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Ishidu et al.

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(54) **LIGHT EMITTING ELEMENT MOUNTING MEMBER, AND SEMICONDUCTOR DEVICE USING THE SAME**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,760,479 A * 6/1998 Yang et al. 257/778

(Continued)

FOREIGN PATENT DOCUMENTS

JP 02-056955 B2 2/1990

(Continued)

OTHER PUBLICATIONS

International Search Report for PCT/JP 2004/003443 mailed Jun. 15, 2004.

(Continued)

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(57) **ABSTRACT**

The object of the present invention is to provide a light-emitting element mounting member and a semiconductor device using the same that is easy to process and that allows adequate heat dissipation.

A light-emitting element mounting member 200 includes: a substrate 2 including an element mounting surface 2a mounting a semiconductor light-emitting element 1 and first and second conductive regions 21, 22 disposed on the element mounting surface 2a and connected to the semiconductor light-emitting element 1; a reflective member 6 including a reflective surface 6a defining an internal space 6b for housing the semiconductor light-emitting element 1 and containing a metal disposed on the element mounting surface 1a; and a metal layer 13 disposed on the reflective surface 6a. The reflective surface 6a is sloped relative to the element mounting surface 2a so that a diameter of the internal space 6b is greater away from the element mounting surface 2a.

14 Claims, 6 Drawing Sheets

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(73) Assignee: **Sumitomo Electric Industries, Ltd.**, Osaka (JP)

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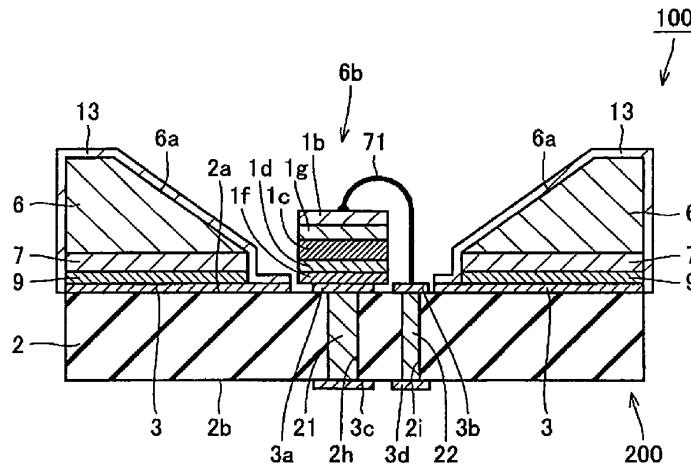
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(51) **Int. Cl.**
H01L 33/00 (2006.01)

(52) **U.S. Cl.** **257/98; 257/79; 257/99**

(58) **Field of Classification Search** 257/79,
257/94-99; 372/43.01, 50.23; 362/613,
362/623, 341, 345, 347-350, 800

See application file for complete search history.



US 7,518,155 B2

Page 2

U.S. PATENT DOCUMENTS

6,495,861 B1 * 12/2002 Ishinaga 257/99
6,781,166 B2 * 8/2004 Lieber et al. 257/211
7,019,335 B2 * 3/2006 Suenaga 257/99
7,157,744 B2 * 1/2007 Palmteer et al. 257/98
2002/0084462 A1 * 7/2002 Tamai et al. 257/79
2002/0105268 A1 8/2002 Schliep et al.
2003/0116769 A1 6/2003 Song et al.
2004/0041159 A1 * 3/2004 Yuri et al. 257/79
2004/0183081 A1 * 9/2004 Shishov et al. 257/79
2004/0211970 A1 * 10/2004 Hayashimoto et al. 257/98
2005/0093116 A1 * 5/2005 Palmteer et al. 257/676

FOREIGN PATENT DOCUMENTS

JP 11-345999 A 12/1999

JP 2002-232017 A 8/2002
JP 2003-17755 A 1/2003
JP 2003008074 1/2003
JP 2003-46137 A 2/2003
JP 2004-134699 A 4/2004
WO WO-01/45180 A1 6/2001
WO 02/089219 A1 11/2002

OTHER PUBLICATIONS

PCT Notification of Transmittal of Copies of Translation of the International Preliminary Report on Patentability (Chapter I or Chapter II of the Patent Cooperation Treaty) mailed Nov. 17, 2005.

* cited by examiner

FIG. 1A

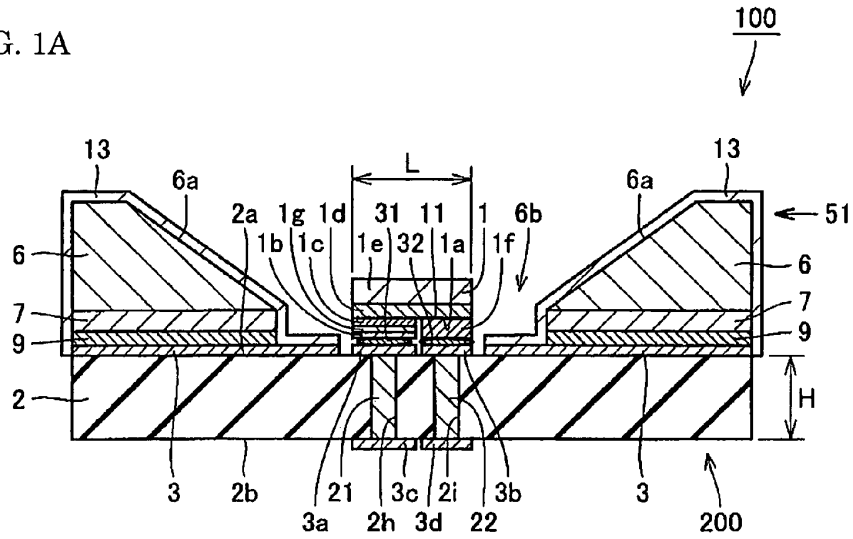


FIG. 1B

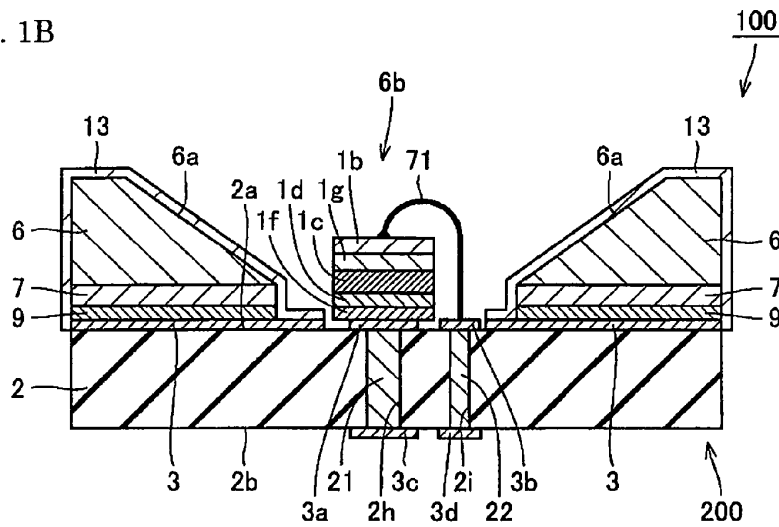


FIG. 2

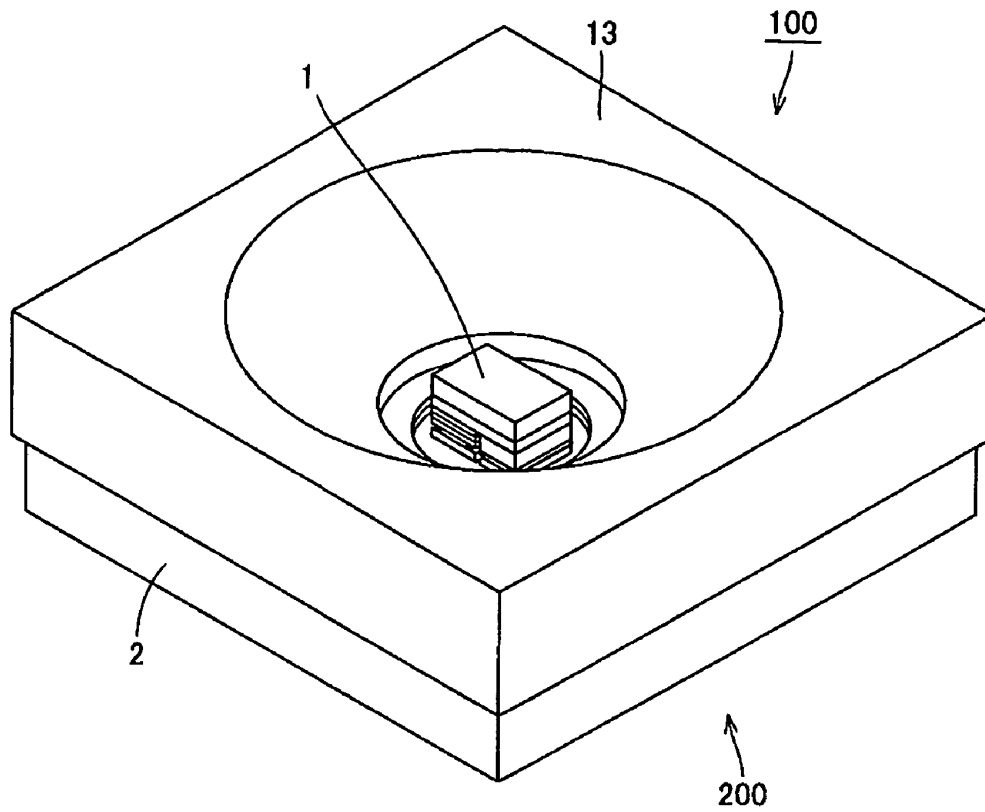


FIG. 3A

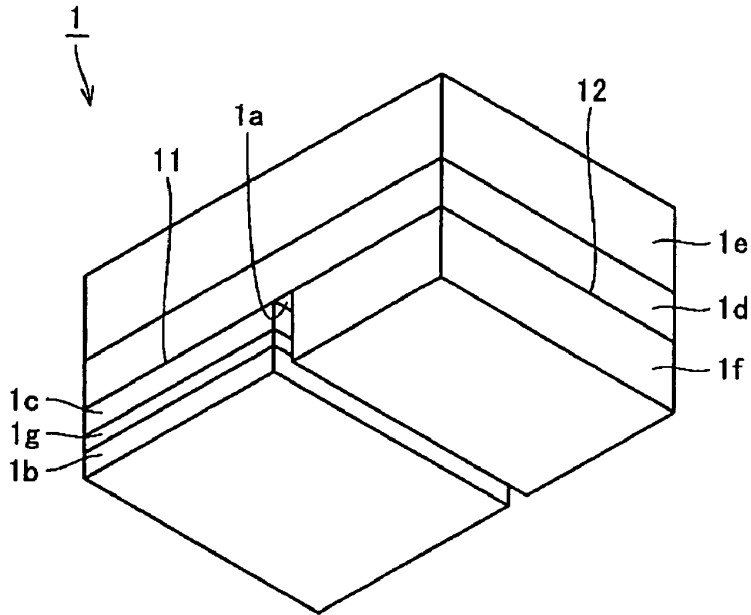


FIG. 3B1

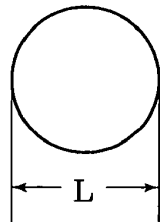


FIG. 3B2

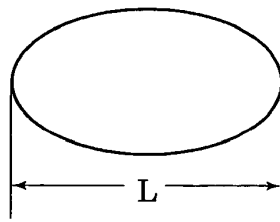


FIG. 3B3

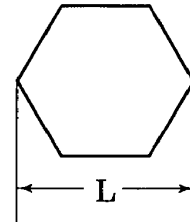


FIG. 3B4

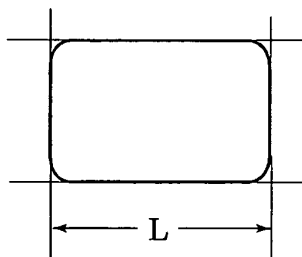
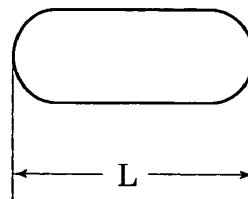


FIG. 3B5



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