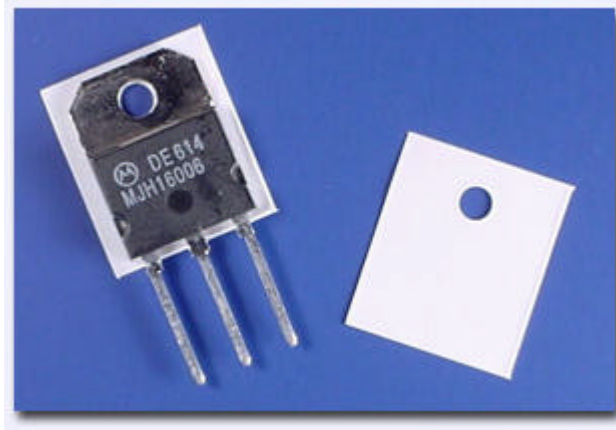


## Thermaphase on Aluminum Foil (52°C)

### "Thermafoil"



#### Advantages:

- ?? Lowest available thermal resistance:  
0.06°C/W/in<sup>2</sup> at 10psi
- ?? Aluminum foil heat spreader
- ?? Low mounting force so you can use clips, not screws
- ?? Differential Phase Change Characteristic allows one or two-phase operation
- ?? Controlled particulate morphology for superior void filling
- ?? Organo-metallic wetting action promotes laminar flow
- ?? Controlled Thixotropicity eliminates migration
- ?? Thermoplastic adhesion can eliminate fasteners
- ?? Reversible Adhesive Bond (RAB) characteristic eliminates outgassing
- ?? Easy to handle - "manufacturing friendly"
- ?? Excellent solvent resistance
- ?? Precision metered coating 0.5 to 6.0 mils thick
- ?? Available with different compound thickness on each side of Foil
- ?? Environmentally friendly/Non Toxic
- ?? Available with Zero ?T adhesive backing

#### Description:

This product consists of high thermal conductivity aluminum alloy foil heat spreader, precoated on both sides with **ORCUS** Thermaphase 52°C Differential Phase Change Material. The material is dry-to-the-touch and flexible at room temperature. This is the original material that started the Differential Phase Change Material revolution years ago. When this material is placed between two rigid, rough, uneven surfaces and heat (>52°C) and pressure (10.0psi) are applied the following occurs:

- 1) When the heat exceeds 52°C (either from electronic component heat-up or because of externally applied heat) the Thermaphase material becomes a soft, thixotropic (much like thick shaving cream).
- 2) The physical pressure on the component causes the Thermaphase material to flow into the micropores of the component and heat sink, expelling air from these pores. The distance from the component to the Kapton and from the Kapton to

the heat sink decreases as the Thermaphase material enters the pores and surface irregularities. Excess material is extruded from under the component and forms a "bead" around the perimeter of the component. The thinnest possible interface is created.

3) The Aluminum foil serves as a heat spreader. The Thermaphase compound provides a heat transfer medium that fills the surface pores of component and heat sink.

