

(51) International Patent Classification:
H01L 33/50 (2010.01)(21) International Application Number:
PCT/KR2012/000728(22) International Filing Date:
31 January 2012 (31.01.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10-2011-0011298 9 February 2011 (09.02.2011) KR
10-2011-0138520
20 December 2011 (20.12.2011) KR(71) Applicant (for all designated States except US): **SEOUL SEMICONDUCTOR CO., LTD.** [KR/KR]; 148-29, Gasan-dong, Geumcheon-gu, Seoul 153-801 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **JUNG, Jung Hwa** [KR/KR]; 1B-36, 727-5, Wonsi-dong, Danwon-gu, Ansan-si, Gyeonggi-do 425-851 (KR). **KIM, Jung Doo** [KR/KR]; 1B-36, 727-5, Wonsi-dong, Danwon-gu, Ansan-si, Gyeonggi-do 425-851 (KR). **JUNG, Seoung Ho** [KR/KR]; 1B-36, 727-5, Wonsi-dong, Danwon-gu, Ansan-si, Gyeonggi-do 425-851 (KR). **KIM, Min Hye** [KR/KR];1B-36, 727-5, Wonsi-dong, Danwon-gu, Ansan-si, Gyeonggi-do 425-851 (KR). **KIM, Yoo Jin** [KR/KR]; 1B-36, 727-5, Wonsi-dong, Danwon-gu, Ansan-si, Gyeonggi-do 425-851 (KR).(74) Agent: **AIP PATENT & LAW FIRM**; Shinwon Bldg. 8F, 823-14, Yeoksam-dong, Gangnam-gu, Seoul 135-933 (KR).

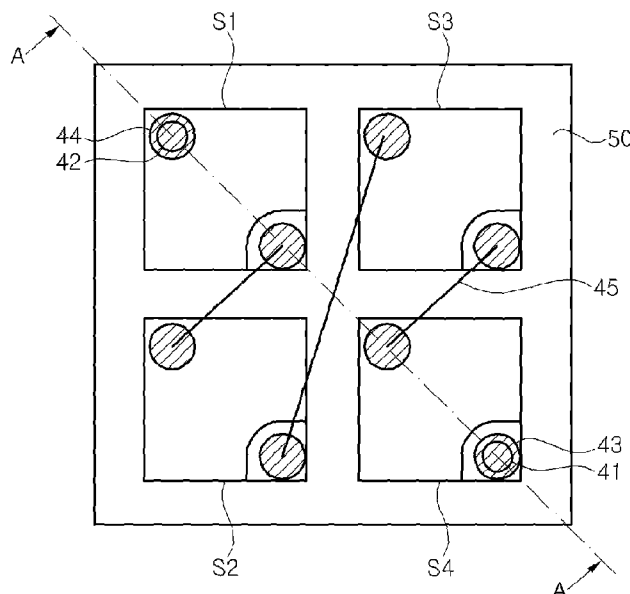
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

[Continued on next page]

(54) Title: LIGHT EMITTING DEVICE HAVING WAVELENGTH CONVERTING LAYER

[Fig. 1]



(57) Abstract: Disclosed is a light emitting device having a wavelength converting layer. The light emitting device comprises a plurality of semiconductor stacked structures; connectors for electrically connecting the plurality of semiconductor stacked structures to one another; a single wavelength converting layer for covering the plurality of semiconductor stacked structures; an electrode electrically connected to at least one of the semiconductor stacked structures; and at least one additional electrode positioned on the electrode, passing through the wavelength converting layer to be exposed to the outside, and forming a current input terminal to the light emitting device or a current output terminal from the light emitting device. Since the single wavelength converting layer covers the plurality of semiconductor stacked structures, the plurality of semiconductor stacked structures can be integrally mounted on a chip mounting member such as a package or a module.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *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))*

Published:

— *with international search report (Art. 21(3))*

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

11 October 2012

A. CLASSIFICATION OF SUBJECT MATTER***H01L 33/50(2010.01);***

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 33/50; H01L 33/00; H01L 33/64; H01L 33/44

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: wavelength converting layer, electrode, passing through, via

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2008-0173884 A1 (ASHAY CHITNIS et al.) 24 July 2008 See abstract; paragraphs [0065],[0087],[0089]; and figures 2,10,12	1-2,4-6,13,18 3,7-12,14-17,19-25
A	KR 10-2011-0011171 A (KOREA PHOTONICS TECHNOLOGY INSTITUTE) 08 February 2011 See paragraphs [0025]-[0028],[0031]-[0050],[0055]-[0056] and figures 1-2	1-25
A	US 2010-0105156 A1 (PO-SHEN CHEN et al.) 29 April 2010 See abstract, paragraphs [0020]-[0022], claim 1, and figures 6-7	1-25
A	KR 10-2006-0095271 A (SAMSUNG ELECTRO-MECHANICS CO., LTD.) 31 August 2006 See abstract; page 4, line 43 - page 5, line 1; and figure 4	1-25
A	JP 2009-239116 A (SHARP CORP.) 15 October 2009 See paragraphs [0046]-[0050],[0068]-[0071]; claims 1,11,18,20; and figures 1,3	1-25



Further documents are listed in the continuation of Box C.



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 application or patent 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 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

21 AUGUST 2012 (21.08.2012)

Date of mailing of the international search report

22 AUGUST 2012 (22.08.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

PARK, Hye Lyun

Telephone No. 82-42-481-8362



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2012/000728

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008-0173884 A1	24.07.2008	CN 101627481 A	13.01.2010
		CN 101663767 A	03.03.2010
		EP 2111648 A2	28.10.2009
		EP 2111649 A2	28.10.2009
		JP 2010-517289 A	20.05.2010
		JP 2010-517290 A	20.05.2010
		JP 2010-517290 T	20.05.2010
		JP 2012-060181 A	22.03.2012
		KR 10-2009-0115156 A	04.11.2009
		KR 10-2009-0122210 A	26.11.2009
		TW 200840092 A	01.10.2008
		US 2008-0179611 A1	31.07.2008
		WO 2008-091319 A2	31.07.2008
		WO 2008-091319 A3	31.07.2008
		WO 2008-115213 A2	25.09.2008
		WO 2008-115213 A3	25.09.2008
		WO 2008-115213 A3	18.12.2008
		WO 2008-115213 A8	30.04.2009
		WO 2008-115213 A8	25.09.2008
KR 10-2011-0011171 A	08.02.2011	None	
US 2010-0105156 A1	29.04.2010	None	
KR 10-2006-0095271 A	31.08.2006	None	
JP 2009-239116 A	15.10.2009	None	