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HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
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PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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.

[Continued on next page]

(54) Title: LED PACKAGE WITH INTEGRATED FEATURES FOR GAS OR LIQUID COOLING

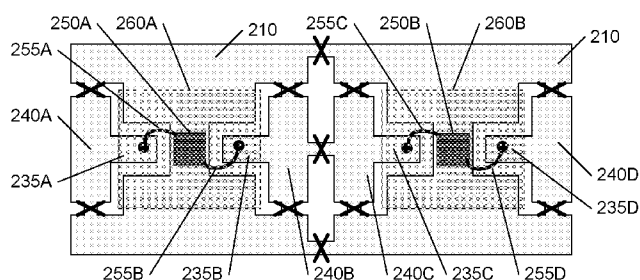


FIG. 2B

(57) Abstract: A light emitting device is provided that includes an integral heat dissipation element. This heat dissipation element is included in the leadframe that is used to facilitate fabrication of the light emitting device, to provide a single common substrate that forms both the heat dissipation element and the conductive elements for coupling the light emitting device to external sources of power. The heat dissipation element may extend beyond the protective structure that surrounds the light emitting element to facilitate heat dissipation to the surrounding medium.



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Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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))*

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25 August 2016

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/067973

A. CLASSIFICATION OF SUBJECT MATTER

INV. H01L33/64

ADD. H01L25/075 H01L33/52

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/180459 A1 (HSU CHENG-HSIANG [TW]) 16 September 2004 (2004-09-16) paragraphs [0020] - [0027]; figures 2-12 -----	1-13
X	WO 2005/101489 A2 (LUCEA AG [CH]; STAUFERT GERHARD [CH]) 27 October 2005 (2005-10-27) paragraph [0081]; figures 1-4 -----	1-13
X	US 2011/303941 A1 (LEE GUNKYO [KR]) 15 December 2011 (2011-12-15) figures 22-26 -----	1-13
A	WO 2014/016734 A1 (KONINKL PHILIPS NV [NL]) 30 January 2014 (2014-01-30) figure 1a ----- -/-	1-13



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 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

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2015/067973

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 2013 0017461 A (LG INNOTEK CO LTD [KR]) 20 February 2013 (2013-02-20) figures 1-5 -----	1-13
A	JP 2007 096236 A (TOYODA GOSEI KK) 12 April 2007 (2007-04-12) abstract; figures 2,9,10 -----	1-12
A	WO 2009/141960 A1 (PANASONIC CORP [JP]; OSHIO SHOZO; TANIMOTO NORIYASU) 26 November 2009 (2009-11-26) figures 1-16 -----	1-13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/067973

Box No. 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 No. 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 fees, this Authority did not invite payment of additional fees.
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.:

1-13

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ 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: 1-13

Lead frame and a light emitting structure comprising heat dissipating elements occupying more than 50% of the total area of the lead frame.

2. claims: 14, 15

Light emitting structure comprising a plurality of heat dissipating elements and a plurality of thin elements that couple the heat dissipating elements and a plurality of support structures that maintain a given physical relationship between each light emitting element and each heat dissipating element.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/067973

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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