

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		11622496	
	Filing Date		2007-01-12	
	First Named Inventor	G.R. Mohan Rao		
	Art Unit	2892		
	Examiner Name	Ajay Arora		
	Attorney Docket Number	0299-0001.01		

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
/A.A./	1	A. S. GROVE, Physics and Technology of Semiconductor Devices, John Wiley Sons, Inc., New York, November 1967	☐
/A.A./	2	W. MURRAY BULLIS and W. R. RUNYAN, Influence of Mobility and Lifetime Variations on Drift-Field Effects in Silicon-Junction Devices, IEEE Transactions on Electron Devices, Vol. Ed-14, No. 2, February 1967	☐
/A.A./	3	BERINDER BRAR et al., Herb's Bipolar Transistors, IEEE Transactions on Electron Devices, Vol. 48, No. 11, November 2001	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/Ajay Arora/	Date Considered	12/16/2011
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	11622496
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	Examiner Name	Ajay Arora
	Attorney Docket Number	0299-0001.01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David M. Mundt/	Date (YYYY-MM-DD)	2011-10-12
Name/Print	David M. Mundt	Registration Number	41,207

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	456	(257/655).OCLS.	USPAT; USOCR	OR	OFF	2011/12/16 09:45
S92	1	("4481522").PN.	USPAT; USOCR	OR	OFF	2011/12/16 08:02

12/ 16/ 2011 10:39:51 AM

C:\ Users\ aarora\ Documents\ EAST\ Workspaces\ 11622496.wsp

<i>Index of Claims</i> 	Application/Control No. 11622496	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY K ARORA	Art Unit 2892

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

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	08/02/2010	04/10/2011	12/16/2011					
	1	-	-	-					
	2	-	-	-					
	3	-	-	-					
	4	-	-	-					
	5	-	-	-					
	6	-	-	-					
	7	-	-	-					
	8	-	-	-					
	9	-	-	-					
	10	✓	✓	✓					
	11	✓	✓	✓					
	12	✓	✓	✓					
	13	✓	✓	✓					
	14	✓	✓	✓					
	15	✓	✓	✓					
	16	✓	✓	✓					
	17	✓	-	-					
	18	✓	✓	✓					
	19	✓	✓	✓					
	20	✓	✓	✓					
	21	✓	✓	✓					
	22	✓	✓	✓					
	23	✓	✓	✓					
	24	✓	✓	✓					
	25	✓	-	-					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 11/622,496
Confirmation No. : 3086
Inventor : G. R. Mohan Rao
Filed : January 12, 2007
TC/A.U. : 2892
Examiner : Ajay Arora
Title : SEMICONDUCTOR DEVICES WITH GRADED
DOPANT REGIONS
Docket No. : 0299-0001.01

RESPONSE PURSUANT TO 37 CFR 1.114

AMENDMENT E

Sir:

In response to the non-final Office Action of December 20, 2011, Applicant submits the following amendment:

Claims. Amendments to the claims begin on page 2 of this amendment.

Remarks. Remarks begin on page 6 of this amendment.

LISTING OF CLAIMS

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

Claims:

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)

10. (Currently Amended) A CMOS Semiconductor device comprising:

a surface layer;

a substrate;

an active region including a source and a drain, disposed on one surface of said surface layer; and

a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate to create and maintain a single static unidirectional electric drift field to aid the movement of ~~drawing all~~ minority carriers from said surface layer to said substrate.

11. (Original) The CMOS Semiconductor device of claim 10 wherein said drift layer is a deeply-implanted layer.

12. (Original) The CMOS Semiconductor device of claim 10 wherein said drift layer is an epitaxial layer.

13. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a linear gradient.

14. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a quasi-linear gradient.

15. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows an exponential gradient.

16. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a complimentary error function gradient.

17. (Canceled)

18. (Currently amended) A CMOS Semiconductor device comprising:

a surface layer;

a substrate;

an active region including a source and a drain, disposed on one surface of said surface layer; and

a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate to create and maintain a single static unidirectional electric drift field to aid the movement of ~~drawing~~ all minority carriers from said substrate to said surface layer.

19. (Original) The CMOS Semiconductor device of claim 18 wherein said drift layer is a deeply-implanted layer.

20. (Original) The CMOS Semiconductor device of claim 18 wherein said drift layer is an epitaxial layer.

21. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a linear gradient.

22. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a quasi-linear gradient.

23. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows an exponential gradient.

24. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a complimentary error function gradient.

25. (Canceled)

REMARKS

Applicant has carefully reviewed the non-final Office Action of December 20, 2012 (“Office Action”) and in response thereto states as follows:

The Office Action maintains a rejection pursuant to 35 U.S.C. §112, first paragraph, and in particular states that, because “movement of minority carriers is affected by multiple forces and fields ... it does not appear that simply the presence of ‘a unidirectional drift field’ in itself can achieve ‘drawing all minority carriers from said surface layer to said substrate.’” Office Action at ¶3.

Applicant respectfully disagrees with this position because (as previously argued by Applicant) a unidirectional drift (electric) field necessarily affects all the present minority carriers in the same way – moving all minority carriers in the same direction because of the unidirectional drift due to the existence of the electric field. *See* “Physics and Technology of Semiconductor Devices,” A.S. Grove, pp. 224-225, John Wiley and Sons, Inc., New York, 1st Edition 1967 (“This same electric field will then be of such direction as to aid the motion of injected holes. Thus the injected minority carriers will now move not only by diffusion but also by drift due to the existence of this electric field.”). Depending on the particular slope of the graded concentration of dopant, all minority carriers are either swept “down” (from the surface layer to the substrate) or “up” (from the substrate to the surface layer). *See* Applicant’s Figs. 5(b) and 5(c).

The Office Action also states that “such a unidirectional drift field may attempt to apply a force on all minority carriers in a specific direction, it does not appear to ensure (without knowing other parameters of the device) that it will draw ‘all’ minority carriers...” Yet, this argument appears to not consider that the graded dopant concentration itself creates a “built-in”

electrical field that forces the movement of carriers into a particular direction, whereby the “direction” of the electrical field and the resulting direction of the carrier movement depends solely on the slope of the graded concentration of dopant. With regard to the existence of a “built-in” electric field created by a graded dopant density, *see*, e.g., Jastrzebski (US 4,481,522) col. 5, lines 11-13 (cited in Office Action). Applicant respectfully submits that this inherent “built-in” unidirectional electric field is the additional parameter for ensuring that all minority carriers are being moved in one direction and which parameter the Office Action deemed to be missing from the disclosure.

However, without conceding Applicant’s position on this issue, Applicant has further amended claims 10 and 18 to overcome the rejection pursuant to 35 U.S.C. 112, first paragraph. In particular, Applicant has removed the word “all” from the rejected claim language which now reads: “unidirectional electric drift field to aid the movement of minority carriers ...” This claim language is supported at least by Applicant’s disclosure in paragraph 11 and original claim 6.

Independent claims 10 and 18 stand rejected as obvious in view of the combined teachings of Kamins (US 4,160,985) of prior record in view of Jastrzebski (US 4,481,522) and Bamji (US 2002/0084430) of prior record. Kamins discloses a photosensing device in which selective doping of a semiconductor substrate of the device produces electric fields in the substrate which accelerate photogenerated charge carriers toward or away from the surface of the device. Abstract, Fig. 3. As the Office Action acknowledges, Kamins does not teach that the electric drift field is a “unidirectional electric drift field.”

Jastrzebski discloses three-phase charge-coupled device (CCD) imagers having unidirectional electric drift fields in their semiconductive substrates to improve the operation of the CCD (*see* e.g., col. 1, lines 5-8, col 2, lines 62-64, col. 3, lines 20-52 and Fig. 1a). Jastrzebski

describes the three-phase clocking signals as follows:

Electrodes 13 and 16 are shown connected to receive a first phase ϕ_1 of the three-phase clocking signals; electrodes 14 and 17, to receive a second phase ϕ_2 of those signals; and electrodes 15 and 18, to receive a third phase ϕ_3 of those signals. The successive application of the clocking signals ϕ_1 , ϕ_2 , and ϕ_3 in order of their ordinal number subscripts will, as known, cause shift of charge packets in potential wells induced under the electrodes in a rightward direction on each clocking signal transition. These potential wells are associated with the charge depletion regions induced below the electrodes receiving relatively positive clocking signal phases. In FIG. 1 the depletion regions are shown in dashed outline being induced under electrode pairs 13, 14 and 16, 17 presumed to be receiving ϕ_1 , ϕ_2 clock voltages relatively positive to the ϕ_3 clock voltage applied to electrodes 15 and 18.

(Jastrzebski, Col. 3, lines 20-36, underlines added).

