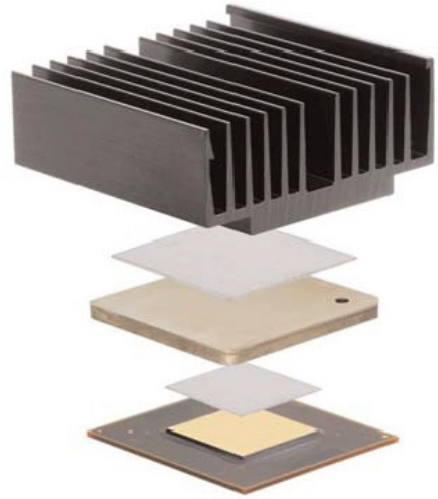
# TIMS

Thermal Interface Materials Solutions

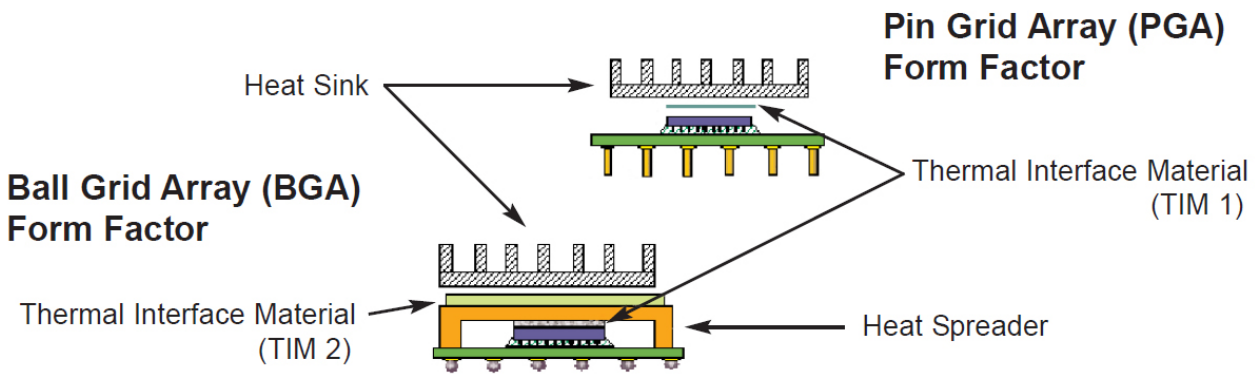
## NON-ADHESIVE OR NON-ORGANIC INTERCONNECT SOLUTIONS IN SUPPORT OF REVOLUTIONARY IMPROVEMENTS IN THERMAL DISSIPATION

As junction resistance values steadily decrease, high performance power applications that use traditional organic based TIMs are quickly approaching their limitations.
Solder based TIMs have the high thermal conductivity properties for the next significant TIM interconnect solutions.

Whether your thermal dissipation improvements focus at the die level (TIM1) or at the interface between the heat spreader/lid to the active or passive heat sink (TIM2), Kester has created interconnect solutions to enable your next generation applications. Kester is a global solutions
supplier to the Semiconductor Packaging Sector and recently has been a recipient of Intel's prestigious Supplier Continuous Quality Improvement (SCQI) for thermal interface materials.



## Common Microprocessor Package Types

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## Material Selection Aids

Table 1 is a listing of the thermal conductivity of a variety of common materials used in the microelectronic and electronic assembly industries. Metal or solder based interconnect materials are currently being utilized in the most demanding thermal interface applications.

| Material | Thermal Conductivity (Wmk-1) |
|---|---|
| In | 82 |
| Pd | 72 |
| In90 Ag10 | 67 |
| Sn | 66 |
| Au80 Sn20 | 57 |
| Sn63 Pb37 | 50.9 |
| Sn60 Pb40 | 49.8 |
| Sn50 Pb50 | 46.7 |
| Sn62 Pb36 Ag2 | 49 |
| Sn40 Pb60 | 43.6 |
| Sn30 Pb70 | 40.5 |
| Sn20 Pb80 | 37.4 |
| Sn10 Pb90 | 35.8 |
| Pb | 35 |
| AI2O3 (96%) | 35 |
| Sn96.5 Ag3.5 | 33 |
| Sn95 Sb5 | 28 |
| Alloy 42 | 15.6 |
| Silver Filled Phase Change | 3 - 8 |
| Boron Nitride Filled Silicone | 6 |
| Ag - Filled Die Attach | 1.3 - 5 |

Table 1 Thermal Conductivities of Materials (Wmk-1)

## Typical Materials For TIM1 and TIM2

| Melt Range | | Alloy | |
|---|---|---|---|
| °F | °C | Pb-Containing | Pb-Free |
| 450 - 464 | 232 - 240 | | Sn95 Sb5 |
| 430 | 221 | | Sn96.5 Ag3.5 |
| 354 - 372 | 179 - 189 | Sn62 Pb36 Ag02 | |
| 361 | 183 | Sn63 Pb37 | |
| 313 | 156 | | In99 |

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