

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.

IPR2023-01383
Patent 8,404,508 B2

Record of Oral Hearing
Held: December 18, 2024

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

APPEARANCES:

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P R O C E E D I N G S

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JUDGE TORNQUIST: Okay. Welcome. We are here today for a hearing for Innoscience Technology Co. v. Efficient Power Conversion Corp. IPR2023-01383. We're talking about US Patent Number 8,404,508. I'm Judge Tornquist. With me is Judge Abraham, and Judge McGraw is appearing remotely here today.

Who do we have from Petitioner?

MR. LAVENUE: Good afternoon Your Honors. Lionel Lavenue from Finnegan for Petitioner. With me, who will also be arguing this morning, or this afternoon, is Kara Specht, my law partner.

And also in the room with us are two other attorneys on the brief. As you know, Dr. Carlos Duarte-Guevara is with us, and also Yi Yu from our Reston office is with us as well.

JUDGE TORNQUIST: Okay. Thank you.

And Patent Owner?

MR. DAVIS: Good afternoon Your Honor, Walter Davis with Blank Rome on behalf of the Patent Owner. With me this afternoon is Jonathan England who will be arguing on behalf of the Patent Owner through the LEAP program. I don't think it's his first argument ever, but his first IPR argument, certainly, so I'm excited for him.

I also have Steve Soffen, Dipu Doshi, Mark Mashack, and Abraham Sandoval here with me.

JUDGE TORNQUIST: Okay. Welcome. Per our oral hearing order, each side will have 60 minutes to argue here today. Patent Owner, as you

1 just mentioned you have a LEAP practitioner so there will be an extra 15
2 minutes.

3 Petitioner, bearing the ultimate burden of proof, will go first. Then
4 you can reserve time for rebuttal. Then we'll hear from Patent Owner, you
5 can also reserve rebuttal -- a short period of rebuttal time. And then we'll
6 hear the rebuttal and surrebuttal.

7 With that, Petitioner when you're ready. And just let us know how
8 much time you'd like to reserve.

9 MS. SPECHT: Thank you, Your Honor. I'd like to reserve 10
10 minutes for rebuttal.

11 Good afternoon, Your Honors. Kara Specht on behalf of Petitioner.
12 And today we're here talking about the '508 Patent. So, I want to start on
13 slide 2 of Petitioner's demonstrative and talk a little bit about what the '508
14 claims as a purported point of novelty or its invention. That's a self-aligned
15 gate and GaN layer in a semi-conductor device.

16 So, what this means is that you use a single photomask to etch along
17 both sides of the gate and the p-GaN in a single etch resulting in perfect
18 alignment of the edges and the center of both of those layers.

19 Now the '508 Patent, turning to slide 3, distinguishes this single mask
20 self-aligned process from the prior art which used a two-mask, two-edged
21 process. And you can see in the prior art figure shown on slide 3, the pink
22 gate metal, and the purple p-GaN layer below it on the left-hand side are not
23 in perfect self-alignment. The gate metal is thinner, the p-GaN is wider,
24 their edges are not aligned, and allegedly, according to Patent Owner, it's
25 important that their centers are also aligned, and we can't tell from this figure
26 if it is or is not.

1 Now what you're going to hear a lot about today is the ordering of the
2 process. Does the gate have to be formed first? And nothing in the
3 purported present invention of this device talks about the ordering of the
4 gate. There's nothing that says the gate is formed first. The important point
5 of novelty, allegedly, is that the gate is formed using this self-aligned
6 process.

7 So, turning to slide 4, let's talk about the grounds that the Petitioner
8 has put forth. We've set forth three different grounds using three separate
9 primary references that hit on the three independent claims of the '508
10 Patent. Claims 1, 4, and 5.

11 Claims 1, 4, and 5 all recite the alleged point of novelty, the self-
12 aligned gate formation process. And in each of our proposed grounds,
13 secondary reference Beach is used in the same way to disclose this alleged
14 point of novelty.

15 Sheppard is added only for the minute teaching of the multiple
16 transition layers. This is actually pretty similar to what you heard in the '294
17 argument this morning about having multiple transition layers. Like in that
18 proceeding, here it's not in dispute either that it would be obvious to use
19 multiple transition layers to prevent cracking.

20 So, let's actually look at these claims because they're quite long. And
21 I'm on slide 5 now of Petitioner's demonstratives. For ease of our argument
22 we've broken the claim, all three of the independent claims in fact, into four
23 main components.

24 The first component, Epitaxial layers formation. There's no dispute
25 that this actually is the first step in the process. You have to grow the layers

1 before you can start forming the device. But the other three steps can be
2 performed in any order.

3 Gate formation, now, this is the alleged point of novelty, dielectric
4 layer formation, and Ohmic formation. Now interestingly there's no dispute
5 that the prior art actually teaches the substance of each of these.

6 Yoshida and Hikita, our primary references, give us the main
7 components of each of these blocks. Beach gives us the implementation
8 details performing the self-aligned gate, the alleged point of novelty.

9 Patent Owner only raises disputes about the combination, and if the
10 combination would result in the proper ordering of these claims, and the
11 proper substance of these claims.

12 But before we dive into that, let's confirm that Claim 4, the second
13 independent claim of the '508 Patent, also has these same blocks. So, we're
14 going to address these claims together.

15 And the disputes raised by Patent Owner are very similar. The final
16 independent claim, Claim 5, looking at slide 7, is even longer. But the
17 differences here don't matter for the purposes of the prior art and the
18 disputes in this case. It still has those same four components. Epitaxial
19 layers, gate formation, dielectric formation, Ohmic formation. And for
20 Claim 5, and ground 3 as well Patent Owner has not raised any disputes that
21 it didn't raise for grounds 1 and 2. So we can handle all of these together
22 and streamline our argument.

23 Let's turn to slide 8 of Petitioner's demonstratives. Because I talked a
24 little bit about this self-aligned process and how that's the alleged point of
25 novelty. And, interestingly enough, Beach, the secondary reference that
26 Petitioner relies on in this proceeding, teaches the identical process disclosed

1 in the prior art reference for purposes of self-alignment. Those steps of
2 creating the self-aligned gate are disclosed identically in Beach.

3 How do we know it's identical? Well Dr. Beach, the inventor on the
4 prior art reference, is also a named inventor on the '508 Patent. He just
5 patented this exact same process previously when he worked for a company
6 called International Rectifier. He patented the exact same process again,
7 along with a few other components in hiding the self-alignment in the
8 middle of other steps in the process once he began working at EPC. Our
9 prior art is by the same inventor.

10 And you can see how similar they are because the figures from the
11 prior art and from the patent look almost identical. On the right-hand side of
12 slide 8 the upper figure shows the Beach reference. You can see the single
13 photomask, the pink gate contact layer, the purple doped GaN layer, and you
14 can see the process of etching, digging down on either side, cutting through
15 if you will, to result in the figure on the right. The pink and the purple are
16 perfectly aligned. The circles mark where the edges are in perfect
17 alignment.

18 And if you look closely, since Patent Owner might focus on how the
19 centers need to be aligned, they also are. That's necessarily true whenever
20 the edges are aligned.

21 Looking at the lower portion of slide 8, the figure from the '508
22 Patent, the figure is almost identical. The only difference is it doesn't show
23 the blue photo resist, single photomask on top. But if you imagine the blue
24 photomask is on top of the pink layer, again you would etch down on either
25 side, and it results in a perfectly aligned pink and purple layers on the right-

1 hand side. The prior art is identical to this point of novelty in the '508
2 Patent.

3 Turning to slide 9 of Petitioner's demonstratives we've broken the
4 claim into these four main components. And I've already showed to you
5 how component number 2 is taught indisputably by Beach. EPC doesn't
6 raise a dispute that Beach teaches a self-aligned process. It does.

7 They raise other disputes about its combinability with the primary
8 reference that we'll get into, but importantly they don't dispute that it's the
9 self-aligned process. It is disclosed in the prior art.

10 And the other components are as well, by the primary reference or
11 also by Beach.

12 JUDGE TORNQUIST: Can I ask a question? Just to re-arm myself
13 with the couple patents here today.

14 MS. SPECHT: Yes, Your Honor.

15 JUDGE TORNQUIST: '294 and the '508 were both before the ITC,
16 correct?

17 MS. SPECHT: That's correct, Your Honor.

18 JUDGE TORNQUIST: What issues did the ITC resolve -- not
19 resolve, but did they address with the '508?

20 MS. SPECHT: In terms in invalidity Your Honor, the ITC analyzed
21 what is ground 2 in the petition in this case, but only for Claim 1. So, no
22 analysis of Claims 2 or 3 or 4, which are also challenged in our ground 1.

23 The conclusion was the claims were not invalid. It was a very short
24 portion of the proceeding, speaking candidly, because there was a finding
25 that the patent was not infringed. And so, invalidity fell by the wayside in
26 my view.

1 I don't think they took a hard enough look at it and we're going to
2 explain to you today why the claims actually are invalid under ground 2.
3 But nonetheless, ground 1 and ground 3 were not before the ITC.

4 JUDGE TORNQUIST: Okay. And when the Commission looked at
5 it, they kind of just said we're just going to take what the initial
6 determination was.

7 MS. SPECHT: Correct. The Commission did not analyze. The
8 Commission adopted the ALJ's, chief ALJ's proposal entirely. There was no
9 re-analysis.

10 JUDGE TORNQUIST: Okay. Thank you.

11 MS. SPECHT: So, what is in dispute? And I'm on slide 10 now.
12 What is in dispute in this case? There's a claim construction dispute that's
13 really critical to the motivation to combine issue related to gate formation.
14 Does the gate have to come first, or can it come last like the prior art?

15 EPC also disputes the motivation to combine. The primary references
16 with Beach's gate formation processes, this is based on a misunderstanding
17 of the combination and insisting that bodily and physical incorporation of
18 the references is necessary. It's legally flawed.

19 For the Ohmic formation steps there's, again, a very similar dispute
20 about the motivation to combine and whether Beach and it's Ohmic
21 formation process can be physically combined into each of the primary
22 references.

23 And finally, again, based on a misunderstanding of the combination,
24 the Petitioner's proposed combination of the two references, EPC disputes
25 whether the combination teaches separate gate photo resist patterns and
26 metal photo resist patterns.

1 Let's start with claim construction. Because that really is the
2 overarching issue in this case. And the Board did opine on it a bit at
3 institution.

4 So, looking again back at the claim, and I'm going to simplify these
5 down, so I don't have to say gate formation, dielectric layer formation, and
6 so on every time. We're going to call it the G-D-O.

7 EPC advocates for a G-D-O process because that's the order they're
8 written in the claim. The Board analyzed this at institution because this was
9 the argument that was raised in the POPR as well and found that the claims
10 do not require -- I'm on slide 13, I'm sorry -- the claims do not require that
11 the gate structure be formed before the source and drain contacts. And that
12 was the correct decision.

13 Now the Board also decided that the claims required the dielectric
14 steps, the D, to happen before the Ohmic steps, the O. So, the D needed to
15 happen before the O. Well Petitioner's expert, Dr. Shealy provides some
16 testimony on why that doesn't necessarily have to be true.

17 Here our prior art is a D-O-G process. So, the dielectric is still
18 coming before the Ohmics. The only issue in dispute from the Board's
19 initial construction, and no dispute in our view, we agree entirely with the
20 Board's initial construction, is whether the gate has to come first or whether
21 it can come last.

22 And the Board got it right the first time. The claims don't require the
23 G-D-O process. D-O-G is more than fine. When we're analyzing the proper
24 interpretation of the claim, of course, we have to start with the claim
25 language of the claim itself.

1 And here, analyzing the language of the claim as the Board did at
2 institution, there's nothing that requires that the claim be performed in any
3 order. There's no indication of an ordering of steps, there's no first, next,
4 last. There's no numbering, there's no antecedent basis that draws back to an
5 earlier limitation in the claim.

6 So now we look to the specification. What does the specification say
7 about ordering? Well as I mentioned previously the point of novelty here is
8 not that the gate is formed first, it's the self-alignment. So, there's very little
9 in the specification at all that requires an order.

10 And importantly, the specification also includes the catch-all language
11 that the embodiments are not supposed to be considered limiting. So in our
12 view there is no G-D-O process requirement, and we have a bit of case law
13 that's shown on slide 14 from the Federal Circuit showing the high bar EPC
14 must overcome to prove that an order should be read into this claim, unless
15 the steps of a method claim actually recite an order, and here they do not.

16 The steps are not ordinarily construed to require one. And that's the
17 right outcome here. They should not be construed to require an order. So,
18 what evidence does EPC have to try to prove that an order should be read
19 into the claim?

20 Looking at slide 15, they rely entirely on an optional unclaimed
21 embodiment that creates a field plate. Now the claims themselves, we
22 looked at them a few times, are silent to any field plate. There's nothing in
23 the claim that mentions a field plate.

24 You're going to hear EPC get up today and talk about the field plate
25 isn't required but the process capable of forming a field plate is what's
26 important. That's not in the claim either. It's simply not.

1 And the patent describes the field plate consistently as an optional and
2 unclaimed embodiment. If the Patentee wanted to put the field plate in the
3 claim, or necessitate the order, of course they could have done so. They
4 chose not to do so here. And this goes back to our analysis of what is the
5 present invention. Well, it's the self-aligned gate.

6 Now EPC points to, and if you look on my slide 15 you can see, and I
7 actually have it greyed out, but I want to address it here because EPC is
8 going to stand up and address it.

9 There's language in the first block, "furthermore a field plate at source
10 potential." Excuse me for this. And it goes on to talk about how a field
11 plate at source potential could be formed simultaneously with the Ohmics.

12 That language furthermore separates this from the present invention.
13 But even if the field plate were considered a part of the present invention,
14 that still is not the claimed embodiment. That still should not be read into
15 the claim. It is still legally wrong to read something from the specification
16 into the claim, especially where other parts of the specification contradict.
17 And the very abstract contradicts this requirement and indicates that the field
18 plate is optional.

19 It says, and I'm looking at the lower portion of slide 15, The
20 enhancement mode GaN transistor may also have a field plate. It's an
21 optional embodiment. The claims are silent. The specification clarifies that
22 it's optional. And there's no reason to limit the claims here.