As the underlined text above indicates, the application of clocking signals causes a shift of charge packets in the regions directly underneath the electrodes which causes a change of value of the unidirectional electric drift field located directly underneath the electrodes. Unlike the capacitor electrodes/gates in a CMOS image sensor, which have a fixed potential, the electrodes/gates in a CCD shift register do not have a fixed potential. As made clear in Jastrzebski, successive application of clocked signals effectively creates multiple electrical fields underneath the gates with varying electric values (potentials), or at least, arguably, one dynamic (varying with time) unidirectional electric field with varying electric (values) potentials. That is so because the electric field described in Jastrzebski is influenced by at least two factors. First, ϕ_1 , ϕ_2 and ϕ_3 “swing” back and forth (shift) their charge and therefore modulate the electric field created by the graded dopant concentration in the substrate. Second, this modulation disturbs the electric field and affects the effectiveness of the electric field to aid the movement of carriers in a single desired direction. Because a CMOS image sensor only has electrodes/gates with a fixed potential, there is no modulation of the electric unidirectional drift field.

Consequently, Applicant's claimed CMOS semiconductor device includes a single static (time-invariant) unidirectional electric drift field.

Applicant has amended claims 10 and 18 to better distinguish over the cited prior art by claiming "a graded concentration of dopants extending between said surface layer and said substrate to create and maintain a single static unidirectional electric drift field to aid the movement of minority carriers."

Bamji discloses a method to measure distance or brightness using a CMOS sensor. The most recent office action cites Bamji against claim 10 for the proposition that integrated circuit structures with photo detectors may be arrays of CMOS devices. However, Applicant respectfully submits that this disclosure is moot in view of the above recited shortcomings in the disclosure of Kamins and Jastrzebski and in view of Applicant's additional amendments to claims 10 and 18.

Claims 11-16 depend on claim 10 and for at least the same reason that claim 10 is patentable over the cited prior art, claims 11-16 are patentable as well. Claims 19-24 depend on claim 18 and for at least the reasons that claim 18 is patentable over the cited prior art, claims 19-24 are patentable as well.

CONCLUSION

Applicant respectfully submits that in view of the amendments made to the claims and the discussion set forth herein, this application is now in condition for allowance. However, should Examiner be of the opinion that further amendment or response is required; Applicant encourages Examiner to contact the undersigned attorney at the telephone number set forth below. The Commissioner is authorized to charge any additional fees or deficiencies or credit any overpayments to Eugene M. Cummings, P.C., Deposit Account No. **50-4199**, with reference to attorney docket number (0299-0001.01).

Respectfully submitted,

By: 
David M. Mundt, Reg. No. 41,207

Law Offices of Eugene M. Cummings, P.C.
1 N. Wacker
Suite 4130
Chicago, Illinois 60606

Telephone: (312) 984-0144
Facsimile: (312) 984-0146

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.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 0299-0001.01																								
Application Number 11/622496	Filed 01/12/2007																								
For SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS																									
Art Unit 2892	Examiner Ajay Arora																								
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application. The requested extension and fee are as follows (check time period desired and enter the appropriate fee below): <table style="width: 100%; border-collapse: collapse;"><thead><tr><th></th><th style="text-align: center;"><u>Fee</u></th><th style="text-align: center;"><u>Small Entity Fee</u></th><th></th></tr></thead><tbody><tr><td>☒ One month (37 CFR 1.17(a)(1))</td><td style="text-align: center;">\$150</td><td style="text-align: center;">\$75</td><td style="text-align: right;">\$ <u>75.00</u></td></tr><tr><td>☐ Two months (37 CFR 1.17(a)(2))</td><td style="text-align: center;">\$560</td><td style="text-align: center;">\$280</td><td style="text-align: right;">\$ _____</td></tr><tr><td>☐ Three months (37 CFR 1.17(a)(3))</td><td style="text-align: center;">\$1270</td><td style="text-align: center;">\$635</td><td style="text-align: right;">\$ _____</td></tr><tr><td>☐ Four months (37 CFR 1.17(a)(4))</td><td style="text-align: center;">\$1980</td><td style="text-align: center;">\$990</td><td style="text-align: right;">\$ _____</td></tr><tr><td>☐ Five months (37 CFR 1.17(a)(5))</td><td style="text-align: center;">\$2690</td><td style="text-align: center;">\$1345</td><td style="text-align: right;">\$ _____</td></tr></tbody></table> ☒ Applicant claims small entity status. See 37 CFR 1.27. ☐ A check in the amount of the fee is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☐ The Director has already been authorized to charge fees in this application to a Deposit Account. ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>50-4199</u>. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. I am the ☐ applicant/inventor. ☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96). ☒ attorney or agent of record. Registration Number <u>41,207</u> ☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____ <u>/David M. Mundt/</u> Signature <u>David M. Mundt</u> Typed or printed name <u>April 17, 2012</u> Date <u>312-984-0144</u> Telephone Number			<u>Fee</u>	<u>Small Entity Fee</u>		☒ One month (37 CFR 1.17(a)(1))	\$150	\$75	\$ <u>75.00</u>	☐ Two months (37 CFR 1.17(a)(2))	\$560	\$280	\$ _____	☐ Three months (37 CFR 1.17(a)(3))	\$1270	\$635	\$ _____	☐ Four months (37 CFR 1.17(a)(4))	\$1980	\$990	\$ _____	☐ Five months (37 CFR 1.17(a)(5))	\$2690	\$1345	\$ _____
	<u>Fee</u>	<u>Small Entity Fee</u>																							
☒ One month (37 CFR 1.17(a)(1))	\$150	\$75	\$ <u>75.00</u>																						
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☐ Four months (37 CFR 1.17(a)(4))	\$1980	\$990	\$ _____																						
☐ Five months (37 CFR 1.17(a)(5))	\$2690	\$1345	\$ _____																						
NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below. ☒ Total of <u>1</u> forms are submitted.																									

This collection of information is required by 37 CFR 1.136(a). 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 1.11 and 1.14. This collection is estimated to take 6 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.

Electronic Patent Application Fee Transmittal

Application Number:	11622496			
Filing Date:	12-Jan-2007			
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS			
First Named Inventor/Applicant Name:	G.R. Mohan Rao			
Filer:	David Michael Mundt/Francisca Hubbard			
Attorney Docket Number:	0299-0001.01			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
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:				
Extension-of-Time:				
Extension - 1 month with \$0 paid	2251	1	75	Dell Ex. 1016 75

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				75

Electronic Acknowledgement Receipt

EFS ID:	12560817
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	70653
Filer:	David Michael Mundt/Francisca Hubbard
Filer Authorized By:	David Michael Mundt
Attorney Docket Number:	0299-0001.01
Receipt Date:	17-APR-2012
Filing Date:	12-JAN-2007
Time Stamp:	15:20:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$75
RAM confirmation Number	1922
Deposit Account	504199
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 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	Amendment/Req. Reconsideration-After Non-Final Reject	AmendmentE.pdf	694682	no	10
			df7ff0ed5b70459b2c714986b91a259d9e26330c		

Warnings:**Information:**

2	Extension of Time	ExtOfTime.pdf	132721	no	1
			dee7fa1a4348d38dd841d010681af572790a8c55		

Warnings:**Information:**

3	Fee Worksheet (SB06)	fee-info.pdf	30313	no	2
			837f11c98ef38348acd8babb3fbf17ca31904272		

Warnings:**Information:**

Total Files Size (in bytes):			857716
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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.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/622,496

01/12/2007

G.R. Mohan Rao

0299-0001.01

3086

70653

7590

08/13/2012

LAW OFFICES OF EUGENE M. CUMMINGS, P.C.
ONE NORTH WACKER DRIVE
SUITE 4130
CHICAGO, IL 60606

EXAMINER

ARORA, AJAY

ART UNIT

PAPER NUMBER

2892

MAIL DATE

DELIVERY MODE

08/13/2012

PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	11/622,496	RAO, G.R. MOHAN	
	Examiner	Art Unit	
	AJAY K. ARORA	2892	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 17 April 2012.
- 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) 10-16 and 18-24 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) 10-16 & 18-24 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

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).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
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) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) ☐ Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 10-16 and 18-24 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for “to create a unidirectional electric drift field” (see lines 8-9 of base claims 10 and 18) , does not reasonably provide enablement for “to create and maintain a single static unidirectional electric drift field” (emphasis added, as recited in lines 8-9 of the currently amended claims 10 and 18). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Applicant has not pointed out to the part of the specification that supports the above amendment. Also, in view of arguments that applicant has presented on pages 8-9 of applicant’s response of 04/17/2012 to argue that Jastrzebski reference does not read on “to create and maintain a single static unidirectional electric drift field”, it is not clear how any of applicant’s Figures conveys the above limitation any more than Figure 1 of Jastrzebski.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10-11, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamins (US 4,160,985) of prior record, hereinafter Kamins, in view Jastrzebski (US 4,481,522) of prior record, hereinafter Jastrzebski, and further in view of Bamji (US 2002/0084430) of prior record, hereinafter Bamji.

