1 show elements. They rely on those paper sidewalls, the Petitioner does, but
2 it says the precise shapes or -- cannot be intended. It cannot be illustrative
3 of an actual device. And those shapes are -- those ledges are defined by
4 shapes of the p-type material.

5 JUDGE ABRAHAM: Thank you.

6 MR. MASHACK: So, again, they -- Petitioner took that teaching
7 and ran with it and said that Yoshida -- sorry, that the Figure 1 of Yoshida
8 doesn't actually illustrate a transistor on an actual device. Again, that's them
9 talking on both sides of their mouth where they say, oh, we can rely on
10 drawings for features that we want, but discard the features that we don't
11 want. And here again, on Slide 34, it's Dr. Shealy continuing to describe the
12 drawings where they say the vertical scale is inaccurate. I think he identifies
13 1B as a strange cartoon. It's a crude design, no way to produce that figure.
14 And similarly with Yoshida, he says that Figure 1 doesn't appear -- doesn't --
15 is not going to be what it appears like.

16 So, again, Dr. Shealy and Petitioner completely discredit these
17 drawings as being inaccurate. The vertical scale, the vertical size, the --
18 Saxler says the shapes can't be relied on. And this is, again, illustrated in the
19 top figure, which is reduced from our own figure -- our own patent, which
20 annotates Figure 7B, which is an SEM image of showing the ledges being
21 substantially equal where they're one nanometer off. And that's compared to
22 Uemoto below, which shows a centrally aligned gate electrode. And it's
23 cartoon, as Dr. Shealy points it, or schematic. And on the right-hand side,
24 it's not centrally equal.

25 So, in their reply -- or in Slide 36, the Petitioner improperly

1 attempts to introduce some motivation. Their motivation is very conclusory.
2 It says a POSITA would have seen Figure 1A, chose a center gate with the
3 ledges (INDISCERNIBLE) width, and found such a gate obvious. That's
4 pure attorney argument, because Dr. Shealy never stated that. And it's just
5 pure -- it's just a conclusory statement that you can't rely on for obviousness.
6 And also, again, the petition relies purely on disclosure, and it would be
7 improper to introduce that type of obviousness statement into the
8 disclosure -- into the petition after the fact. And this is -- obviousness
9 statement is also contradicted by paragraph 42, again, the Saxler, which
10 says, the shapes are not intended to illustrate the precise shape of a region of
11 the device. So, again, the shape are the ledges, and those are not intended to
12 be accurate.

13 JUDGE ABRAHAM: If I could pause you real quick on this slide,
14 I want to make sure I understand your argument that you're portraying here.
15 It's that the petition says the figures disclose these substantially equal. But
16 then in the reply, they're saying, well, that limitation would be obvious based
17 on the figure, and those are two different arguments, and it's a new argument
18 in the reply?

19 MR. MASHACK: Yes. Yeah, there's a number of case law
20 passage, or case law that support the position that you can't shift between
21 what teaches -- from what teaches in the petition to what is obvious in the
22 reply. Those type of shifting is improper because it's unfair to the Patent
23 Owner because we can't respond with expert testimony. And it's the Federal
24 Circuit shot those type of -- that type of shifting down for being improper.

25 So, going next to Slide 37, which shows independent Claim 5 of

1 the '335 Patent and what's underlying is self-aligned ledges, which we'll
2 address now. So, Petitioner -- or the Petition completely ignores this
3 limitation. They allege that the self-aligned ledges lends no patentable
4 weight based on the interpretation of being product-by-process. Initially,
5 Patent Owner disagrees as product-by-process, but even if it's product-by-
6 process, Petitioner fails to provide any type of motivation or any type of
7 disclosure for this structure. And as agreed on by Petitioner and Patent
8 Owner, the product of the product-by-process is the substantially equal
9 ledges, or equal ledges. And it's Petitioner's duty, or they're -- they have to
10 disclose -- they have to show this structure is either disclosed or render
11 obvious in the prior art, and they completely failed to do that.

12 JUDGE ABRAHAM: If you -- if we decide that it is a product-by-
13 process limitation, these self-aligned ledges is a product-by-process
14 limitation, then can Patent Owner, I'm sorry, can't Petitioner demonstrate
15 that element by showing that the ledges are substantially equal?

16 MR. MASHACK: Yes, arguably. If --

17 JUDGE ABRAHAM: And I'm not saying that they have or have
18 not, I'm saying that's how they would do it by showing that -- if they could
19 show that they're substantially equal, that would satisfy this limitation if we
20 determine it's a product-by-process limitation?

21 MR. MASHACK: Yes. The rule, as the Board pointed out on the
22 Board, is a (INDISCERNIBLE) case where it says in determinability of a
23 product-by-process claim, but focus on the product, not the product-by-
24 process -- not the process of making it.

25 JUDGE ABRAHAM: Right. And I guess my question is more

1 directed to, you would agree that this, the process of using this self-
2 alignment gives you substantially equal ledges. And so that's, they're pretty
3 much one in the same at that point, in terms of the structure itself.

4 MR. MASHACK: Yes. The product of the, the self-aligned
5 technique is a substantial equal ledges or equal ledges, which doesn't include
6 substantially equal. And again, Petitioner fails to provide any type of
7 rationale or this product is in the prior art. They cite our own patent and use
8 that as a roadmap, which is improper. That's hindsight as held by the
9 Federal Circuit. And even setting your own patent, it says, it's passage of a
10 cite is that misalignment would be -- is misalignment -- it says that the two-
11 step -- there's a possibility of misalignment with a two-step approach.

12 And that passage itself is pulled from our own specification. So
13 using a blueprint, our patent as a blueprint, which is improper, first of all.
14 And second of all, they're trying to import motivation into the petition,
15 which is not there where they rely on disclosure. So again, that's improper.
16 And again, a possibility of misalignment, the obviousness isn't based on
17 possibility. It's a motivation of why you would do it. And even we don't
18 admit that self-aligned ledges are known and there's nothing in the prior art,
19 none in the prior art that Petitioner cites discloses self-aligned techniques or
20 substantially equal ledges. So, there's no prior art basis for the self-aligned
21 technique -- or the self-aligned ledges.

