

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

EFFICIENT POWER CONVERSION CORPORATION,
Patent Owner

Case IPR2023-01383
Patent No. 8,404,508

**PETITIONER'S REPLY TO PATENT OWNER'S
PRELIMINARY RESPONSE**

On January 9, 2024, the Board authorized Petitioner to submit a ten-page reply addressing Patent Owner's construction of the claims of U.S. Patent No. 8,404,508 as requiring a "gate first" process. Ex. 1038.

I. THE BOARD SHOULD REJECT PATENT OWNER'S CLAIM CONSTRUCTION REQUIRING "GATE FIRST" PROCESS

The claims of the '508 patent recite a method of forming an enhancement mode GaN transistor, including, among other things, steps to form a gate structure ([1e1] through [1e5], [4f1] through [4f5], [5f1] through [5f5]) ("gate structure steps") and steps to form ohmic drain and source contacts ([1g1] through [1g5], [4h1] through [4h5], [5i1] through [5i5]) ("ohmic contact steps"). Ex. 1001, 6:59-8:39. Patent Owner wrongly requires the gate structure be formed before the source drain contacts, but has no intrinsic support.

The steps of a method claim do not require a particular order, unless the claim, "as a matter of logic or grammar, requires that the steps be performed in the order written, or the specification directly or implicitly requires an order of steps." *Mformation Technologies, Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398 (Fed. Cir. 2014).

The '508 patent claims do not explicitly recite an order for the gate structure steps as compared to the ohmic contact steps. The sets of steps are separate, and do not refer to any overlapping elements. Nor does the specification include any

statement emphasizing the sequence of forming the gate and ohmic contacts, or disclaimer of such. Proper construction allows the steps to form the gate structure to occur at any time compared to the steps to form the source and drain contacts. By contrast, where the patent specification *does* emphasize the sequence of steps, the forming of the gate contact itself, EPC argues that *no* order is required. EPC's contradictory constructions illustrate that its erroneous construction requiring a "gate first" process must be denied.

A. The Claim Language Does Not Require the Gate Structure to Be Formed First

While the gate structure steps of the independent claims are listed before the ohmic contact steps, the claims do not require an order. The claims do not grammatically or logically indicate that the gate structure steps must occur in a particular order compared to the ohmic contact steps. Rather, the gate structure steps and ohmic contact steps are concerned with forming different components of the transistor, i.e., the gate structure and the ohmic contacts, separately.

The gate structure steps include five steps: (1) depositing a gate contact layer; (2) applying a gate photo resistant pattern; (3) etching away the gate contact layer; (4) etching away the doped GaN layer; (5) removing the gate photo resistant pattern. The ohmic contact steps separately include five additional steps: (1) depositing an ohmic contact metal; (2) applying a metal photo resistant pattern;

(3) etching the ohmic contact metal; (4) removing the metal photo resistant pattern; (5) performing rapid thermal annealing.

These are separate sets of steps. None of the elements in the gate structure steps appear in the ohmic contact steps, and none of the elements in ohmic contact steps appear in the gate structure steps. The gate structure steps and ohmic contact steps are independent and self-contained. Further, looking at the claim language, there is no reason why the gate structure must be formed before the ohmic contacts. The gate structure and ohmic contacts are separate components of the transistor with separate functions, and thus logically the gate structure could be formed before, after, or simultaneously with the ohmic source and drain contacts. Patent Owner cannot and does not identify any claim language supporting its “gate-first” construction. Paper No. 7 at 2-7.

Patent Owner’s sole argument is that the claims require the gate structure to be formed before the source and drain contacts “because the claims do not specify that the dielectric layer is etched to form an opening for the gate structure,” and if a different sequence is followed, “such an opening in the dielectric layer would be necessary in order to result in an operating transistor.” Paper No. 7 at 6-7. Setting aside that Patent Owner’s statements are unsupported by any intrinsic or extrinsic

evidence,¹ Patent Owner’s interpretation does not properly appreciate the use of the term “comprising” recited in the claims.

The independent claims each recite an open-ended term “comprising” before the steps of the claims. Ex. 1001, 6:59-60, 7:21-22, 8:8-9. It is well-established that “comprising” indicates that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997); *Invitrogen Corp. v. Biocrest Manufacturing, L.P.*, 327 F.3d 1364, 1368 (Fed. Cir. 2003) (“The transition ‘comprising’ in a method claim indicates that the claim is open-ended and allows for additional steps.”).

Thus, contrary to Patent Owner’s arguments, regardless of when the gate structure is formed compared to the source and drain contacts, the claims as written do not exclude any additional steps, such as the step of forming such an opening for the gate structure in the dielectric layer.

B. The Specification Does Not Require the Gate Structure to Be Formed First

While the ’508 patent provides embodiments forming the gate structure before forming the ohmic contacts, the ’508 patent places no emphasis on the

¹ Indeed, Patent Owner does not even have expert testimony supporting its contention and opposing Petitioners’ expert, Dr. Shealy’s, assessment.

sequence of forming the gate structure compared to the ohmic contacts. Absent limiting language, claims cannot be limited to embodiments of the specification. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372-73 (Fed. Cir. 2014) (“absent such language [limiting the invention], we do not import limitation from the specification into the claims.”); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (“although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.”).

