

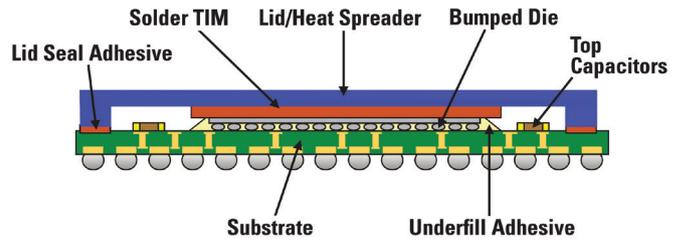
PRODUCT DATA SHEET

Solder Thermal Interface Materials for BGA Packages

Introduction

Pure indium has been used for decades as a solder thermal interface material (sTIM) solution in LGA- and PGA-style socketed packages. **Solder TIMs** are reflowed to form an intermetallic bond that provides the lowest interfacial resistance TIM with the highest thermal conductivity (K) available. Indium solder TIM has historically been limited to LGA and PGA packages due to its low melting point and inability to survive secondary high-temperature reflow cycles without excessive voiding. Indium-silver (InAg) alloys offer lower voiding compared to pure indium for BGA packages that undergo multiple SAC reflows after the initial TIM-assembly. Indium Corporation has developed a proprietary manufacturing process enabling consistent reflow and improved void performance for solder TIM in BGA style packages.

FC-BGA Key Components



Advantages of Metal TIMs

In addition to improved thermal conductivity, using a metal thermal interface material eliminates the pump-out and bake-out found in greases and other materials. There is no surface preparation required and clean-up is easy. **Solder TIMs** are available in a variety of shapes, sizes, and thicknesses. Flux-coated **Solder TIMs** are also available to further reduce total cost and offer the lowest voiding available.

Applications

In addition to being the leading supplier of pure indium **Solder TIMs**, Indium Corporation offers a variety of InAg alloy compositions as **Solder TIMs** that are able to withstand multiple high-temperature reflow cycles. When compared to a pure indium solder TIM, trade-offs should be taken into consideration when adding Ag to the solder TIM joint. As the Ag percentage increases, not only does this correspond to lower voiding but also results in lower bulk thermal conductivity. It also causes a more rigid solder joint and possibly poorer mechanical reliability. All solder TIM1 and TIM0 applications require the use of backside metallization, typically a gold (Au) sputter process. Please contact your Indium Corporation representative to discuss your specific requirements and other considerations when implementing a solder TIM solution.

Storage and Packaging

TIM preforms come in a variety of packaging options, including tape & reel for automated processing. To minimize handling and exposure to air, solder TIM preforms should be stored in their original container, closed securely in 55% RH or less and at temperatures less than 22°C. They can also be stored in an inert atmosphere, such as a nitrogen dry box.

Technical Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Materials Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice in solder properties, alloy compatibility and selection of solder preforms, wire, ribbon, foil, and paste. Indium Corporation's Technical Support Engineers provide rapid response to all technical inquiries.

Safety Data Sheets

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy.

Properties

| Indalloy® | Liquidus (°C) | Solidus (°C) | Density (g/cc) | Composition | Tensile Strength (psi) | Elongation (%) | Modulus (psi x 10 ⁶) | TC (W/mK) |
|-----------|---------------|--------------|----------------|-------------|------------------------|----------------|----------------------------------|-----------|
| 4 | 156 | 156 | 7.31 | 100In | 386 | 67 | 1.7 | 86 |
| 290 | 143 | 143 | 7.38 | 97In/3Ag | 1,200 | 50 | 1.8 | 84 |
| 312 | 190 | 143 | 7.45* | 93In/7Ag | 1,330 | 33 | 1.92 | 75* |
| 3 | 237 | 143 | 7.54 | 90In/10Ag | 1,364 | 9.45 | 2.2 | 71 |

*Estimated. Not measured.

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All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified. Indium Corporation is an ISO 9001:2015 registered company.

From One Engineer To Another®

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