23 If you needed even more proof, Dr. Shealy, looking at slide 16, talked
24 extensively at his deposition and in his reply report about the different
25 ordering of steps and how there are different positives and negatives to
26 various orderings.

1 EPC talks about the negative drawbacks of doing the gate last, but Dr.
2 Shealy contradicts that and provides some positives. He goes so far as to say
3 there are six different variations of how you could perform these three steps.
4 The D, the O, and the G.

5 And he drew a few examples for us. And these are included here.
6 The details are not important. What is important on slide 17 is the benefits.
7 EPC says some of these are not possible or nobody would do them. That's
8 simply not true.

9 Each of these have positives, each have negatives. They're suitable
10 design alternatives for one another. And I want to highlight the benefits of
11 the D-O-G process since that's what our prior art discloses.

12 It protects the gate region from contamination during subsequent
13 processing steps. And that makes perfect sense. If you form the gate last,
14 the gate cannot be damaged or contaminated while you're performing the
15 other components of the device. So, in certain applications that would be the
16 choice that a person of skill in the art would have looked to realize that
17 benefit.

18 So just to conclude, looking at slide 18, the claims don't require a G-
19 D-O process. No gate-first process. The Board got it right at institution.
20 There are many different options here, and the claim should not be so
21 limited just because of one optional field plate embodiment in the
22 specification that isn't even claimed.

23 Turning to slide 19, let's now jump into ground 1 which is where I am
24 going to spend the majority of my time. And ground 1 is Yoshida, Beach,
25 and Sheppard. Like I said, Beach and Sheppard are used almost identically

1 in all three grounds. So, most of the arguments for Yoshida are the same
2 because Yoshida's disclosure is very similar to the Hikita references as well.

3 Turning to slide 20, and this is a very important slide, and I want to
4 spend some time on it here because EPC seems to fundamentally
5 misunderstand Petitioner's proposed combination. The combination is not
6 taking Beach in its entirety and putting it into the devise of Yoshida.

7 This is a method claim, and Yoshida gives us every step of the
8 method. It just, for one steps lacks the self-alignment which is a known
9 improvement. There's no dispute here that self-aligned isn't proved. EPC
10 has not disputed that self-alignment is a better way to do this.

11 But Yoshida teaches forming a gate, it just lacks the benefits of self-
12 alignment where a person of skill in the art would have looked to Beach.
13 And it lacks implementation details for Ohmic contacts.

14 So what is missing from Yoshida? The details for self-alignment.
15 The details for forming Ohmic contacts where Yoshida is silent. Although it
16 tells you, you have to form a gate. And then growing multiple transition
17 layers which comes out of Sheppard and that's not in dispute.

18 What Yoshida give us in this combination is the D-O-G process, and
19 epitaxial layers as well, but those aren't in dispute. It gives us that process
20 flow. It tells us the dielectric happens first, the Ohmic formation happens
21 second. Now it lacks the details, and it tells us that the gate happens third,
22 although it doesn't give us the self-aligned details either.

23 So, what we're doing is not physically taking Beach and putting it into
24 Yoshida, that contradicts the law anyway. What we're doing is taking the
25 steps for forming a self-aligned gate out of Beach and implementing them
26 into the step in Yoshida for forming a gate.

1 We're taking the implementation details for forming Ohmic contacts
2 out of Beach and again, inserting them into the place in Yoshida where
3 Yoshida is silent about how to do it but tells you you must. So, the flow of
4 Yoshida is maintained. And that is important for our combination. And
5 that's where EPC seems to misunderstand and where all of the motivation to
6 combine arguments they raise come from.

7 Looking at slide 21, there are three disputes here. Two of them are
8 motivation to combine and one, again, is about the separate photo resist.
9 Let's look at slide 23 and start with the first issue, motivation to combine for
10 the gate formation steps.

11 Now for this one, EPC raises its primary dispute about the ordering of
12 the steps saying, well Yoshida is gate last, Beach is gate simultaneous,
13 you're never getting a gate-first process. The claims don't require a gate-first
14 process, and I'm going to go ahead -- the claims don't require a gate-first
15 process.

16 But looking more closely at the motivation to combine, and why a
17 person of skill in the art would have incorporated the self-aligned single
18 mask formation into Yoshida, I want to turn to slide 24, we've provided five
19 different reasons. Four reasons plus one counterargument.

20 On slide 25, as we always do in this analysis, we start with are the
21 references analogous to the patent. Here, both of them indisputably are.
22 They relate to gallium nitride transistors and the processes performing them.

23 Slide 26, at least one, multiple really, SKR rationales applies directly
24 to this combination. Yoshida, in combination with Beach, uses a known
25 technique that is Beach's self-aligned single-mask gate process. EPC doesn't
26 dispute that that was known, and that Beach discloses it, to improve a similar

1 device. That's Yoshida's resulting transistor and Yoshida's method for
2 forming it, in the same way by substituting the self-aligned steps, using a
3 single mask to etch the gate contact and the doped GaN layers.

4 So, I have some figures here on the left-hand side. You can see
5 Yoshida's transistor and its gate that is not self-aligned. The red circles
6 show that the edges are not aligned for the pink and the purple layers. And
7 on the right-hand side we have the familiar figure from Beach that shows the
8 perfect self-alignment.

9 And Beach's technique improves gate alignment which improves
10 operation of the device, and it also saves the cost of having to apply a second
11 mask. Neither of those are in dispute. EPC has not disputed the known
12 benefits of self-alignment which is the heart of our motivation to combine.

13 Turning to slide 27, we actually have some express teaching in
14 Yoshida that suggests you would want to do a self-aligned process there.
15 So, Yoshida at paragraph 22, instructs the reader to etch away the p-GaN
16 except where the gate electrode was to be loaded. Now I got hung up on the
17 past tense in that phrase for a little while, but when you think about how
18 Yoshida is not a single mask process it makes perfect sense.

19 You're trying to etch away the p-GaN except where you're going to
20 put the gate down in the second step. You want them to be perfectly
21 aligned. You want the p-GaN eliminated except where the gate will be
22 directly above it. But you're doing it in two steps, just like the '508 Patent
23 tells you is undesirable in the prior art. It's trying to achieve self-alignment,
24 but it's trying to do so using two steps.

25 Well a person of skill in the art then would have looked to Beach.
26 Well let's just put the gate metal down first, use a single photomask, and

1 etch. We don't have to do this forward looking. We don't have to have
2 where the gate was to be loaded, let's go ahead and load it and etch them
3 together. And now you've got a self-aligned process, and you recognize the
4 benefits that were known in the art.

5 Let's talk about the reasonable expectation of success, because I think
6 this is where EPC's confusion about the combination really comes into play.
7 They're not saying there were not benefits to combining. They're not saying
8 that the art isn't analogous. They're really saying you can't physically
9 combine the two, and a person of skill in the art would not have physically
10 combined them.

11 Now as I've mentioned, the *In re Mouttet* case instructs us that actual
12 physical combination of references is not required. But even if it were,
13 we've provided a few illustrative examples in reply of how these could
14 actually, physically be combined.

15 Starting with Dr. Shealy's opening declaration however, he provides
16 an explanation that using self-alignment was routine, conventional, and well
17 understood, and would have required only conventional techniques to
18 implementing Yoshida.

19 He proved how the combination would look, turning to slide 29, in a
20 figure submitted in reply. Incorporating Beach's gate into Yoshida requires
21 only a simple modification of the last step of the process. Now each of these
22 components of the figure, a, b, c, and d, and e, those are all in Yoshida.
23 Especially if you look at figure a3 is labeled the D -- I guess it's b. Figure b
24 is labeled D, figure c is labeled O, and then figure e is the G. All we're
25 substituting is the G here.

1 We're maintaining the process flow of Yoshida, but taking the
2 implementation details of how to form a self-aligned gate and putting that
3 into Yoshida's process at the point in time when Yoshida would have been
4 forming the gate.

5 Now EPC said this was not possible, that this could not be done. And
6 now they argue that because Dr. Shealy provided an example, two examples
7 in fact, of how it could and would be done, they argue that this is new
8 argument. But it's not new argument. The combination was expressly
9 described in the petition. Dr. Shealy stated a reasonable expectation of
10 success.

11 If you turn to slide 31, excuse me, Dr. Shealy actually drew a very
12 similar figure in the context of claim construction at his deposition where he
13 talked about how self-alignment could be performed and would be
14 performed in the D-O-G process.

15 Now the figure he drew at his deposition was not specific to the
16 references, although he did have some testimony saying it would be the
17 same for these particular references. So, in reply, after EPC questioned, and
18 I'm looking at slide 32 now, EPC questioned whether the combination was
19 particularly explained.

20 And that particular explanation isn't about the substance of the
21 combination. It isn't how we're piecing the references together. It isn't that
22 we're maintaining the process flow from Yoshida and adding
23 implementation details of Beach. It's that, could you physically combine
24 them. That's what they're looking for here. They questioned whether the
25 references could physically be combined.

1 And in reply, as is the very nature of a reply, Petitioner and Dr. Shealy
2 illustrated the combination described in the petition in the figure on the left
3 that shows yes, you could and would. This isn't impossible. This is
4 something you would do. Combine that with the known benefits of why you
5 would want a gate last process, protecting the gate from contamination.
6 Why you would want a self-aligned process, to make sure you have peak
7 device performance based on perfect alignment of your gate and p-GaN.
8 And that's the combination that we've proposed.

9 The figure is not the combination. The figure is an illustration for a
10 reasonable expectation of success and it's not even reasonable. It's an
11 illustration of an absolute expectation of success because this proves a
12 person of skill in the art could physically combine these two references even
13 though you're not required to do so under the law.

14 So, let's look at slide 33.

15 JUDGE McGRAW: Excuse me.

16 JUDGE TORNQUIST: Hold on.

17 JUDGE McGRAW: Could you address Patent Owner's argument that
18 this process conflicts with your stated motivation to combine? I believe that
19 they argue it requires more steps in one of your arguments for motivation
20 versus fewer steps.

21 MS. SPECHT: I understand. I understand, Your Honor. Yes.

22 So, in a self-aligned process you are still using fewer steps for
23 forming the gate and for forming the p-GaN. So, in that sense it is still one
24 step less.

25 Now I think what EPC is focusing in on in their argument about the
26 number of steps is that you have to add -- you have to lay the gate material

1 and do one additional etch elsewhere. But that has to be done anyway. So,
2 each of these layers have to be laid and patterned regardless of what order
3 you do them in.

4 So, putting the self-alignment last, it moves the steps around. They're
5 happening at a different place in time. But the number of steps is the same,
6 and you still realize the benefit of self-alignment and minimize that step
7 where you're not etching the gate metal and the p-GaN separately using two
8 separate photomasks.

9 With that I want to move on to slide 34 and address a few of EPC's
10 arguments. First, that Beach and Yoshida are not gate first. Second, bodily
11 incorporating Beach's gate simultaneous process into Yoshida and how that
12 would work, and third, the Yoshida-Beach combination doesn't meet
13 limitation 1e4. This is an argument that was raised for the first time in the
14 surreply. They've never challenged limitation 1e4 before but we're going to
15 address it here because it's not correct.

16 Turning to slide 35, we don't need to belabor this point. EPC's first
17 argument, and their primary argument again, is that the claims are a gate-
18 first process. If the Board finds that there is no gate-first process required as
19 they did at institution, this first argument goes away.

20 Second, on slide 36, EPC argues there's no motivation because Beach
21 is a gate-simultaneous process and Yoshida is a gate-last process. And
22 hopefully I've explained sufficiently at this point that you guys are following
23 along well. We are not changing the process ordering of Yoshida. We are
24 maintaining the D-O-G. The fact that Beach happens with two steps
25 simultaneously is not what we're incorporating into Yoshida. We're taking
26 the implementation details from one, the gate formation, and putting them

1 into Yoshida's process at the gate formation step of Yoshida. We're taking
2 the implementation details for the Ohmic formation and putting them into
3 Yoshida at the step in Yoshida's process for forming the Ohmics.

4 The combination --

5 JUDGE TORNQUIST: You can go --

6 MS. SPECHT: The combination maintains Yoshida's flow; it's just
7 substituting implementation details for the self-aligned gate formation and
8 again for the Ohmic. So, you'll hear the same argument there as well.

9 Let's turn to slide 37 and EPC's last argument that it raised for the first
10 time in its surreply. It argues that in the figure that was provided in
11 Petitioner's reply, you can see these remnant P-type islands. And they're
12 shown on slide 37 under the red layer. It's that little blue portion.

13 And they argue that etching -- this remnant p-type island as they call
14 it, does not meet limitation 1e4, it precludes the combination from meeting
15 limitation 1e4. That's incorrect, and it's new, and should be disregarded.

16 So, let's start with why this should've been raised in Patent Owner's
17 response. In Dr. Shealy's deposition, the first time he drew this figure
18 demonstrating a physical incorporation there was a p-type island in his
19 drawing. And we know that the Patent Owner was aware of this and
20 addressed it because in their Patent Owner response they did argue about the
21 p-type islands and in fact provided, their expert provided his own figure
22 arguing that the remnant islands could be detrimental to the function of an
23 enhancement mode HEMT.

24 They talked about the remnant p-type islands. They never raised
25 limitation 1e4. That was the appropriate time to raise it. It should have been
26 raised in the Patent Owner response, not for the first time on surreply.

1 But nonetheless it's incorrect for a few reasons. We've talked
2 extensively about self-alignment and how that is the point of novelty. You
3 still have the same process, the same self-aligned result, and meet each of
4 these limitations even if there is an island.

5 So, let's walk through it. You can see how in the lower figure on the
6 right-hand side of slide 39 you have -- well let's start with the upper one. On
7 the upper figure on the right-hand side of slide 39 you lay an orange photo
8 resist on top of the green gate metal and the blue p-GaN. That's step 1e1,
9 1e2.

10 Then you etch away the gate contact outside the gate region. So,
11 you're etching through the gate. Then you continue etching down, 1e4, etch
12 away the doped GaN layer, except under the gate contact continuing that line
13 vertically straight down so that you're etching, and that results in self-
14 alignment when you remove the photo resist.

15 So even though there's a remnant island left, the p-type GaN outside
16 the gate region is etched because you're etching outside the photo resist.
17 You're still etching outside of the gate. The p-type GaN outside of the photo
18 resist of course is etched because that's what's patterning both the gate and
19 the p-GaN.

