

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

Case IPR2023-01381
U.S. Patent No. 8,350,294

PATENT OWNER'S MOTION TO AMEND

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TABLE OF AUTHORITIES

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Cases

<i>Lectrosonics, Inc. v. Zaxcom, Inc., IPR2018-01129, Paper 15 at 4-5</i> <i>(PTAB Feb. 25, 2019)</i>	2, 7
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Other Authorities

35 U.S.C. 316(d)	1
37 C.F.R. § 42.121	1, 2, 4
84 FR 9497	1

PATENT OWNER’S EXHIBIT LIST

Exhibit No.	Description
2001	Jorg Neugebauer et al., “Role of Hydrogen Complexes in Doping of GaN,” Material Research Society Symposium Proceedings, Vol. 423 (1996), pp. 619-24 (“Neugebauer-MRS1”)
2002	Jorg Neugebauer et al., “Theory of Point Defects and Complexes in GaN,” Material Research Society Symposium Proceedings, Vol. 395 (1996), pp. 645-56 (“Neugebauer-MRS2”)
2003	EPC’s Responsive Claim Construction Brief: Inv. No. 337-TA-1366, dated October 6, 2023
2004	IEEE Dictionary definition for “compensated”
2005	U.S. Patent No. 6,498,111 (“the ‘111 patent”)
2006	Translation of Innoscience’s Invalidation Request to the Chinese Patent Office for the Chinese Counterpart to the ‘294 Patent
2007	U.S. Patent App. No. 12/756, 906, filed on April 8, 2010
2008	U.S. Provisional App. No. 61/167,792, filed on April 8, 2009
2009	Declaration of Dr. E. Fred Schubert
2010	Respondents’ Post-Hearing Initial Brief (Inv. No. 337-TA-1366)
2011	Declaration of Dr. James Richard Shealy (IPR2023-01384)
2012	Deposition Transcript of Dr. Shealy (IPR2023-01381)
2013	Deposition Transcript of Dr. Shealy (IPR2023-01382, -01384)
2014	Evidentary Hearing Transcript, pages 1-238 (Inv. No. 337-TA-1366) (Public)(
2015	Evidentary Hearing Transcript, pages 239-506 (Inv. No. 337-TA-1366) (Public)
2016	Evidentary Hearing Transcript, pages 741-984 (Inv. No. 337-TA-1366) (Public)
2017	Evidentary Hearing Transcript, pages 985-1270 (Inv. No. 337-TA-1366) (Public)
2018	Certified Translation of Innoscience’s Invalidation Request to the Chinese Patent Office for the Chinese Counterpart to the ‘294 Patent
2019	Certified Translation of Decision on Innoscience’s Invalidation Request to the Chinese Patent Office for the Chinese Counterpart to the ‘294 Patent

2020	“About Efficient Power Conversion Corporation,” https://epc-co.com/epc/about-epc , printed Mar. 2, 2023
2021	“SEMI Awards Honors Process and Technology Integration Achievements,” https://www.semi.org/en/semi-awards-honor-process-and-technology-integration-achievements , Jan. 13, 2016

I. INTRODUCTION

Patent Owner Efficient Power Conversion Corporation (“EPC” or “Patent Owner”) respectfully submits this Motion to Amend under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121 to request amendment of certain claims of U.S. Patent No. 8,350,294 (the “’294 patent”). Patent Owner requests that claims 4-6 and 10-12 be cancelled and that proposed new claims 13-14 be entered. The proposed new claims (attached as Appendix A) meet all the requirements of 37 C.F.R. § 42.121. That is, each proposed amendment is responsive to a ground of unpatentability, does not seek to enlarge the scope of the claims, and does not introduce new subject matter. In addition, the proposed new claims are reasonable in number.

II. MOTION TO AMEND PILOT PROGRAM

Pursuant to 84 FR 9497, Patent Owner elects to participate in the pilot program concerning the motion to amend practice before the Board. Accordingly, Patent Owner elects to receive preliminary guidance from the Board regarding the proposed amendments disclosed herein.

