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6 July 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HIGH EFFICIENCY GROUP III NITRIDE LED WITH LENTICULAR SURFACE

(57) Abstract: A high efficiency Group III nitride light emitting diode is disclosed. The diode includes a substrate selected from the group consisting of semiconducting and conducting materials, a Group III nitride-based light emitting region on or above the substrate, and, a lenticular surface containing silicon carbide on or above the light emitting region.



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INTERNATIONAL SEARCH REPORT

International application No
CT/US2005/032894

A. CLASSIFICATION OF SUBJECT MATTER INV. H01L33/00		
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) H01L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 263 058 A (TOYODA GOSEI CO., LTD) 4 December 2002 (2002-12-04) figures 9-11	1-63
X	US 2002/197764 A1 (UEMURA TOSHIYA ET AL) 26 December 2002 (2002-12-26) figure 1	1
A	US 6 100 104 A (HAERLE ET AL) 8 August 2000 (2000-08-08) abstract	16
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed		*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
Date of the actual completion of the international search <p align="center">10 May 2006</p>		Date of mailing of the international search report <p align="center">24/05/2006</p>
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer <p align="center">Werner, A</p>

INTERNATIONAL SEARCH REPORT

International application No

'CT/US2005/032894

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WINDISCH R ET AL: "40% EFFICIENT THIN-FILM SURFACE-TEXTURED LIGHT-EMITTING DIODES BY OPTIMIZATION OF NATURAL LITHOGRAPHY" IEEE TRANSACTIONS ON ELECTRON DEVICES, IEEE SERVICE CENTER, PISACATAWAY, NJ, US, vol. 47, no. 7, July 2000 (2000-07), pages 1492-1498, XP000958488 ISSN: 0018-9383 the whole document</p>	1
X	<p>EP 0 810 674 A (SUMITOMO ELECTRIC INDUSTRIES, LTD) 3 December 1997 (1997-12-03) figure 1A</p>	64-74
X	<p>US 4 990 972 A (SATO ET AL) 5 February 1991 (1991-02-05) figure 2</p>	64-74
X	<p>US 4 675 875 A (TAKAMIYA ET AL) 23 June 1987 (1987-06-23) page 1</p>	64
A	<p>US 5 696 389 A (ISHIKAWA ET AL) 9 December 1997 (1997-12-09) abstract</p>	64

INTERNATIONAL SEARCH REPORT

International application No.
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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-63

Nitride LED with a lenticular surface containing SiC.

2. claims: 64-74

LED with a "vertical orientation" and mirror layers.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/032894

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