20 And importantly, it results in self-alignment. The gate metal and the
21 p-GaN are self-aligned after this etching process. And EPC hasn't said that
22 this isn't a self-aligned process.

23 Even if this were incorrect, there's another combination, another
24 illustrative combination, physical combination, I mean, that Dr. Shealy
25 provided. And it does not have the remnant p-type island. And even though

1 this was illustrated in Petitioner's reply, it stands unrebutted in EPC's
2 surreply.

3 So, the diagram that shows yeah, if you wanted to get rid of the p-type
4 islands you certainly could and a person of skill in the art would have known
5 how to physically combine a self-aligned process into Yoshida's D-O-G
6 process and not had a remnant p-type island. That was out there. That
7 argument was in place. It went unrebutted.

8 So, to --

9 JUDGE TORNQUIST: So, you agree that the p-GaN is not etched
10 away in those little islands, correct?

11 MS. SPECHT: Your Honor, it's not -- there is remnant p-GaN that is
12 left, yes, but in the language of the claim there is still an etching except the
13 portion under the gate. So, the portion under the gate is not etched and the
14 portion outside of the gate is etched. And in our read of the claim, that
15 meets it.

16 In fact, this is the exact read of the claim that EPC took at the ITC that
17 "except" does not have to mean "all".

18 JUDGE TORNQUIST: Do you have a cite for that?

19 MS. SPECHT: I can get the site for you for rebuttal.

20 JUDGE TORNQUIST: Okay.

21 MS. SPECHT: I believe that's in the record.

22 JUDGE TORNQUIST: Okay.

23 MS. SPECHT: Okay. So, on slide 41, just to very briefly conclude
24 because we're going a lot slower than I intended to. There is a motivation to
25 combine Yoshida and Beach for the gate formation steps.

1 Let's turn to the motivation to combine for the Ohmic formation steps.
2 This is very similar so it will go a little bit quicker. Why would a person of
3 skill in the art have incorporated Beach's Ohmic formation process into
4 Yoshida. Again, we have four reasons and EPC's -- and a response to each
5 of EPC's counter arguments.

6 On slide 44 there's still analogous art. On slide 45, this is very similar
7 to what we did for the gate formation process but here, Yoshida is silent on
8 the process for making its Ohmics. It says that you need a Ohmic -- it says
9 that you need Ohmics and tells you to form them. It says to deposit them,
10 load them, as it says. But it doesn't tell you the process for how.

11 Yoshida presumes that a person of skill in the art would have
12 routinely understood how to form Ohmic contacts in a device like this. But
13 to be sure, a person of skill in the art would have looked to other references
14 that teach routine methods for forming Ohmic contacts like Beach.

15 Looking at slide 46, this is the portion of Yoshida, paragraph 22, that
16 talks about loading source electrode and drain electrode in the highlighted
17 part. That's the part of Yoshida that's telling a person of skill in the art, look,
18 you need to load these, you need to form these but is silent as to the process
19 for actually forming them and patterning them. That comes out of Beach.

20 I'm going to jump ahead to respond to EPC's arguments because this
21 is one they spent quite a bit of time on in their responsive papers. They
22 argue there can be no motivation to combine here because Yoshida uses a
23 lift-off technique to form --

24 JUDGE ABRAHAM: Counsel, I'm sorry to interrupt you but can you
25 refer to your slide numbers as you move through so that we can go --

26 MS. SPECHT: Yes, Your Honor. Thank you.

1 On slide 48 now. EPC argues you cannot combine Yoshida and
2 Beach because Yoshida purportedly teaches a lift-off technique to form its
3 Ohmic contacts. We just looked two slides earlier on slide 46 at the same
4 portion of Yoshida at paragraph 22.

5 This is all Yoshida says about forming Ohmic contacts, basically that
6 you need to do so. There's nothing in here about lift-off. There's nothing in
7 here about etching. A person of skill in the art would have understood that
8 etching is a more precise process that can produce the vertical side walls
9 shown in Yoshida. Now this is what EPC disputes. They say the vertical
10 side walls would be formed by lift-off and not by etching.

11 Returning to slide 49, Petitioner has provided a textbook, the
12 Gorowitz reference, and its figure 1 that shows the differences between lift-
13 off and etching and proves that etching actually results in vertical side walls
14 like that shown in Yoshida.

15 On the left-hand side you can see the lift-off process and how it
16 creates this rounded, sloped side wall remaining after. And on the right-
17 hand side you can see an etching process very similar to what Beach
18 discloses, almost identical, and how it results in vertical side walls after the
19 etch. Yoshida shows vertical side walls, so it at least suggests etching.

20 And I'm going to conclude on 51 for this because even if Yoshida did
21 suggest lift-off, which it doesn't, it suggests etching looking at its figure. Dr.
22 Shealy explained that there are only two prevalent alternatives for forming
23 Ohmic contacts. There's only two choices here. There's either lift-off or
24 there's etching. And there are benefits to etching. It's more accurate and
25 controllable to pattern the metal and that's highlighted in pink on slide 51.

1 At the very least, etching would have been obvious to try or an
2 obvious design choice or a suitable alternative. So, a person of skill in the
3 art would have known you could and would form Yoshida's Ohmic contacts
4 using Beach's etching process.

5 So, to conclude, for the Ohmic formation steps a person of skill in the
6 art would have been motivated to combine Beach's Ohmic formation steps
7 into Yoshida's step for forming Ohmic contacts. Into that step in Yoshida's
8 process.

9 Let's go to slide 53 and the last argument that EPC raises for ground 1,
10 whether separate gate photo resistant pattern and metal photo resistant
11 patterns are required. This comes out of two different components of the
12 claim. In the gate formation steps, in the G, the claims require applying a
13 gate photo resist pattern. We've talked about this. This is the single
14 photomask that we've been talking about.

15 And in the ohmic contact steps, element 1g, 1g2 requires applying a
16 metal photo resist pattern. So, in each of these steps in the process you're
17 using a photo resist to etch. That's all this requires.

18 Now EPC argues that Beach teaches only a single pattern for forming
19 both its gate and its ohmic contacts. And that can't meet these two separate
20 limitations of the claim.

21 But the Board considered this, turning to slide 54, the Board
22 considered this argument at institution and got the answer right the first time,
23 concluding claim 1 does not require that the gate photo resistant pattern and
24 the metal resistant pattern be applied at different times.

25 Now although I think that is the right conclusion, even if they were
26 required to be applied at different times, I want to turn to slide 56 and look at

1 what the combination that the Petitioner actually proposed was. Because
2 EPC's interpretation is misunderstanding our combination. They're not
3 preserving the ordering of Yoshida and substituting implementation details.
4 They're attacking Beach on its own as if it were wholly, physically, and
5 bodily incorporated into Yoshida. And that's not just right. And that's just
6 not right.

7 And so, on slide 56 we have the disclosures from Yoshida that's relied
8 on in the petition in each of these sections discussing these claim limitations.
9 Even if separate steps were required, Yoshida at paragraph 22 talks about
10 forming its source and drain, its ohmic contacts. And Yoshida at paragraph
11 23 says lastly, and then speaks about its final step in the process. Talks
12 about forming the gate electrode.

13 They're two separate steps in the process. Only physically
14 incorporating Beach in its entirety would result in a mismatch here and that's
15 not what we're doing.

16 Now EPC's going to get up and talk about how relying on the ordering
17 of Yoshida is new argument and it's just not. So, I want to provide a few
18 citations to the petition for why our combination has always been
19 maintaining Yoshida's process flow and substituting implementation details
20 from Beach.

21 On slide 57, the petition, in its very overview of Yoshida, sets forth an
22 overview of the different steps in Yoshida's process flow pointing out that
23 step 5 is depositing the source and drain electrodes and step 6 is forming the
24 gate contact. Separate steps.

25 But let's look a little bit closer because in the portion of the petition
26 actually mapping these limitations, you can see on slide 58 the top portion is

1 citing to petition at pages 30 and 31. This is the beginning of our analysis of
2 the gate formation steps.

3 We start with Yoshida in view of Beach. We then turn to Yoshida at
4 first talking about how Yoshida discloses forming a gate contact. We're
5 maintaining that portion of Yoshida. Only when we get into the details of
6 how you do it do we turn to Beach.

7 And the same is true for limitation 1g, forming the ohmic contacts.
8 We start with Beach. This is in the petition at page 35. Yoshida in view of
9 Beach renders obvious 1g, not Beach alone. We've never relied on Beach
10 alone. We've always relied on the combination and started with the primary
11 reference to disclose the step in the process. The secondary reference simply
12 provides the implementation details.

13 Turning to slide 59 and to conclude our ground 1 analysis here,
14 although it's not required by the claims as the Board found at institution to
15 have separate metal and photo resist patterns, Beach teaches separate metal
16 photo resist patterns and the combination with Yoshida shows them being
17 applied at the appropriate steps in the D-O-G process.

18 Turning to slide 61, let's talk about ground 2, and I'm only going to
19 touch on the differences between ground 1 and ground 2 because most of
20 EPC's arguments are the same.

21 So, let's start with slide 62 and talk about how similar these really are
22 and how the combination is quite similar as well. So, Hikita-347, just like
23 Yoshida, in fact even more clearly than Yoshida teaches every step in the
24 process. There is a figure 6 in Hikita that shows each of the steps of the
25 process, the D, the O, and the G. That gives us the process flow.

1 But it does not disclose the implementation details for forming a self-
2 aligned gate. And it doesn't disclose the implementation details for forming
3 the ohmic contacts. It just tells you that you need to do those things.

4 It also doesn't teach using a mask to open the source and drain contact
5 area and growing multiple transition layers. Those come out of Sheppard
6 and are not disputed here, nor is the motivation to combine Hikita-347 with
7 Sheppard in dispute.

8 The only thing disputed, just like for Yoshida is whether it would be
9 obvious to incorporate Beach's implementation details for gate formation
10 and ohmic formation into the primary reference. And we're doing so in the
11 same way we did for Yoshida.

12 You can see on slide 63 the same disputes are raised by EPC, but they
13 put two new sub-arguments in for their motivation to combine for the ohmic
14 contacts. And so, I'm going to go to those.

15 I want to go to EPC's new arguments here so I'm mindful of time
16 because they raised two in addition to the ones they raised for Yoshida. All
17 the other ones are the same. And they're numbers 3 and 4 shown on slide 76
18 of the Petitioner's demonstratives.

19 Number 3, EPC advocates that you can't bodily incorporate Beach's
20 depletion mode device into Hikita-347's enhancement mode device. This is
21 an argument new that wasn't raised for Yoshida. And number 4 on this same
22 slide, bodily incorporating Beach's gate and ohmic contact formed with the
23 same metal into Hikita. They say you wouldn't do that either.

24 So, Hikita teaches using different types of metal for its gate and its
25 ohmic contacts. Beach teaches using the same metal. Neither of these
26 arguments are availing because neither of them matter for the proposed

1 combination. They're simply requiring physical substitution of elements.
2 That contradicts the law.

3 So, let's turn to --

4 JUDGE McGRAW: Can you address that more? Why would
5 somebody believe that you could use two different metals given that Beach
6 process does require the same metal for both the gate and the ohmic
7 contacts?

8 MS. SPECHT: Of course, Your Honor. So, the important thing to
9 realize is that the types of metals impact the operation of the device but don't
10 necessarily impact the method for forming the device. So, the types of
11 metals can be irrespective of the etching process.

12 So, what we're getting out of Beach isn't the type of metal, it's the
13 process for forming the etching. The process for laying the photomask. The
14 process for etching along the sides of it to form these contacts.

15 Regardless of what type of metal you're using, the process for doing
16 that etching process would be the same. And that's the same for both the
17 gate and the ohmic formations, right? It's the process from Beach does not
18 depend on the type of metal being used.

19 So, you could apply that process to different metals like Hikita or you
20 could do it on the same metal like in Beach.

21 JUDGE McGRAW: Is there evidence in the record to support that?

22 MS. SPECHT: Yes, Your Honor. And I want to point you to slide 79
23 of Petitioner's demonstratives. This is, I believe, responsive to your
24 question. And it's testimony from Dr. Shealy. Here, he's talking about
25 enhancement mode versus depletion mode devices. The difference between

1 enhancement and depletion mode devices is the types of materials used to
2 develop them.

3 And he's saying that the process as far as the ohmic and gate contacts
4 is the same regardless. So, it's not exactly speaking about the types of
5 metals but he's talking about the types of devices where the distinctions
6 between those devices would use different components, would use different
7 metals, would use different layers. And the process for forming these can
8 still be the same. And this comes from his transcript, Exhibit 2002 page 104
9 to 105.

10 And since your question led me here, and I think the answer is the
11 same for both the metals and the types of devices, that's Petitioner's position
12 for both of those questions. It doesn't matter if they're different types of
13 devices. It doesn't matter if they're different metals because the process for
14 forming the device remains the same. The process of using a photomask and
15 using an etching process, which is really all we're taking out of Beach.
16 That's it. That remains the same regardless of the type of device and
17 regardless of the type of metal.

18 I do want to touch briefly on slide 80. And going back specifically to
19 the enhancement mode versus depletion mode argument. EPC again argues
20 that Beach is a depletion mode device. Beach also suggests an enhancement
21 mode device or at least recognizes that it's -- it would be desirable to create a
22 device that is normally off -- sorry -- Beach says nominally off. That is
23 synonymous for the term normally off, flipping lingos. Concept is the same.
24 And a normally or nominally off transistor is enhancement mode as I think
25 you heard this morning as well.

1 So, Beach at least in its background indicates one of its goals is to
2 achieve or recognizes the benefit of achieving an enhancement mode device.
3 So, it has some teaching, suggestion, and motivation to implement its
4 processes in an enhancement mode device like those in Hikita, both Hikita-
5 347 and Hikita-023.

6 I believe I've already addressed the metals unless there are other
7 comments there. Petitioner's position is that EPC is advocating for physical
8 substitution of elements and not addressing the proposed combination.

9 Turning to slide 82, EPC again raises the same limitation 1e4 dispute
10 for Hikita as it does for Yoshida. And I'm going to skip through those since
11 our response is the same.