Regarding claim 10, Kamins (refer to Figures 2-3) teaches a semiconductor device comprising:

- a surface layer (23);
- s substrate (19);
- an active region (comprising photodiodes 11, 13, 15 and 17 are formed), disposed on one surface (i.e. upper surface in Figure 2) of said surface layer (23); and
- a single drift layer (21) disposed between the other surface (i.e. lower surface in Figure 2) of said surface layer (23) and said substrate (19), said drift layer having a graded concentration of dopants (see Figure 3) extending between said surface layer and said substrate, which is capable of creating and maintaining a single static electric

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drift field (because the drift field is created by graded concentration of dopants which does not change over time; i.e. it is “single static”). Also see Col. 2, lines 15-16; Col. 2, line 64 - Col. 3, line 2; Col. 1, lines 38-46; and Col. 3, lines 8-11).

Kamins does not teach that the drift field is a “unidirectional drift field” that is capable of aiding the movement of minority carriers in a given direction. Jastrzebski (refer to Figures 1a-b) teaches a semiconductor device in which a drift field utilized is a “unidirectional drift field” so as aid movement of minority carriers in a specific direction; i.e. direction of the unidirectional drift field (Col. 5, lines 17-20 and 25-30). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify Kamins so that the drift field is a unidirectional drift field that is capable of aiding the movement of minority carriers in a given direction. The ordinary artisan would have been motivated to modify Kamins for at least the purpose of optimizing the performance of any device that may be used in conjunction with transistors (as part of an integrated circuit) that may require drawing of minority carriers in a specific direction to improve performance (see Jastrzebski, Col. 2, lines 22-42).

Further, whereas Kamins teaches photosensing elements like photodiodes and associated integrated circuit structures (Col. 2, lines 56-59), Kamini does not teach that the semiconductor device is a “CMOS” semiconductor device and with the active region including “a source and a drain”. Bamji teaches that integrated circuit structures with photo detectors such as photodiodes may be arrays of CMOS devices (page 1, para 0004) wherein active regions may include a source and a drain (page 9, para 0098, 1st sentence). It would have been obvious to one of ordinary skills in the art at the time of

the invention to modify Kamins so that the semiconductor device is a CMOS semiconductor device and with the active region includes a source and a drain. The ordinary artisan would have been motivated to modify Kamins for at least the purpose of using CMOS technology that is suitable for field effect devices with source and drain regions, as CMOS technology enables integration of images sensors on a single integrated circuit and reduction in power consumption (see Bamji, page 1, para 0002).

It is noted that claim 10 is a product claim but recites a method therein (i.e. “create and maintain a single static unidirectional electric drift field”; emphasis added). Therefore, claim 10 (same applies to claim 18) amounts to a product by process claim. *“Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.* To the extent the limitation of “create and maintain a single static unidirectional electric drift field” applies to the electric drift field inherently created by the claimed “graded concentration of dopants”, it conveys a structural limitation. However, if the above implies absence of other electric fields (see applicant's arguments on page 8 of applicant's response of 4/17/2012), that does not constitute a structural limitation but rather method steps.

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Claim 18 is similar to claim 10 (and hence the same rejection applies) except for the direction of drawing minority carriers. However, Kamins also teaches the direction of drawing minority carriers as in claim 18; i.e. drawing minority carriers (Col. 2, lines 15-16) may also be from said substrate to said surface layer (Col. 1, lines 38-46 and Col. 3, lines 6-18).

Regarding claims 11 and 19, Kamins teaches that said drift layer (21) is a deeply implanted layer (see Figures 2-3; also see Col. 2, lines 36-42).

5. Claims 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamins, Jastrzebski and Bamji as applied to claims 10 and 18 above above, and further in view of Baliga (US 2002/0056883) of prior record, hereinafter Baliga.

Regarding claims 12 and 20, Kamins (refer to Figures 2-3) teaches substantially the claimed structure but does not teach that the drift layer is an "epitaxial" layer. Baliga (US 2002/0056883) teaches that it is known in the art that a drift layer with graded dopant concentration may be an epitaxial layer (page 2, para 0008, 2nd and 3rd sentences and page 9, para 0063, especially 7th – 9th sentences). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify Kamins so that the drift layer is an epitaxial layer. The ordinary artisan would have been motivated to modify Kamins for at least the purpose of using a layer that has a uniform crystal structure

which makes electrical properties more predictable and can also act as a base for further epitaxial layers in which devices may be formed.

6. Claims 13-16 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamins, Jastrzebski and Bamji as applied to claims 10 and 18 above, and further in view of Fujimoto (2002/0102783) of prior record, hereinafter Fujimoto; and Ishaque (US 5,517,052) of prior record, hereinafter Ishaque.

Regarding claims 13-16 and 21-24, Kamins (refer to Figure 3) teaches substantially the claimed structure but does not specifically state if the gradient is "linear", "quasi-linear", "exponential"; or "complimentary error function". Fujimoto teaches that an impurity region having a concentration gradient may have a profile that is linear, exponential, "or a combination thereof (page 3, para 0038). Further, Ishaque teaches that doping gradient is typically complementary error function or Gaussian if a deep diffusion process is used (Col. 3, line 49 to Col. 4, line 14). Given that Kamins teaches that a desired electric field is formed as a result of the gradient in doping (thus suggesting the gradient affects profile of the field) and various profiles of concentration gradient are known (as explained above in view of Fujimoto and Ishaque), it would have been obvious to one of ordinary skills in the art at the time of the invention to modify Kamins so that the gradient is linear, exponential; or alternatively other profiles such as "quasi-linear" or "complimentary error function", which are essentially combinations of linear and exponential profiles. The ordinary artisan would have been motivated to modify

Kamins for at least the purpose of creating a specific profile of the electric field that is suitable for directing the minority carriers in a specific direction.

Response to Arguments

7. Applicant's arguments with respect to 35 USC 112, 1st paragraph rejection of claims 10 and 18 related to "drawing all minority carriers from said substrate to said surface layer" have been considered but are moot because the arguments do not apply in view of the amendment to the claims. However, the amendments result in new 35 USC 112, 1st paragraph rejections, which have been outlined above.

8. Applicant's arguments with respect to 35 USC 103(a) rejections of claims 10 and 18 (see 2nd last paragraph of page 7 to page 9) have been considered but they are not persuasive.

9. On page 7, last paragraph to page 9, 1st paragraph of applicant's response, applicant argues that because Jastrzebski reference teaches "clocking signals" in addition to the drift field created by graded dopant concentration, it does not read on "create and maintain a single static unidirectional electric drift field". This argument is not persuasive. This argument is addressed in the revised rejection of claims 10 and 18, which now points out product-by-process limitations.

Conclusion

10. 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.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY K. ARORA whose telephone number is (571)272-8347. The examiner can normally be reached on Mon through Fri, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2892

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJAY K. ARORA/
Primary Examiner, Art Unit 2892

Search Notes 	Application/Control No. 11622496	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY K ARORA	Art Unit 2892

SEARCHED			
Class	Subclass	Date	Examiner
257	655	12/16/2011	AKA

SEARCH NOTES		
Search Notes	Date	Examiner
Revised EAST search history report	12/16/2011	AKA
Revised EAST search history report	8/10/2012	AKA

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

	/A. K. A./ Primary Examiner.Art Unit 2892
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S94	0	(single WITH static WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/10 00:21
S96	1	(unidirectional WITH field WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/10 00:24

8/ 10/ 2012 1:40:03 AM
C:\ Users\ aarora\ Documents\ EAST\ Workspaces\ 11622496.wsp

<i>Index of Claims</i> 	Application/Control No. 11622496	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY K ARORA	Art Unit 2892

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

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	08/02/2010	04/10/2011	12/16/2011	08/10/2012				
	1	-	-	-	-				
	2	-	-	-	-				
	3	-	-	-	-				
	4	-	-	-	-				
	5	-	-	-	-				
	6	-	-	-	-				
	7	-	-	-	-				
	8	-	-	-	-				
	9	-	-	-	-				
	10	✓	✓	✓	✓				
	11	✓	✓	✓	✓				
	12	✓	✓	✓	✓				
	13	✓	✓	✓	✓				
	14	✓	✓	✓	✓				
	15	✓	✓	✓	✓				
	16	✓	✓	✓	✓				
	17	✓	-	-	-				
	18	✓	✓	✓	✓				
	19	✓	✓	✓	✓				
	20	✓	✓	✓	✓				
	21	✓	✓	✓	✓				
	22	✓	✓	✓	✓				
	23	✓	✓	✓	✓				
	24	✓	✓	✓	✓				
	25	✓	-	-	-				

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 11/622,496
Confirmation No. : 3086
Inventor : G. R. Mohan Rao
Filed : January 12, 2007
TC/A.U. : 2892
Examiner : Ajay Arora
Title : SEMICONDUCTOR DEVICES WITH GRADED
DOPANT REGIONS
Docket No. : 0299-0001.01

RESPONSE PURSUANT TO 37 CFR 1.114

AMENDMENT F

Sir:

In response to the final Office Action of August 13, 2012, Applicant submits the following amendment:

Claims. Amendments to the claims begin on page 2 of this amendment.

Remarks. Remarks begin on page 6 of this amendment.