22 So, going to Slide 39, is just an illustration just between a two-
23 one -- two-mask approach and two -- a one-mask approach, and it shows that
24 the misalignment that we introduced in the two-mask approach. And again,
25 if you look at Figure 5 on the left-hand side, the two-mask approach creates

1 misalignment in that the center axes are misaligned. So, if you look at the
2 set -- the misalignment of the center axis and compare that to our claim,
3 which cites substantially equal ledges, if you offset the center alignment by
4 one nanometer, that doubles the Delta between the two ledges. So one
5 nanometer misalignment in the central axis creates double the difference
6 between because you're adding one nanometer to the one ledge and taking
7 the one nanometer away from the other ledge. So, that just highlights that
8 the particularity and the specificity of our claims.

9 So, moving to Slide 40, this shows independent Claim 1 of Ground
10 4, with respect to Ground 4 of the '335 patent. And then Claim 5, which
11 both extend the horizontal -- which both disclose the horizontal -- which
12 claim the horizontally extending sidewalls on Slide 41. And then moving to
13 Slide 42, Petitioner relies on inherency to meet this limitation for Ground 4,
14 '335. They -- we take a direct quote from the petition. It says, "Any
15 constructed embodiment would necessarily extend at least slightly on the
16 bottom due to manufacturing tolerances." So, it's inherency. They say any
17 construction embodiment would necessarily have these extending --
18 horizontally extending walls.

19 However, Dr. Shealy and Dr. Schubert both agree that vertical and
20 undercut sidewalls are a possibility. And even the Petitioner admits that,
21 and on the right box in the middle, it says that this does not mean a vertical
22 sidewall would not have been obvious. So, a vertical sidewall is a
23 possibility. Another kind of sidewall is a possibility. And they don't
24 provide any type of motivation or replacing those vertical sidewalls with
25 horizontally extended sidewalls. And again, they rely on inherency in the

1 petition and try to backtrack to obviousness in the reply, but again, there's no
2 obviousness. There's no obvious rationale in the petition to support their
3 argument, just inherency.

4 So, moving on to Ground 4 of '347 and Grounds 5 and 6 of '335,
5 where the Petitioner attempts to modify Yoshida with Saxler's sidewalls.
6 Again, the Petitioner completely disregards the difference between
7 enhancement-mode and depletion-mode transistors, where enhancement-
8 mode, as Yoshida describes it is intended to form that pn junction meaning
9 under the gate structure and adding those dramatic sidewalls of Saxler,
10 which is a depletion-mode transistor, which has lengthened that pn junction .
11 So, it reduces the voltage control as desired by Yoshida. And based on this
12 argument, they produced an alternative obviousness rationale in their reply.
13 But it's the same context, whether you're shrinking that p-type material and
14 the gate material or widening that p-type material, the criticality is a relative
15 dimension. So, they gave metal to that p-type material, specifically that pn
16 junction . That's Yoshida thinks it's so critical for gate control with low
17 voltage or low injection of current.

18 JUDGE TORNQUIST: Counsel, can you go back? This is Judge
19 Tornquist. Can you go back to that Slide? Those sloping sidewalls are
20 exactly what's in the patent itself, isn't it?

21 MR. MASHACK: No, not exactly. They're -- they photoshopped
22 Saxler's sidewalls themselves into Yoshida. So, they're relying on
23 Yoshida -- Saxler's sidewalls. And specifically --

24 JUDGE TORNQUIST: I understand, my understanding of your
25 argument was, hey, if you use any amount of this cap material that's outside

1 of the gate, you're going to cause an issue with turning back on the 2DEG
2 when you want to activate the transistor, correct?

3 MR. MASHACK: There's two issues. There's an issue between
4 turning Saxler into an enhancement-mode. That's the issue of turning on and
5 off because that cap layer is so thick. This issue is modifying Yoshida with
6 the sidewalls of Saxler because you're just increasing the voltage
7 requirement for controlling that transistor.

8 JUDGE TORNQUIST: Right. And I guess the question I have
9 then is the patent in Figure 5 also increases the distance.

10 MR. MASHACK: Yes.

11 JUDGE TORNQUIST: So, but you're saying that we wouldn't
12 want to do that, but that's exactly what the patent's doing.

13 MR. MASHACK: But essentially, you have to look at what
14 Yoshida teaches and discloses. Yoshida actually teaches away. Yoshida is
15 concerned that pn junction, it's not until our patent saying that, oh, we want
16 to create a different structure. That's one response to your question. And
17 second response to the question is that they're, again, they're relying on
18 sidewalls of Saxler, not our own sidewalls because that's the ground. It's
19 Yoshida in view of Saxler.

20 JUDGE TORNQUIST: Okay.

21 MR. MASHACK: So, again, but Yoshida teaches away from
22 forming that because they want that pn junction, as they say, immediately
23 under the gate electrode. So, even though we show a different transistor
24 with those sidewalls, that's not -- that's Yoshida is teaching away. It's on --
25 Yoshida says it's undesirable to like that pn junction because the pn junction

1 wouldn't be immediately under the gate electrode because Yoshida is the
2 base of the grounds.

3 So, turning to Slide 44, we're addressing Grounds 1 and 3 of '347,
4 within independent Claim 1, specifically, an enhancement-mode transistor.
5 And then looking at Ground 1 of '335 patent on Slide 45, and then Ground 1
6 of '335, again, on slides -- with enhancement-mode independent Claim 5, the
7 '335 patent.

8 So, Grounds 1 and 3 of '347 and Ground 1, '335 are all Saxler
9 alone rejections -- or grounds. They don't introduce Yoshida until Ground 2
10 of '347 and Grounds 2 and 3 of '335. So, in these grounds, they specifically
11 rely on disclosure of this photoshop version of their transistor, as well as
12 enhancement-mode. And the left-hand column, it says, Saxler's gate contact
13 may be recessed or not recessed. And wherein the gate recess is not utilized,
14 Saxler is on the following structure, which they take Figure 1A and just take
15 out that stem of the t-gate material -- t-gate structure.