12 So, let's look very briefly at the motivation to combine for the ohmic
13 formation steps with Yoshida -- I'm sorry, with Hikita and Beach, and why a
14 person of skill in the art would have incorporated Beach's ohmic formation
15 process into Hikita.

16 Again, we have the four reasons plus a response to EPC's counter
17 arguments. I'm going to go quickly because these are very, very similar to
18 what were raised with respect to Yoshida. But I want to touch on the
19 analogous art because we are talking about a different reference here.

20 Hikita-347 is also analogous and also relates to a gallium nitride
21 transistor, and the process for forming one. The same as Beach.

22 Hikita-347 and Beach in combination, just like with Yoshida, uses a
23 known technique, Beach's masking and etching process to improve similar
24 devices in the same way, by masking and etching.

25 Now, just like in the Yoshida ground, Hikita also recognizes that you
26 want to align your gate and p-GaN. It says the source electrode and drain

1 electrode are formed of a titanium layer and the Al-GaN layer and the
2 associated one of its openings. I'm sorry, I'm talking about the wrong
3 limitation here.

4 Hikita recognizes that you have to form ohmic contacts, but doesn't
5 give you the details for doing so. It talks about loading a source and drain
6 electrode. It tells you what to form them of, it tells you where to put them,
7 but it doesn't tell you the process for how to form them. Beach tells you the
8 process for how to form them using the etching process.

9 Turning to slide 92, reasonable expectation of success. Dr. Shealy
10 explained in his declaration that using Beach's masking process to etch
11 ohmic contacts in Hikita's device, just like for Yoshida's device would have
12 required only conventional skill.

13 This is because, as we mentioned for Yoshida, there are only two
14 ways to do this. You either etch or you use lift-off. Both were well known,
15 both were conventional. There would have been a reasonable expectation of
16 success for either.

17 And that's exactly the same argument, turning to slide 93, that EPC
18 raises here. Again, just like for Yoshida, EPC argues that there's no
19 motivation to combine because Hikita discloses a lift-off technique.

20 Well, we've already talked about how Yoshida doesn't necessitate a
21 lift-off technique. I read you the relevant portion from Hikita's paragraph 60
22 a moment ago about loading the source and drain electrodes. It's silent, just
23 like Yoshida, about lift-off versus etching.

24 Its figures, if you look on the right-hand side of slide 93, again show
25 vertical edges of the ohmic contacts, and Dr. Shealy explained using the

1 Gorowitz textbook that those vertical edges indeed suggest etching and not
2 lift-off.

3 But regardless, there are only two alternatives here. It has to be either
4 lift-off or etching. It would at least have been obvious to try. It would at
5 least have been a suitable option.

6 And I see I'm about out of time, so I want to touch very briefly on
7 ground 3 only to show that the arguments EPC raised for ground 3 and the
8 Hikita-032 reference are identical to what they raised for both Yoshida and
9 Hikita-347. 347 and 023 are quite similar with only minor differences. EPC
10 actually addresses them together in the paper.

11 And with that we would argue that all the claims are obvious over all
12 three grounds and reserve the remainder of the time for rebuttal. Thank you,
13 Your Honors.

14 JUDGE TORNQUIST: Thank you.

15 MR. ENGLAND: Sorry. Before I begin, I'd like to reserve 15
16 minutes.

17 JUDGE TORNQUIST: Fifteen? Okay.

18 MR. ENGLAND: Okay.

19 JUDGE TORNQUIST: Okay. Whenever you're ready.

20 MR. ENGLAND: Okay. May it please the Court, as Counsel said on
21 the other side, we're here to address the '508 Patent. And of the issue
22 brought up, she claimed the overall arching issue was claim construction.
23 But the overall arching issue here -- we're here today to discuss is hindsight.
24 Petitioner's use of hindsight throughout this proceeding to justify their
25 inconsistent motivation to combine resulting in a claim that purportedly
26 invalidates the '508 Patent.

1 The other issue that we're here to discuss is Petitioner's deficient
2 petition in not presenting the actual combination it proposed. The Petitioner
3 presented a series of combinations and disproportioned to those
4 combinations which it then combined in an undisclosed method to allegedly
5 achieve the claim process.

6 Due to those two issues, Petitioner's deficient and Petitioner has not
7 established its burden to demonstrate that any of the claims of the '508
8 Patent are invalid is obvious.

9 Turning to slide 2, this is what we're going to discuss today. The '508
10 Patent's technology, followed by the claim construction issue which is
11 whether or not there's a sequential order to the gates, followed by the merits
12 of the grounds.

13 Turning to slide 4, we are at the '508 Patent. The '508 Patent is a
14 method patent and recites only method claims. The important part is that it
15 cites or accounts as the other Counsel said, the epitaxial process and the
16 fabrication process.

17 And the issue here are the gate formation, the dielectric formation,
18 and the ohmic contact formation of the fabrication process. And it's not that
19 we have conceded that the claim limitations are actually met, as Counsel
20 said, but instead their motivation to combine is deficient. And even if
21 combined, it still does not teach the claim limitations once the Petitioner
22 disclosed in their reply brief what the actual combination was.

23 So, before we get to the technology of the claims, we need to look at
24 what the inventors themselves described as the present invention. As
25 Counsel said, it is a self-aligned gate structure where the gate -- where the

1 gate metal and the gate material are both etched with a single mask allowing
2 for a self-aligned process.

3 But in addition, there is defined by the inventors furthermore which
4 means in addition to what I was just discussing as the present invention.

5 The inventors described a process of forming a field plate at source
6 potential, simultaneous or together with, the source and drain contact. In
7 reading the specification, they called it a field plate but really, the field plate
8 is just the portion of the source contact that is extending over the gate and
9 functions as a field plate.

10 And this matters because these two present features are recited in each
11 claim of the '508 Patent. Up here you can see Claims 1, 4, and 5, the
12 independent claims. And in green you have the green portion from our prior
13 screen, the present invention, that discusses the self-aligned gate structure.
14 And those are the steps that require to how you form the gate structure.

15 In blue below it describes the steps required to form the source -- the
16 field plate at source potential together with the source contact. And as I will
17 describe shortly, since the field plate is part of the source contact, the claim's
18 reciting depositing an only contact metal, applying a metal photo resist
19 pattern, etching the ohmic contact metal as all the steps required to form the
20 source contact, which has just been defined as a portion of being the field
21 plate.

22 And this can be more easily seen if you look to slide 8 where this
23 shows figure 2 of the '508 Patent. Figure 2 shows the completed process
24 which is the easiest showing of what the ohmic contact looks like.

25 Before I get to the source contact, first you can see that the gate
26 structure with reference 15, the gate material and 17, the contact and self-

1 aligned structure. And then you can see the source and the drain which are
2 referenced in numerals 20 and 19 in dark black.

3 And a portion of the source is extending over the gate contact and
4 functioning as a field plate. So, it's really a source -- apologies -- it's that the
5 source contact itself, which is a required element in every single
6 embodiment is included in the field plate. Or is included over the gate
7 structure.

8 Now first, as I just mentioned, on the left you can see in slide number
9 9, figures 3b and 3c, and those show the steps to make the self-aligned gate
10 structure. You start with the epitaxially deposited materials. And then with
11 reference numbers 17 and 15, the gate contact and the gate material have
12 been etched in a self-aligned forming structure.

13 Since Counsel explained this process, I will just go to the issue with
14 prior art and what the process really entails because it really informs us more
15 about the ohmic formation process.

16 So just to walk through the steps. What happens is, first, the gate
17 material, the p-GaN in light blue, in step 1 is deposited. Then the first photo
18 resistant material is deposited on top of that.

19 The photo resistant material is developed of light ,as you can see at
20 the top, and is patterned and developed which results in what is in step 2,
21 which is the patterned photo resist. That patterned photo resist is used as a
22 mask to etch the p-type material resulting in step 3.

23 And after you have p-type material, the photo resist is removed and
24 subsequently a gate metal layer and a photo resist layer is deposited. And
25 now the gate metal layer is not etched at this point, until the photo resistant

1 material is deposited on top and then patterned and developed as you can see
2 in 5.

3 Now you can see with the vertically dotted lines, there is not a center
4 alignment, which is how we are trying to depict what is precise center
5 alignment and shown as the precise alignment between the two different
6 structures. And this comes from machine tolerance and inevitable errors of
7 being able to perfectly line up two layers.

8 And once the photo resist in light green, step 5, is used to etch the gate
9 contact, you get a gate contact as shown in 6 which is not perfectly centered
10 on top of the p-GaN material below.

11 Now turning to slide 11, you can see what the self-alignment
12 improvement did on the '508 Patent. And on that, to explain the process, it
13 starts with the gate material, p-GaN, which is unetched and then the gate
14 metal is deposited on the unetched p-GaN. And only then is the single
15 photomask material deposited on top.

16 And at that point the photomask is patterned and developed as you can
17 see in step 2, and the photomask is then used to etch both the gate metal and
18 the p-GaN layer without any independent steps.

19 Due to that -- due to this process, as shown in step 5, you can see the
20 precise center alignment which is the easiest way to determine whether or
21 not there's perfect -- there is a self-aligned process. And these steps are
22 depicted in the green on right which goes to the claim language depicting
23 how to do this.

24 Now this is important because, turning to slide 13, as we discussed the
25 '508 Patent describes essentially what we're designating as a two-etch or
26 two-mask process to form the structure of the ohmic contacts.

1 First, the formation of the dielectric material, the depositing of the
2 dielectric material, and the patterning and etching to open up the holes in the
3 dielectric material. Which the Board picked up on in the institution decision
4 in saying that the dielectric material has to come before the ohmic contact.

5 So once the dielectric material is opened and formed and deposited,
6 which is shown in numeral 18, the source material -- the source contact is
7 deposited, or the source metal is deposited over the entire branch, or the
8 entire set. It resists as pattern and etched, and then the resist is used to etch
9 the gate -- the -- sorry -- to etch the gate contact which then -- or the source
10 contact which then extends over the gate metal as shown in figure 3E.

11 Dr. Schubert, the expert for EPC, prepared the attached exhibit
12 showing an actual representation of the two-etch process. As you can see
13 the first photolithography process on the left is used to first etch holes for the
14 dielectric which is shown in the next step.

15 Subsequently, the contact metal is deposited on top of the entire
16 process and a photo resist is deposited on top of the contact metal and
17 pattern etched in the second photolithography process.

18 As you can see in the second photolithography process, the photo
19 resist is patterned in a way that's actually wider than the openings in the gate
20 contact. And that is due to natural misalignment and ensuring that the photo
21 resist covers enough of the gate -- covers enough of the gate, or the ohmic
22 metal to ensure that none of the photo resist within the dielectric is being
23 etched during the etching process. And that's shown in the bottom step on
24 the left.

25 As a result of this process, there's no vertical alignment between the
26 dielectric material and the edges of the ohmic contacts. Additionally, there's

1 an option to simultaneously form a field plate over the gate structure, which
2 is as I've mentioned, it's the present invention. However, the one detriment
3 is that this is, as parties have said, a multiple photolithography process so
4 essentially it takes more steps than needed and which are some of the most
5 expensive steps.

6 Now the prior art, or an alternative, is lift-off. And I'm right now on
7 slide 15. And lift-off begins in the same manner that the two-step process
8 occurs.

9 The dielectric is deposited, the photo resist is deposited and patterned
10 in the first photolithography step. And then the etching occurs in the
11 dielectric. The only difference is, at that point, the photo resist is not left on
12 the material. Instead, the contact metal is deposited directly on the photo
13 resist.

14 And once the contact metal is deposited on the photo resist, the photo
15 resist is lifted off or removed, removing all of the contact metal on top of it.
16 That results in these vertically aligned structures as shown on the bottom left
17 and there's no option, due to this formation process to achieve the present
18 invention of simultaneously forming the field plate and the source contact.
19 But there is the benefit of it being a single photolithography process in the
20 Patent Owner context.

21 So, turning to slide 16 you can see a comparison on the left of the two
22 representations of the processes. So, on the top you have two etched process
23 of the '508 Patent resulting in the t-type shape. And on the bottom, you have
24 the lift-off process or alternative resulting in vertical alignment. And this is
25 shown in figure 3E on the top right of the '508 Patent which is showing the
26 two-etched process.

1 And you can see in reference numeral 20 and numeral 19 extending
2 over the dielectric material and over the gate, versus in Yoshida which is on
3 the bottom right, the figure depicting S and D, which is source and drain
4 electrodes having a vertical alignment.

5 So, unless there are any other questions about the technology
6 background I will move on to the claim construction issue.

7 JUDGE ABRAHAM: I do have a question.

8 MR. ENGLAND: Yes.

9 JUDGE ABRAHAM: Just want to make sure I understand. Where in
10 the claim, if you could direct me to that, is this field plate showing up? I see
11 where you have on the screen on 16, on the left-hand side at the top. You've
12 got the contact metal which is sort of fans out over the dielectric a little bit.

13 MR. ENGLAND: Yes.

14 JUDGE ABRAHAM: You're saying that that's this field plate portion
15 of the invention that distinguishes it from the prior art?

16 MR. ENGLAND: No, Your Honor. What I'm saying is that is a
17 representation of the contact metal in a two-etched process. Which this
18 process, which is the process patent, it's allowing the formation of the source
19 and drain contact simultaneous with the field plate.

20 If you would look at the right of slide 16 in figure 3E, the portion of
21 the dark black source contact numeral 20 that extends continuously over the
22 dielectric material towards either the gate contact shown, which is 15 and 17
23 stacked. That portion that extends over is the field plate.

24 It's really the source contact, but it's the source contact extending over
25 the gate structure functioning as a field plate. And that is what I was saying,

1 the ability to form the field plate is part of the present invention that the
2 inventors disclosed.

3 JUDGE ABRAHAM: And where is that in the claim?

4 MR. ENGLAND: The claim -- oh, if I could go back to slide 7 which
5 shows claim 1, as just an exemplary claim. This is shown in step -- or in
6 light blue on the bottom where it's talking about how you form the source
7 and drain contact.

8 Now it doesn't say field plate, because this isn't in the claim that we're
9 talking about the processes to achieve the methods. The process that's
10 described in the claim talks about forming the source plate and the source
11 contact. And the source contact, the formation of the source contact together
12 with the field plate since the field plate is part of the source contact. It's
13 where you would find it in the claims.

