

By using CTE matched materials and the laminar structure, more design options are available in the IC design and packaging.

Background

In some high powered Integrated Circuit (IC) designs there is a need for passive cooling via high performance conductive heat sinks that are CTE (Coefficient of Thermal Expansion) matched to the IC material. There are limitations of thermal conductivity or geometry possibilities for conventional materials. By using a correctly selected and assembled laminar heat sink structure, increased passive cooling via thermal conduction can be achieved.

Description

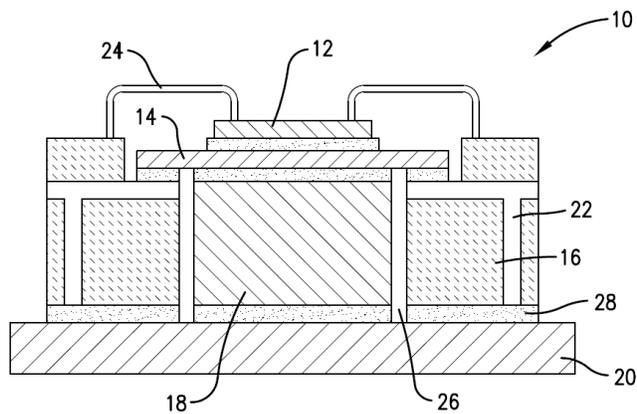


Fig. 2.

The IC (12) is mounted and bonded to a CTE matched carrier (14), such as CuW, Diamond laminate or CuMo. That structure is mounted to a “brick” of high thermal conductivity material like graphite or high-purity copper (18). The brick is mounted to a thermally conductive plate (20). That overall assembly is part of a larger Micro-Chip Module package (10) or other assembly with high power ICs.

Advantages

By using CTE matched materials and the laminar structure more design options are available in the IC design and packaging.

- Larger IC designs and/or increased operating temperature range are possible with improved CTE matching
- Increases thermal conductivity (>1000 W/m-K) relative to other CTE matched materials (<250 W/m-K)
- Laminar structure allows removal of defective IC's and reuse of the larger package
- Reduces need for active cooling systems, like fans, and cooling fluids.

Applications

High reliability designs with high power dissipation IC's using low CTE (<9ppm /C) substrates such as: GaAs, GaN or SiC.

- High power RF transmitters
- Power Converters
- Power Amplifiers

Intellectual Property Status

This technology is patent pending under US Patent application number 14/086,835 filed Nov 21, 2013.

Keyword List

Heat Sink, Power Amplifier, Passive cooling, CTE Matched

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14520 Botts Road, Kansas City, MO 64147 | 816.488.2000 | August 2017