16 And they specifically refer to it as Saxler's non-recessed
17 embodiment. So, they're saying it's in Saxler. And again, they keep on
18 relying on this recess being optional. So, what they're saying is Figure 1 has
19 a recessed option, a non-recessed option, Figure 1B has a non-recessed
20 option, a recessed option. So, they're trying to argue that they're just picking
21 in an embodiment actually disclosed because that recess is optioned. There's
22 only a finite of gate structures that they're saying that 1A is recessed or it can
23 be not recessed, or 1B can be recessed or not recessed. They're just picking
24 one of those embodiments that they're saying is disclosed by Saxler.

25 And it's specifically evident where on the right-hand box, where it

1 says Saxler discloses a certain structure, it's like Figure 1A and 1B, this
2 constitutes a normally off-enhancement-mode transistor. A POSITA would
3 have understood that Saxler transistors are enhancement-mode, at least
4 because of their gate structure. So, again, there's the reliant disclosure for
5 both the structure and also enhancement-mode transistor.

6 When Patent Owner pressed Dr. Shealy -- I'm trying to find where
7 the exact disclosure of that photoshop version that they're relying on, he
8 made these quotes saying that it's based on paragraph 52. And his opinion
9 that paragraph 52 allows them to mix and match and take all embodiments
10 and bring in which ones you want, depending on what you're trying to
11 accomplish, which is not disclosure, it's not obviousness, it's pure hindsight
12 based on looking back and trying to modify what you're trying to accomplish
13 and what the person looking back is trying to accomplish, what Dr. Shealy is
14 trying to accomplish.

15 And again, on the right-hand box, they fall back from disclosure to
16 obviousness law. And instead of -- and show Saxler disclosing
17 enhancement-mode, now they rely on is a motivation to produce
18 enhancement-mode at (INDISCERNIBLE) recess. So, it's completely a
19 contradiction of whether it discloses enhancement-mode transistor in the
20 petition or in their reply, they're trying to modify Saxler to produce
21 enhancement-mode. And they cite Shealy 103, which is only cited for
22 Grounds 2 when they're -- the only time they try to modify Saxler to produce
23 enhancement-mode is when they bring in Yoshida. So, Grounds 3 is for, I
24 think, Ground 2 of '335. And similarly, there's a similar passage, or
25 paragraph 146 of Shealy, which is for Grounds 2 of '347. So, the only time

1 in the petition they try to modify Saxler to produce enhancement-mode is
2 based on Yoshida. And the grounds -- these certain grounds are based on
3 disclosure of its structure and disclosure of enhancement-mode transistor.

4 So, in their reply, again, they cite unrelated grounds of turning it
5 into enhancement-mode transistor, which in the petition, they only rely on
6 disclosure of enhancement-mode transistor. And they rely on another
7 ground, another obvious statement of that simplifies Saxler's Figure 1A,
8 which is complete attorney argument in hindsight, where it's just circular
9 logic, where they try to start with the Figure 1A, the recessed embodiment,
10 and they look at another reference saying that it shows a transistor without a
11 recess. And they try to circle back to 1A, saying, oh, a non-recessed
12 embodiment is a suitable option, even though the figure in Saxler discloses a
13 non-recessed option. And there's -- it doesn't provide any motivation of
14 taking Figure 1A and removing the recessed embodiment.

15 So, yeah, you asked Luke of different passages of the recess being
16 optional, and this is where this chart came from. These are the passages
17 where they cite saying that the recess is optional, and they address the non-
18 recessed embodiment and the recessed embodiment. So, again, there's clear
19 distinctions between the non-recessed and the recessed embodiment. They
20 highlight -- Petitioner highlights overlap, which, if you look at the thickness
21 of the cap layer, it's disclosed to be 2 angstroms to 20 angstroms, and the
22 recessed embodiment would be 5 to 5,000 angstroms. So, the only overlap
23 in the recess range would be 0.1 percent of the recess range. And, again,
24 they're relying on exactly how Figure 1 is shown -- 1A is shown by
25 removing that recess, and that's the only disclosure of these sidewalls is

1 Figure 1A.

2 So, if you're reducing the width to the 0.1 percent range of the
3 recessed embodiment, then you'd have to produce a different structure. It's a
4 different transistor than what's relied on. And they're reducing it to the 0.1
5 percent in the range of the recessed embodiment, and it's all pure speculation
6 that these tapered sidewalls would actually still be present when it's that
7 narrow. It's likely that once you reduce it to that thickness, it would revert
8 back to what they show as a non-recessed embodiment, because that's what
9 they're trying to -- that's what Petitioner is trying to indirectly get to.

10 And they also cite paragraphs 13 and 71 for an alleged disclosure
11 of the same doping range for the recessed and non-recessed range
12 embodiments. But as outlined in the slide, on Slide 51, there's pure
13 distinctions. They describe the recessed embodiment with a doping range.
14 They describe it in non-recessed embodiments, in particular, embodiments
15 that are present invention of the gate recess on top of paragraph 71. Then
16 they say in particular embodiments with the gate recess.

17 So, just because the non-recessed and recessed embodiments are
18 described next to each other doesn't mean this doping concentration, which
19 is described for the recessed embodiment, would also apply to the non-
20 recessed embodiment. It doesn't make any sense. They're making -- the
21 sector's making distinctions. And this is further highlighted in the bottom of
22 paragraph 71, where they say that the non-recessed embodiment can't be
23 conductive while the recessed embodiment can be conductive. So, they can't
24 have the exact same doping range, because, one, the doping ranges has to
25 include a conductive doping level, and one can't. So, there can't be the exact

1 range for the recessed and non-recessed embodiment.

2 And again, here's 50 -- paragraph 52, which Dr. Shealy says it can
3 mix and match and take all embodiments (INDISCERNIBLE), which is not
4 anywhere in paragraph 52. And then Petitioner actually tries to massage that
5 and say that paragraph 52 expressly acknowledges Saxler's recess is
6 optional, which, again, that's disclosure. If it's -- if Figure 1A says recess
7 is -- if the recess is optional, that's an expressed disclosure, which they
8 backtrack from. And then, again, Saxler itself tells a POSITA. If Saxler
9 itself is telling you, then that's not -- it's a disclosure. That's not obviousness
10 law.

11 And again, there's no illustrations to these other embodiments,
12 where it says where Figures 1A through 6 disclose some embodiments, and
13 there's other embodiments that may or may not include a gate recess, there's
14 no -- it doesn't say anything about being optional. It just says there's other
15 optional -- other embodiments available. And this is specifically shown in
16 this last paragraph, where it says, or the last sentence, where it says that the
17 embodiment covers any suitable structure having a cap layer and a
18 passivational layer, as described herein. That's completely unreasonable to
19 extend this disclosure to any single structure with a passivational layer or a
20 cap layer that's disclosed.

21 So, again, on Slide 53, Petitioner relies on disclosure. It says
22 Saxler discloses and citing Figures 1A and 1B normally off enhancement-
23 mode GaN transistor, a POSITA would understand that Saxler's transistor
24 were enhancement-mode. So, this is citing Grounds 1 and 3 of '347 and
25 Grounds 1 of '335. But, however, they later contradict that statement, saying

1 that Saxler does not disclose an enhancement-mode. Dr. Shealy opined that
2 this is enhancement-mode, the recessed embodiment, and the non-recessed
3 embodiment is also non-enhancement-mode.

4 The main issue here is the difference between the depletion-mode
5 and enhancement-mode, and a person of ordinary skill wouldn't try to
6 retrofit this depletion-mode transistor of Saxler based on the non -- the
7 enhancement-mode transistor of Yoshida, where again Yoshida discloses
8 that they want the pn junction immediately under the electrode, so, for
9 voltage control with a small amount of carrier injection. And that's
10 produced by etching the p-type material except where the gate electrode was
11 to be loaded.

12 On the other hand, this p-type material of Saxler extends
13 substantially the entire way between the electrodes. And as Petitioner's own
14 IT expert said that if you make that cap layer really thick and really wide, it
15 would produce not an ideal device with lots of leakage. And as Dr. Schubert
16 put it, a POSA would not produce any mode device in this manner because
17 of the excess voltage requirements, it might not even turn on. So, that is for
18 retrofitting this depletion-mode transistor into enhancement-mode transistor
19 when Yoshida tells you that's not how you do it.

20 And, again, the Petitioner, in their reply, they rely on some
21 attorney argument for saying the access regions are the same for both this
22 photoshop version of Figure 1A and also our own disclosure, where they
23 highlight these access regions, which is right under the p-type material.
24 Those access regions extend the entire way. And, obviously, these access
25 regions are not the same for these two, where with the modified Photoshop

1 version of Figure 1A, the cap layer extends almost entirely to the only
2 contacts. So, majority of access region, at least the majority is covered,
3 while the majority of access regions, our own patent is not covered.

4 So, now we're on Slide 57, returning ground.

5 JUDGE TORNQUIST: Counsel, this is Judge Tornquist. Can you
6 go back to that slide again?

7 MR. MASHACK: Yes.

8 JUDGE TORNQUIST: Just one back. I want to make sure I
9 understand this. Because I understand what that p doped cap layer will do is
10 deplete the 2DEG underneath it, correct?

11 MR. MASHACK: Yes. For enhancement-mode, it's a sponge.
12 So, the cap layer sucks up the 2DEG for the entire 2DEG underneath the cap
13 layer.

14 JUDGE TORNQUIST: Okay. And the access regions are the
15 areas that are under the green cap layer, but not under the gate?

16 MR. MASHACK: No. That's a mistake by Petitioner. The access
17 region actually extends all the way from the gate to the contacts. So, this
18 was an image that Petitioner annotated that show the access regions being
19 the same. But, first, that's under a misinterpretation of access region, which
20 extends entirely from the gate contact to the ohmic contacts. And so, that's
21 their first mistake, that they have the access region completely wrong in this
22 figure that they show. And the second point that they're wrong is that they're
23 not the same. The majority of the access region in their modified photoshop
24 version is the p-type material extends entirely between the ohmic contacts,
25 almost entirely between the ohmic contacts. So, the majority of the access

1 region is covered by the p-type material in their proposed version, but it's not
2 in the Patent Owner's version.

3 JUDGE TORNQUIST: Okay.

4 MR. MASHACK: Does that answer your question?

5 JUDGE TORNQUIST: I think so. I have to just go back and
6 make sure I look at that again.

7 MR. MASHACK: Okay. And, again, this p-type material only
8 sucks up the 2DEG immediately underneath it. So, this p-type material
9 would not have any effect on this fourth part of the access region, while this
10 p-type material has an effect on this entire access region, or substantially the
11 entire access region. And the gate contact, gate electrode, the function is to
12 replenish the 2DEG. That's the function of the gate metal.

13 JUDGE TORNQUIST: Right. But if that gate cap, say in purple
14 on your right-hand side, is very large, then when you do replenish, it would
15 replenish under that part of the gate, correct?

16 MR. MASHACK: If it's very large. So, the voltage requirement is
17 based on the width and the length of the cap layer. So, in their proposed
18 modified version, you have to pump a ton of voltage in to be able to
19 replenish this entire pn junction.

20 JUDGE TORNQUIST: Okay. Perhaps what's throwing me off a
21 little bit is on page 26 of the Patent Owner response, when you draw the
22 access regions, you have the 2DEG under the cap, but not under the area of
23 the -- under the gate, but not under the areas of the cap that are not under the
24 gate. So, maybe that's what's throwing me off a little bit.