14 JUDGE ABRAHAM: Okay. Thank you.

15 MR. ENGLAND: But I will touch on that again when I get to claim
16 construction.

17 So turning now to slide 18, here are the three claim construction
18 positions. You have Patent Owner's position, which is that it should be a
19 gate-first, or ohmic-last, dielectric should also come before the gate.

20 Petitioner believes that there's no claim construction needed except
21 the Petitioner apparently agrees now that the dielectric can come before the
22 gate material, as we heard today. As we heard today. Or the dielectric can
23 come before the ohmic material. And the Board's position was the dielectric
24 had to come before the ohmic material in the institution decision.

25 As we just discussed, this is based on -- there's a presumption that
26 claims in a process patent are not ordered unless it's necessary by either

1 logic in the claim or required -- or implicitly or explicitly -- implicitly or
2 explicitly in the specification.

3 Now first we're going talk about the present invention and what the
4 inventors said. And what's important to note here is that the inventors are
5 talking about an actual process. The field plate is a structure, yes. But the
6 field plate at source potential is patterned and etched together with the
7 source and drain contact metal.

8 So the benefit they're talking about is achieving two structures using
9 one photomask which is the same benefit talking about in the self-aligned
10 structure. It reduces processing and allows the formation of a field plate,
11 which is just part of the source contact instead of alternatives such as lift-off
12 method where a field plate can later on be deposited and added in, thereby
13 requiring additional steps.

14 Then going -- next going to the claims. As Judge Abraham just said,
15 the Petitioner -- or Patent Owner's position is that the claims recite the steps
16 necessary to perform the field plate, and that is required by a method claim,
17 not just structure.

18 And so each independent claim recites all the method steps required to
19 form the field plate. It's a choice between whether or not the structure result
20 needs to be there.

21 Then going to the specification. The specification also supports, on
22 slide 21, a formation of the field plate. The specification teaches that the
23 field plate's formed over the gate structure and the specification teaches that
24 field plate is formed over the gate structure as shown in figure 3E in every
25 embodiment that's disclosed. And every embodiment includes forming the
26 source contact which is just a portion of it is the field plate.

1 And you can see that the -- and you can see the specification is
2 consistent with this, as throughout even and during Dr. Shealy's deposition --
3 Dr. Shealy acknowledged that the field plate is shown in every embodiment.
4 And you can see that as you look here throughout this, only a gate-first
5 process can achieve both the present invention which is a self-aligned gate --
6 self-aligned gate material and the field plate at source potential formed
7 together with the source and drain contact.

8 And you can see that the order -- the sequence matters because the
9 field plate is always located over the gate structure which requires a
10 subsequent formation process. It's included in all embodiments, and it
11 cannot be deposited over the gate structure without the presence of an
12 already formed gate structure.

13 And then the -- now turning to slide 22. The important part of slide
14 22 is showing that non-gate-first process, or G-D-O processes, do not
15 achieve the present invention and still allow the claim.

16 And as you heard Counsel on the other side discussing, G-D-O
17 processes, D-O-G process, and O-D-G processes were all generally known
18 in the art. The problem is that -- like -- the other side, or Petitioner talked
19 about these in abstract with any analysis turned towards the actual claim
20 language.

21 And once you look at the actual D-O-G process as compared to the
22 claim language, as explained by Dr. Schubert, you have the process shown
23 to the left of slide 22 which shows the formation of the p-type material,
24 which is an etching step. Then the drain -- or then with the sourcing drain
25 contact formed. At the bottom you end up with a remnant island, which as
26 Dr. Schubert explained, would result in non-enabled or non-operable

1 devices. The p-type material on this depletes the 2DEG material below,
2 which allows the device to be an enhancement mode device, which is
3 included in the preamble in this claim and described throughout the
4 specification.

5 An enhancement mode device works by the voltage being applied to
6 the gate contact, turning back -- turning on the flow of the electrons between
7 the source and the drain allowing the transistor to work.

8 But Dr. Schubert explained is that because of these remnant islands
9 there would be portions that would not be able to be turned back on due to
10 the application of voltage rendering Petitioner's own described embodiment
11 inoperable.

12 Furthermore --

13 JUDGE McGRAW: If I might interrupt for a moment. This requires
14 those to read the field claim limitation into the claim. So if we disagree with
15 that, and we determine the field plate should not be read into the claim as
16 said in this argument, it doesn't have merit. Is that correct?

17 MR. ENGLAND: No, Your Honor. This is a separate argument. The
18 argument about the inoperability is because of the self-aligned structure
19 leaving remnant p-type material below. Then that p-type material, in light
20 blue on this slide here, will actually prevent the device from turning on and
21 becoming an operable transistor.

22 Separately, Petitioner -- or Patent Owner is also arguing that because
23 the ohmic material is deposited before the gate contact is formed, it cannot
24 include the field plate and meet that field plate limitation. Is that clear?
25 Clarify Patent Owner's argument?

1 JUDGE McGRAW: So are you arguing that under the process
2 proposed by Petitioner they would end up with these remnant islands and
3 would not function? Is that correct?

4 MR. ENGLAND: That is correct Your Honor.

5 Sorry, was there something else? All right.

6 Turning now to slide 23, after Patent Owner presented Dr. Shealy's
7 redirect examination's explanation of the claim construction -- of his claim
8 construction position, the Patent -- Petitioner submitted a second revised D-
9 O-G process. However this D-O-G process was never tied to the claim and
10 Petitioner never explained how it actually met the claim limitations. It was
11 just a generic D-O-G process.

12 Further, throughout the proceeding, Petitioner, until today, never once
13 explained how these remnant islands formed, as you can see in the bottom
14 left in step E, actually met the limitation 1e4.

15 However, because this was not presented until Petitioner's reply brief,
16 with respect to the merits, Patent Owner never raised this as an issue with
17 respect to the combination having remnant islands until its surreply, when it
18 first became timely.

19 Now, as Patent Owner explained, the remnant islands, in the last slide,
20 result in an inoperable device. Petitioner says that hypothetically you can
21 make the same process without the remnant islands, but Petitioner's
22 argument is purely based on speculation and actually provides no analysis
23 about how a person of ordinary skill in the art would have known that based
24 upon disclosure of the patent and Petitioner's hypothetical, after the fact, D-
25 O-G process.

1 Turning next to -- slide 25, Petitioner also provided an O-G-D
2 process. And the O-G-D process is materially different than the claim
3 process and the process described in the '508 Patent. The issue with the O-
4 D-G -- the O-G-D process is that it's going to be shown on the left, on step B
5 the ohmic contact material is formed. Step C, the gate metal is formed on
6 top of the ohmic material, and then in the process step of D, when the
7 etching of the gate metal is occurring, the metal is similar between the gate
8 metal and the ohmic metal, there will inevitably be etching away of the
9 ohmic -- unprotected ohmic metal during forming of the gate contact.

10 And that will remove portions of the gate contact, and as shown and
11 explained by Dr. Schubert, will also remove portions of the barrier layer.
12 But also, and this is a separate argument, because the ohmic contact is being
13 formed before the gate metal is being formed, there's no way to meet the
14 present invention. For those two reasons, that this is not an operable
15 invention.

16 Further, as I mentioned before, Petitioner's analysis of the claim
17 construction was completely detached from the claim limitations. Petitioner
18 never actually explained how its O-G-D process would meet claim limitation
19 1F3 which is etching the dielectric layer to open the drain and source contact
20 area.

21 And this is the limitation in the institution decision that the Board
22 determined was why the ohmic layer had to happen before the gate contact.
23 And it's still not met even by Petitioner's reading. Because once -- first you
24 have to look at the claims by the plain and ordinary language, then you have
25 to look in the intrinsic record which clearly demonstrates what opening --
26 what etching the dielectric layer to open the drain and source contact area is.

1 It's part of the two-step etch process to form the ohmic contact as described
2 by the invention.

3 So Petitioner's O-G-D process is actually contrary to the Board's
4 interpretation in the institution decision. It's contrary to the claim language
5 of the claim which is what the Board relied on in its institution decision. It's
6 also contrary to the specification which describes explicitly what the plain
7 and ordinary meaning should be understood to a person of ordinary skill.
8 And finally, it results in a non-operable embodiment as I described in a
9 previous slide.

10 During conclusion, only the G-D-O process results in -- both meets
11 the claim limitations, results in an operable device, and can achieve the
12 present invention. And that is why that should be the correct construction
13 adopted here.

14 And before we get to the merits, I would like to talk about the
15 sequences that were added and discussed by Patent Owner's Counsel -- or
16 Petitioner's Counsel today. Now these sequences -- these sequences were
17 provided in response to Petitioner pointing out deficiencies in the -- or
18 Patent Owner pointing out deficiencies in the petition.

19 The Petitioner essentially said, here's Beach, here's Yoshida. They
20 have each has independent steps and we can throw these two together and
21 result in teaching each limitation in isolation without actually comparing the
22 combination to the inventions.

23 The new combinations are essentially a way gap fill the deficiency of
24 the petition and then look at the invention as a whole as opposed to looking
25 at the invention as a series of discreet isolated limitations.

1 Although first appearing in a paper in Petitioner's reply, Patent Owner
2 -- Petitioner is now contending that Dr. Shealy really explained it in his
3 redirect examination during deposition. So examination by his own
4 Counsel. But that's misleading for two reasons.

5 First, it's trying to absolve Petitioner from the petition contained in the
6 case in chief because this is obviously responding to deficiencies identified
7 by Patent Owner. And secondly, Petitioner's entire discussion, which was
8 even acknowledged by Patent Owner -- or by Petitioner -- Petitioner's
9 expert's discussion, which was acknowledged by Petitioner, was actually
10 with respect to claim construction, not with respect to his proposed
11 combinations.

12 And so, only during the reply brief, Patent Owner's reply brief, did
13 Patent Owner actually propose what it would look like to combine Yoshida
14 and Beach into a single process to achieve the claims. And because of that,
15 because the arguments were so late and should have been presented in the
16 petition, and there's no reason they should not have been -- or should not
17 have been presented today for the first time, all that material should not be
18 considered by the Board and it's at the Board's discretion to be able to
19 determine whether or not to consider it.

20 But turning to slide 29, I just want to emphasize a little bit of what the
21 difference is and why there's an actual change in theory of validity. So on
22 the left you see the D-O-G process discussed today by Petitioner's Counsel
23 showing -- which shows up in their brief paper 18 at 14.

24 And I think it's important to step through the process as compared to
25 Yoshida. So as Petitioner essentially said, it follows Yoshida and then it
26 turns to Beach at the very end. Well if you look at step A, they're citing

1 Yoshida. Step A is taking a p-type material and etching the p-type material
2 where the gate is to be loaded -- where the gate contact is to be loaded.

3 Steps B and C are then forming the ohmic contacts. Step D, if you
4 can look in very closely, you see the p-type material which has already been
5 etched. The ohmic material which is on top. The dielectric shown in red.
6 And on top you see a gate contact which is in green.

7 And this is relying upon what Petitioner is telling us its doing. In step
8 7 Petitioner says, pattern gate contact metal applied. And so it says pattern.
9 It's showing a pattern. So what it's really showing, an expanded version
10 there, I'll show this shortly, is it is showing depositing a gate metal, which is
11 what Yoshida teaches, etching a gate metal to form the gate contact, and
12 then only then, you complete Yoshida. You turn to step E, and the
13 subsequent part of step D where you're adding a yellow photo resist and
14 forming a secondary etching step, resulting in what is shown in 8E.

15 Now that is different for two reasons. First, it's adding to Yoshida.
16 Second, when you compare that to what the Petitioner said in petition at 33,
17 which is showing the center, in the center figure showing figures 1D and 1E
18 of Beach, you go from Petitioner citing what Beach exclusively that has no
19 remnant islands when you go to figure 1E, to a device that has remnant
20 islands.

21 So not only is the combination at best described differently, but it's
22 actually producing a different structure. And the important part is that the
23 claim language at issue, which is 1e4, requires an etching away except for
24 gate -- except for the material below the gate contact.

25 And further, this combination now abandons the Beach discloses this,
26 Yoshida discloses that process that was actually talked about in the petition

1 and is now saying the combination of Beach and Yoshida in a combined
2 process not explicitly disclosed teaches it.

3 There's no reason why this new analysis could not have been
4 presented earlier in a clear way to actually show what Petitioner is proposing
5 the combination. Because it's not only incorporating certain parts of Beach.
6 Beach is a wholly different process performing different steps. It's not just
7 implementing a certain step.

8 There's a portion of Beach where it has to start, a portion of Beach
9 where it has to end. And there's no way to determine where Yoshida ends
10 and how much of Beach is being incorporated into Yoshida based upon the
11 petition.

12 Turning now to slide 30, you can see on the left the petition versus on
13 the right, the reply. Petition says Beach discloses element 1e1. Second
14 Beach discloses element 1e2. Third Beach discloses 1e3, 1e4, and then 1e5.
15 Paraphrasing.

16 That is showing that Petitioner is relying exclusively on Beach and
17 they're not showing and telling the Board or the Patent Owner what the exact
18 combination will result in, or how to evaluate the claims. Instead, in the
19 reply it now actually produces a response.

20 And instead of what the Board understood, which in the institution
21 decision was an understanding of it replacing etching steps to be more
22 efficient, which is what the paper 11 says at page -- I believe it's page 23.
23 Patent Owner is actually adding steps. So you're producing the entire
24 Yoshida process, and you're adding Beach's self-aligned etching process at
25 the very bottom. And that's the difference between step D and step E.
26 You're also producing remnant islands.

1 So there is a change in theory, a change in combination, and Patent
2 Owner had no chance to actually respond to this in a timely basis. And that
3 is why this should be disregarded. To the extent that it's considered, Patent
4 Owner should not be able to now justify why it meets any of the claim
5 limitations.

6 And with that I will turn to the grounds, unless there's any questions
7 on the propriety of the reply sequences.

8 JUDGE TORNQUIST: Let me just make sure I understand. Your
9 argument is that it's new, so it shouldn't be considered. But even if they did
10 this, and they left the remnant islands, they wouldn't work.

11 MR. ENGLAND: Well it's too --

12 JUDGE TORNQUIST: Am I mixing --

13 MR. ENGLAND: You're mixing operability with respect to claim
14 construction and whether or not that would be a feasible embodiment with
15 whether or not the combination itself of Yoshida and Beach in Ground 1,
16 and Hikita and Beach in Ground 2 would actually meet the claim limitations.

