



(12) **United States Patent**
Ma et al.

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(54) **METHOD TO PROTECT AN ENCAPSULATED DIE PACKAGE DURING BACK GRINDING WITH A SOLDER METALLIZATION LAYER AND DEVICES FORMED THEREBY**

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(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.⁷** **H01L 21/44**

(52) **U.S. Cl.** **438/106; 257/612; 257/712; 257/714; 257/720; 257/722**

(58) **Field of Search** **438/106; 257/622, 257/712, 714, 720, 722**

(57) **ABSTRACT**

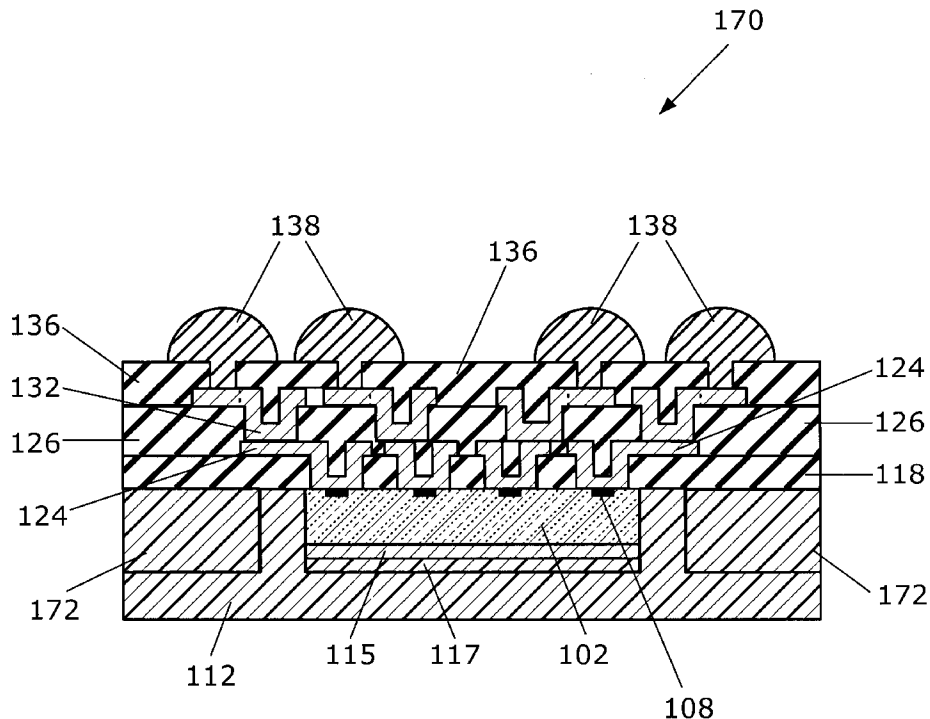
A microelectronic package including a microelectronic die having an active surface and at least one side. An encapsulation material is disposed adjacent the microelectronic die side(s). A portion of the encapsulation material is removed to expose a back surface of the microelectronic die which has a metallization layer disposed thereon. A protective layer is disposed on the metallization layer prior to encapsulation, such that when the portion of the encapsulation material is removed, the protective layer prevents the metallization layer from being damaged. After the portion of the encapsulation material is removed, the protective layer is removed and the metallization layer is exposed. A heat spreader may then be attached to the microelectronic die by abutting the heat spreader against the metallization layer and reflowing the metallization layer.

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9 Claims, 20 Drawing Sheets



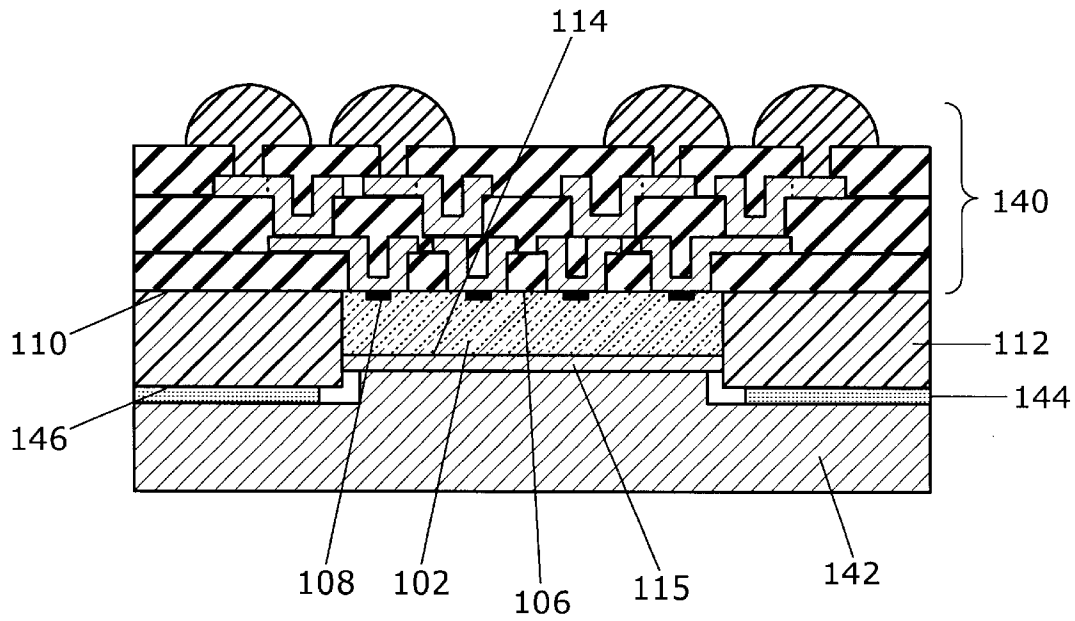


FIG. 1

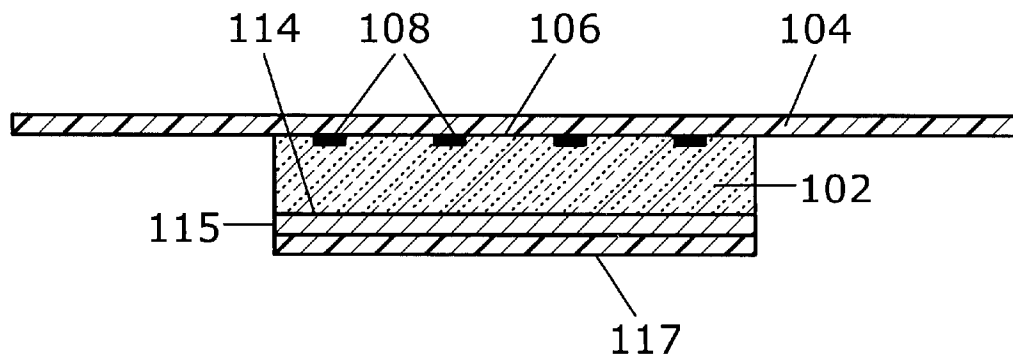


FIG. 2

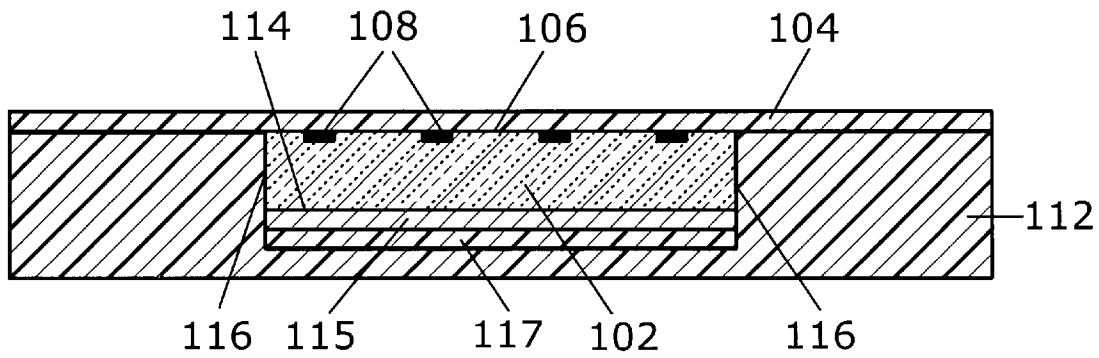


FIG. 3

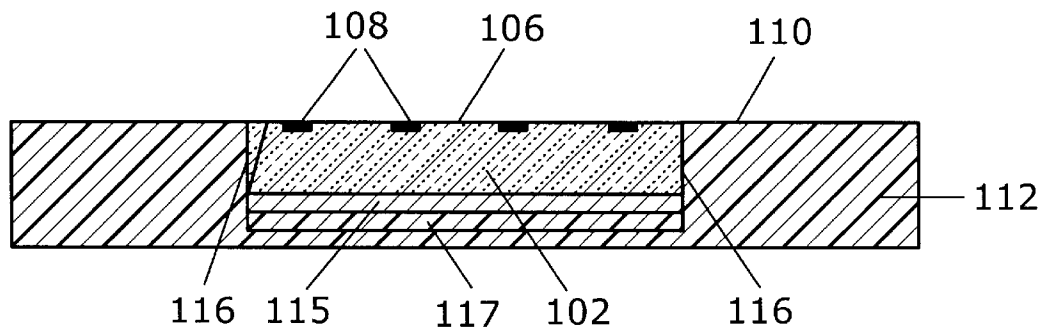


FIG. 4

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