25 MR. MASHACK: I will have to look at that. What's --

1 JUDGE TORNQUIST: Page 26.

2 MR. MASHACK: POR 26. I'll look at that for my sur-reply. I've
3 heard it somewhere.

4 JUDGE TORNQUIST: Thank you.

5 MR. MASHACK: So, going to Slide 57, which we'll start
6 discussing the etching steps, or the processes of '347 patent, where, again,
7 there's a first etching step and there's a second etching step, where the first
8 etching step produces substantial equal ledge, and the second etching step
9 produce this pair of ledges. So, Petitioner tries to phrase it as Saxler being
10 flexible, and they phrase it by splitting one step into two or combining two
11 steps into one, which they're trying to provide a route or a road so they
12 completely redesign Saxler based on their -- how they want it to be to meet
13 the claims. But splitting one step into two and two steps into one doesn't
14 provide you complete authority to completely re-engineer the Saxler
15 process. And they're applying simple substitutions, which is fraught with
16 hindsight, and they fail to find any specific process sequence, which is
17 apparently by strategy, so they can improperly shift petition to combinations.
18 So, they did their reply -- in their reply, they say, oh, no, that's not what I
19 meant in the petition, but this is what I meant. And that seems to be by
20 design with the petition where they just refuse to give us any type of process
21 steps.

22 And again, with Yoshida, Yoshida is not -- it's not disclosed to be a
23 method step -- or a flexible process, as Dr. Shealy points out, specific order
24 of process steps. And we're not saying that there's -- it'd be impossible, you
25 can't make any type of modifications to Shealy or to Yoshida. The thing is,

1 you can't just completely redesign it based on characterizing as flexible
2 when it's not -- there's no any -- no suggestion of it being flexible or the
3 structure being formed by any other processes.

4 So, turning to Slide 60, where this is one very important
5 underlying issue where they premise their process steps that they propose to
6 meet the claim languages based on schematics, where, again, the Saxler
7 paragraph 42 says, these shapes are not intended to be illustrated in an actual
8 transistor. So, there'd be no reason to redesign Saxler to produce this
9 structure -- or the actual specific shapes.

10 And they also say that Yoshida is not an actual device -- Figure 1
11 doesn't show an actual device. And the only disclosure in Saxler is that the
12 gate contact can be offset close to the source contact and the drain contact.
13 They -- Petitioner tries to phrase this as you're shifting the entire structure,
14 but Saxler Figure 1A extends the substantially entire way and Figure 1B
15 does extend substantially the entire way. So, you can't shift this entire
16 structure because there's no space. So, they're specifically saying this gate
17 contact, specifically with the incorporation of Smith that we'll discuss in the
18 next slide. And shown in the bottom, it shows, again, why you can't trust
19 transistor schematics or for re-engineering purposes, where Figure 1 of
20 Saxler or Yoshida is centrally aligned, where Figure 5 is not -- shows an
21 actual image of a transistor that's not centrally aligned.

22 So, in reply to this argument where there's no centrally aligned
23 structures in either Yoshida or Saxler they reproduce based on their
24 engineering -- re-engineering of their methods, they respond by saying,
25 "imprecise gate structure would obviously lead to manufacturing defects."

1 And this is based on Saxler's incorporation of Smith. But Saxler's
2 incorporation of Smith is for left-aligned of the gate electrode. So, their
3 incorporation of Smith, of course, fabrication methods is specifically saying
4 they want a left-aligned or source-aligned gate metal. And any type of
5 central alignment would lead to severe misalignment. And with Petitioner's
6 reliance on Saxler incorporating Smith, they're saying that this centrally
7 aligned structure would obviously lead to manufacturing defects based on
8 their reliance of Smith's own fabrication methods as incorporated in Saxler.

9 So, Yoshida, again, is a gate-last approach. And these ledges are
10 formed so that gate metal can be later deposited. And Petitioner attempts to
11 re-engineer this gate-last approach forming the structure, but however, they
12 never refute that the only purpose of these ledges are because to later form
13 this gate metal on top of it. So, these ledges are a complete byproduct of the
14 gate-last approach and wouldn't be present in a gate-first approach as they
15 propose.

16 So, turning to Slide 63 in this first etching step where they rely on
17 Beach, especially in claims recite side surfaces of the p-type gate material
18 that extend horizontally. First of all, looking at this on the petition on Slide
19 64, it says, "the modification is to make the stacked gate structure of Saxler's
20 non-recessed embodiments using Beach and Shenoy's methods." And
21 they're bringing in Beach for improved alignment between layers and for its
22 simple method of making stack gate structures. So, there's no mention of
23 just using the mask. They're saying that they're using the method of Beach
24 for that alignment. And as Petitioner -- Patent Owner points out, Beach,
25 Beach-II, and Smith, which are all cited, are all for aligning sidewalls, and

1 they would cut off these horizontal extending surfaces or not form them at
2 all. So, you would not form the structure that their target structure they're
3 trying to produce based on this photoshop version of Figure 1 of Saxler.

4 And looking I say in issues are with Yoshida or as Beach self-
5 aligned sidewalls, and they won't perform -- these won't form these lateral
6 extending sidewalls as they target -- as they intend, as Petitioner intends.
7 So, it would completely undercut their modification.

8 And in the petition, they rely on a new argument of, to make the
9 stacked gate structures of Saxler's -- I'm sorry, their new argument is the
10 combination using Saxler's etching technique to create sloped sidewalls
11 using Beach's-I mask approach. That's not in the petition. They don't cite
12 Saxler's etching techniques anywhere in the modified method. They only
13 cite in the background. They don't cite it in the modified method that they're
14 relying on. And again, the method, the proposed modification was to make
15 the stacked gate structure of Saxler's using Beach's and Shenoy's methods.

16 And the reason that they're citing Beach is for an improved self-
17 alignment, which -- or improved alignment, which the self-alignment is that
18 the sides not -- wouldn't form any type of laterally extending surfaces. So,
19 the petition fails to reference the Saxler's etching techniques with respect to
20 the modified method and does not provide any suggestion of how Saxler's
21 etching techniques would be modified based on Beach and Shenoy. Again,
22 the Petitioner intentionally shifting positions.

23 So, next we're looking at Shenoy with his element [1i], where a
24 pair of ledges are formed by etching the gate metal underneath the
25 photoresist, which Shenoy, again, is a mathematical model based on this

1 underlying insulator where the etching goes -- proceeds down until it
2 proceeds sideways once it reaches this insulator. And as Dr. Shealy pointed
3 out, Shenoy is based on this current distribution (i), on Slide 69. Where in
4 Shenoy there's no current distribution with this insulator, but there would be
5 current distribution in this GaN material. So, the Shenoy would obviously
6 etch both the gate contact and the GaN material.