17 JUDGE TORNQUIST: Okay.

18 MR. ENGLAND: So for the merit base, it's more about whether or
19 not it actually meets the strict language of the claims which is something we
20 could not actually evaluate when in the petition -- because the petition
21 showed Beach, which is on the left, having no remnant islands.

22 So of course there's not going to be a challenge to that point about
23 whether or not you etch away any material outside the gate content.

24 JUDGE TORNQUIST: Okay.

25 MR. ENGLAND: Okay. So Ground 1 is Yoshida in view of
26 Sheppard and Beach. And as discussed by other's Counsel the combination

1 between Sheppard and Beach for Grounds 2 and 3 are substantially the same
2 as Ground 1. So my arguments will focus today on Ground 1 and will
3 essentially equally applicable, except for a few distinctions that I'll point out
4 for Grounds 2 and 3.

5 And the main issue is that Petitioner failed to establish a motivation to
6 combine Beach with Yoshida. You mentioned the ITC case. The ITC case,
7 as Counsel said, is about Hikita and Beach's combination. And the ITC
8 determined that it was not, that the combination did not invalidate because it
9 was -- because a person of skill in the art would not combine the references
10 based on hindsight, which is also what we're arguing today.

11 There's -- first, the argument is that the entire combination is based on
12 hindsight. And that was hidden from us because Petitioner failed to
13 correctly identify its process in the petition.

14 Further, Petitioner's combination is inconsistent -- or the motivation to
15 combine are inconsistent to achieve different formation steps. And when
16 you look at the process as a whole and not as it's been disclosed in the reply,
17 you can tell that the hindsight is there justifying the combination.

18 Further, once combined if the Board adopts the claim construction of
19 gate-first contact, there's no motivation to achieve the gate-first contact. But
20 that's a separate argument, it doesn't affect whether or not hindsight is there.

21 And finally, after looking at the proposed combination in the reply
22 brief, there is a question about whether the Petitioner actually explained the
23 sequences themselves would have taught 1e4. Patent Owner believes that
24 Petitioner's argument it does not teach 1e4, but it is Petitioner's obligation to
25 actually show that it meets claim limitation 1e4. And that was not done in

1 the petition. That was not done in the reply brief. That was not done in any
2 paper. It wasn't done until it was attempted today.

3 So first turn to Yoshida. Yoshida is a gate-last process, which is the
4 only note that we need to make of Yoshida. Then turning to Beach on slide
5 35.

6 Slide 35 shows the process of Beach forming the gate contact. The
7 only thing I want to point out about Beach, is you can see from figure 1E on
8 the left is what they're saying is the gate contact formation. On the right is
9 what they're showing as the ohmic contact formation.

10 On the left they're calling the gate contact formation a self-aligned
11 process. And on the right they're showing that as the two-etch process
12 allegedly meeting the claim limitations of the ohmic formation of the '508
13 Patent.

14 As can be seen looking from figure 1B through 1E, there's two etching
15 processes actually to define what the ohmic contact looks like, and that's
16 what forms the t-type shape. And that's why we're saying this is a two-etch
17 process. It's more complicated than what -- than what would be in a lift-off
18 process.

19 Now turning to slide 36. Before we get into the merits, I just want to
20 highlight about the hindsight that's being used by Petitioner. Petitioner is
21 essentially picking and choosing disparate elements from two significantly
22 different references as explained in the papers and analyzing the proposed
23 combination of an independent reference by reference on an isolated
24 limitation by limitation basis. There's no explanation of how these processes
25 actually combine to form a cogent, actual process that would meet the
26 limitations of the independent claims challenged.

1 And then you can see that on the below images on the left and the
2 right. On the below images on the left which show Beach figures 1D and 1E
3 as annotated by Petitioner, you see the source contact formation. And on the
4 right you see -- on the right you see the ohmic formation. This is citing and
5 explaining only Beach and nothing but the hypothetical combination that
6 would allegedly teach the reference.

7 What this is is basically picking disparate elements from Beach and
8 inserting them into the process of Yoshida without an explicit motivation to
9 combine from either reference. And as I will shortly explain a little, that is
10 inconsistent.

11 This is more similar to --

12 JUDGE McGRAW: I --

13 MR. ENGLAND: Yes, Your Honor.

14 JUDGE McGRAW: If I could interrupt. Petitioner seems to be
15 arguing that you would want to create a self-aligned gate. And that would
16 provide the motivation to use Beach as a single masked process to create that
17 self-alignment. What is wrong with that argument? With wanting to create
18 self-alignment. Wouldn't that be motivation to use Beach's single mask
19 process with Yoshida to create Yoshida's gate?

20 MR. ENGLAND: Patent Owner does not dispute that in isolation the
21 idea of Beach's self-aligned gate is a motivation to reduce the overall steps
22 and form the self-aligned gate. It's that the -- it's that Beach in totality
23 teaches away from it and then the overall process, including Beach, is
24 actually a more intensive time consuming process that would actually
25 dissuade a person of ordinary skill in the art from combining the references.

1 So when you look at that in isolation, there's potential that there is an
2 argument that a motivation to combine can exist. But when you look at the
3 totality of what Petitioner is looking to do based on Yoshida and combining
4 Beach in different ways to achieve a more complicated process versus what
5 it disclosed in the motivation to combine, the argument is that it's only based
6 on hindsight that actually justify why you would actually pick this reference
7 based upon all the other teachings of Beach telling you not to choose it.

8 JUDGE McGRAW: But I just want to make sure, your argument is
9 that Yoshida on its own is not as complicated as Yoshida and Beach. And
10 therefore, a person of skill in the art would not look to add Beach because
11 it's more complicated. Is that correct?

12 MR. ENGLAND: That is one of the arguments against the motivation
13 to combine. That is correct, Your Honor.

14 JUDGE McGRAW: And what about Petitioner's argument that the
15 self-aligned gate itself has benefits, and a person of skill in the art would
16 have wanted to create that self-aligned gate for the benefits -- for that
17 particular benefit?

18 MR. ENGLAND: Patent Owner does not necessarily dispute that a
19 self-aligned gate has benefits and a person of ordinary skill in the art would
20 choose to have a self-aligned gate. The issue, looking at the motivation
21 behind this, identified by Patent Owner in totality, that, weighing that versus
22 the actual cost benefit analysis of incorporating a self-aligned gate, a person
23 of ordinary skill in the art would not look to incorporate that element when
24 you're looking at the claim as a whole as opposed to just the gate formation
25 step.

26 JUDGE McGRAW: Thank you. I understand. Thank you.

1 MR. ENGLAND: All right. So what I was trying to say is this step is
2 -- and this touches a little bit on what Your Honor just said. This is similar
3 to the *In Touch Tech* case. Where essentially the Federal Circuit found that
4 the claims were not in the -- sorry.

5 Federal circuit found that the analysis was based on the improper
6 hindsight where the person argued that the elements in isolation were known
7 in the prior art, but never provided the actual glue about to how to get to the
8 invention as a whole.

9 Here, this is a case where Patent Owner has essentially provided a
10 series of puzzle pieces, identifying where the prior art teaches each
11 limitation in isolation and then Petitioner -- but Petitioner, as a petition has
12 not provided any guidance on what the puzzle is to look like or how to
13 assemble the puzzle.

14 So you're left with a series of pieces and the only guidance to how to
15 get to the puzzle is hindsight and the teaching of the '508 Patent.

16 But turning now to slide 37. As I just mentioned, the Petition did not
17 actually identify the modification that it intended to make to Yoshida. It
18 said combine Yoshida with Beach to arrive at the claim dimension of just
19 implementing a gate process.

20 As I showed you previously, the actual combination is a little different
21 from what Petitioner is even now saying that the implementation was.
22 Further, as I mentioned before there's no modification to achieve a gate-first
23 process ever actually put forth in the petition. And even in the reply, the
24 Petitioner's expert had already said that there's good reasons not to choose
25 that path.

1 Furthermore, Petitioner's identified modifications combined, which is
2 what Judge McGraw's position is, is first about where the gate is to be
3 located. There's no motivation based upon where the gate is to be located
4 because yes, it is teaching a smaller gate material, but Patent Owner's
5 actually proposed response, as I showed in the reply sequence, actually
6 performs all the steps in Yoshida. So there's no reason to improve Yoshida
7 based upon that.

8 Furthermore, we've no reduction in the overall number of steps.
9 Because as I showed, Yoshida's actually performed -- the entire process of
10 Yoshida is performed in the reply sequence before the Beach step is added.
11 And that is of note because Beach's whole purpose, Petitioner pointed out of
12 adding the Beach step is to reduce the overall number of steps, but instead
13 the proposed combination actually increases the number of steps.

14 In lieu of time I'll move to slide 38. And essentially what I was trying
15 to say with hindsight is that the Petitioner is just mix and matching
16 beneficial portions of prior art and talking in generalities. It's not actually
17 talking about how to incorporate Yoshida -- or Beach into Yoshida to
18 achieve a better process as a person of ordinary skill in the art would.

19 It talks about a general idea of self-aligned gate and isolation would
20 be a good idea, but not how to incorporate it into Yoshida in a way that a
21 person of ordinary skill in the art would seek to do so.

22 And then there's no specific analysis of how to actually modify
23 Yoshida to achieve that invention. And besides hindsight, there's no reason
24 to actually combine the elements of Yoshida and Beach with the expectation
25 of success in the matter now proposed by Petitioner.

1 Previously, as we will see elsewhere, Beach requires a different --
2 Beach is a different process with different materials and different pre-
3 forming layers. And it wouldn't have been obvious to take Beach, and
4 isolate it, and apply it to a pre-etched PM material.

5 Turning now to slide 39. We have the reason why there's no
6 motivation to modify Yoshida in view of Beach to achieve the ohmic
7 contact. So Yoshida teaches a vertical sidewall. And you don't need to trust
8 me, you can trust Petitioner's own statements.

9 In Petitioner at page 23 of the petition, Petitioner stated, second
10 Beach's masking process is simpler compared to the alternative lift-off
11 process, citing Shealy at paragraph 145. A person of ordinary skill in the art
12 would have understood that Beach's masking process avoids manufacturing
13 of the vertical profile of photo resist shape used in lift-off process thereby
14 reducing cost.

15 So that is Petitioner itself talking about how the vertical shape, which
16 you can see in the bottom right of Yoshida, the vertical shape of the photo
17 resist is a lift-off -- is a result of a lift-off process.

18 Now as I explained earlier in the technical background, in order to
19 make the mask that's being shown in -- the ohmic material being shown in
20 Beach, figure 1E in the bottom right, it requires the t-shape that's caused by a
21 two-etching process versus the vertical alignment which is caused by the
22 one-etching process.

23 So regardless of whether or not teaching vertical or -- sorry -- it's
24 looking -- based upon the drawings alone, it's looking to use a two-mask
25 process to achieve the process of Beach. Because Beach requires that earlier
26 layer ohmic opening to form the t-shape, so it requires at least two etching

1 processes, two photolithography process, which as Petitioner said on page
2 21 of the petition -- I just want to quote it.

3 On the bottom of page 21. Second, Beach's single-mask process is
4 simpler. And this is with respect to gate formation. Second, Beach's single-
5 mask process is simpler. Compared to Yoshida's process which requires
6 separate masks for each etching step, Beach uses a single mask to etch the
7 gate and doped GaN layer removing the additional second mask steps.

8 A person of ordinary skill in the art would have understood that
9 applying a mask is a substantial undertaking during manufacturing and the
10 removal of any additional mask applications simplifies the manufacturing
11 process.

12 That's Petitioner's own motivation to combine -- or own proposed
13 combination of Beach with Yoshida for the ohmic formation actually makes
14 it a more complicated two-etch process as opposed to the one-etch process
15 shown and described in Yoshida.

16 And Dr. Schubert explained, which we saw in response by Yoshida is
17 a one -- or is a vertical aligned lift-off process.

18 Turning to slide 40, Petitioner presented why masking could achieve
19 the same process in an unrelated and generic reference. It does not actually
20 analyze any of the process teaching of Yoshida and it's actually contrast to
21 Yoshida which I described the etching processes throughout its -- throughout
22 its formation step on paragraph 22 does not describe an etching step to form
23 the ohmic contact with the vertical sidewall as depicted in this image.

24 Further, Petitioner's alleged motivation to combine Yoshida and
25 Beach because of lift-off and etching are the only two processes are overly
26 generic. As we've seen throughout this presentation today, and even

1 throughout the '508 Patent, there are many different etching forms resulting
2 in many different structures.

3 Similarly, there are many different lift-off forms -- possibilities
4 forming different lift-off. So etching and lift-off are not just two
5 possibilities. There's single-mask etching, multiple-mask etching, multiple -
6 - so Petitioner is trying to over simplify it to make it seem like it is a
7 reasonable and limited -- and selection of a limited number of scopes.

8 And finally, this is as I mentioned before, this is inconsistent with
9 Petitioner's motivation to select a self-aligned gate, which is reduced steps.

10 Now going to petition -- or to page -- slide 41. This is why the Patent
11 Owner is asserting that Beach fails to limitation 1e2 and 1g2 which is
12 applying steps. And I will go over this quickly because it's mostly based on
13 what the petition says.

14 The petition says Beach discloses each of these steps. End of
15 sentence. That is what the petition said. It talks generically about a
16 hypothetical combination, but it doesn't say where it starts and where it ends.
17 It just identifies these two.

18 Beach -- Beach's purpose is to form this gate contact and the photo --
19 or the gate contact and the ohmic at the same time. And in doing that it
20 deposits, as shown on paragraph 47 on the bottom left of slide 41, the resist
21 material 13. Resist material 13 is applied and patterned in a single process
22 resulting in two structures.

23 This is like Patent Owner's cookie cutter example, where the cookie
24 cutter is -- the cookie dough is made and then the cookie cutter is pressed,
25 and the result is different steps. Not simultaneous process, not multiple
26 processes happening at the same time. Okay.

1 So Beach is only doing this -- only to perform one step and Petitioner
2 is telling us in two ways and not actually proposed in the combination in the
3 petition.