III. A REASONABLE NUMBER OF CLAIMS ARE AMENDED

Pursuant to 37 C.F.R. § 42.121(a)(3), a motion to amend may propose a reasonable number of substitute claims for each challenged claim. Generally, it is presumed “that only one substitute claim would be needed to replace each challenged claim,” but that challenge may be rebutted by a showing of need. 37

C.F.R. § 42.121(a)(3); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4-5 (PTAB Feb. 25, 2019). Petitioner challenges independent claims 1, 4, 7, and 10, and dependent claims 2-3, 5-6, 8-9, and 11-12. Patent Owner proposes one substitute independent claim (substitute claim 13) for challenged independent claim 4, and one substitute independent claim (substitute claim 14) for challenged independent claim 10. Claims 1-3 and 7-9 are not being amended. Claims 4-6 and 10-12 are being cancelled.

IV. EACH PROPOSED AMENDMENT RESPONDS TO A GROUND OF UNPATENTABILITY INVOLVED IN THIS PROCEEDING

Substitute claims 13 and 14 are responsive to one or more grounds of unpatentability at issue in this proceeding. 37 C.F.R. § 42.121(a)(2)(i). Specifically, Petitioner has asserted that the prior art discloses the elements of independent claims 4 and 10 (*see* Petition at 45-48, 53-60, 82-87), which this motion seeks to amend.

V. PROPOSED AMENDED CLAIMS

The proposed amended claims are set forth in Appendix A below. Brackets are used to indicate deletions, and underlining is used to indicate additions.

A. The Proposed Amended Claims Do Not Broaden Claim Scope

The proposed amended claims do not broaden the claim scope. Rather, the proposed amended claims further limit the scope of independent claims 4 and 10 as follows:

(1) the proposed amended claims limit the “semi-insulating III-N layer” to “a compensated GaN layer containing acceptor type dopant atoms passivated with hydrogen”. Note that ‘294 patent at col. 3, lines 47-48 recites, “the compensated semi-conductor layer 38 is a highly compensated semi-insulating material.”

(2) The proposed amended claims specifically recite that the transistor is an “enhancement mode” transistor.

(3) The proposed amended claims further limit the claimed invention to include “a gate comprising a gate contact and the compensated GaN layer, wherein no two-dimensional electron gas (2DEG) region exists below the gate at zero volts applied gate bias.”

**B. The Proposed Amended Claims Do Not Introduce New Matter
and Are Supported By The Original Specification**

The originally filed disclosure of the '294 patent supports each proposed substitute claim. See 37 C.F.R. § 42.121(b)(1)-(2). The '294 patent issued from U.S. App. No. 12/756,906, filed on April 8, 2010 (Exhibit 2007), which claims priority to U.S. Provisional App. No. 61/167,792, filed on April 8, 2009 (Exhibit 2008).

Claim 13 (Substitute for claim 4)

Claim Limitation	Support for Claim 13
13. <u>An enhancement mode</u> [A] column III Nitride transistor comprising:	<u>U.S. App. No. 12/756,906</u> : Ex. 2007, ¶[0027], lines 1-2. <u>U.S. Prov. App. No. 61/167,792</u> : Ex. 2008, ¶[0025], lines 1-2.
a substrate,	<u>U.S. App. No. 12/756,906</u> : Ex. 2007, ¶[0026], lines 2-3; ¶[0028], lines 2-3; FIGS. 2-10. <u>U.S. Prov. App. No. 61/167,792</u> : Ex. 2008, ¶[0024], lines 2-3; ¶[0026], lines 2-3; FIGS. 3-11.
a set of III-N transition layers above the substrate,	<u>U.S. App. No. 12/756,906</u> : Ex. 2007, ¶ [0026], lines 4-5; ¶[0028], line 3; FIGS. 2, 4-10. <u>U.S. Prov. App. No. 61/167,792</u> : Ex. 2008, ¶[0024], lines 4-5; ¶[0026], line 3; FIGS. 3, 5-11.

a III-N buffer layer above the set of transition layers,	<u>U.S. App. No. 12/756,906</u>: Ex. 2007, ¶[0026], lines 5-6; ¶[0028], lines 3-5; FIGS. 2, 5-9. <u>U.S. Prov. App. No. 61/167,792</u>: Ex. 2008, ¶[0024], lines 5-6; ¶[0026], lines 3-5; FIGS. 3, 6-10.
a III-N barrier layer <u>above the buffer layer</u>, [and]	<u>U.S. App. No. 12/756,906</u>: Ex. 2007, ¶[0026], lines 8-9; ¶[0028], lines 4-5; FIGS. 2, 6-9. <u>U.S. Prov. App. No. 61/167,792</u>: Ex. 2008, ¶[0024], lines 8-9; ¶[0026], lines 4-5; FIGS. 3, 7-10.
a semi-insulating III-N layer above the barrier layer, <u>wherein the semi-insulating III-N layer comprises a compensated GaN layer containing acceptor type dopant atoms passivated with hydrogen</u>, and	<u>U.S. App. No. 12/756,906</u>: Ex. 2007, ¶[0026], lines 12-16; ¶[0029], lines 1-2; ¶[0030], lines 1-4; FIGS. 2, 7-9. <u>U.S. Prov. App. No. 61/167,792</u>: Ex. 2008, ¶ [0024], lines 12-16; ¶[0028], lines 1-4; FIGS. 3, 8-10.
a gate comprising a gate contact and <u>the compensated GaN layer under the gate contact, wherein no two-dimensional electron gas (2DEG) region exists below the gate at zero volts applied gate bias</u>.	<u>U.S. App. No. 12/756,906</u>: Ex. 2007 ¶[0005], lines 4-6; ¶[0026], lines 11-14; ¶[0029], lines 3-6; FIGS. 2, 8-9. <u>U.S. Prov. App. No. 61/167,792</u>: Ex. 2008, ¶[0004], lines 4-6; ¶[0024], lines 11-14; ¶[0027], lines 3-6; FIGS. 3, 9-10.

Claim 14 (Substitute for claim 10)

Claim Limitation	Support for Substitute Claim 14
14. A compensated gate <u>enhancement mode</u> MISFET transistor comprising:	<u>U.S. App. No. 12/756,906:</u> Ex. 2007, title, ¶[0026], line 1; ¶[0027], lines 1-2; ¶[0010], lines 1-2; ¶[0011], lines 1-3; ¶ [0026], lines 12-14; ¶[0029], lines 2-4; ¶[0030], lines 3-6. <u>U.S. Prov. App. No. 61/167,792:</u> Ex. 2008, title, ¶[0024], line 1; ¶[0025], lines 1-2; ¶[0008], lines 1-2; ¶[0009], lines 1-3; ¶[0024], lines 12-14; ¶[0027], lines 2-4; ¶ [0028], lines 3-6.
a III-N barrier layer beneath a gate contact,	<u>U.S. App. No. 12/756,906:</u> Ex. 2007, ¶[0026], lines 8-9; ¶[0028], lines 4-5, FIGS. 2, 6-9. <u>U.S. Prov. App. No. 61/167,792:</u> Ex. 2008, ¶[0024], lines 8-9; ¶[0026], lines 4-5, FIGS. 3, 7-10.
a drain contact,	<u>U.S. App. No. 12/756,906:</u> Ex. 2007 ¶[0026], lines 9-10; FIG. 2. <u>U.S. Prov. App. No. 61/167,792:</u> Ex. 2008, ¶[0024], lines 10-11; FIG. 3.
a source contact, [and]	<u>U.S. App. No. 12/756,906:</u> Ex. 2007 at 45 ¶[0026], lines 10-11; FIG. 2. <u>U.S. Prov. App. No. 61/167,792:</u> Ex. 2008, ¶[0024], lines 10-11; FIG. 3.