7 Dr. Shealy tries to backtrack on his (INDISCERNIBLE) on
8 Shenoy in Slide 70 with a couple different theories. Dr. Shealy proposes
9 "holes" theory in his deposition, where he says that surfaces of the GaN
10 material, red arrows, the surfaces would be -- or he says that after
11 performing the Beach etch, these side surfaces would be passivated because
12 it wouldn't have any holes. So, these side surfaces wouldn't be etched,
13 which Dr. Shealy disagrees. And again, it's based on current distribution,
14 which there would still be current distribution in the GaN. But even
15 assuming Dr. Shealy is correct, it's these ledges that are still not exposed
16 under the gate contact that the etching technique is intended to produce. So,
17 even if these side surfaces are passivated, these surfaces that form the ledges
18 are not. So, these surfaces would be etched with Shenoy's technique, even
19 assuming Dr. Shealy's theory is correct. And Dr. --

20 JUDGE ABRAHAM: Counsel, just so you know, you have about
21 five minutes left of your initial time.

22 MR. MASHACK: Okay. In the reply, he had to introduce new
23 arguments about many wet etchings, which is completely outside the scope
24 of the petition. And he also recites toughness of the material, which is
25 irrelevant. On Slide 51, where again, Shenoy is based on current distribution

1 (i) and not toughness of the material, and the Petitioner's proposed
2 modification based on Shenoy. And he also -- Petitioner tries to bring up
3 these differential etching rates, which the proposed combination to preserve
4 these surfaces.

5 And again, we're on Slide 71. And so, differential etching rates is
6 irrelevant because they're trying to preserve these ledges and not reduce
7 etching at the ledges. They want to preserve these ledges as shown in their
8 modified photoshop version. So, here shows both Saxler and Yoshida and
9 what you get after Beach and then Shenoy etching Saxler and Yoshida. It's
10 kind of unclear, but in any case, it wouldn't be what they're trying to target.
11 There'd be some type of etching of both the GaN and the gate material based
12 on these sidewalls, and there wouldn't be any -- they wouldn't produce what
13 they're trying to propose.

14 And the Petitioner also introduces an argument in their reply about
15 passivation in the GaN material in Saxler. But again, they don't provide any
16 type of teaching in petition. They don't rely on petition or how that
17 passivation layer would affect the Beach cut or Shenoy. It's completely
18 unrelated to the grounds and it's not relied on any grounds or how it's
19 incorporated all these other etching steps that they're relying on.

20 So, again, Yoshida is a gate-last approach where these ledges are a
21 bi-product of the gate-last approach. It's not refuted by Petitioner. So, their
22 main arguments for Grounds 4 and 5 and Ground 6 is to try to produce that
23 Figure 1 of Yoshida in a gate-first approach. However, as shown on the
24 right-hand side, if you take Saxler and perform a Beach cut, which would
25 have horizontally sidewalls, we're on Slide 74, these self-aligned sidewalls

1 wouldn't have ledges. After Beach, you'd have a functioning gate structure.
2 And that's specifically one that's desired by Yoshida because the pn junction
3 would be immediately under the gate metal. There'd be no reason to
4 perform the second etching of either Shenoy or Ahn because those ledges
5 have no function. Their only function is in the gate-last approach where you
6 create a wider platform to later deposit the gate electrode. And there'd be no
7 function in the gate-first approach. So, it'd only widen that pn junction
8 relative to the electrode, reducing the gate control, as well as adding
9 unnecessary cost of additional etching, which Petitioner swears against and
10 says is undesirable.

11 So, the Petitioner, again, tries to introduce a new rationale of these
12 ledges reducing gate leakage, but that's not supported by the petition. The
13 only supporting petition is these horizontally sidewalls reducing gate
14 leakage. Again, attorney argument and also not supported by petition.

15 Now, looking at Ahn, Grounds 3 and 5 of '347, we're on Slide 76
16 now where there's two etching steps they're relying on for both etching steps.
17 And on, again, this unrelated structure, it's a thin-film transistor with this
18 double-step gate structure to reduce deterioration of thin oxide layer. That's
19 the purpose of the structure and all the etching techniques. And it's also
20 unrelated fabrication where it's unrelated to Saxler and Yoshida, which we'll
21 discuss in a second.

22 So, for as far as Ground 3 of '347, Petitioner lacks any basis for
23 their modified version where it's their line of disclosure in the petition, and
24 then obviousness in the reply, which is improper. And there's no centrally
25 aligned gate structure to reproduce. So, their reliance of what's shown in the

1 schematics is inappropriate. And there's also no reason to modify Saxler
2 based on this structure because the thin oxide layer is not there in the scan
3 HEMT where the saturation layer is much thicker. The only contacts are
4 laterally aligned instead of vertically aligned. There'd be no reason to apply
5 this structure to either Saxler or Ahn.

6 And here is Ground 5 of '347, similar arguments as before, where
7 after the first cut, then you'd form a gate-first approach, a gate-first gate,
8 which there would be no reason to perform additional etchings to produce
9 these ledges. And their motivation of improved performance to prevent
10 deterioration has no relevance because, again, Saxler has this passivation
11 layer, which is much thicker. It's not vertically aligned. There's no vertical
12 separation of the gate in the semiconductive layer. And there's no thin oxide
13 layer that we're concerned about -- that Yoshida would be concerned about
14 any type of deterioration.

15 So, Petitioner falls back on conclusory statements of it would work
16 and same field in endeavor, which is irrelevant to motivation. There's no
17 motivation or rationale to modify Yoshida based on Saxler's gate structure,
18 or to improve performance as they rely on or prevent deterioration. And
19 they also failed to provide any reason why you'd want these side surfaces of
20 Ahn to be incorporated in Yoshida. And Petitioner fails to address any type
21 of relevance of these ledges after the gate is already formed.