LISTING OF CLAIMS

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

Claims:

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)

10. (Currently Amended) A CMOS Semiconductor device comprising:

a surface layer;

a substrate;

an active region including a source and a drain, disposed on one surface of said surface layer; and

a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first to create and maintain a single static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate; and

at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate.

11. (Original) The CMOS Semiconductor device of claim 10 wherein said drift layer is a deeply-implanted layer.

12. (Original) The CMOS Semiconductor device of claim 10 wherein said drift layer is an epitaxial layer.

13. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a linear gradient.

14. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a quasi-linear gradient.

15. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows an exponential gradient.

16. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a complimentary error function gradient.

17. (Canceled)

18. (Currently amended) A CMOS Semiconductor device comprising:

a surface layer;

a substrate;

an active region including a source and a drain, disposed on one surface of said surface layer; and

a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first to create and maintain a single static unidirectional electric drift field to aid the movement of minority carriers from said substrate to said surface layer; and

at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the

movement of minority carriers from said substrate to said surface layer.

19. (Original) The CMOS Semiconductor device of claim 18 wherein said drift layer is a deeply-implanted layer.

20. (Original) The CMOS Semiconductor device of claim 18 wherein said drift layer is an epitaxial layer.

21. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a linear gradient.

22. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a quasi-linear gradient.

23. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows an exponential gradient.

24. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a complimentary error function gradient.

25. (Canceled)

REMARKS

Applicant has carefully reviewed the final Office Action of August 13, 2012 (“Office Action”) and in response thereto states as follows:

Claims 10-16 and 18-24 stand rejected pursuant to 35 U.S.C. 112, first paragraph because Applicant’s specification does not enable “to create and maintain a single static unidirectional electric drift field.” Office Action at ¶2. Without conceding the merits of this rejection, Applicant has further amended base claims 10 and 18 to overcome the rejection pursuant to 35 U.S.C. 112, first paragraph. In particular, Applicant has removed any reference to the terms “create,” “maintain” and “single.” With regard to the remaining term “static,” Applicant respectfully notes that prior art reference Kamins (US 4,160,985), just like Applicant, discloses the presence of a “static” drift field, “because the drift field is created by graded concentration of dopants which does not change over time.” See Office Action ¶4 p.4 lines 1-3, further citing to Kamins, Col. 2, lines 15-16; Col. 2, line 64 – Col. 3, line 2; Col. 1, lines 38-46; and Col. 3, lines 8-11.

Claims 10-11 and 18-19 stand rejected as obvious in view of the combined teachings of Kamins (of prior record) in view of Jastrzebski (US 4,481,522) (of prior record) and Bamji (US 2002/0084430) (of prior record). Applicant has previously summarized the disclosure of these references. Without conceding any of Applicant’s positions, Applicant has further amended independent claims 10 and 18 to better distinguish over the cited prior art by claiming “at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers.” Applicant respectfully submits that neither Kamins nor Jastrzebski, disclose the above limitation.

Finally, Applicant has further amended claims 10 and 18 to address the Examiner’s

position that claims 10 and 18 as previously submitted are product by process claims. See Office

Action at p.5. In particular, Applicant has amended claim 10 as follows:

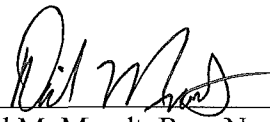
“a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first ~~to create and maintain a single~~ static unidirectional electric drift field to aid the movement of minority carriers from said substrate to said surface layer ...”

Claims 11-16 depend on claim 10 and for at least the same reason that claim 10 is patentable over the cited prior art, claims 11-16 are patentable as well. Claims 19-24 depend on claim 18 and for at least the reasons that claim 18 is patentable over the cited prior art, claims 19-24 are patentable as well.

CONCLUSION

Applicant respectfully submits that in view of the amendments made to the claims and the discussion set forth herein, this application is now in condition for allowance. However, should Examiner be of the opinion that further amendment or response is required; Applicant encourages Examiner to contact the undersigned attorney at the telephone number set forth below. The Commissioner is authorized to charge any additional fees or deficiencies or credit any overpayments to Eugene M. Cummings, P.C., Deposit Account No. **50-4199**, with reference to attorney docket number (0299-0001.01).

Respectfully submitted,

By: 
David M. Mundt, Reg. No. 41,207

Law Offices of Eugene M. Cummings, P.C.
1 N. Wacker
Suite 4130
Chicago, Illinois 60606

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Facsimile: (312) 984-0146

Electronic Acknowledgement Receipt

EFS ID:	13981170
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	70653
Filer:	David Michael Mundt/Francisca Hubbard
Filer Authorized By:	David Michael Mundt
Attorney Docket Number:	0299-0001.01
Receipt Date:	15-OCT-2012
Filing Date:	12-JAN-2007
Time Stamp:	11:20:04
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	Amendment After Final	AmendmentF.pdf	473206 200b0f61139362e54ef9b9229051b8cc71a7b5e7	no	8

Warnings:

Information:

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 11/622,496		Filing Date 01/12/2007		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☒ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=		X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 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		TOTAL			
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	10/15/2012	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	= 0	X \$31 =	0		X \$	=
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 8	= 0	X \$125 =	0		X \$	=
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
						TOTAL ADD'L FEE	0		TOTAL ADD'L FEE	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=		X \$	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=		X \$	=
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** 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.										

Legal Instrument Examiner:
/RAMONA WILSON/

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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/622,496

01/12/2007

G.R. Mohan Rao

0299-0001.01

3086

70653

7590

10/24/2012

LAW OFFICES OF EUGENE M. CUMMINGS, P.C.
ONE NORTH WACKER DRIVE
SUITE 4130
CHICAGO, IL 60606

EXAMINER

ARORA, AJAY

ART UNIT

PAPER NUMBER

2892

MAIL DATE

DELIVERY MODE

10/24/2012

PAPER

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.

Advisory Action Before the Filing of an Appeal Brief	Application No. 11/622,496	Applicant(s) RAO, G.R. MOHAN
	Examiner AJAY K. ARORA	Art Unit 2892

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

THE REPLY FILED 15 October 2012 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:

a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.

b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires _____ months from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because

a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);

b) ☐ They raise the issue of new matter (see NOTE below);

c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: The new limitations of base claims 10 requiring "at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate" (see last 3 lines of claim 10). Amended base claim 18 also recites similar new limitations (see last 3 lines of claim 18). (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).

5. ☐ Applicant's reply has overcome the following rejection(s): _____.

6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

7. ☐ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).

9. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.

12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08) Paper No(s). _____

13. ☐ Other: _____.

STATUS OF CLAIMS

14. The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____.

Claim(s) objected to: _____.

	/AJAY K. ARORA/ Primary Examiner, Art Unit 2892
--	--

DO NOT ENTER: /A.A./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 11/622,496
Confirmation No. : 3086
Inventor : G. R. Mohan Rao
Filed : January 12, 2007
TC/A.U. : 2892
Examiner : Ajay Arora
Title : SEMICONDUCTOR DEVICES WITH GRADED
DOPANT REGIONS
Docket No. : 0299-0001.01

RESPONSE PURSUANT TO 37 CFR 1.114

AMENDMENT F

Sir:

In response to the final Office Action of August 13, 2012, Applicant submits the following amendment:

Claims. Amendments to the claims begin on page 2 of this amendment.

Remarks. Remarks begin on page 6 of this amendment.

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

**Request
for
Continued Examination (RCE)
Transmittal**

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	11/622496
Filing Date	01/12/2007
First Named Inventor	G.R. Mohan Rao
Art Unit	2892
Examiner Name	Ajay Arora
Attorney Docket Number	0299-0001.01

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.

Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 CFR 1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

ii. ☐ Other _____

b. ☒ Enclosed

i. ☒ Amendment/Reply

iii. ☐ Information Disclosure Statement (IDS)

ii. ☐ Affidavit(s)/ Declaration(s)

iv. ☐ Other _____

2. **Miscellaneous**

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a

a. ☐ period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

b. ☐ Other _____

3. **Fees**

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

The Director is hereby authorized to charge the following fees any underpayment of fees or credit any overpayments to

a. ☒ Deposit Account No. 50-4199.

i. ☒ RCE fee required under 37 CFR 1.17(e)

ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)

iii. ☐ Other _____

b. ☐ Check in the amount of \$ _____ enclosed

c. ☐ Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/David M. Mundt/	Date	November 13, 2012
Name (Print/Type)	David M. Mundt	Registration No.	41,207

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature	<i>Francisca M. A. Hubbard</i> <i>Electronic Filing</i>		
Name (Print/Type)	Francisca M. A. Hubbard	Date	November 13, 2012

This collection of information is required by 37 CFR 1.114. 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 1.11 and 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: Mail Stop RCE, 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 11/622,496
Confirmation No. : 3086
Inventor : G. R. Mohan Rao
Filed : January 12, 2007
TC/A.U. : 2892
Examiner : Ajay Arora
Title : SEMICONDUCTOR DEVICES WITH GRADED
DOPANT REGIONS
Docket No. : 0299-0001.01

REQUEST FOR CONTINUED EXAMINATION

AMENDMENT F

Sir:

In response to the Advisory Action of October 24, 2012, Applicant submits the following amendment:

Claims. Amendments to the claims begin on page 2 of this amendment.