a semi-insulating III-N layer between the barrier layer and the gate contact, <u>wherein the semi-insulating III-N layer comprises a compensated GaN layer containing acceptor type dopant atoms passivated with hydrogen, and</u>	<u>U.S. App. No. 12/756,906</u>: Ex. 2007, ¶[0026], lines 12-16; ¶[0029], lines 1-2; ¶ [0030], lines 1-4; FIGS. 2, 7-9. <u>U.S. Prov. App. No. 61/167,792</u>: Ex. 2008, ¶[0024], lines 12-16; ¶[0028], lines 1-4; FIGS. 3, 8-10.
<u>a gate comprising the gate contact and the compensated GaN layer, wherein no two-dimensional electron gas (2DEG) region exists below the gate at zero volts applied gate bias.</u>	<u>U.S. App. No. 12/756,906</u>: Ex. 2007, ¶[0005], lines 4-6; ¶[0026], lines 11-14; ¶[0029], lines 3-6; FIGS. 2, 8-9. <u>U.S. Prov. App. No. 61/167,792</u>: Ex. 2008, ¶[0004], lines 4-6; ¶[0024], lines 11-14; ¶[0027], lines 3-6; FIGS. 3, 9-10.

C. The Proposed Amended Claims Are Patentable

“A Patent Owner does not bear the burden of persuasion to demonstrate the patentability of substitute claims presented in a motion to amend.” *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4 (PTAB Feb. 25, 2019).

Rather, “the burden of persuasion ordinarily will lie with the petitioner to show that any proposed substitute claims are unpatentable by a preponderance of the evidence.” Here, the additional claim elements of proposed independent amended claims 13 and 14 are not taught by the prior art combinations used by Petitioner to challenge the original claims. Petitioners have not met their burden to show that the proposed substitute claims are unpatentable by a preponderance of the evidence.

VI. CONCLUSION

For the reasons set forth herein, Patent Owner asserts that the proposed amended claims meet all statutory requirements and respectfully requests that the Board allow proposed amended claims 13-14.

Dated: June 12, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that a true and correct copy of the foregoing **PATENT OWNER'S MOTION TO AMEND** is being served on counsel of record by filing this document through the Patent Review Processing System, with a copy served via electronic mail to the following email address, as authorized in the Petition:

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Dated: June 12, 2024

Respectfully submitted,

/s/ Walter D. Davis, Jr.

Walter D. Davis, Jr. (Reg. No. 45,137)

Counsel for Patent Owner

APPENDIX A

Patent Owner's proposed amended claims are set forth below. Modifications to the original claims are shown in the substitute claims by underlining (added text) and brackets/strikethroughs (deleted text).

Claim 13 (Substitute for claim 4)

13. An enhancement mode [A] column III Nitride transistor comprising:
a substrate,
a set of III-N transition layers above the substrate,
a III-N buffer layer above the set of transition layers,
a III-N barrier layer above the buffer layer, [and]
a semi-insulating III-N layer above the barrier layer, wherein the semi-insulating III-N layer comprises a compensated GaN layer containing acceptor type dopant atoms passivated with hydrogen, and
a gate comprising a gate contact and the compensated GaN layer, wherein no two-dimensional electron gas (2DEG) region exists below the gate at zero volts applied gate bias.

Claim 14 (Substitute for claim 10)

14. A compensated gate enhancement mode MISFET transistor comprising:
a III-N barrier layer beneath a gate contact,
a drain contact,
a source contact, and

a semi-insulating III-N layer between the barrier layer and the gate contact,
wherein the semi-insulating III-N layer comprises a compensated GaN layer
containing acceptor type dopant atoms passivated with hydrogen, and
a gate comprising the gate contact and the compensated GaN layer, wherein no
two-dimensional electron gas (2DEG) region exists below the gate at zero volts
applied gate bias.