22 So, going to Slide 81, they rely specifically --

23 JUDGE ABRAHAM: Counsel, sorry to interrupt. Just so you
24 know, you're now into your rebuttal time.

25 MR. MASHACK: Okay. I've just got two more slides, and then

1 I'll be done.

2 So, Petitioner repeatedly relies on this differential etching rates as
3 Ahn. That's one of their motivations, applying Ahn to Yoshida to perform
4 this structure. But Ahn specifically says that differential etching rates are
5 successful in performing the gate structure because of the etching materials
6 and metals used by Ahn. Specifically, there's a double-layered gate
7 structure. And also, they have a specific etching material formed
8 specifically for those materials that are being etched. Ahn, as we discussed
9 before, the gate structure of Yoshida and Saxler are completely different.
10 It's not a double-level gate structure, which is specific to Ahn. So, this
11 differential etching structure, which is successful because the etching
12 materials produces very intricate gate structure, has no relevance to this GaN
13 cap layer and this gate contact of Saxler or of Yoshida.

14 So, now our Slide 82, which is the last but not least slide, which
15 here's a perfect illustration of all the hindsight that Petitioner is relying on,
16 where in the '347 patent -- or the '335 patent, on the right-hand side of Slide
17 82, they rely on Yoshida saying that these ledges are symmetric on either
18 side of the gate metals, because that's what they're relying on to get to the
19 claim language of these substantially equal widths. So, they're saying there's
20 already alignment in Yoshida when they're addressing Claim 1 of the '335
21 patent. But for the '347 patent, which is a method claim, which they're
22 trying to incorporate Ahn for one, they're trying to improve alignment
23 precision. So, it's unclear whether there's alignment already or they're trying
24 to prove alignment. And they specifically say that Yoshida is already
25 symmetric. So, there's no reason to modify a symmetric structure with

1 another method of fabricating to improve symmetry. That's contradictory.
2 And just shows you that Petitioner is talking out both sides of their mouth,
3 depending on what they're trying to accomplish, as Dr. Yoshida puts it.

4 And I yield the rest of my time for sur-rebuttal.

5 JUDGE ABRAHAM: Okay. Thank you. I have you with about
6 12 minutes left for rebuttal. And we'll turn it back over to Mr. MacDonald.
7 I have you with just over 10 minutes, and you can begin when you're ready.

8 MR. MACDONALD: Thank you, Your Honor. This is Luke
9 MacDonald again. I'll just share my screen to get that set up. So, we heard a
10 lot of discussion from the Patent Owner regarding the substantially equal
11 term, and I just wanted to talk about that briefly. We heard Patent Owner
12 admit that substantially equal means that the two ledges can be more or less
13 than the same dimension. In other words, it doesn't have to be exactly equal.
14 It could be a little bit more, a little bit less. But Patent Owner never
15 identified how much more or how much less substantially equal implies.
16 And that's what makes it imprecise. That is why this is an imprecise term to
17 which *Hockerson* does not apply. All of this analysis of the nanometers
18 figure in the claims that we've already addressed in the reply brief. For
19 example, in the '335 reply at pages 14 to 15, none of those nanometer
20 measurements were described in the patent itself and none of them are
21 claimed in any of the claims, which is most important. So, substantially is
22 absolutely an imprecise term to which *Hockerson* doesn't apply.

23 And I also thought it might be helpful to just briefly give a
24 framework for thinking about *Ex Parte Bjorn*, which analyzes different prior
25 art references to consider the term substantially equal. And so, for *Ex Parte*

1 *Bjorn*, it's very simple. Everything begins with the drawing. And so, as we
2 read through *Ex Parte Bjorn*, whenever the Board encountered a drawing
3 which showed plainly substantially equal dimensions, then the Board said
4 *Hockerson* doesn't apply. And the Board was able to find the claims invalid.
5 And the only time going through the prior art when, hey, the drawings show
6 two things that are not equal. Now I have to do a calculation. And so, the
7 Board found, well, *Hockerson* applies because we really can't make that
8 calculation. But the Board began its analysis with the prior drawings. That's
9 how *Hockerson* was applied. And the same should hold here.

10 And in particular, I wanted to highlight one of the last things that
11 Patent Owner said, which is in their papers, which is that Yoshida already
12 discloses symmetric ledges. And so, Patent Owner has admitted that the
13 drawings disclose this feature in an attempt to argue against any combination
14 with Ahn. And that admission applies equally to Saxler. And so, these
15 drawings plainly disclose, just like in *Ex Parte Bjorn*, this imprecise term of
16 substantially equal ledges.

17 JUDGE ABRAHAM: I'm sorry, Counsel. I want to make sure I
18 understand what you just said. You're saying that because of their admission
19 about Yoshida that they've made the same admission about Saxler?

20 MR. MACDONALD: Well, because -- thank you for the
21 clarification. Because Yoshida on its face plainly discloses substantially
22 equal ledges, and they're admitting that it discloses symmetry, that same
23 reasoning should apply to Saxler, where Patent Owner never disputed that
24 those drawings show substantially equal ledges. Their only disputes have to
25 do with whether Saxler has described an optional embodiment in which they

1 might not be equal. But Patent Owner never challenged the figures and said,
2 okay, those are not equal. And as the Board showed for *Ex Parte Bjorn*,
3 whenever the prior art drawings show a substantially equal dimension, then
4 it can be relied on to invalidate the claim.

5 JUDGE ABRAHAM: Okay. Thank you.

6 MR. MACDONALD: Okay. And with that, Your Honor, I think
7 we'll rest our case.

8 JUDGE ABRAHAM: Okay. Thank you very much. Any
9 questions from the panel? All right. Not seeing any, we'll turn it back over
10 to counsel for Patent Owner. I have you with about 12 minutes to go, so you
11 can start when you're ready.

12 MR. MASHACK: Okay. Luke, would you mind?

13 MR. MACDONALD: Yeah, of course.

14 MR. MASHACK: Okay. So, let me share my screen again. And
15 so, going back to Luke's -- the Petitioner's last point about our admission that
16 Yoshida discloses substantial equal ledges, that's not true. We never admit
17 that. We disclosed that Saxler discloses ledges, and the ledges are not
18 substantially equal. We provided a number of arguments -- a number of
19 showings that these aren't substantially equal. These are ledges that are just
20 to be able to allow the gate electrode to be loaded anywhere on top of the
21 platform. This is purely a schematic. As Petitioner and Saxler points out,
22 this is not intended to show exact shapes of these ledges, which are right
23 here. And Petitioner still fails to address paragraph 42 of Saxler, which they
24 apply where they explicitly say that the shapes are not intended to describe
25 specific shapes.