Remarks. Remarks begin on page 6 of this amendment.

LISTING OF CLAIMS

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

Claims:

1. (Canceled)

2. (Canceled)

3. (Canceled)

4. (Canceled)

5. (Canceled)

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Canceled)

10. (Currently Amended) A CMOS Semiconductor device comprising:

a surface layer;

a substrate;

an active region including a source and a drain, disposed on one surface of said surface layer; and

a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first to create and maintain a single static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate; and

at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate.

11. (Original) The CMOS Semiconductor device of claim 10 wherein said drift layer is a deeply-implanted layer.

12. (Original) The CMOS Semiconductor device of claim 10 wherein said drift layer is an epitaxial layer.

13. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a linear gradient.

14. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a quasi-linear gradient.

15. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows an exponential gradient.

16. (Original) The CMOS Semiconductor device of claim 10 wherein said graded concentration follows a complimentary error function gradient.

17. (Canceled)

18. (Currently amended) A CMOS Semiconductor device comprising:

a surface layer;

a substrate;

an active region including a source and a drain, disposed on one surface of said surface layer; and

a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first ~~to create and maintain a~~ single static unidirectional electric drift field to aid the movement of minority carriers from said substrate to said surface layer; and

at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the

movement of minority carriers from said substrate to said surface layer.

19. (Original) The CMOS Semiconductor device of claim 18 wherein said drift layer is a deeply-implanted layer.

20. (Original) The CMOS Semiconductor device of claim 18 wherein said drift layer is an epitaxial layer.

21. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a linear gradient.

22. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a quasi-linear gradient.

23. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows an exponential gradient.

24. (Original) The CMOS Semiconductor device of claim 18 wherein said graded concentration follows a complimentary error function gradient.

25. (Canceled)

REMARKS

Applicant has carefully reviewed the Advisory Action of October 24, 2012. In addition, Applicant incorporates herein by reference the October 15, 2012 Response to the Final Office Action and states as follows:

Claims 10-16 and 18-24 stand rejected pursuant to 35 U.S.C. 112, first paragraph because Applicant's specification does not enable "to create and maintain a single static unidirectional electric drift field." Office Action at ¶2. Without conceding the merits of this rejection, Applicant has further amended base claims 10 and 18 to overcome the rejection pursuant to 35 U.S.C. 112, first paragraph. In particular, Applicant has removed any reference to the terms "create," "maintain" and "single." With regard to the remaining term "static," Applicant respectfully notes that prior art reference Kamins (US 4,160,985), just like Applicant, discloses the presence of a "static" drift field, "because the drift field is created by graded concentration of dopants which does not change over time." See Office Action ¶4 p.4 lines 1-3, further citing to Kamins, Col. 2, lines 15-16; Col. 2, line 64 – Col. 3, line 2; Col. 1, lines 38-46; and Col. 3, lines 8-11.

Claims 10-11 and 18-19 stand rejected as obvious in view of the combined teachings of Kamins (of prior record) in view of Jastrzebski (US 4,481,522) (of prior record) and Bamji (US 2002/0084430) (of prior record). Applicant has previously summarized the disclosure of these references. Without conceding any of Applicant's positions, Applicant has further amended independent claims 10 and 18 to better distinguish over the cited prior art by claiming "at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers." Applicant respectfully submits that neither Kamins nor Jastrzebski, disclose the above limitation.

Finally, Applicant has further amended claims 10 and 18 to address the Examiner's position that claims 10 and 18 as previously submitted are product by process claims. See Office Action at p.5. In particular, Applicant has amended claim 10 as follows:

“a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate, said drift layer further having a first to create and maintain a single static unidirectional electric drift field to aid the movement of minority carriers from said substrate to said surface layer ...”

Claims 11-16 depend on claim 10 and for at least the same reason that claim 10 is patentable over the cited prior art, claims 11-16 are patentable as well. Claims 19-24 depend on claim 18 and for at least the reasons that claim 18 is patentable over the cited prior art, claims 19-24 are patentable as well.

CONCLUSION

Applicant respectfully submits that in view of the amendments made to the claims and the discussion set forth herein, this application is now in condition for allowance. However, should Examiner be of the opinion that further amendment or response is required; Applicant encourages Examiner to contact the undersigned attorney at the telephone number set forth below. The Commissioner is authorized to charge any additional fees or deficiencies or credit any overpayments to Eugene M. Cummings, P.C., Deposit Account No. **50-4199**, with reference to attorney docket number (0299-0001.01).

Respectfully submitted,

Date: November 13, 2012

By: /David M. Mundt/
David M. Mundt, Reg. No. 41,207

Law Offices of Eugene M. Cummings, P.C.
1 North Wacker Drive
Suite 4130
Chicago, Illinois 60606

Telephone: (312) 984-0144
Facsimile: (312) 984-0146

Electronic Patent Application Fee Transmittal

Application Number:	11622496			
Filing Date:	12-Jan-2007			
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS			
First Named Inventor/Applicant Name:	G.R. Mohan Rao			
Filer:	David Michael Mundt/Francisca Hubbard			
Attorney Docket Number:	0299-0001.01			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
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:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for continued examination	2801	1	465	465
Total in USD (\$)				465

Electronic Acknowledgement Receipt

EFS ID:	14209126
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	70653
Filer:	David Michael Mundt/Francisca Hubbard
Filer Authorized By:	David Michael Mundt
Attorney Docket Number:	0299-0001.01
Receipt Date:	13-NOV-2012
Filing Date:	12-JAN-2007
Time Stamp:	09:12:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$465
RAM confirmation Number	17230
Deposit Account	504199
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 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	Request for Continued Examination (RCE)	RCE.pdf	151110 669bd13352097826785b6b507e921bb2d21f3ba0	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Amendment After Final	AmendmentF.pdf	726410 c3fe02a1a6fa54c984a7668cd2344d6e4c426b1f	no	8
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30433 1669af2e315b53327c32b94c85ccbe287af2f2ce	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			907953		
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.					

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 11/622,496		Filing Date 01/12/2007		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☒ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=	OR	X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 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.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	11/13/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	=	0	OR	X \$	=	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 8	=	0	OR	X \$	=	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE		
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=		OR	X \$	=	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		OR	X \$	=	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** 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.										

Legal Instrument Examiner:
/LAJUAN HICKSON/

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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

70653 7590 12/12/2012
LAW OFFICES OF EUGENE M. CUMMINGS, P.C.
ONE NORTH WACKER DRIVE
SUITE 4130
CHICAGO, IL 60606

EXAMINER

ARORA, AJAY

ART UNIT

PAPER NUMBER

2892

DATE MAILED: 12/12/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

11/622,496

01/12/2007

G.R. Mohan Rao

0299-0001.01

3086

TITLE OF INVENTION: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$885	\$300	\$0	\$1185	03/12/2013

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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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 and an extra copy of the form should be submitted. 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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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.

70653 7590 12/12/2012
LAW OFFICES OF EUGENE M. CUMMINGS, P.C.
ONE NORTH WACKER DRIVE
SUITE 4130
CHICAGO, IL 60606

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/622,496 01/12/2007 G.R. Mohan Rao 0299-0001.01 3086

TITLE OF INVENTION: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional YES \$885 \$300 \$0 \$1185 03/12/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
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ARORA, AJAY 2892 257-371000

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/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form 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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information 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 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, 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.

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UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/622,496	01/12/2007	G.R. Mohan Rao	0299-0001.01	3086

70653 7590 12/12/2012
LAW OFFICES OF EUGENE M. CUMMINGS, P.C.
ONE NORTH WACKER DRIVE
SUITE 4130
CHICAGO, IL 60606

EXAMINER

ARORA, AJAY

ART UNIT	PAPER NUMBER
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2892

DATE MAILED: 12/12/2012

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

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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.	Applicant(s)	
	11/622,496	RAO, G.R. MOHAN	
	Examiner	Art Unit	
	AJAY K. ARORA	2892	

-- 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 11/13/12.
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 10-16 & 18-24. 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).
 - 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)

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. ☐ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____ | <ol style="list-style-type: none"> 5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____ |
|---|---|

/AJAY K. ARORA/
Primary Examiner, Art Unit 2892

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/13/2012 has been entered.

Reasons for Allowance

1. Claims 10-16 and 18-24 are allowed. The following is an examiner's statement of reasons for allowance:

2. Claims 10-16 and 18-24 are allowed because the prior art of record does not teach or suggest, singularly or in combination, at least the limitations of base claim 10 which requires "at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said

Art Unit: 2892

substrate” (see last 3 lines of claim 10). Base claim 18 recites similar limitations (see last 3 lines of claim 18).