4 Going to slide 42, we now look at Petitioner's reply sequences. And
5 this is where we talked briefly about the reply sequences not actually include
6 -- not actually teaching limitation 1e4 which clearly says etching away the
7 doped GaN layer, the portion of the doped GaN layer beneath the gate
8 content.

9 Now Petitioner's position is -- Petitioner never actually said how they
10 met it, which is the burden of the petition itself to demonstrate. Only today
11 did the Petitioner argue why it's met. But it's clear that there's gate material,
12 there's PN, or doped GaN material, not beneath the gate content that's not
13 etched away in Petitioner's own proposed combination.

14 Further, there's an issue because the theory of invalidity changed
15 from, as I mentioned earlier, that Beach with no remnant islands to now
16 remnant islands. Either way, there's either a change in theory that Beach
17 alone teaches 1e4, and there's no combination of Beach in Yoshida. Or now
18 there's -- Petitioner just blatantly failed to actually acknowledge and disclose
19 this combination and how its proposed combination with these remnant
20 islands meets the limitation.

21 Finally, I would argue that Petitioner's remnant-free, island-free
22 embodiment was not actually disclosed as part of the proposed combination
23 of Yoshida and Beach. Instead it was only in claim construction discussed
24 as a potential option for why a claim construction without remnant islands in
25 a D-O-G process could form.

1 Petitioner has not proposed until today a remnant island-free
2 embodiment of the combination of Yoshida and Beach.

3 Turning now to 43 --

4 JUDGE McGRAW: Is your argument -- excuse me. Before you
5 move on. What is your argument that the remnant islands prevent step 1e4
6 from being there?

7 MR. ENGLAND: Step 1e4 recites etching away the dope GaN layer
8 except a portion of the dope GaN layer beneath the gate contact. If I could
9 turn to slide 43 where you can see the entire process. Between steps D and
10 E is the self-aligned gate etching step. And at that point you are etching the
11 p-GaN material and leaving remnant islands.

12 So you're not etching away the material except beneath the gate
13 contact. Except the portion of the dope GaN layer beneath the gate contact.
14 So you're just not meeting the part where it says except the portion of the
15 dope GaN layer beneath the gate contact.

16 I'm sorry I don't have both images on one slide.

17 JUDGE McGRAW: Thank you.

18 MR. ENGLAND: All right. So, and this goes to both motivation to
19 combine and hindsight. If you look at figure -- or on slide 30 - 43, on the
20 left you have Petitioner's combination of Yoshida and Beach. And that has
21 only been provided first in the reply.

22 But what actually, if you look at what Petitioner is actually describing,
23 and based upon Dr. Schubert's initial testimony, on the right is an expanded
24 version of every step actually being required by the combination of Yoshida
25 and Beach. Can you -- as I explained earlier, regardless of the image on the

1 center on paper 29 at page 7, there is an additional etching step of Yoshida
2 after Beach.

3 Or sorry. There is an additional Beach etching step to form the self-
4 aligned gate after Yoshida which is complete -- which is more complicated,
5 adding steps, and exactly contradictory to the claimed motivation to
6 combine.

7 Further, the ohmic contact also has additional steps beyond what
8 Yoshida taught. Yoshida taught a method of forming a vertical contact, or
9 vertical aligned wall, and did not actually disclose two etching steps.

10 Petitioner has now manufactured a method where two etching steps
11 are required to perform this. And as Petitioner said itself in the petition,
12 more etching steps is more costly, time consuming, and a person of ordinary
13 skill in the art would choose not to do that, in its argument on why you
14 would combine gate contact. Or self-aligned gate contact.

15 That's -- hindsight is really the only basis for Petitioner's proposed
16 sequence. On one side you have motivation to select a self-aligned gate
17 because it reduces the overall steps. On the other hand you have motivation
18 to select a two-etched process over lift-off because it's simpler.

19 So you're reducing steps it's simpler, you're adding etching steps, or
20 adding photolithography steps, it's simpler. It's obviously hindsight that
21 they're using disparate motivations to arrive at different issues -- or arrive at
22 the same idea of getting to the '508 Patent claims.

23 And finally, throughout the discussion today and throughout these
24 papers, Petitioner has tried to divorce itself from this proposed combination
25 in the claim limitations and just arguing that D-O-G processes are possible

1 and were known, and a person of ordinary skill in the art would select gate
2 structure.

3 But the '508 Patent is a single process. A process for circulating 19
4 claim limitations that need to all be performed. Yoshida is not the same
5 process, and Petitioner is not -- and Patent Owner only uses hindsight to
6 combine these references and these generic applications rather than actually
7 talking about specific motivations of why a person of skill in the art and how
8 a person of skill in the art would be able to combine the teaching of Yoshida.

9 And so finally, now that we got into the reply sequence, Petitioner
10 also argued that it's a gate-first process would only be one of six sequences
11 and therefore it would be obvious to try. Essentially however though, as
12 we've gone throughout this each step recited in the claim and each step
13 talked about in the D, and O, and a G process includes numerous subsets.
14 And those subsets interact with each other either by protecting other layers,
15 etching other layers, and affecting the overall operability of the transistor.

16 It's more than just a routine substitution of one in six choices to get to
17 a gate-first. And what's most important, throughout this litigation --
18 throughout this proceeding and the entire record is showing this table.

19 Beach is the closest by teaching a gate-simultaneous process.
20 Yoshida and Sheppard and also you'll see in Ground 2 teach gate-last
21 processes. There's only once reference that teaches a gate-first process
22 forming a D-O-G -- forming a gate ohmic -- a gate dielectric ohmic
23 according to the claims that that's the '508 Patent.

24 Clearly, as shown in the picture, this is a series of puzzles with no
25 guidance and just hindsight used to map the prior art to the claims. And
26 that's it for Ground 1.

1 Ground 2 I will briefly highlight, since as noted by Petitioner's
2 counsel, is essentially the same as Ground 1. The only item I will note is
3 Hikita-347 which is shown in slide 47, the process of forming Hikita-347 is
4 essentially the same. The only difference between Hikita-347 and Yoshida's
5 combination, which was first disclosed also in the reply, is the Ground 2
6 sequence starts at figure 8E -- or proceeds from 8A through 8E and then
7 diverts through the last two steps of figure -- of the same Yoshida-Beach.
8 And then it shows the time, it goes from 8E to steps D and steps E as I
9 showed on slide 43 on the left.

10 So all the analysis about, going back to slide 47, all the analysis
11 performing all the steps, substantial steps of figure -- of Hikita-347 are done
12 before even the addition of the self-aligned process as proposed by Patent
13 Owner.

14 That's for all the same reasons. The motivation to combine are only
15 based on hindsight trying -- using a solution to try to seek a cause, and
16 there's no reason why a person of ordinary skill in the art would combine the
17 references.

18 As shown in slide 48 essentially is how Petitioner presented the
19 Ground 2. You have Beach alone teaching the ohmic formation and the gate
20 formation. And you have Hikita-347 teaching the overall process. But
21 there's no combination of where you actually insert the Beach process of
22 Hikita -- the Beach self-aligned gate or two-etched process into Hikita.

23 And that is why Petitioner is -- petition is based on hindsight. It's
24 clearly using these independent jigsaw puzzles which you see in figures 1D
25 and sticking them into figures, somewhere in figure 8E but since there's a
26 process, we don't know where in the process we're figuring, and we don't

1 know what we're adding to, what we're removing, and what we're
2 substituting. There's no showing of the invention, of the '508 patent as a
3 whole in the comparison.

4 And this is, I believe, Judge McGraw touched on this briefly with the
5 other counsel about the motivation of the gate-last process and the gate-
6 simultaneous process. And the real crux of this is that these are completely
7 different processes. There's different reasons why different layers are made.

8 There is an issue which I will touch on about enhancement mode
9 versus depletion mode, but the layers within these structures serve different
10 functions throughout. And even though there's enhancement versus
11 depletion mode, the way these materials are patterned and formed, and the
12 processes required to protect each layer serving different purposes dissuades
13 a person of ordinary skill in the art from just grabbing a portion of Beach
14 and inserting it into Yoshida.

15 JUDGE McGRAW: Could you point to what evidence in the record
16 there is to support that? It's not entirely clear why a person of skill in the art
17 who wanted to create a self-aligned gate would not just use Beach's teaching
18 to do so. I'm trying to understand your rationale as to why there's a problem
19 with doing that.

20 MR. ENGLAND: Okay. As I understand Your Honor's question, it's
21 about why you used the self-aligned teaching, not necessarily tied to this
22 specific slide that I'm discussing. Is that correct?

23 JUDGE McGRAW: Well, I guess it's more if we disagree with your
24 argument that it has to be gate-first.

25 MR. ENGLAND: Yes.

1 JUDGE McGRAW: If we, in that situation, what is the problem with
2 combining Beach with the primary references?

3 MR. ENGLAND: The problem is as --

4 JUDGE McGRAW: Petitioner is arguing that a person of ordinary
5 skill in the art would use Beach to create a self-aligned gate because of the
6 advantages of doing that.

7 MR. ENGLAND: The --

8 JUDGE McGRAW: What's wrong with their argument?

9 MR. ENGLAND: The argument is that -- we can only base our
10 arguments off of what they disclose to us. In the petition they didn't actually
11 disclose how they were going to combine the references, they just said they
12 can be combined.

13 In the reply, they provided the sequences which is essentially
14 performed both Yoshida and Hikita-347's entire processes before then using
15 the self-aligned gate process. It is a less-efficient process. It's not replacing
16 -- it's not actually creating more efficiencies.

17 There's no reason why a person of ordinary skill in the art needed to
18 make -- would receive any benefit by incorporating the self-aligned gate
19 structure into the already completed process. The gate's already formed.
20 Petitioner never proposed modifying an already formed gate structure.

21 Beach talks about etching a p -- sorry -- etching a gate metal on top of
22 a, it's not a p-type material, it's an n-type material, but on top of a protective
23 layer that is unetched. The self-aligned structure is not being loaded on to
24 anything and you starting with an etched gate contact on top of a differently,
25 potentially misaligned etched p-GaN material.

1 It's talking about two layers being etched with ohmic material. It's a
2 different process and a person of ordinary skill in the art would not have
3 looked at, based on Petitioner's teachings, would not have looked to combine
4 the references because it doesn't result in a more efficient, better process as
5 Patent Owner presented in the petition.

6 JUDGE MCGRAW: Okay. Thank you.

7 MR. ENGLAND: Okay.

8 And then moving to slide 50 for Ground 2. This slide illustrates why,
9 for the same reasons with Yoshida, a person of ordinary skill in the art
10 would not have sought to incorporate Beach's two-etched process into
11 Hikita-347's most likely lift-off process with the vertical alignment.

12 And as I've explained in the papers, the vertical alignment shown in
13 Hikita-347 actually demonstrates that. It's a lift-off -- it's a lift off which is
14 in agreement with what Petitioner said about vertical alignment.

15 I touched on the depletion mode recently. And finally for this -- and
16 then the applying round for Ground 2. The applying argument is the same as
17 Ground 1. With respect to Ground 1, this is based on the Petitioner's
18 argument.

19 And finally there's no motivation with respect to gate-first process
20 with Ground 2 for the same reasons as Ground 1. And same with Ground 1,
21 this is just a series of hindsight between applying both Beach's self-aligned
22 structure and Beach's gate ohmic formation structure to Yoshida or to Hikita.
23 Hindsight is the only justification to make a more complicated process on
24 both fronts from the original process describing Yoshida.

25 Yoshida describes a function -- sorry -- Hikita-347 describes a
26 functioning device and instead of -- it says a functioning device of a gate

1 structure and ohmic materials and all the combination has done is allege the
2 motivation to combine to create an efficiency and more streamlined process
3 and added subsequent processes and steps to the end result.

4 Turning to Ground 3. I just briefly want to touch on Hikita-023
5 before my time is up. Hikita-023 was filed a year after Hikita-347 and
6 functionally for the purposes of discussion they result -- recite the same
7 limitations.

8 The only difference between Hikita-023 that's material to the issues
9 here is that Hikita-023 explicitly discloses that it's ohmic contacts are
10 formed in a lift off process, thereby demonstrating that Petitioner is actually
11 adding more etching steps than necessary, which as Petitioner has argued in
12 the petition would be the one step that it would seek to avoid at all costs.

13 And then for the same reasons, Ground 3 is deficient for that as
14 Ground 2. And in the end we're left with pieces of the puzzle. The disparate
15 references identifying in isolation in the petition why a person of ordinary
16 skill -- or why each limitation would allegedly be obvious. But there's no
17 combination, there's no reason why a person of ordinary skill would
18 combine them in a way, whether or not gate-first is right in the -- is
19 construed in the claims or not since there's no guidance in how to actually
20 make the overall process.

21 And with that I will reserve the rest of my time for rebuttal.

22 JUDGE TORNQUIST: All right. I just have one question. There's a
23 statement of facts issue.

24 MR. ENGLAND: Yes.

25 JUDGE TORNQUIST: Do we need to resolve it? Is anything really
26 disputed in that statement? It sounds like it came back in the surreply it's the

1 same look. It sounds like they're just trying to combine known elements.

2 But I need to know if we need to resolve this question.

3 MR. ENGLAND: We don't need to resolve the question as statement
4 of facts. There is a related dispute that, about whether the facts in -- whether
5 these statements in isolation may or may not have been known. That is not
6 an issue really before.

7 It's whether or not the isolated statements, in combination, in a full
8 method would have been known. And so petition -- the whole point, or
9 Patent Owner's point, is that in isolation they may be known if you pick and
10 choose random prior art references. But combined together they were not
11 known and novel. And that's why the Patent issued.

12 JUDGE TORNQUIST: Okay. So that was in your surreply. The
13 Patent Owner's response that said we shouldn't give them no weight, I think.

14 MR. ENGLAND: Yeah.

15 JUDGE TORNQUIST: So I just wanted to make sure I understood.

16 MR. ENGLAND: We should give it no -- it's not a finding of fact is
17 what I'm saying. We should give no weight to the finding of fact, and the
18 surreply is not material to the issue because Patent Owner's not arguing any
19 one limitation in isolation is the point of novelty.