1 So, Saxler itself says that these ledges that are shown in the figures
2 are not exactly what they're shown. It's not going to be what's shown, what's
3 actually going to be a transistor. So, that's another thing that Petitioner
4 points out.

5 And turning to the Patent Owner response, hold on, let me pull this
6 up. So, what was brought up is paragraph -- page 26 of -- I think your
7 question was on this figure, is that correct?

8 JUDGE ABRAHAM: I believe that's what Judge Tornquist is
9 talking about.

10 JUDGE TORNQUIST: Yes.

11 MR. MASHACK: So, what this figure is showing, it's not saying
12 that the 2DEG is only under the cap layer, only under the gate contact. It's
13 saying that the gate contact can only control with a reasonable voltage the
14 2DEG, substantially underneath the gate contact. But the access region
15 extends the entire way. Access region, specifically, this is exactly correct,
16 where the access region extends between the gate contact and also the ohmic
17 contacts. That's how we define it in our slide deck, where the gate -- where
18 the access region extends between the gate contact and the ohmic contacts.
19 And with the gate contact, it can only replenish a reasonable length, the pn
20 junction, and it can't replenish this entire length between the ohmic contacts.

21 JUDGE TORNQUIST: Okay. So the question I had was, you
22 drew a very small gate contact here, reasonably small compared to what
23 Petitioner drew, which is a larger gate contact that covered more of that cap
24 layer. Does that make a difference?

25 MR. MASHACK: It does make a difference. But still if we go

1 back to the petition or the demonstratives. First of all, their Figure 1
2 modified is just purely photoshopped. They take this T junction -- a t-type
3 gate contact, and they just literally white out the stem in the T and then just
4 keep the top of the T. So, this isn't accurate to begin with. If anything, a
5 recessed embodiment of Saxler would look more like this.

6 JUDGE MCGRAW: And what page are you on?

7 MR. MASHACK: We're on Slide 19 of the demonstratives. So
8 again, this is based on pure photoshop, where they take Figure 1A and just
9 cut off the stem and fill it in with cap layer. And then they just keep the top
10 of the T. So, this is not supported by Saxler, and this is just based on their
11 photoshop skills. If anything, a recessed structure would have this type of
12 shape, which is narrower. And the amount of a 2DEG that can be
13 replenished is dependent on the gate contact. But as shown in the proposed
14 photoshop structure, they have these elaborate sidewalls and these tapered
15 sidewalls, which only increases the amount of pn junction that needs to be
16 replenished.

17 JUDGE TORNQUIST: Okay. And that's helpful, because I
18 understood your argument before to be that it didn't matter about the size of
19 the gate. So, I think I understand it now.

20 MR. MASHACK: It does. The gate size does matter. It's the
21 relative size of the gate to the pn junction . That's what Yoshida says.
22 Yoshida says you want direct alignment or the pn junction directly under the
23 gate contact. So, you want like a one-to-one ratio almost between that gate
24 metal and that p-type material, ideally, to create voltage control.

25 JUDGE TORNQUIST: Okay. So, for your access region

1 argument to work, do we have to find that the gate contact would not be
2 shaped like Petitioner showed it in their figures?

3 MR. MASHACK: No. We're not relying on that argument. We're
4 just saying that their Figure 1A is a lot thicker and a lot wider. So, there's --
5 this gate contact can't replenish, even if you assume that the photoshop is
6 correct, this gate contact still can't replenish all of this access region over
7 here, because first of all, this is a depletion-mode transistor, or the basis of
8 this is a depletion-mode transistor. So, the shape of the cap layer doesn't
9 matter because it can extend entirely between element contacts or
10 substantially the entire length. So, the Saxler's cap layer, it doesn't depend
11 on -- the function isn't dependent on the cap layer structure of Yoshida. It's
12 just really the width between the element contacts.

13 So, they're trying to retrofit a recessed environment or a depletion-
14 mode transistor into an enhancement-mode transistor, which would not form
15 a functional enhancement-mode because of these access regions being
16 covered by the cap layer.

17 JUDGE TORNQUIST: Okay.

18 MR. MASHACK: And I'll cede the rest of the time unless you
19 have any questions.

20 JUDGE ABRAHAM: Okay. All right. Not seeing any questions.
21 That wraps up our hearing. Thank you, everyone, for your presentations
22 today. Also, we really appreciate you taking advantage of the LEAP
23 program. It's great to see you guys getting the opportunity to argue, and
24 both did an excellent job. So, thank you for the presentations, and we will
25 go off the record. This concludes the hearing.

IPR2023-01382 (Patent 9,748,347 B2)
IPR2023-01384 (Patent 10,312,335 B2)¹

1 (Whereupon the above-entitled matter went off the record at
2 12:03 p.m.)

IPR2023-01382 (Patent 9,748,347 B2)
IPR2023-01384 (Patent 10,312,335 B2)¹

PETITIONER:

Lionel Lavenue
Kara Specht
Cory Bell
Forrest Jones
Chen Zang
Yi Yu
Luke MacDonald
Carlos Duarte-Guevara
FINNEGAN, HENDERSON, FARABOW, GARRETT, & DUNNER LLP
lionel.lavenue@finnegan.com
kara.specht@finnegan.com
cory.bell@finnegan.com
forrest.jones@finnegan.com
chen.zang@finnegan.com
yi.yu@finnegan.com
luke.macdonald@finnegan.com
carlos.duarte-guevara@finnegan.com

FOR PATENT OWNER:

Walter Davis
Dipu Doshi
Stephen Soffen
Ameya Paradkar
Jonathan England
Mark Mashack
BLANK ROME LLP
walter.davis@blankrome.com
dipu.doshi@blankrome.com
ssoffen@blankrome.com
aparadkar@blankrome.com
jwengland@blankrome.com
mark.mashack@blankrome.com