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. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY K. ARORA whose telephone number is (571)272-8347. The examiner can normally be reached on Mon through Fri, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2892

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJAY K. ARORA/
Primary Examiner, Art Unit 2892

Search Notes 	Application/Control No. 11622496	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY K ARORA	Art Unit 2892

SEARCHED			
Class	Subclass	Date	Examiner
257	655	12/16/2011	AKA

SEARCH NOTES		
Search Notes	Date	Examiner
Revised EAST search history report	12/16/2011	AKA
Revised EAST search history report	8/10/2012	AKA
Revised EAST search history	11/19/2012	AKA
Inventor search	11/19/2012	AKA
.clm. interference search	11/19/2012	AKA

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
257	655	12/16/2011	AKA

	/A. K. A./ Primary Examiner.Art Unit 2892
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Issue Classification 	Application/Control No. 11622496	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY K ARORA	Art Unit 2892

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
257		655				H	0	1	L	21 / 02 (2006.01.01)								
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
257	611	E33.048																
438	510																	

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

NONE		Total Claims Allowed:	
		14	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/AJAY K ARORA/ Primary Examiner.Art Unit 2892	12/04/2012	1	5b
(Primary Examiner)	(Date)		

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(unidirectional WITH field WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/11/19 14:46
L2	0	(unidirectional WITH field WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/11/19 14:46
L3	0	((GR) near2 (RAO)).INV.	US-PGPUB; USPAT	OR	ON	2012/11/19 14:48
L4	0	((GR) near2 (RAO)).INV.	EPO; JPO; DERWENT	OR	ON	2012/11/19 14:48
L5	0	(("G.R.") near2 (RAO)).INV.	EPO; JPO; DERWENT	OR	ON	2012/11/19 14:49
L6	89	(mohan near2 RAO).INV.	EPO; JPO; DERWENT	OR	ON	2012/11/19 14:49
L7	245	(mohan near2 RAO).INV.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/11/19 14:49
L8	2	l7 and (grad\$3 WITH dop\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/11/19 14:50
S1	2	("20070158790").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/04/08 11:10
S2	58	("20020074585" "20040063288" "4001864" "4347654" "4866000" "5130262" "5213988" "5329144" "5480816" "5496746" "5569612" "5575862" "5797999" "6211028" "6452086" "6472715" "6670544" "6683343" "6696314" "6706550" "6713813" "6737722" "6744117" "6747883" "6753202" "6754093" "6756616" "RE37441").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/04/08 11:19
S3	1096	(graded OR gradation) WITH (dopant OR	US-PGPUB;	OR	ON	2008/04/08

		doping) WITH concentration	USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB			11:47
S4	805	S3 AND ("257" OR "438").clas.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/04/08 11:47
S5	253	(graded OR gradation) WITH (dopant OR doping) WITH concentration WITH (semiconductor OR silicon)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/04/08 11:49
S6	7	S5 SAME (carrier WITH (movement OR mobility))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/04/08 11:51
S7	48	S5 AND (((carrier OR electron OR hole) WITH (movement OR mobility)) SAME ((emitter WITH collector) OR (source WITH drain)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/04/08 11:55
S8	58	("20020074585" "20040063288" "4001864" "4347654" "4866000" "5130262" "5213988" "5329144" "5480816" "5496746" "5569612" "5575862" "5797999" "6211028" "6452086" "6472715" "6670544" "6683343" "6696314" "6706550" "6713813" "6737722" "6744117" "6747883" "6753202" "6754093" "6756616" "RE37441").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/18 12:16
S10	13	S8 AND ("dopant concentration" OR "concentration of dopant")	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/18 12:17
S11	0	S8 AND (dop\$3 WITH (concentrat\$3 OR amount OR quantity) WITH (variable OR varying OR grad\$3)) AND ((doping OR dopant) WITH well) AND ((carrier OR charge) WITH (moving OR movement OR mobile OR mobility))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/18 12:22
S12	1136	(graded OR gradation) WITH (dopant OR doping) WITH concentration	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/18 12:22
S13	86	S12 AND (dop\$3 WITH (concentrat\$3 OR amount OR quantity) WITH (variable OR varying OR grad\$3)) AND ((doping OR dopant) WITH well) AND ((carrier OR	US-PGPUB; USPAT; USOCR; EPO; JPO;	OR	ON	2008/07/18 12:22

		charge) WITH (moving OR movement OR mobile OR mobility))	DERWENT; IBM_TDB			
S14	29	("20020068409" "6303450" "6437406" "6458665" "6483158" "6489223" "6509241").PN. OR ("6743684").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2008/07/18 13:13
S15	34	uniform\$2 WITH dop\$3 WITH drift WITH epitaxial	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:19
S16	2	("5637898").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/07/23 15:26
S17	0	(non-uniform\$2 OR nonuniform\$2 OR grad43 OR grading OR gradient) WITH (dopant OR doping) WITH well WITH carrier WITH (movement OR mobility) WITH ((away WITH active WITH surface) OR (towards WITH substrate))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:40
S18	4	(non-uniform\$2 OR nonuniform\$2 OR grad\$3 OR grading OR gradient) WITH (dopant OR doping) WITH well WITH carrier WITH (movement OR mobility) WITH ((away WITH active WITH surface) OR (towards WITH substrate))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:40
S19	4	("4001864").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/07/23 15:43
S20	58	("20020074585" "20040063288" "4001864" "4347654" "4866000" "5130262" "5213988" "5329144" "5480816" "5496746" "5569612" "5575862" "5797999" "6211028" "6452086" "6472715" "6670544" "6683343" "6696314" "6706550" "6713813" "6737722" "6744117" "6747883" "6753202" "6754093" "6756616" "RE37441").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:57
S21	92	S15 S19 S20	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:58
S22	39	S21 AND ((non-uniform\$2 OR nonuniform\$2 OR grad\$3 OR grading OR gradient) WITH (dopant OR doping))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:58
S23	60	S21 AND well	US-PGPUB; USPAT; USOCR;	OR	ON	2008/07/23 15:59

			EPO; JPO; DERWENT; IBM_TDB			
S24	39	S22 AND well	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 15:59
S25	2	S22 AND (well WITH carrier WITH (movement OR mobility) WITH ((away WITH active WITH surface) OR (towards WITH substrate)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 16:00
S26	3	S22 AND (well WITH (carrier OR movement OR mobility) WITH ((away WITH active WITH surface) OR (towards WITH substrate)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 16:00
S27	2	("20030042511").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/07/23 16:05
S28	2	S21 AND (substrate WITH carrier WITH away WITH ((active WITH surface) OR (towards NEAR2 substrate) OR (direction NEAR4 substrate)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 17:17
S29	3	S21 AND (substrate WITH (carrier OR holes OR electron OR majority OR charge) WITH away WITH ((active WITH surface) OR (towards NEAR2 substrate) OR (direction NEAR4 substrate)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 17:18
S30	30	S21 AND ((non-uniform\$2 OR nonuniform\$2 OR grad\$3 OR grading OR gradient) WITH (dopant OR doping) WITH substrate)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 17:26
S31	253	(grad\$3 OR grading OR gradient) NEAR2 (dopant OR doping) NEAR4 substrate	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 17:33
S32	5	dopant WITH concentration WITH donor WITH acceptor WITH optimiz\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:02
S33	2	10/182,784	US-PGPUB; USPAT; USOCR;	OR	ON	2008/07/23 18:06

			EPO; JPO; DERWENT; IBM_TDB			
S34	0	S20 AND (dopant WITH concentration WITH donor WITH acceptor)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:22
S35	0	S20 AND (dopant WITH donor WITH acceptor)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:22
S36	5	(dopant WITH donor WITH acceptor WITH optimiz\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:26
S37	5	(dopant WITH donor WITH acceptor WITH (optimiz\$ OR optimization OR optimal))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:27
S38	487	(donor WITH acceptor WITH (optimiz\$ OR optimization OR optimal))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:27
S39	14	S38 AND semiconductor.ab.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:28
S40	0	(layer WITH dopant WITH wafer WITH transfer\$4 WITH ((another OR second OR alternate) NEAR1 wafer)) AND (wafer NEAR1 bond\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:49
S41	0	(dopant WITH wafer WITH transfer\$4 WITH ((another OR second OR alternate) NEAR1 wafer)) AND (wafer NEAR1 bond\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:49
S42	0	(dopant WITH transfer\$4 WITH ((another OR second OR alternate) NEAR1 wafer)) AND (wafer NEAR1 bond\$3)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:50
S43	0	(dopant WITH transfer\$4 WITH ((another OR second OR alternate) NEAR1 wafer))	US-PGPUB; USPAT; USOCR;	OR	ON	2008/07/23 18:50

