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Lee et al.

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(54) **SEMICONDUCTOR DEVICE WITH A LIGHT
EMITTING SEMICONDUCTOR DIE**

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patent is extended or adjusted under 35
U.S.C. 154(b) by 494 days.

This patent is subject to a terminal dis-
claimer.

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Related U.S. Application Data

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filed on Jun. 27, 2003, now Pat. No. 7,256,486.

(51) **Int. Cl.**

H01L 33/00 (2010.01)

H01L 23/48 (2010.01)

(52) **U.S. Cl.** **257/99**; 257/778; 257/E33.056;
257/E33.062; 257/E33.065; 257/E33.066

(58) **Field of Classification Search** 257/99,
257/778, E33.056, E33.062, E33.065, E33.066
See application file for complete search history.

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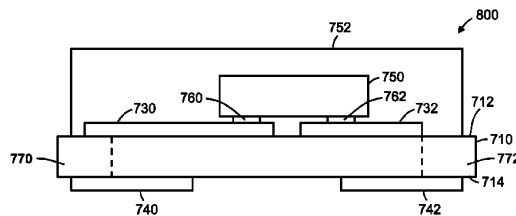
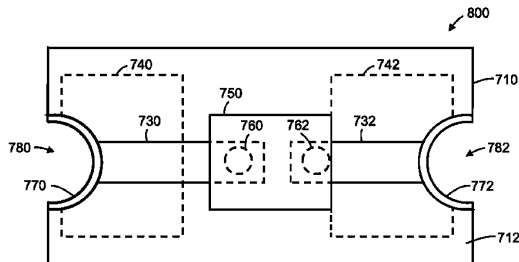
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Primary Examiner — Shouxiang Hu

(57) **ABSTRACT**

A semiconductor device includes a light emitting semicon-
ductor die mounted on at least one of first and second elec-
trically conductive bonding pads, which are located on a first
major surface of a substrate of the device. The light emitting
semiconductor die has an anode and a cathode, which are
electrically connected to the first and second electrically con-
ductive bonding pads. The semiconductor device further
includes first and second electrically conductive connecting
pads, which are located on a second major surface of the
substrate. The first and second electrically conductive bond-
ing pads are electrically connected to the first and second
electrically conductive connecting pads via first and second
electrically conductive interconnecting elements.

14 Claims, 10 Drawing Sheets



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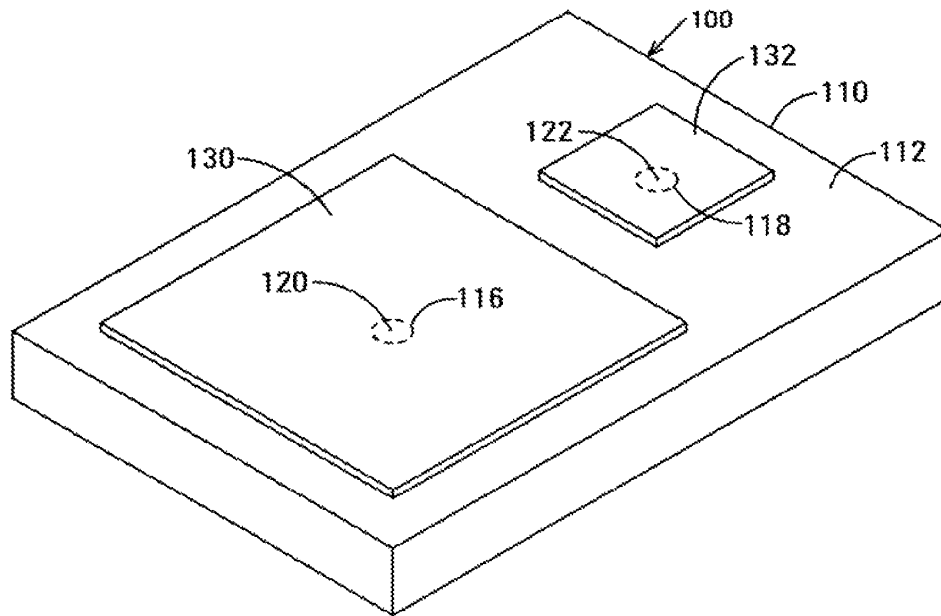


FIG. 1A

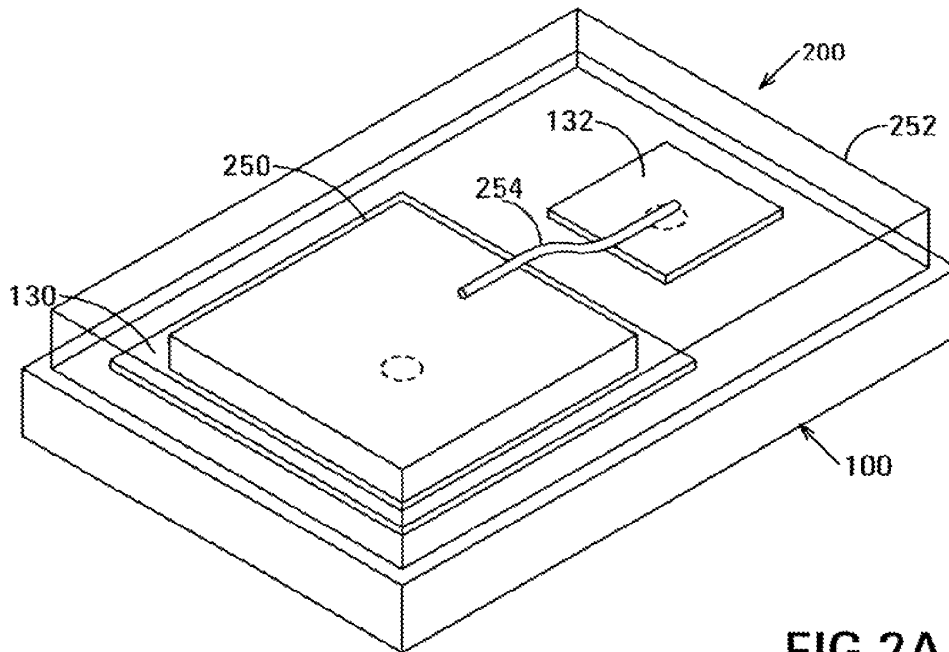


FIG. 2A

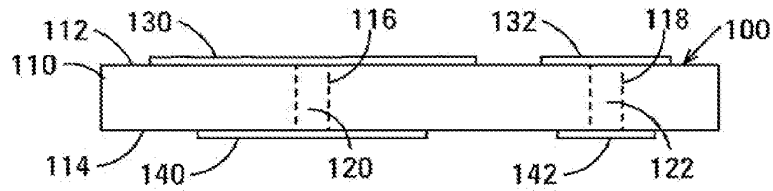


FIG. 1B

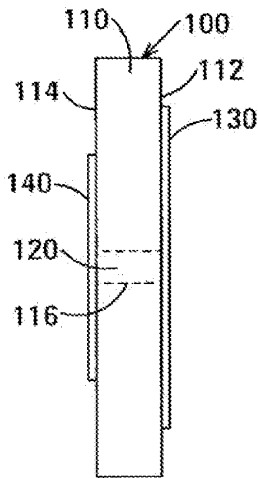


FIG. 1C

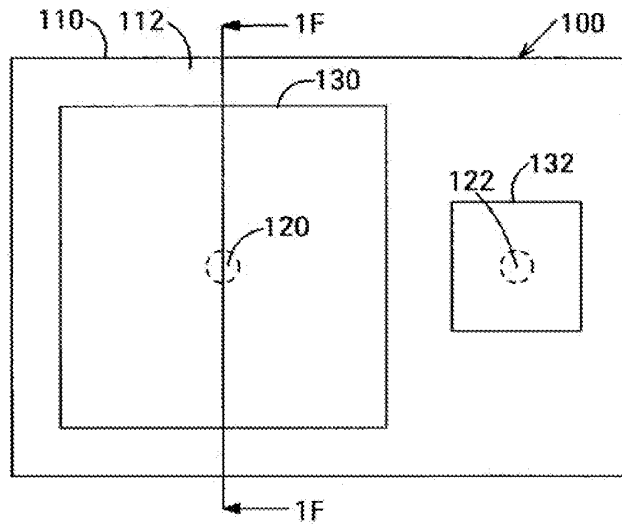


FIG. 1D

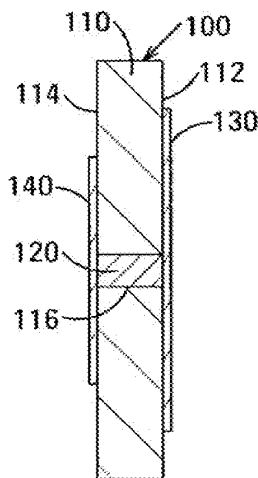


FIG. 1F

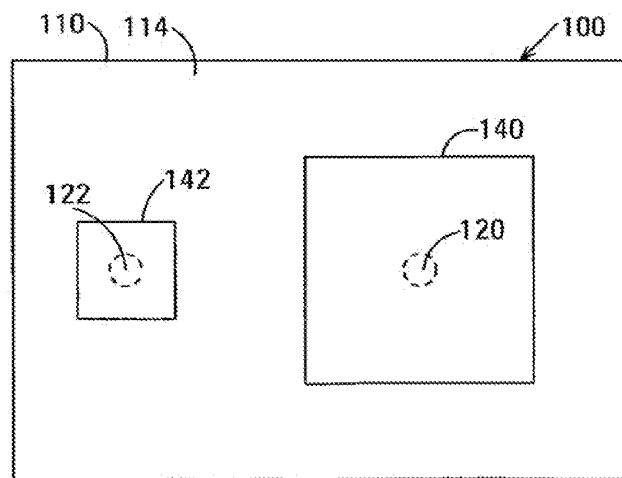


FIG. 1E

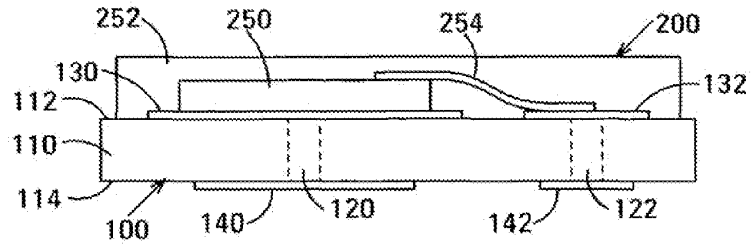


FIG. 2B

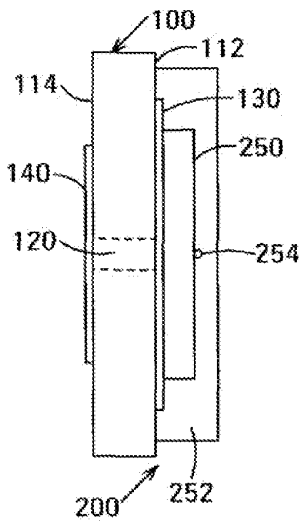


FIG. 2C

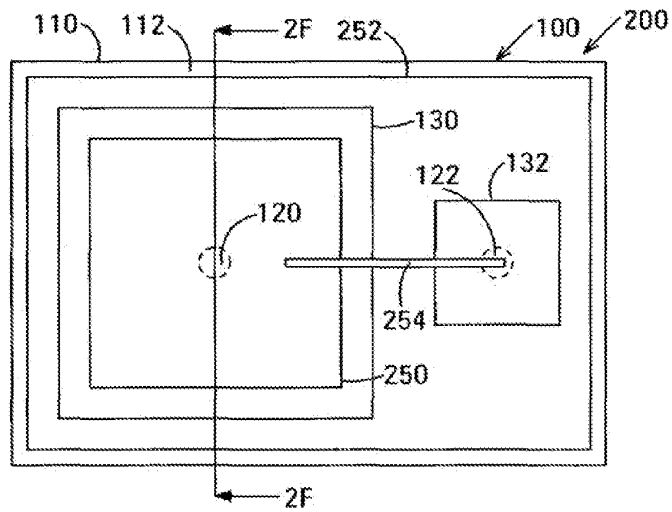


FIG. 2D

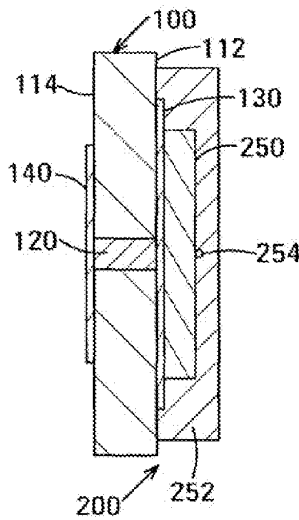


FIG. 2F

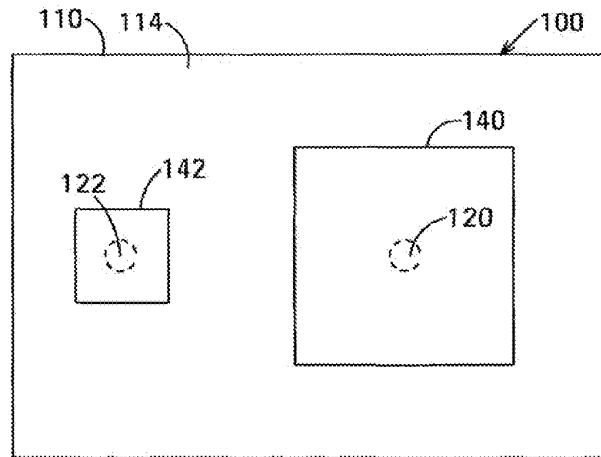


FIG. 2E

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