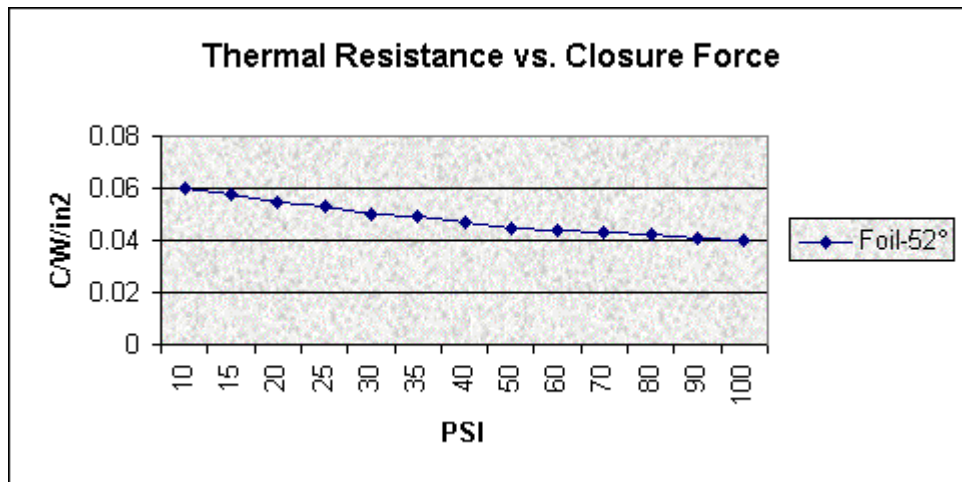
This Thermaphase is Thermoplastic and exhibits RAB (reversible adhesive bonding). When the material has reflowed under heat and pressure between component and heat sink and then recools below the phase change temperature it adheres the component and heat sink to each other. By reheating the material again beyond its reflow temperature, you can reverse the adhesion and separate the component and heat sink. These process can be carried out an unlimited number of times. This product feature can be used to adhere components to heat sinks to replace mechanical fasteners.

Use Thermaphase on Aluminum foil when you do not require electrical insulation between component and heat sink. If you need electrical isolation between component and heat sink then use Thermaphase on Kapton.

#### Typical Characteristics:

Thermal Characteristics	Units	Aluminum Foil
Overall Thermal Resistance at 10psi. See graph of Thermal Resistance vs Closure Force (See Test Procedure)	°C/W/in <sup>2</sup>	0.06
Thermal Conductivity of Aluminum Substrate	W/m <sup>2</sup> .K	221
Phase Change Temperature	°C	52
Use Temperature	°C	-60 to +200
Mechanical Characteristics	Units	Aluminum Foil
Substrate Material	----	1100 Aluminum
Substrate Thickness	inches	0.002
Coating Thickness	mils	0.5 to 6.0 mils
Viscosity (Thermaphase compound) at 150°C	Poise	>100
Density of Thermaphase Compound	g/cc	2.1
Electrical Characteristics	Units	Aluminum Foil
Aluminum substrate is electrically conductive and the Thermaphase compound is not.		

Thermaphase on Aluminum Foil does not require high mounting forces. Typically 10.0 psi is quite sufficient. Clips can be used to hold the semiconductor in place. Since only low mounting forces are required, it is practical to contact large surface areas.



**Thermal Resistance versus Closure Force**

**OPTIONS:**

- 1) This material is available in 52°C and 71°C only. It is not available in 98°C version.
- 2) The thickness of the Thermaphase coating can be varied from 0.5 mils up to 6 mils per side  
The coating thickness can be different on the two sides of the Al foil. This is useful if you have a very smooth, flat electronic component on one side and a rough, uneven heat sink on the other side.
- 3) This material is available with **ORCUS'** unique Zero  $\Delta$ T fiberized pressure sensitive adhesive (PSA) which does not increase thermal resistance.
- 4) Available with **ORCUS'** unique Zero  $\Delta$ T repositionable thermal adhesive (PSTA) which allows adjusting position of the part after it is applied to the heat sink.

**How to Use:**

Place Thermaphase on Aluminum foil material on heat sink. Install component using clips, screws, spring-loaded screws, or Belleville washers. Use at least 10.0 psi of closure force during initial reflow of Thermaphase compound. Heat component/heat sink by using component operating temperature, or externally applied heat. You can use more or less than 10.0 psi closure force. The thermal resistance decreases with increasing closure force. (See graph above).

**Product Availability:**

Standard Sheets: 12 x 12"  
 Standard rolls: 12" x 500 ft.  
 Standard die-cut parts: Pads for all standard case sizes are available. Contact us for outline drawings of standard parts. We have cut thousands of special die-cut parts. We may already have what you need.

For detailed information on "Specials we will be pleased to assist you in selecting the material having the best thermal, electrical, and mechanical characteristics.