			EPO; JPO; DERWENT; IBM_TDB			
S44	14807	wafer NEAR1 bond\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:51
S45	33	S44 AND (dopant WITH transfer\$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/07/23 18:51
S46	579	(257/655,269).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/07/24 09:14
S47	539	(257/655).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/01/02 21:01
S48	695	VLSI AND ((graded OR gradation OR gradient) WITH (dopant OR doping OR impurit\$3))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/24 11:04
S49	62	S48 AND (((carrier OR electron OR hole) WITH (movement OR mobility)) SAME ((emitter WITH collector) OR (source WITH drain)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/24 11:05
S50	4	S48 AND (well WITH carrier WITH (movement OR mobility) WITH ((away WITH active WITH surface) OR (towards WITH substrate)))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/05/24 11:06
S51	4	("4001864").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/24 11:10
S52	2	("6831292").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/24 11:36
S53	2	("5029277").PN.	US-PGPUB; USPAT; USOCR;	OR	OFF	2009/05/24 12:17

			EPO; JPO; DERWENT; IBM_TDB			
S54	551	(257/655).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/05/24 12:52
S55	564	(257/655).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/12/22 10:12
S56	2	("6831292").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2009/12/22 10:14
S57	10	(US-20040072395-\$ or US-20010046753-\$ or US-20010050382-\$ or US-20020093281-\$ or US-20030042511-\$).did. or (US-6743684-\$ or US-5359221-\$ or US-5637898-\$ or US-5627092-\$ or US-5029277-\$).did. or (US-20020093281-A-\$).did.	US-PGPUB; USPAT; DERWENT	OR	ON	2009/12/22 10:26
S58	0	S57 AND drift WITH aid\$3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/22 10:27
S59	7	(drift WITH aid\$3) WITH dopant WITH concentration	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/22 10:27
S60	173	((graded OR gradient OR gradation) NEAR2 (dop\$3 OR impurity)) WITH between WITH substrate AND (active OR source OR drain OR source/drain)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 12:45
S61	74	S60 AND CMOS	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 13:43
S62	5	(complementary WITH error WITH function WITH gradient)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 19:12
S64	55	CMOS AND (exponential WITH gradient)	US-PGPUB; USPAT;	OR	ON	2010/08/01 19:13

			USOCR; EPO; JPO; DERWENT; IBM_TDB			
S65	712	CMOS AND (linear WITH gradient)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 19:14
S66	12	S64 AND S65	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 19:14
S67	0	S66 AND S62	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 19:15
S68	7	(grad\$3 WITH (dop\$3 OR donor)) SAME ((dopant OR donor) WITH (sweep\$3 OR mov\$3 OR attract\$3) WITH substrate)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 19:58
S69	4	(grad\$3 WITH (dop\$3 OR donor)) SAME ((dopant OR donor) WITH driv\$3 WITH (toward OR into OR deep\$2) WITH substrate)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 20:00
S70	16	(layer WITH (dopant OR donor) WITH concentration WITH minority WITH substrate)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/01 20:02
S71	3377	((graded OR gradation OR gradient) NEAR3 (dopant OR doping OR impurity OR donor OR acceptor)) AND (semiconductor OR CMOS OR FET OR "field effect" OR NMOS OR PMOS).ab.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 04:28
S72	371	S71 AND (drift WITH field)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 04:29
S73	0	S71 AND (minority WITH carrier WITH into WITH substrate)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 04:29
S74	114	S71 AND (minority WITH carrier WITH substrate)	US-PGPUB; USPAT;	OR	ON	2010/08/02 04:30

			USOCR; EPO; JPO; DERWENT; IBM_TDB			
S75	33	S72 AND S74	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 04:30
S76	88	S71 AND (drift WITH layer WITH (graded OR gradation OR gradient) WITH (dopant OR doping OR impurity OR donor OR acceptor))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 04:47
S77	7	S76 AND (drift WITH layer WITH between WITH substrate)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 04:48
S78	8028	photodiode WITH CMOS	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 05:13
S79	0	S78 AND S76	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 05:14
S80	0	S78 AND S77	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 05:14
S81	7	S71 AND S77	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 05:14
S82	98	S71 AND S78	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 05:20
S83	9	S72 AND S78	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 05:20
S84	2	("20020084430").PN.	US-PGPUB; USPAT;	OR	OFF	2010/08/02 05:26

			USOCR; EPO; JPO; DERWENT; IBM_TDB			
S85	172	(drift WITH layer WITH epitaxial) AND S71	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 07:16
S86	47	S71 AND (linear AND exponential)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 08:04
S87	3	S86 AND "complimentary error function"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 08:04
S88	8	S86 AND donor	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/02 08:38
S89	583	(257/655).OCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/08/02 10:21
S90	593	(257/655).OCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/01/11 11:40
S91	598	(257/655).OCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/04/10 20:57
S92	1	("4481522").PN.	USPAT; USOCR	OR	OFF	2011/12/16 08:02
S93	456	(257/655).OCLS.	USPAT; USOCR	OR	OFF	2011/12/16 09:45
S94	0	(single WITH static WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/10 00:21
S95	22	(static WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/10 00:21

S96	1	(unidirectional WITH field WITH drift) AND ((gradient OR grading OR graded) WITH dop\$3)	US-PGPUB; OR USPAT; EPO; JPO; DERWENT; IBM_TDB	ON	2012/08/10 00:24
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<i>Index of Claims</i> 	Application/Control No. 11622496	Applicant(s)/Patent Under Reexamination RAO, G.R. MOHAN
	Examiner AJAY K ARORA	Art Unit 2892

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

☒ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	08/02/2010	04/10/2011	12/16/2011	08/10/2012	11/19/2012			
	1	-	-	-	-	-			
	2	-	-	-	-	-			
	3	-	-	-	-	-			
	4	-	-	-	-	-			
	5	-	-	-	-	-			
	6	-	-	-	-	-			
	7	-	-	-	-	-			
	8	-	-	-	-	-			
	9	-	-	-	-	-			
	10	✓	✓	✓	✓	=			
	11	✓	✓	✓	✓	=			
	12	✓	✓	✓	✓	=			
	13	✓	✓	✓	✓	=			
	14	✓	✓	✓	✓	=			
	15	✓	✓	✓	✓	=			
	16	✓	✓	✓	✓	=			
	17	✓	-	-	-	-			
	18	✓	✓	✓	✓	=			
	19	✓	✓	✓	✓	=			
	20	✓	✓	✓	✓	=			
	21	✓	✓	✓	✓	=			
	22	✓	✓	✓	✓	=			
	23	✓	✓	✓	✓	=			
	24	✓	✓	✓	✓	=			
	25	✓	-	-	-	-			

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
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 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 or **Fax** (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.

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Francisca M.A. Hubbard	(Depositor's name)
<i>Francisca M.A. Hubbard</i>	(Signature)
March 12, 2013	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/622,496	01/12/2007	G.R. Mohan Rao	0299-0001.01	3086

TITLE OF INVENTION: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$885	\$300	\$0	\$1185	03/12/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARORA, AJAY	2892	257-371000

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/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form 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.

Eugene M. Cummings, P.C.

1 P.C.

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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:

☒ Issue Fee

☒ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

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

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 504199 (enclose an extra copy of this form).

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

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature *David M. Mundt*

March 12, 2013

Date _____

Typed or printed name David M. Mundt

Registration No. 41,207

This collection of information 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 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, 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.

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Electronic Patent Application Fee Transmittal

Application Number:	11622496			
Filing Date:	12-Jan-2007			
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS			
First Named Inventor/Applicant Name:	G.R. Mohan Rao			
Filer:	David Michael Mundt/Francisca Hubbard			
Attorney Docket Number:	0299-0001.01			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
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:				
Utility Appl Issue Fee	2501	1	885	885
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300
				Dell Ex. 1016

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1185

Electronic Acknowledgement Receipt

EFS ID:	15191627
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	70653
Filer:	David Michael Mundt/Francisca Hubbard
Filer Authorized By:	David Michael Mundt
Attorney Docket Number:	0299-0001.01
Receipt Date:	12-MAR-2013
Filing Date:	12-JAN-2007
Time Stamp:	15:32:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1185
RAM confirmation Number	3028
Deposit Account	504199
Authorized User	

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

Charge any Additional Fees required under 37 C.F.R. Section 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)	IssueFee.pdf	169875 03bcbf9d7d2927752ec0c60b4ff01d078e7f afc1	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31843 3959a4d0703527cbda6bd4c321ef249fa66 5b73d	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			201718		
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
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/622,496	04/16/2013	8421195	0299-0001.01	3086

70653 7590 03/27/2013
LAW OFFICES OF EUGENE M. CUMMINGS, P.C.
ONE NORTH WACKER DRIVE
SUITE 4130
CHICAGO, IL 60606

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 Data Management (ODM) at (571)-272-4200.

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

G.R. Mohan Rao, McKinney, 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.

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PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Patent Number	8,421,185
	Issue Date	04/16/2013
	First Named Inventor	RAC, G.R. MOHAN
	Title	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
	Attorney Docket Number	GRTD-32611

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

25883

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name:

Address:

City:

State:

Zip:

Country:

Telephone:

Email:

I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Inventor or Patent Owner

Signature

Date

Name

Telephone

Title and Company

GREENTHREAD, LLC

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 1.11 and 1.14. This collection is estimated to take 3 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 1480, Alexandria, VA 22313-1480. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1480, Alexandria, VA 22313-1480.