20 JUDGE TORNQUIST: Okay.

21 MR. ENGLAND: It's a process claim.

22 JUDGE TORNQUIST: I understand. Thank you.

23 MR. ENGLAND: Thank you.

24 MS. SPECHT: Ready.

25 JUDGE TORNQUIST: Petitioner, I have you at ten minutes so when
26 you're ready.

1 MS. SPECHT: Thank you, Your Honor.

2 So I want to begin by responding to a request for a citation from Judge
3 McGraw.

4 Judge McGraw you asked about the ITC claim construction position
5 that Patent Owner proposed that was relevant to their limitation 1e4
6 argument. It is Exhibit 1039 at page 11. The construction that was proposed
7 for limitation 1e4 before the ITC by Patent Owner was etching away the
8 doped GaN layer without etching beneath the gate contact.

9 So our position, as I was less eloquently explaining during my direct
10 opening argument, is that you are etching away the doped GaN layer without
11 etching beneath the doped contact whether or not there is a remnant island.
12 And that's -- that would be consistent.

13 Now, there's -- I hope that answers your question because I'm going to
14 parlay into something else here. You've heard a lot of EPC talking about
15 these figures. And the figures with the remnant islands, and the figure in
16 1e4, and just the figures on reply and how they're new.

17 You haven't heard them contest any limitation by itself except 1e4,
18 and only with reference to the figures. To be clear, from Petitioner's
19 perspective, the figure is not our mapping. The mapping is in the petition.
20 And the mapping in the petition does not take the references in isolation like
21 the Patent Owner alleges.

22 If you look, for example, at pages 30 through 39 of the petition, that's
23 for Ground 1. There's a similar mapping for Grounds 2 and 3. That's the
24 relevant portion of the petition where we map limitation 1E and all of its
25 subcomponents, and then towards the end, 1G and all of its subcomponents.

1 I showed you a few examples earlier from those pages of the petition.
2 Importantly, they begin with Yoshida. They talk about Yoshida's step for
3 forming the gate. They talk about Yoshida's step for forming the ohmics.
4 They're not relying solely on Beach.

5 The combination is very clear on those pages. And the slide that
6 Patent Owner showed you that began Beach first and second Beach, those
7 are for the subcomponents. Those are the implementation details Petitioner
8 is using from Beach, not the process flow out of Yoshida that's necessarily
9 being replaced.

10 As I said, I'll say it for the last time, I hope, we're taking the flow of
11 Yoshida, the D-O-G of Yoshida, the same for the Hikita references, we're
12 substituting implementation details from Beach to achieve the self-aligned
13 gate and to form the ohmic contacts in a way that a person of ordinary skill
14 in the art would have understood.

15 So I want to refer now to my slide 5 and talk about what you haven't
16 heard from EPC today. You have not heard that all of these references
17 disclose the pieces of the puzzle. It sounded to me, just a moment ago, like,
18 they admitted all of the pieces of the puzzle are here. The primary
19 references propose the instructions for assembling those pieces. They give
20 us the process flow.

21 The motivation for doing self-alignment comes out of the prior art.
22 EPC doesn't dispute that it was known that self-alignment provided benefits
23 for the operability of the device. It was a desired configuration. Even
24 Yoshida and Hikita-347, and Hikita-023 suggest you want those to be
25 aligned.

1 Turning to slide 9. I want to walk through each of their disputes very
2 briefly. EPC doesn't dispute that each of the components of these claims is
3 disclosed in the prior art references. It's not disputing that the pieces of the
4 puzzle are there.

5 And it doesn't dispute that the primary references disclose each block,
6 and that the secondary references disclose the specific implementation
7 details for two of the four blocks including the allegedly novel self-aligned
8 gate and for forming the ohmic contacts.

9 The disputes here are very narrow. And the law of obviousness
10 supports the Petitioner. Now I'm going to move all the way down to slide
11 112 and it'll be faster if I do it like this.

12 First, EPC disputes claim construction but the only support that EPC
13 has is not in the claim at all, but is in the optional field plate embodiment
14 that's absent from the claim. Even if the field plate were part of the present
15 invention as EPC contends, the case *Absolute Software Inc. versus Stealth*
16 *Signal*, 659 F.3d. 1121 from the Federal Circuit in 2011 declined to read a
17 feature referred to as the present invention into the claim where the patent
18 elsewhere referred to the feature as optional. That's exactly what we have
19 here.

20 Even if it's part of the present invention, the abstract says you may
21 have it. You may also have it. It's optional elsewhere and it's definitely not
22 claimed. EPC admits it's not literally written into the claim.

23 Second, EPC purports to dispute the motivation to combine the
24 references for the gate formation steps, but it doesn't dispute that self-
25 alignment was a known technique with known benefits. EPC only advocates

1 that it would not be physically possible to combine Beach in its entirety with
2 the primary references.

3 But that's not the legal standard. The case that I mentioned during my
4 opening argument, the *In re Moutett* case that comes right out of the MPEP
5 686 F.3d. 1322, it's well established that the determination of obviousness
6 does not require an actual physical substitution of elements. That's what
7 EPC is demanding we provide to you, an actual physical substitution of
8 elements. And that's just not the right standard.

9 There's one other interesting case in the MPEP. *In re Keller* that's
10 actually even older. The test for obviousness is not whether the features of
11 the secondary reference may be bodily incorporated into the structure of the
12 primary reference, but what the combined teaching of the references would
13 have suggested to a person of skill in the art. That's what we need to look
14 for here.

15 So going back to the figure that EPC argues so vehemently against.
16 The figure isn't the combination. The figure is just an illustration showing
17 the physical combination here, although not required actually is required.

18 EPC insists that the Petitioner prove that an actual, physical, working
19 device exists to show an expectation of success. But the case *Pfizer, Inc.*
20 *versus Apotex*, 480 F.3d 1348, says the expectation of success need only be
21 reasonable, not absolute.

22 Here, Petitioner and the demonstrative figures, that is all EPC argued
23 against. They didn't argue against the petition, they argued against an
24 exemplary figure showing physical incorporation. Those prove that absolute
25 expectation of success is the bar we have met here even though that's way
26 higher than the bar we actually need to meet.

1 Petitioner has more than shown a reasonable expectation of success
2 and has gone so far as to show an absolute expectation of success.

3 Third, EPC purports to dispute the motivation to combine the ohmic
4 formation steps arguing lift-off is a better choice than etching. But the
5 primary references don't teach lift-off at all and rather lack ohmic formation
6 implementation details.

7 The *Realtime Data LLC versus Iancu* case, 912 F.3d 1386 from the
8 Federal Circuit in 2019 found that a person of skill in the art would look to a
9 secondary reference to supply details necessary to better understand or
10 interpret the primary reference. That's what we're doing here for the ohmic
11 contact steps. We're looking to a known process for forming the ohmics to
12 supply the missing details and to better understand how to form the contacts
13 of the primary references.

14 Even if the references taught lift-off, even if the *Par Pharma versus*
15 *TWi Pharms* case does not require that the motivation be the best option.
16 Only that it be a suitable option from which the prior art did not teach away.
17 You didn't hear EPC tell you anything about teaching away today. And this
18 case applies not only to the motivation to combine for the ohmics, but to the
19 gate formation as well.

20 Even if an extra step is added, even if -- even if as EPC argues, it may
21 not be the most efficient way there are still realized benefits they have not
22 contested and the motivation need not be the best option, just a suitable
23 option. You haven't heard EPC say that this is not a suitable option, and you
24 haven't heard them say there's any teaching away.

25 Finally, EPC argues that Beach lacks a gate metal and photo resist
26 applied at different steps, but this is attacking the references individually.

1 It's attacking Beach on its own and not the combination with the primary
2 references with the D-O-G process.

3 Going back to what I think is my favorite case, *In re Mouttet*, once
4 again tells us that the test for obviousness is what the combined teachings of
5 the references would have suggested. Here, especially at pages 30 through
6 39 of the petition the combination is very clear. It always starts with
7 Yoshida. And implementation details come out of Beach.

8 And we have to look at what the combined teachings of the references
9 would have suggested, not these isolated portions of Beach in isolation. All
10 of EPC's counter arguments violate the very tenants of obviousness law and
11 the only legally correct decision here is that the claims of the '508 Patent are
12 obvious. Thank you very much.

13 JUDGE TORNQUIST: Thank you.

14 When you're ready.

15 MR. ENGLAND: Okay. Petitioner's Counsel provided a citation
16 about the claim construction for etching of 1e4. I just wanted to point out
17 that Petitioner's claim construction can also be found at the same exhibit,
18 Exhibit 1039 at 17 to 42 where it also advocated an opposite position than it
19 is now taking today.

20 JUDGE TORNQUIST: What page was that?

21 MR. ENGLAND: That is Exhibit 1039 at 17.

22 JUDGE TORNQUIST: Seventeen.

23 MR. ENGLAND: Yes.

24 JUDGE TORNQUIST: Okay. Thank you.

25 MR. ENGLAND: And that's just so you can compare what both
26 parties said at that point versus what we're saying today even though it is

1 Patent Owner's position that Petitioner's belated argument now should not be
2 considered by the Board.

3 Turning next, the Petitioner is now arguing to disregard everything
4 they said in its reply essentially and ignore the figures provided in the reply
5 showing a combined sequence and instead look to the petition. Well that is
6 what Patent Owner has done.

7 Patent Owner in its response looked at the petition, looked at what
8 they're saying. They're saying Yoshida teaches this. Yoshida teaches that.
9 It doesn't actually show what the combination is. Only when it showed the
10 combination could Patent Owner see what the combination was, evaluate
11 what the expectation of success was of the combination, and then make an
12 argument about it.

13 There's never been an argument of bodily incorporation. There's been
14 an argument based upon what Petitioner said it's teaching, what figures it
15 pointed to for its teaching.

16 One of the clearest is in Ground 1, talking about ohmic formation and
17 gate formation where Petitioner did say Yoshida teaches the general process.
18 And then it said Beach teaches this limitation, Beach teaches this limitation,
19 Beach teaches this limitation, which could be seen on slides 29 and 30.
20 Thirty is more prevalent on this, showing the difference in what the petition
21 said versus what the reply said.

22 We're not -- Petitioner is not advocating bodily incorporation of the
23 combination. Petitioner -- or Patent Owner is actually discussing what
24 Petitioner said meets the limitations. So when Petitioner says figure 1e4
25 meets the limitation, or figure 1E meets limitation 1e4 etching away the gate
26 contact and Petitioner shows embodiment without remnant islands, and then

1 in the reply when Patent Owner says you didn't actually disclose what your
2 combination was Petitioner says, no our combination really actually has
3 remnant islands and we're combining it this way.

4 Then Petitioner says it's too late to challenge the idea. Patent Owner
5 has from the get-go, analyzed what the Petitioner has said its actual proposed
6 combination is.

7 Oh, Patent Owner also wants to make a note that although I said
8 previously that the only thing we have is with 1e4 in the proposed
9 combination, we're also still disputing whether or not the petition itself
10 demonstrated that the applying limitations, that in all three independent
11 claims, applying the gate contact and applying the -- oh, sorry, applying the
12 gate photo resistance, Your Honor. Applying the gate contact -- gate metal -
13 - applying the gate photo resist material and applying the gate metal, or the
14 metal photo resist material is also taught. Because it's being cited both times
15 by Beach and not necessarily in different manners.

16 Petitioner doesn't say Beach in combination, and when you look at the
17 patent it doesn't say Beach in combination teaches this. It says Beach
18 teaches this limitation.

19 And so without Petitioner being clear in the petition telling us what
20 the actual combination was, there's no way to analyze whether or not it
21 actually is teaching that limitation.

22 Petitioner talked about how there was no teaching away said
23 throughout my earlier argument. However, that is just looking for key
24 words. The earlier argument spoke numerous times about inconsistent
25 motivations to combine, which in looking to with the references are teaching

1 themselves, what Petitioner says a person of ordinary skill would look to to
2 combine the sources -- or to combine the references.

3 Petitioner said efficiency was a reason why a person of ordinary skill
4 in the art would select the gate -- the self-aligned gate structure. Petitioner
5 said efficiency is a way to -- why a person of ordinary skill in the art would
6 select the two-etch process to form the ohmic structure.

7 The Petitioner then, when in showing its actual combination, showed
8 a combination that was substantially more complicated, which can be seen in
9 slide 43, comparing what Petitioner disclosed with the supposedly more
10 efficient process on the left to what Petitioner actually proposes as the
11 combination on the right.

12 Now Petitioner says that its mapping is only in the petition and not in
13 the reply. But since the reply was grounded in what the petition said, it
14 doesn't make sense how it has inconsistencies either way.

15 And finally, throughout this proceeding Petitioner has looked at the
16 combined teachings. Although the Patent Owner's response looked at the
17 limitations in isolation, that is because that is how the Petitioner identified
18 the limitations in isolation -- identified them meeting the claim limitations.

19 The combination was speculative to guess on, as even the Board noted
20 in its institution decision that Petitioner was replacing steps. But instead
21 when you look at the combination, Petitioner put in the reply to fill its
22 deficiencies, it was motivation to combine, it was actually adding steps.

23 And finally, one thing you did not hear throughout the day from
24 Petitioner's side, and that was any rebuttal to hindsight. Hindsight guiding
25 the motivation. Hindsight leading to this more complicated process you see
26 in the center of slide 43 from what was initially disclosed in either Yoshida

1 and Beach. And hindsight trying to use more arguments for motivation to
2 combine based to achieve a more efficient process to achieve a more step
3 inclusive process that is costly and more complicated than anything
4 disclosed in the prior art.

5 So although there's no explicit teaching away that Patent Owner
6 argues in its statements alone, the resulting combination which is Petitioner
7 said is the important part. It shows that the combination would dissuade a
8 person of ordinary skill in the art from achieving the combination.

9 Because the only way to arrive at the claims of the '508 Patent based
10 upon the prior art is to achieve this incredibly complicated process shown in
11 the center of slide 43. And because of that, it's obvious that Petitioner's
12 entire combination is based on hindsight.

13 And I will yield the rest of my time.

14 JUDGE TORNQUIST: Thank you very much.

15 Okay. I'd like to thank the parties again for an excellent argument and
16 for the second time, we had a LEAP Practitioner lay out the entire argument.
17 Very impressive. We always appreciate the LEAP Practitioners
18 participating in these.

19 With that, this hearing is adjourned. And decisions will issue in due
20 course. Thank you.

21 (Whereupon, the proceedings at 3:10 p.m. were concluded.)

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