

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 December 2008 (18.12.2008)

PCT

(10) International Publication Number
WO 2008/154526 A3

(51) International Patent Classification:
H01L 23/48 (2006.01)

(21) International Application Number:

PCT/US2008/066378

(22) International Filing Date:

10 June 2008 (10.06.2008)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

11/761,897 12 June 2007 (12.06.2007) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

18 February 2010

(54) Title: METHOD TO MAKE LOW RESISTANCE CONTACT

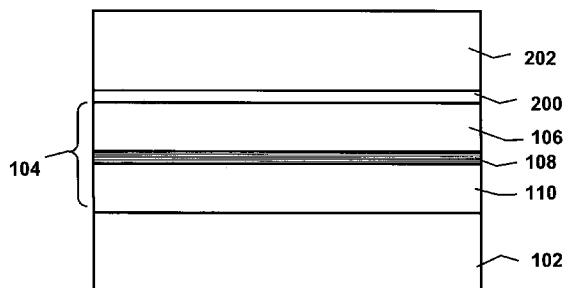


FIG. 4A

(57) Abstract: Techniques for fabricating contacts on inverted configuration surfaces of GaN layers of semiconductor devices are provided. An n-doped GaN layer may be formed with a surface exposed by removing a substrate on which the n-doped GaN layer was formed. The crystal structure of such a surface may have a significantly different configuration than the surface of an as-deposited p-doped GaN layer.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 08/66378

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H01L 23/48 (2009.01)
USPC - 257/734

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - H01L 23/48 (2009.01)
USPC - 257/734

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8) - H01L 23/48 (2009.01) (text search - see terms below)
USPC - 257/79, 102, 103, 734, 742, 777; 438/34, 35, 116, FOR157 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(USPT,PGPB,EPAB,JPAB); Google Patents, Google Scholar Search terms: LED, GaN, substrate, remove, n-doped, p-doped, contact, electrode, metal, Al, AlTi, AlSi, AlCu, AlNi, Sn, Zn, Mg, Hf, W, Ta, Co,Vd, Mo, vertical light emitting diode, multi-quantum well, sapphire

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 2004/0209402 A1 (Chai et al.) 21 October 2004 (21.10.2004), Figs 2, 3, 6-9; paras [0031]-[0033], [0057], [0059], [0070], [0072], [0073], [0124], [0125]	1, 2, 4-6 ----- 3, 7-10
Y	US 2004/0166599 A1 (Ishida) 26 August 2004 (26.08.2004), para [0017]	3, 7, 10
Y	US 2006/0154392 A1 (Tran et al.) 13 July 2006 (13.07.2006), Figs 1, 3; paras [0021], [0027]	8-10

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

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“O” document referring to an oral disclosure, use, exhibition or other means	“&” document member of the same patent family
“P” document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 11 December 2009 (11.12.2009)	Date of mailing of the international search report 23DEC 2009
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