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

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Greenthread, LLC

Application No./Patent No.: 8,421,195

Filed/Issue Date: April 16, 2013

Titled: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS

Greenthread, LLC, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 035630, Frame 0391, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.06]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Philip W. John Jr.
Signature

5/20/2015
Date

Philip W. John Jr.
Printed or Typed Name

PRESIDENT
Title

This collection of information is required by 37 CFR 3.73(b). 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 1.11 and 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 1480, Alexandria, VA 22313-1480. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1480, Alexandria, VA 22313-1480.

If you need assistance in completing the form, call 1-800-PTO-5130 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	22481607
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	70653
Filer:	Gregory Michael Howison/Heather Hamilton
Filer Authorized By:	Gregory Michael Howison
Attorney Docket Number:	0299-0001.01
Receipt Date:	01-JUN-2015
Filing Date:	12-JAN-2007
Time Stamp:	17:54:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	GRT32611POAEXE.pdf	642022 12e9c8c605e84c992a66f6dbf27d21bbf40e0f93	no	1

Warnings:

Information:

2	Assignee showing of ownership per 37 CFR 3.73	GRT32611STMT373bEXE.pdf	602530 7949fff2285221279cfa919f38bd9ff17abdb Sae	no	1
Warnings:					
Information:					
Total Files Size (in bytes):				1244552	
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.					



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/622,496	01/12/2007	G.R. Mohan Rao	0299-0001.01

70653
EUGENE M. CUMMINGS, P.C.
55 W. MONROE
SUITE 3500
CHICAGO, IL 60603

CONFIRMATION NO. 3086
POWER OF ATTORNEY NOTICE



Date Mailed: 06/08/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/01/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/



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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/622,496	01/12/2007	G.R. Mohan Rao	GRTD-32611

25883
HOWISON & ARNOTT, L.L.P.
P.O. BOX 741715
DALLAS, TX 75374-1715

CONFIRMATION NO. 3086
POA ACCEPTANCE LETTER



Date Mailed: 06/08/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/01/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/

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**PATENT - POWER OF ATTORNEY
OR
REVOCATION OF POWER OF ATTORNEY
WITH A NEW POWER OF ATTORNEY
AND
CHANGE OF CORRESPONDENCE ADDRESS**

Patent Number	8,421,195
Issue Date	04-16-2013
First Named Inventor	G.R. Mohan Rao
Title	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
Attorney Docket No.	GRTD.01.01.DV1

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

40672

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☐ Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/95) submitted herewith or filed on 06-01-2015

SIGNATURE of Applicant or Patent Owner		Date	3/20/2020
Signature	<i>Philip W. John, Jr.</i>	Date	3/20/2020
Name	Philip W. John, Jr.	Telephone	
Title and Company	PRESIDENT of GREENTHREAD, LLC		

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☒ A total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 3 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.

Electronic Acknowledgement Receipt

EFS ID:	38951953
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	25883
Filer:	Bill Naifeh/April Reasoner
Filer Authorized By:	Bill Naifeh
Attorney Docket Number:	GRTD-32611
Receipt Date:	24-MAR-2020
Filing Date:	12-JAN-2007
Time Stamp:	13:35:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA_8421195_GRTD0101DV1.pdf	2184135 12cacaad717a3a8effb040956d502574c1497c1d	no	1

Warnings:

Dell Ex. 1016

Information:	
Total Files Size (in bytes):	2184135
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.	



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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/622,496	01/12/2007	G.R. Mohan Rao	GRTD.01.01.DV1

CONFIRMATION NO. 3086

POA ACCEPTANCE LETTER

40672
BILL R. NAIFEH
PO BOX 803423
DALLAS, TX 75380



Date Mailed: 04/02/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mmasfaw/



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/622,496	01/12/2007	G.R. Mohan Rao	GRTD-32611

25883
MUNCK WILSON MANDALA L.L.P.
P.O. Drawer 800889
DALLAS, TX 75380

CONFIRMATION NO. 3086
POWER OF ATTORNEY NOTICE



OC000000115879847

Date Mailed: 04/02/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2020.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mmasfaw/

**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

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

DOCKET NO. 2:19-cv-147	DATE FILED 4/30/2019	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division	
PLAINTIFF Greenthread, LLC		DEFENDANT Samsung Electronics Co., Ltd. Samsung Semiconductor, Inc. Samsung Electronics America, Inc. Samsung Austin Semiconductor, LLC	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
1 8,421,195 B2	4/16/2013	Greenthread, LLC	
2 9,190,502 B2	11/17/2015	Greenthread, LLC	
3 8,106,481 B2	1/31/2012	Greenthread, LLC	
4 9,647,070 B2	5/9/2017	Greenthread, LLC	
5			

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		
2		
3		
4		
5		

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Dell Ex. 1016
Page 380



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY.DOCKET NO./TITLE	REQUEST ID
11/622,496	01/12/2007	G.R. Mohan Rao	GRTD.01.01.DV1	121958

Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 09/28/2020 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

✕ Applicant changing to regular undiscounted fee status.

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

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Bill R. Naifeh, Reg. No. 44962/
Name:	Bill R. Naifeh
Registration Number:	44962

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

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

DOCKET NO. 2:19-cv-147		DATE FILED 4/30/2019		U.S. DISTRICT COURT Eastern District of Texas, Marshall Division	
PLAINTIFF Greenthread, LLC				DEFENDANT Samsung Electronics Co., Ltd. Samsung Semiconductor, Inc. Samsung Electronics America, Inc. Samsung Austin Semiconductor, LLC	
PATENT OR TRADEMARK NO.		DATE OF PATENT OR TRADEMARK		HOLDER OF PATENT OR TRADEMARK	
1 8,421,195 B2		4/16/2013		Greenthread, LLC	
2 9,190,502 B2		11/17/2015		Greenthread, LLC	
3 8,106,481 B2		1/31/2012		Greenthread, LLC	
4 9,647,070 B2		5/9/2017		Greenthread, LLC	
5					

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		
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5		

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Dell Ex. 1016
Page 382

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 - POWER OF ATTORNEY
OR
REVOCATION OF POWER OF ATTORNEY
WITH A NEW POWER OF ATTORNEY
AND
CHANGE OF CORRESPONDENCE ADDRESS**

Patent Number	8,421,195
Issue Date	2013-04-16
First Named Inventor	G.R. Mohan RAO
Title	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
Attorney Docket No.	GRTD60-32611

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

25883

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☐ The address associated with the above-identified Customer Number.

OR

☒ The address associated with the Customer Number identified in the box at right: 25883

OR

☐ Firm or

Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Patent Owner

Signature	<i>Philip John</i>	Date	9/24/2014
Name	Philip John	Telephone	244 728 8244
Title and Company	Manager		GreenThread, LLC

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 3 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.

Electronic Acknowledgement Receipt

EFS ID:	43954488
Application Number:	11622496
International Application Number:	
Confirmation Number:	3086
Title of Invention:	SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONS
First Named Inventor/Applicant Name:	G.R. Mohan Rao
Customer Number:	40672
Filer:	Gregory Michael Howison
Filer Authorized By:	
Attorney Docket Number:	GRTD.01.01.DV1
Receipt Date:	07-OCT-2021
Filing Date:	12-JAN-2007
Time Stamp:	11:42:37
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	Assignee showing of ownership per 37 CFR 3.73	GRT32611373STMT.pdf	120620	no	3
			b2a7259e26c87f8e7a642c4b7fa9da3b56e8aa23		

Warnings:

Dell Ex. 1016

Page 384

Information:					
2	Power of Attorney	GRT32611POACHANGEADD. pdf	1027082	no	1
			8f46fd57bac53173c2e2064aa1566b991ab20f01		
Warnings:					
Information:					
Total Files Size (in bytes):				1147702	
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.					

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.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: Greenthread, LLCApplication No./Patent No.: 8,421,195 Filed/Issue Date: 2013-04-16Titled: SEMICONDUCTOR DEVICES WITH GRADED DOPANT REGIONSGreenthread, LLC, a Limited Liability Company

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 035630, Frame 0391, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:
1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). 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 1.11 and 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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Gregory M. Howison, Reg. #30646/

October 5, 2021

Signature

Date

Gregory M. Howison

30,646

Printed or Typed Name

Title or Registration 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/622,496	01/12/2007	G.R. Mohan Rao	GRTD60-32611

25883
MUNCK WILSON MANDALA L.L.P.
P.O. Drawer 800889
DALLAS, TX 75380

CONFIRMATION NO. 3086
POA ACCEPTANCE LETTER



Date Mailed: 10/15/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/07/2021.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mbeyene/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/622,496	01/12/2007	G.R. Mohan Rao	GRTD.01.01.DV1

CONFIRMATION NO. 3086

POWER OF ATTORNEY NOTICE

40672
LAW OFFICE OF BILL NAIFEH
PO BOX 803423
DALLAS, TX 75380



Date Mailed: 10/15/2021

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/07/2021.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/mbeyene/

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		
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