BONDING METHOD USING SOLDER COMPOSED OF MULTIPLE ALTERNATING GOLD AND TIN LAYERS

Abstract

A device (10) such as a laser is bonded to a submount (20) such as diamond by a process in which the submount is successively coated with an adhesion layer (21) such as titanium, a barrier layer (22) such as nickel, and a gold-tin solder composite layer (23) formed by sequential deposition on the barrier layer a number (preferably greater than seven) of multiple alternating layers (23.1, 23.2, ..., 23.11) of gold and tin, the last layer (23.11) being gold having a thickness that is equal to approximately one-half or less than the thickness of the (next-to-last) tin layer that it contacts immediately beneath it. The bonding is performed under applied heat that is sufficient to melt the solder-metallization composite layer. Prior to the bonding, (in addition to the submount) the device advantageously is coated with a gold layer (13).