Orcus Datasheets

Thermaphase Free Standing Film: FSF-52ºC

Advantages:

?? Lowest available thermal resistance:
0.03 °C/W/in^2 at very low closure force
?? 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
?? Easy to handle - "manufacturing friendly"
?? Excellent solvent resistance
?? Available in a wide range of thickness
?? Environmentally friendly/Non Toxic
?? Available with Zero ? T adhesive backing

Description:
This product consists of a self-supporting membrane Thermaphase Phase Change Material. It does not contain a substrate of non-melting material. It is dry-to-the-touch and flexible at room temperature. This is the original Free-Standing-Film material. When placed between two rigid, rough, uneven surfaces and heat (>52°C) and pressure (4.5psi) 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 substance flowable under low closure force.

2)The physical pressure on the component causes the Thermaphase material to flow into the micropores of the component and heat sink, expulsing air from these pores. The distance from the component 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" forms around the perimeter of the component. The thinnest possible interface is created.

This material 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. This 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.

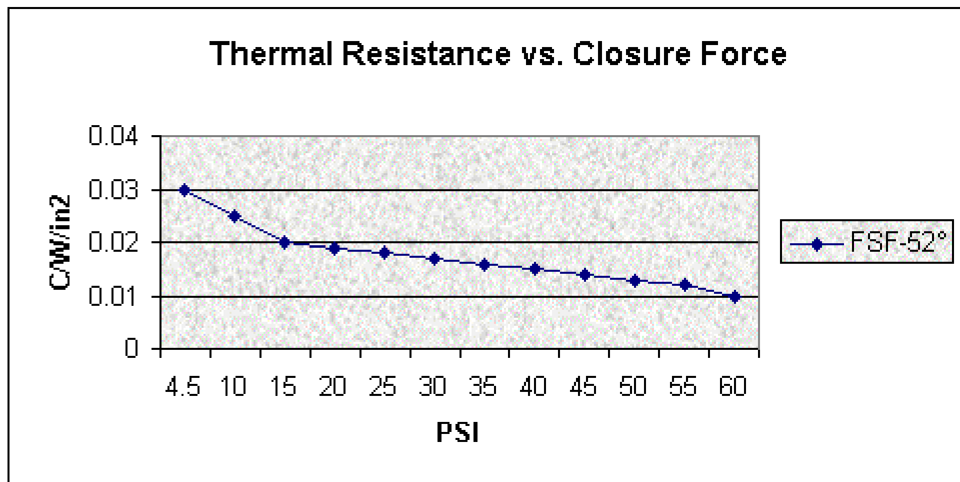
When selecting a product of this type please be aware of the following: Always check to see at what closure force the thermal resistance measurements were made. Products tested using ASTM 5470-95 as the test method use 438 psi. You cannot obtain this with normal electronic components and fasteners. Beware of phase change products that melt at temperatures less than 52°C as they can melt in transit.

Typical Characteristics:

Thermal Characteristics	**Units**	**FSF-52**
Overall Thermal Resistance at 4.5 psi. See graph of Thermal Resistance vs. Closure Force (See Test Procedure)	°C/W/in^2	0.03 at 4.5psi 0.02 at 15psi
Phase Change Temperature	°C	52
Use Temperature	°C	-60 to +200
Mechanical Characteristics	**Units**	**FSF-52**
Substrate Material	----	None
Material Thickness	mils	3 to 125
Viscosity (Thermaphase compound) at 150°C	Poise	>100
Density of Thermaphase Compound	g/cc	2.1
Electrical Characteristics	**Units**	**FSF-52**
Volume Resistivity*	? -cm	10^{14}
Dielectric Strength	Volts AC	375 per mil

* FSF-52 is not electrically conductive but contains no substrate to prevent metal to metal contact between component and heat sink.

Thermaphase FSF-52 does not require high mounting forces. Typically 4.5 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:

Available in thicknesses from 3 to 125 mils thick.

Available with Zero ?T PSA (Pressure Sensitive Adhesive)

How to Use:

Method 1: The FSF membrane is simply placed between component and heat sink. Clips can be used to maintain closure force.
Method 2: The FSF membrane is melted onto and thus adhered to the heat sink or to the component
Method 3: The heat sink and/or component are heated. The component is pressed into the molten FSF and after cooling, the component is adhered to the heat sink.

Product Availability:

Standard Sheets: 12" x 12"
Standard rolls: 9" x 1000ft and 13" x 1000ft
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.

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