

# Chapter 13. Sealing of Integrated Circuits and Microblocks

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**Abstract:** This chapter discusses the design features of metal-glass and metal-ceramic packages for integrated circuits and microblocks, focusing on their hermetic sealing processes through soldering and welding. Modeling performed using the ANSYS Mechanical environment has revealed significant internal stress at the boundary of the lead in metal-ceramic assemblies with molybdenum metallization. To address this, the study proposes modifying the assembly design by incorporating bevels during metallization formation, which promotes a more uniform distribution of the resulting stress. For vacuum-tight joints with Kovar, parts must undergo annealing to decrease internal stress, and soldering should occur at a temperature only 20–30°C above the melting point of the solder. Before soldering, Kovar parts should be nickel-plated with a coating thickness of 10–15  $\mu\text{m}$  and subsequently annealed at 950°C. To prevent the liquid phase from penetrating along the grain boundaries of Kovar, the use of gold or copper-germanium solders is recommended.

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