The purported invention of the '508 patent has nothing to do with the ohmic contacts or the sequence of forming the gate structure compared to the ohmic contacts. The '508 patent states, “**The present invention is an enhancement mode GaN HEMT device with a gate metal material and a doped GaN or AlGaN material that are self-aligned**, and a method for making such a device.” Ex. 1001, 3:1-4. To achieve self-alignment, the patent explains that “[t]he materials are patterned and etched using a single photo mask.” Ex. 1001, 3:4-6. In describing the embodiments, the patent further emphasizes that “gate metal 17 and the p-type GaN material 15 are patterned and etched using a single photo mask and are thus automatically self-aligned,” which “reduces manufacturing cost” and “minimize[es] gate charge.” Ex. 1001, 4:6-11; *see also id.*, 4:55-59, 5:16-17. The '508 patent also distinguishes the invention from prior art based on forming a self-

aligned gate structure. Ex. 1001, 1:65-2:16. Therefore, the '508 patent describes the purported invention as providing a self-aligned gate structure, not the sequence of forming the gate structure compared to the ohmic contacts.

The '508 patent includes no statements that it is important to form the gate structure before the ohmic contacts or disclaim the sequence of forming the gate structure compared to the ohmic contacts. *See generally* Ex. 1001. Nor does the prosecution history indicate a surrender of the sequence of forming the gate structure compared to the ohmic contacts. *See generally* Ex. 1002.

Patent Owner attempts to import the “gate-first” aspect of the described embodiments into the claims, while failing to identify any language in the '508 patent limiting the invention to such aspect. To the contrary, the '508 patent repeatedly states that the invention is not limited to the described embodiments. Ex., 1001, 6:52-56 (“the embodiments of the invention are not considered being limited by the foregoing description and drawings,” and “[m]odifications and substitutions to specific process conditions can be made”); 2:65-67 (“other embodiments may be employed and that various structural, logical, and electrical changes may be made.”). Patent Owner’s “gate-first” construction has no support in the intrinsic record and should be rejected. *See Hill-Rom Servs.*, 755 F.3d at 1372 (embodiments cannot limit the scope of the claims absent the patentee’s “words or expressions of manifest exclusion or restriction.”).

C. Patent Owner Takes Inconsistent Positions at Parallel ITC Litigation

While arguing the claims require a certain order for a “gate-first” process, Patent Owner, at the parallel ITC litigation, argues that the gate structure steps [1e2] through [1e5] do not require to be performed in the order listed. Ex. 1039 at 13-16. Different from the order for forming the gate structure relative to forming the ohmic structure, the patent specification describes its invention as forming a self-aligned gate structure, implicitly requiring an order for performing the gate structure steps themselves.

As explained in Section I.B., the ’508 patent describes its purported invention as forming a self-aligned gate structure using a single photomask to pattern and etch both the gate metal and . Despite that the ’508 patent limits its invention to forming a self-aligned gate structure, and that the embodiments perform steps [1e2] through [1e5] in order,² Patent Owner argues at the ITC that

² The embodiments of the ’508 patent perform steps [1e2] through [1e5] in order (i.e., applying a gate photoresistant pattern, then etching away the gate contact layer, then etching away the doped GaN layer, and removing the gate photoresistant pattern). Ex. 1001, 3:45-50; 4:38-44; 5:4-8; 5:23-28; 5:42-45; 5:52-58; 5:61-65; 6:14-20. Petitioner did not propose this as a claim construction in its petition as it is unnecessary to resolve any controversy in the petition, as all the

“Respondents’ construction, which limits the claimed steps to the order written in the claims, improperly imports limitations from the specification into the claim.”

Ex. 3002 at 15-16.

But it is Patent Owner, not Petitioner, that is importing limitations into the claims here with its “gate first” process. The patent never emphasizes any order of forming the gate versus the ohmic contacts, and in introducing the ohmic contact metal steps, it simply states it is “referring” to the figure showing the addition of the structure, with no emphasis on order. Ex. 1001, 3:62-64; 4:49-54. By contrast, the patent consistently describes the self-aligned gate structure as the “present invention,” (Ex. 1001, 3:1-4) and uses order emphasizing terms such as “followed by” in discussing the order of the gate structure steps themselves, describing the photoresist strip happening *after* the etching of the gate metal and p-type GaN gate layer (Ex. 1001, 3:45-50).

Apparently, Patent Owner construes the terms of the claims in different ways to simultaneously avoid invalidity and find infringement. This approach, however, has been rejected by courts. Patent Owner should not be allowed to make conflicting claim construction arguments here. *See CommScope Techs. LLC v. Dali*

proposed combinations also perform these steps in the same order. Paper No. 1 at 10.

Wireless Inc., 10 F.4th 1289, 1295 (Fed. Cir. 2021) (holding that Patent Owner’s infringement argument conflicts with its validity arguments and reversing the infringement finding); *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001) (“A patent may not, like a nose of wax, be twisted one way to avoid anticipation and another to find infringement.”).

II. CONCLUSION

The Board should reject Patent Owner’s “gate-first” construction. Neither the claims nor the specification requires such a construction. Patent Owner’s “gate-first” construction is also inconsistent with its argument at the ITC that the steps forming the gate structure need not be performed in the order listed. Proper construction of the claims does not limit the gate structure steps to be performed before the ohmic contact steps.

Date: January 16, 2024

Respectfully Submitted,

By: /Lionel M. Lavenue/
Lionel M. Lavenue, Reg. No. 46,859
Counsel for Petitioner

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing **Petitioner's Reply to Patent Owner's Preliminary Response**, was served on January 16, 2024, via e-mail directed to counsel of record for Patent Owner at the following:

Walter D. Davis, Jr.
walter.davis@blankrome.com

Dipu Doshi
dipu.doshi@blankrome.com

Mark Thronson
mark.thronson@blankrome.com

Stephen Soffen
stephen.soffen@blankrome.com

Cory R. Edwards
cory.edwards@blankrome.com

Ameya V. Paradkar
arun.paradkar@blankrome.com

Jonathan England
jonathan.england@blankrome.com

EPCC-Inno-IPRS@blankrome.com

Date: January 16, 2024

By: /Lisa C. Hines/
Lisa C. Hines
Case Manager
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP