

given property, and, as such, a recorded assignment document will be retained, even if it is subsequently found to be invalid. *In re Raney*, 24 USPQ2d 1713 (Comm'r Pat. 1992).

Here, petitioner seeks an extraordinary remedy, properly addressed under 37 CFR 1.182. The USPTO will not normally resort to an extraordinary remedy under 37 CFR 1.182 if the rules of practice and the procedures before the USPTO already provide an avenue for the requested relief. *See Cantello v. Rasmussen*, 220 USPQ 664, (Comm'r Pat. 1982).

As set forth in MPEP § 323, an error in a recorded assignment is not corrected by expunging the previous document, but by simply submitting a “corrective document” that explains the nature of the recorded document so as to clarify the assignment records. “Corrective documents” are not limited to assignments, but include any documents affecting title to a patent or application. *See* MPEP § 313. This would include an explanation of the recorded document so as to clarify the assignment records. The new recordation form cover sheet must identify the submission as a “corrective document” submission and indicate the reel and frame number where the incorrectly recorded assignment document appears. The corrective document will be recorded and given a new reel and frame number and recording date. The recording fee set forth in 37 CFR 1.21(h) is required for each patent application and patent against which the corrective document is being recorded. *See* MPEP § 302.06.

Therefore, the rules of practice and the procedures before the USPTO provide an avenue for the requested relief without relying upon extraordinary measures. As a request for the Office to invalidate an assignment is both extraordinary and contrary to USPTO policy, this petition must be dismissed.

Telephone inquiries concerning this communication should be directed to Katherine Zalasky McDonald at (571) 270-7064.

/Christopher Bottorff/

Christopher Bottorff
Petitions Examiner
Office of Petitions



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/371,839	07/09/2021	G.R. MOHAN RAO	GRTD60-35314	2197
25883	7590	02/28/2022		
MUNCK WILSON MANDALA L.L.P			EXAMINER	
P.O. Drawer 800889			ARORA, AJAY	
DALLAS, TX 75380				
			ART UNIT	PAPER NUMBER
			2892	
			NOTIFICATION DATE	DELIVERY MODE
			02/28/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPdocketing@munckwilson.com
admin@dalpat.com
eofficeaction@appcoll.com

Office Action Summary

Application No.

17/371,839

Applicant(s)

RAO, G.R. MOHAN

Examiner

AJAY ARORA

Art Unit

2892

AIA (FITF) Status

No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/1/2021.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-30 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-30 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date ____.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 4) ☐ Other: ____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a

result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1-30 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-30 of U.S. Patent No. US 11121222. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims of the current application are only different in that they claim "An electronic system, the system comprising at least one semiconductor device, the at least one semiconductor device including.." (see, for example, base claims 1 and 21) compared to claims 1-30 of U.S. Patent No. 11121222 (see for example, base claims 1 and 21), which claims a specific type of electronic system that comprises at least one semiconductor device; i.e. a VLSI semiconductor device. Thus, claims 1-30 of the

current application are broader in scope compared to the corresponding claims 1-30 of U.S. Patent No. 11121222, as explained above, but are otherwise similar.

Art Based Rejection

4. No art based rejection has been provided, as the prior art does not teach or suggest the features of claims 1-30. The closest prior art is Hong (US 2007/0045682), hereinafter Hong, especially see Figures 4A-4D and 5A-5C and para 26-32 (as also explained in Notice of Allowance of 8/11/2021 for parent application 16/947,294).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY ARORA whose telephone number is (571)272-8347. The examiner can normally be reached 9 AM - 5 PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on 5712721708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJAY ARORA/
Primary Examiner, Art Unit 2892

<i>Search Notes</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

CPC - Searched*		
Symbol	Date	Examiner
H01L 29/1095	10/23/2021	AKA

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
257	25	10/23/2021	AKA

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor search	10/23/2021	AKA
Assignee search	10/23/2021	AKA
References for all parent applications (10/934,915; 11/622,496; 15/590,282; 16/717950 and 16/947294) considered	10/23/2021	AKA
.clm. interference search	10/23/2021	AKA
EAST search history report	10/23/2021	AKA
Revised EAST search history report	02/23/2022	AKA

/AJAY ARORA/ Primary Examiner, Art Unit 2892	
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<i>Search Notes</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H01L	29/1095	10/23/2021	AKA
257	25	10/23/2021	AKA

/AJAY ARORA/ Primary Examiner, Art Unit 2892	
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<i>Index of Claims</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	10/23/2021	02/23/2022							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	✓							
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	16	✓	✓							
	17	✓	✓							
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	25	✓	✓							
	26	✓	✓							
	27	✓	✓							
	28	✓	✓							
	29	✓	✓							
	30	✓	✓							

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L34	3	16/947,294	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/02/23 11:02 PM
L35	544	(source drain source\$1drain) AND drift AND ((gradient graded) near2 concentration near2 dop\$3) AND well	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2022/02/23 11:22 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed		PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce
Electronic Petition Request	TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	
Application Number	17371839	
Filing Date	09-Jul-2021	
First Named Inventor	G.R. MOHAN RAO	
Attorney Docket Number	GRTD60-35314	
Title of Invention	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS	
☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action ☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.		
Owner	Percent Interest	
VERVAIN, LLC	100%	
The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s) 11121222 as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.		

☐ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ☐ Small Entity ☐ Micro Entity ☒ Regular Undiscounted	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ☒ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number <u>66850</u> ☐ A sole inventor ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ☐ A joint inventor; all of whom are signing this request	
Signature	/William G. Howison, Reg. #66850/
Name	William G. Howison

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
 Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	17371839			
Filing Date:	09-Jul-2021			
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS			
First Named Inventor/Applicant Name:	G.R. MOHAN RAO			
Filer:	William G. Howison			
Attorney Docket Number:	GRTD60-35314			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				170

Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17371839

Filing Date: 09-Jul-2021

Applicant/Patent under Reexamination: RAO

Electronic Terminal Disclaimer filed on March 4, 2022

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt

EFS ID:	45143893
Application Number:	17371839
International Application Number:	
Confirmation Number:	2197
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. MOHAN RAO
Customer Number:	25883
Filer:	William G. Howison
Filer Authorized By:	
Attorney Docket Number:	GRTD60-35314
Receipt Date:	04-MAR-2022
Filing Date:	09-JUL-2021
Time Stamp:	12:30:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 170
RAM confirmation Number	E202234C30322647
Deposit Account	500208
Authorized User	William Howison

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

Dell Ex. 1002

Page 151

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	41402	no	2
			4d991e41980f21eb9155bf9068f5448b37bf671		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	38019	no	2
			8ce81bc4d9c0cfb1086a96d9c0b9a84fc97e97bf		

Warnings:

Information:

Total Files Size (in bytes):	79421
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: G. R. Mohan Rao
Serial No.: 17/371,839
Confirmation No.: 2197
Filed: July 9, 2021
Group: 2892
Examiner: Ajay Arora
For: SEMICONDUCTOR DEVICES WITH GRADED DOPANT
REGIONS

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

AMENDMENT AND RESPONSE TO OFFICE ACTION

This communication is responsive to the Examiner's Office Action dated February 28, 2022. Reconsideration is respectfully requested.

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.
Remarks/Arguments begin on page 7 of this paper.

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) An electronic system, the system comprising:

at least one semiconductor device, the at least one semiconductor device including:

a substrate of a first doping type at a first doping level having a surface;

a first active region disposed adjacent the surface with a second doping type opposite in conductivity to the first doping type and within which transistors can be formed;

a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed;

transistors formed in at least one of the first active region or second active region;

at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the first and second active regions towards an area of the substrate where there are no active regions; and

at least one well region adjacent to the first or second active region containing at least one graded dopant region, the graded dopant region to aid carrier movement from the surface towards the area of the substrate where there are no active regions, wherein at least some of the transistors form digital logic of the semiconductor device.

2. (Previously Presented) The system of Claim 1, wherein the substrate of the at least one semiconductor device is a p-type substrate.

3. (Previously Presented) The system of Claim 1, wherein the substrate of the at least one semiconductor device has epitaxial silicon on top of a nonepitaxial substrate.

4. (Previously Presented) The system of Claim 1, wherein the first active region and second active region of the at least one semiconductor device contain digital logic formed by one of either p-channel and n-channel devices.
5. (Previously Presented) The system of Claim 1, wherein the first active region and second active region of the at least one semiconductor device contain either p-channel or n-channel devices in n-wells or p-wells, respectively, and each well has at least one graded dopant.
6. (Previously Presented) The system of Claim 1, wherein the first active region and second active region of the at least one semiconductor device are each separated by at least one isolation region.
7. (Previously Presented) The system of Claim 1, wherein the graded dopant is fabricated with an ion implantation process.
8. (Previously Presented) The system of Claim 1, wherein the first and second active regions of the at least one semiconductor device are formed adjacent the first surface of the substrate of the at least one semiconductor device.
9. (Previously Presented) The system of Claim 1, wherein dopants of the graded dopant concentration in the first active region or the second active region of the at least one semiconductor device are either p-type or n-type.
10. (Previously Presented) The system of Claim 1, wherein dopants of the graded dopant concentration in the first active region of the at least one semiconductor device are both p-type and n-type.
11. (Previously Presented) The system of Claim 1, wherein dopants of the graded dopant concentration in the second active region of the at least one semiconductor device are both p-type and n-type.

12. (Previously Presented) The system of Claim 1, wherein dopants of the graded dopant region in the well region of the at least one semiconductor device are both p-type and n-type.

13. (Previously Presented) The system of claim 1, wherein the transistors which can be formed in the first and second active regions of the at least one semiconductor device are CMOS digital logic transistors requiring at least a source, a drain, a gate and a channel.

14. (Previously Presented) The system of Claim 1, wherein the at least one semiconductor device is a dynamic random access memory (DRAM).

15. (Previously Presented) The system of Claim 1, wherein the at least one semiconductor device is a complementary metal oxide semiconductor (CMOS) with a nonepitaxial substrate.

16. (Previously Presented) The system of Claim 1, wherein the at least one semiconductor device is a flash memory.

17. (Previously Presented) The system of Claim 1, wherein the at least one semiconductor device comprises digital logic and capacitors.

18. (Previously Presented) The system of Claim 1, wherein the at least one semiconductor device is a central processing unit.

19. (Previously Presented) The system of Claim 1, wherein the at least one semiconductor device is an image sensor.

20. (Previously Presented) The system of Claim 1, wherein each of the first and second active regions of the at least one semiconductor device are in the lateral or vertical direction.

21. (Previously Presented) An electronic system, comprising:

at least one semiconductor device, the at least one semiconductor device including:

a substrate of a first doping type at a first doping level having a surface;

a first active region disposed adjacent the surface of the substrate with a

second doping type opposite in conductivity to the first doping type and within

which transistors can be formed in the surface thereof;

a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed in the surface thereof;

10 transistors formed in at least one of the first active region or second active region;

at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the surface to an area of the substrate where there are no active regions; and

15 at least one well region adjacent to the first or second active region containing at least one graded dopant region, the graded dopant region to aid carrier movement from the surface to the area of the substrate where there are no active regions, and wherein the graded dopant concentration is linear, quasilinear, error function, complementary error function, or any combination thereof.

22. (Previously Presented) The system of Claim 21, wherein the substrate of the at least one semiconductor device is an n-type substrate.

23. (Previously Presented) The system of Claim 21, wherein the substrate of the at least one semiconductor device is a p-type substrate.

24. (Previously Presented) The system of Claim 21, wherein the substrate of the at least one semiconductor device has epitaxial silicon on top of a nonepitaxial substrate.

25. (Previously Presented) The system of Claim 21, wherein the first active region and second active region of the at least one semiconductor device contain at least one of either p-channel and n-channel devices.

26. (Previously Presented) The system of Claim 21, wherein the first active region and second active region of the at least one semiconductor device contain either p-channel or n-channel devices in n-wells or p-wells, respectively, and each well has at least one graded dopant.

27. (Previously Presented) The system of Claim 21, wherein the first active region and second active region of the at least one semiconductor device are each separated by at least one isolation region.

28. (Previously Presented) The system of Claim 21, wherein dopants of the graded dopant concentration in the first active region or the second active region of the at least one semiconductor device are either p-type or n-type.

29. (Previously Presented) The system of Claim 21, wherein dopants of the graded dopant concentration in the first active region of the at least one semiconductor device are both p-type and n-type.

30. (Previously Presented) The system of Claim 21, wherein dopants of the graded dopant concentration in the second active region of the at least one semiconductor device are both p-type and n-type.

REMARKS

Applicant has carefully reviewed the Office Action dated February 28, 2022. Reconsideration and favorable action is respectfully requested.

Claims 1-30 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 11121222. A Terminal Disclaimer is submitted concurrently with this response with respect to U.S. Patent No. 11121222.

Applicant has now made an earnest attempt in order to place this case in condition for allowance. For the reasons stated above, Applicant respectfully requests full allowance of the claims as amended.

If any issues arise, or if the Examiner has any suggestions for expediting allowance of this Application, the Applicant respectfully invites the Examiner to contact the undersigned at the telephone number indicated below or at whowison@munckwilson.com.

Recognizing that Internet communications are not secure, Applicant hereby authorizes the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application by video conferencing, instant messaging, or electronic mail. Applicant understands that a copy of these communications will be made of record in the application file.

Please charge any additional fees or deficiencies in fees or credit any overpayment to
Deposit Account No. 50-0208/GRTD60-35314.

Respectfully submitted,
MUNCK WILSON MANDALA, LLP
Attorneys for Applicant

/William G. Howison, Reg. #66850/

William G. Howison
Registration No. 66,850

WGH/als

P.O. Drawer 800889
Dallas, Texas 75380
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Fax: 972-628-3616
March 4, 2022

Electronic Acknowledgement Receipt

EFS ID:	45143918
Application Number:	17371839
International Application Number:	
Confirmation Number:	2197
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. MOHAN RAO
Customer Number:	25883
Filer:	William G. Howison
Filer Authorized By:	
Attorney Docket Number:	GRTD60-35314
Receipt Date:	04-MAR-2022
Filing Date:	09-JUL-2021
Time Stamp:	12:32:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		GRT35314AMD.pdf	104672	yes	8
			b7e71d2fc480d3afb876e1eed26332baeb2bb3e6		

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Response After Final Action	1	1	
Claims	2	6	
Applicant Arguments/Remarks Made in an Amendment	7	8	

Warnings:

Information:

Total Files Size (in bytes):	104672
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 17/371,839		Filing Date 07/09/2021		☐ To be Mailed			
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO											
APPLICATION AS FILED - PART I											
		(Column 1)		(Column 2)							
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A		N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 = *				x \$100 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$480 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))											
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL					
APPLICATION AS AMENDED - PART II											
		(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	03/04/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0			x \$100 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0			x \$480 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
								TOTAL ADD'L FEE		0	
		(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=			x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=			x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
								TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.								LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".								/THERESA D DAWKINS/			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".											
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed		PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce
Electronic Petition Request	TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	
Application Number	17371839	
Filing Date	09-Jul-2021	
First Named Inventor	G.R. MOHAN RAO	
Attorney Docket Number	GRTD60-35314	
Title of Invention	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS	
☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action ☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.		
Owner	Percent Interest	
GREENTHREAD, LLC	100%	
The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s) 11121222 as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.		

☐ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ☐ Small Entity ☐ Micro Entity ☒ Regular Undiscounted	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ☒ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number <u>30646</u> ☐ A sole inventor ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ☐ A joint inventor; all of whom are signing this request	
Signature	/Gregory M. Howison, Reg. #30646/
Name	Gregory M. Howison

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
 Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	17371839			
Filing Date:	09-Jul-2021			
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS			
First Named Inventor/Applicant Name:	G.R. MOHAN RAO			
Filer:	Gregory Michael Howison/Joselyn Rodriguez			
Attorney Docket Number:	GRTD60-35314			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				170

Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17371839

Filing Date: 09-Jul-2021

Applicant/Patent under Reexamination: RAO

Electronic Terminal Disclaimer filed on March 15, 2022

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt

EFS ID:	45218088
Application Number:	17371839
International Application Number:	
Confirmation Number:	2197
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. MOHAN RAO
Customer Number:	25883
Filer:	Gregory Michael Howison/Joselyn Rodriguez
Filer Authorized By:	Gregory Michael Howison
Attorney Docket Number:	GRTD60-35314
Receipt Date:	15-MAR-2022
Filing Date:	09-JUL-2021
Time Stamp:	15:55:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 170
RAM confirmation Number	E20223EF55242618
Deposit Account	500208
Authorized User	Joselyn Rodriguez

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.21 (Miscellaneous fees and charges)

Dell Ex. 1002

Page 169

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	41407	no	2
			ce154e2964899d218ef9dae5a3347ca4e03 ea568		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38134	no	2
			3ae58ae3a199f0bc9bc08814725ee818db8 0dd20		
Warnings:					
Information:					
Total Files Size (in bytes):			79541		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

25883 7590 03/23/2022
MUNCK WILSON MANDALA L.L.P.
P.O. Drawer 800889
DALLAS, TX 75380

EXAMINER

ARORA, AJAY

ART UNIT

PAPER NUMBER

2892

DATE MAILED: 03/23/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/371,839	07/09/2021	G.R. MOHAN RAO	GRTD60-35314	2197

TITLE OF INVENTION: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	06/23/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

25883 7590 03/23/2022
MUNCK WILSON MANDALA L.L.P
P.O. Drawer 800889
DALLAS, TX 75380

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/371.839	07/09/2021	G.R. MOHAN RAO	GRTD60-35314	2197

TITLE OF INVENTION: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	06/23/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARORA, AJAY	2892	257-025000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/371,839	07/09/2021	G.R. MOHAN RAO	GRTD60-35314	2197
25883	7590	03/23/2022	EXAMINER	
MUNCK WILSON MANDALA L.L.P			ARORA, AJAY	
P.O. Drawer 800889			ART UNIT	
DALLAS, TX 75380			PAPER NUMBER	
			2892	
DATE MAILED: 03/23/2022				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/371,839	Applicant(s) RAO, G.R. MOHAN	
	Examiner AJAY ARORA	Art Unit 2892	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/4/2022.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-30. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.	

/AJAY ARORA/
Primary Examiner, Art Unit 2892

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Reasons for Allowance

2. Claims 1-30 are allowed. The following is an examiner's statement of reasons for allowance:

Claims 1-20 are allowed because the prior art of record does not teach or suggest, singularly or in combination, at least the limitations of the base claim 1 that requires "at least one well region adjacent to the first or second active region containing at least one graded dopant region, the graded dopant region to aid carrier movement from the surface towards the area of the substrate where there are no active regions" (see last 5 lines).

The closest reference is Hong (US 2007/0045682), hereinafter Hong. More specifically, regarding claim 17, Hong (refer to Figures 4A-4D and 5A-5C) teaches An electronic system, the system comprising:

a substrate (312 – see para 29) of a first doping type (i.e. parts 312 and 21 of the substrate have n-type doping, see para 29) of a first doping type and a first doping level having a surface;

a first region (311, which includes wells such as 21, 22, 5, 2) disposed adjacent the first surface,

a second active region (such as source/drain region 2, see para 40; or 2 or 5 or 22 of pixel cell formed in an adjacent region separated by shallow trench isolation 37 – see para 30) separate from the first region disposed adjacent to the first active region and within which transistors (406, 407) may be formed;

at least a portion of at least one of the first and second regions having at least one graded dopant concentration (350 – see para 24, last 3 sentences; also see Figure 5C and para 29) to aid carrier movement (para 26).

However, the first region is not an “active” region and the structure does not show that the graded dopant region is to “aid carrier movement from the surface to the area of the substrate where there are no active regions”. Further, it is not obvious to modify Hong as changing first region and second region as above would change the intended function of the device.

Similarly, claims 21-30 are allowed because the prior art of record does not teach or suggest, singularly or in combination, at least the limitations of base claim 21 that requires “at least one well region adjacent to the first or second active region containing at least one graded dopant region, the graded dopant region to aid carrier movement from the surface to the area of the substrate where there are no active regions” (see last 5 lines). Again, the closest reference is Hong.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY ARORA whose telephone number is (571)272-8347. The examiner can normally be reached 9 AM - 5 PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on 5712721708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197

Application/Control Number: 17/371,839
Art Unit: 2892

Page 5

(toll-free). If you would like assistance from a USPTO Customer Service

Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJAY ARORA/
Primary Examiner, Art Unit 2892

Issue Classification 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

CPC						
Symbol					Type	Version
H01L	/	29	/	1095	F	2013-01-01
H01L	/	27	/	11524	I	2013-01-01
H01L	/	27	/	14643	I	2013-01-01
H01L	/	27	/	11521	I	2013-01-01
H01L	/	29	/	7395	I	2013-01-01
H01L	/	29	/	36	I	2013-01-01
H01L	/	27	/	0214	A	2013-01-01
H01L	/	27	/	10844	A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
/				

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 30	
/AJAY ARORA/ Primary Examiner, Art Unit 2892 (Primary Examiner) _____ (Date) 08 March 2022		O.G. Print Claim(s) 1	O.G. Print Figure 5b

<i>Issue Classification</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H01L29/10	/	29	/ 10

NON-CLAIMED			
/	/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
257	25

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	30	
/AJAY ARORA/ Primary Examiner, Art Unit 2892	08 March 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	5b

Issue Classification 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19		28								
	2		11		20		29								
	3		12		21		30								
	4		13		22										
	5		14		23										
	6		15		24										
	7		16		25										
	8		17		26										
	9		18		27										

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 30	
/AJAY ARORA/ Primary Examiner, Art Unit 2892 (Primary Examiner) _____ (Date) 08 March 2022		O.G. Print Claim(s) 1	O.G. Print Figure 5b

<i>Search Notes</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

CPC - Searched*		
Symbol	Date	Examiner
H01L 29/1095	10/23/2021	AKA

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
257	25	10/23/2021	AKA

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor search	10/23/2021	AKA
Assignee search	10/23/2021	AKA
References for all parent applications (10/934,915; 11/622,496; 15/590,282; 16/717950 and 16/947294) considered	10/23/2021	AKA
.clm. interference search	10/23/2021	AKA
EAST search history report	10/23/2021	AKA
Revised EAST search history report	02/23/2022	AKA
Revised EAST search history report	03/08/2022	aka

/AJAY ARORA/ Primary Examiner, Art Unit 2892	
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<i>Search Notes</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H01L	29/1095	10/23/2021	AKA
257	25	10/23/2021	AKA

/AJAY ARORA/ Primary Examiner, Art Unit 2892	
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<i>Index of Claims</i> 	Application/Control No. 17/371,839	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY ARORA	Art Unit 2892

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	10/23/2021	02/23/2022	03/08/2022						
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	2	✓	✓	=						
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	29	✓	✓	=						
	30	✓	✓	=						

OK TO ENTER: /A.A/

GRTD60-35314

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: G. R. Mohan Rao
Serial No.: 17/371,839
Confirmation No.: 2197
Filed: July 9, 2021
Group: 2892
Examiner: Ajay Arora
For: SEMICONDUCTOR DEVICES WITH GRADED DOPANT
REGIONS

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

AMENDMENT AND RESPONSE TO OFFICE ACTION

This communication is responsive to the Examiner's Office Action dated February 28, 2022. Reconsideration is respectfully requested.

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.
Remarks/Arguments begin on page 7 of this paper.

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	0	17/371,839	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 10:17 AM
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		511 "4001864 "5130262 "5262345 "5448087 "6472715 "6670544 "6720622 "6780713 "6921946 "20170243876 "5835402 "20070045682 "10510842 "20010040622 "20020074585 "20030183856 "4684971 "6465862 "6747883 "7233044 "7307327 "4688063 "20030030488 "20040063288 "20060113592 "20150200314 "4866000 "5029277 "5480816 "5517052 "5797999 "6452086 "6706550 "6737722 "6831292 "6878603 "7115925 "9190502 "9647070 "20080142899 "6384431 "5888857 "6744117 "6756616 "6933215 "7504692 "8421195").PN.					
L14	319	L7 L9 L10 L11 L12 L13	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 11:01 AM
L15	10	L3 and drift	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 11:02 AM
L16	14	L2 and drift	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 11:02 AM
L17	574	(source drain source/drain) and drift and ((gradient graded) near2 concentration near2 dop\$3) and well	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 11:03 AM
L18	25930	H01L27/11521.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:03 AM
L19	14669	H01L27/11524.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:04 AM
L20	29711	H01L27/14643.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:04 AM
L21	11836	H01L29/36.cpc.	(US-PGPUB; USPAT;	OR	ON	ON	2021/10/23

L22	13097	H01L29/7395.cpc.	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	11:04 AM
L23	18	L4 and L18 and L21	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:04 AM
L24	18	L4 and L18 and L20	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:08 AM
L25	18	L4 and L19 and L20	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:10 AM
L26	66	L4 and L19 and L21	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/10/23 11:10 AM
L27	2	((source drain "source/drain" active) and drift and ((gradient graded) near2 concentration near2 dop\$3) and well and ((no near2 active) (inactive))).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 11:11 AM
L28	32	((source drain "source/drain" active) and drift and ((gradient graded) near2 concentration near2 dop\$3) and well and ((no near2 active) (inactive)))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 11:13 AM
L30	574	(source drain source/drain) and drift and ((gradient graded) near2 concentration near2 dop\$3) and well	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 03:37 PM
L31	574	L30	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2021/10/23 03:37 PM
L32	1	("9647070").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/10/23 04:21 PM
L33	1	("6384431").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/10/23 04:21 PM
L34	3	16/947,294	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2022/02/23 11:02 PM

L35	544	(source drain source\$1drain) AND drift AND ((gradient graded) near2 concentration near2 dop\$3) AND well	AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	OFF	OFF	2022/02/23 11:22 PM
L36	1	"11121222"	(USPAT)	OR	ON	ON	2022/03/08 09:28 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N29	31	((source drain "source/drain" active) and drift and ((gradient graded) near2 concentration near2 dop\$3) and well and ((no near2 active) (inactive)))	(US-PGPUB; USPAT)	OR	OFF	OFF	2021/10/23 11:12 AM

Bibliographic Data

Application No: 17/371,839

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged:

/AJAY ARORA/

Examiner's Signature

Initials

Title:

SEMICONDUCTOR DEVICES WITH GRADED DOPANT
REGIONS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
07/09/2021	257	2892	GRTD60-35314
RULE			

APPLICANTS

GREENTHREAD, LLC, Dallas, TX, UNITED STATES

INVENTORS

G.R. MOHAN RAO, ALLEN, TX, UNITED STATES

CONTINUING DATA

This application is a CON of 16947294 07/27/2020 PAT 11121222

16947294 is a CON of 16717950 12/17/2019 PAT 10734481

16717950 is a CON of 15590282 05/09/2017 PAT 10510842

15590282 is a CON of 14931636 11/03/2015 PAT 9647070

14931636 is a CON of 14515584 10/16/2014 PAT 9190502

14515584 is a CON of 13854319 04/01/2013ABN

13854319 is a CON of 11622496 01/12/2007 PAT 8421195

11622496 is a DIV of 10934915 09/03/2004ABN

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/22/2021

STATE OR COUNTRY

UNITED STATES

ADDRESS

MUNCK WILSON MANDALA L.L.P

P.O. Drawer 800889

DALLAS, TX 75380

UNITED STATES

FILING FEE RECEIVED

\$7,160

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

25883 7590 03/23/2022
MUNCK WILSON MANDALA L.L.P
P.O. Drawer 800889
DALLAS, TX 75380

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/371.839	07/09/2021	G.R. MOHAN RAO	GRTD60-35314	2197

TITLE OF INVENTION: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	06/23/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARORA, AJAY	2892	257-025000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Gregory M. Howison

2

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

GREENTHREAD, LLC

DALLAS, TEXAS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 50-0208

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /William G. Howison, Reg. #66850/

Date March 23, 2022

Typed or printed name William G. Howison

Registration No. 66,850

Electronic Patent Application Fee Transmittal

Application Number:	17371839			
Filing Date:	09-Jul-2021			
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS			
First Named Inventor/Applicant Name:	G.R. MOHAN RAO			
Filer:	William G. Howison/Anna Nguyen			
Attorney Docket Number:	GRTD60-35314			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
UTILITY APPL ISSUE FEE	1501	1	1200	1200
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1200

Electronic Acknowledgement Receipt

EFS ID:	45300225
Application Number:	17371839
International Application Number:	
Confirmation Number:	2197
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. MOHAN RAO
Customer Number:	25883
Filer:	William G. Howison
Filer Authorized By:	
Attorney Docket Number:	GRTD60-35314
Receipt Date:	23-MAR-2022
Filing Date:	09-JUL-2021
Time Stamp:	15:40:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1200
RAM confirmation Number	E20223MF45452092
Deposit Account	500208
Authorized User	William Howison

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

Dell Ex. 1002

Page 198

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	GRT35314IssueFeeTransmittal.pdf	1231571	no	1
			c23ddc1d6949e077a00bd27b1dc82df75f150ea8		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	40395	no	2
			591f9a252b7a02f743b3047422b0137efc393983		

Warnings:

Information:

Total Files Size (in bytes):	1271966
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/371,839	04/26/2022	11316014	GRTD60-35314	2197

25883 7590 04/06/2022

MUNCK WILSON MANDALA L.L.P
P.O. Drawer 800889
DALLAS, TX 75380

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

G.R. MOHAN RAO, ALLEN, TX;

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

GREENTHREAD, LLC, Dallas, TX;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 6:22-cv-00105	DATE FILED 1/27/2022	U.S. DISTRICT COURT Western District of Texas, Waco Division
PLAINTIFF GREENTHREAD, LLC		DEFENDANT INTEL CORPORATION, DELL INC., AND DELL TECHNOLOGIES INC.,
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,421,195	4/16/2013	GREENTHREAD, LLC
2 9,190,502	11/17/2015	GREENTHREAD, LLC
3 10,510,842	12/17/2019	GREENTHREAD, LLC
4 10,734,481	8/4/2020	GREENTHREAD, LLC
5 11,121,222	9/14/2021	GREENTHREAD, LLC

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☒ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 11,316,014	4/26/2022	GREENTHREAD, LLC
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy