ENCAPSULATION DEVICE AND MANUFACTURING PROCESS

Technological advantages

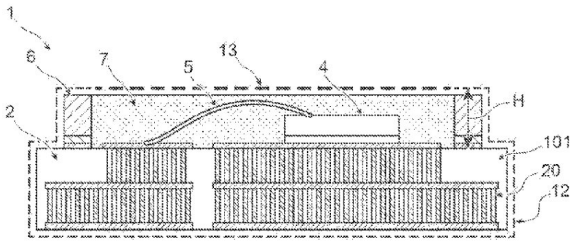
- Metal wall providing high mechanical strength and enhanced durability.
- Simultaneous attachment of the chip and wall: faster and more cost-effective process.
- Optimized ceramic substrate (LTCC/HTCC) with adapted CTE: improved thermal reliability.
- Internal polymer encapsulation reducing mechanical stress and protecting against external aggression.
- Semi-hermetic structure offering strong environmental protection at reduced cost.

Invention synthesis

The invention relates to a semiconductor chip encapsulation device particularly suited for demanding applications such as space. It is based on a ceramic substrate featuring several metal pads on which both the semiconductor chip and a metallic wall are mounted, forming a cavity. The chip is electrically connected, notably through aluminum wire bonding, and then protected by inserting a polymer substance (resin) inside the cavity created by the wall. The metallic wall, attached by soldering or silver sintering, provides high mechanical strength and excellent thermal resistance. The process enables simultaneous attachment of both the chip and the wall, simplifying and accelerating manufacturing. The result is a semi-hermetic solution with an excellent balance between performance, reliability, resistance to harsh environments (radiation, high temperatures), and cost reduction compared to traditional packages.

Potential applications

- Satellite and space electronic components.
- High-temperature power electronics.
- Critical embedded systems (aerospace, defense).
- Devices exposed to severe thermal or mechanical stress.
- Applications requiring efficient thermal dissipation and reinforced protection.



Schematic view of the set-up :

1. Encapsulation device
2. Substrate
4. Semiconductor chip
5. Electrical connection means
6. Wall fixed to a third metal pad
7. Polymeric substance

Commercial benefits

- Lower cost than traditional hermetic ceramic packages.
- Parallel manufacturing of multiple components on a single substrate.
- Reduced manufacturing steps (no complex hermetic sealing stage).
- Strong competitiveness for the evolving space market.
- Reliable solution combining high performance and cost control.

Patented invention - under license.

For more information :

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