
Environmental tests of laser micro bonded glass packages

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Abstract

Hermetic glass packages with a footprint smaller than 10 mm x 10 mm enable a multitude of products: smart medical implants, consumer micro-optics on a wafer level as well as sensor packages for satellites. The key to miniaturize such packages is a bonding process that provides a high shear strength even for small contact areas. Glass micro bonding via localized laser irradiation solves this challenge. In contrast to other bonding processes, it requires no additives, and the devices can be sealed at room temperature with minimal heat load. Laser micro bonded interfaces that can withstand a shear stress in the order of 50 MPa have been reported (1,2), thus surpassing glue-based bonding strengths by an order of magnitude. The crucial question for many applications is, if the glass enclosures survive harsh environmental conditions, e.g. the temperature changes (3) and radiation exposure (4) for devices operating in earth's orbit. In this talk, we summarize how laser micro bonded encapsulations perform in harsh environmental test protocols, e.g. MIL-STD-883 and MIL-STD-750D.

Keywords: glass packaging, laser micro welding, bonding, sensors

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