

# THERMFLOW®

## Phase-Change Thermal Interface Pads



### DESCRIPTION

THERMFLOW® phase-change Thermal Interface Materials (TIM) are designed to minimize the thermal resistance between power dissipating electronic components and heat sinks.

This low thermal resistance path maximizes heat sink performance and improves component reliability. At room temperature, THERMFLOW materials are solid and easy to handle. This allows them to be consistently and cleanly applied as dry pads to a heat sink or component surface. THERMFLOW material softens as it reaches component operating temperatures. With light clamping pressure it will readily conform to both mating surfaces.

This ability to completely fill interfacial air gaps and voids typical of component packages and heat sinks allows THERMFLOW pads to achieve performance superior to any other thermal interface materials.

THERMFLOW products are electrically non-conductive. However, since metal-to-metal contact is possible after the material undergoes phase-change in a typical heat sink assembly. In general, THERMFLOW pads should not be used as electrical insulators - PC07DS-7 is offered as a dielectric version.

Chomerics offers two types of phase change materials—traditional thermal interface pads and polymer solder hybrids.

### POLYMER SOLDER HYBRID MATERIALS

These Thermal Interface Materials provide superior long term reliability performance. These products exhibit the lowest thermal impedance of the phase-change family.

For optimum performance, the pads must be exposed to temperatures above 64°C during operation or by a burn-in cycle to achieve lowest thermal impedance and highest thermal performance.

Upon reaching the required burn-in temperature, the pad will fully change phase and attain MBLT (minimum bond-line thickness less than 0.001 inch or 0.0254mm) and maximum surface wetting.

### FEATURES/BENEFITS

- Low thermal impedance
- Proven solution – years of production use in personal computer OEM applications
- Demonstrated reliability through thermal cycling and accelerated age testing
- Can be pre-applied to heat sinks
- Protective release liner prevents contamination of material prior to final component assembly
- Tabs available for easy removal of release liner (T710, T725, T557, T777)
- Available in custom die-cut shapes, kiss-cut on rolls
- Electrically non-conductive polymers

### TYPICAL APPLICATIONS

- Microprocessors
- Graphics Processors
- Chipsets
- Memory Modules
- Power Modules
- Power Semiconductors

### HANDLING INFORMATION

Commercial THERMFLOW pads are defined by Chomerics as “articles” according to the following generally recognized regulatory definition for articles:

An article is a manufactured item “formed to a specific shape or design during manufacturing,” which has “end use functions” dependent upon its size and shape during end use and which has generally “no change of chemical composition during its end use. In addition, there is no known or anticipated exposure to hazardous materials/substances during routine and anticipated use of the article.

These materials are not deemed by Chomerics to require an MSDS. For further questions, please contact Chomerics at 781-939-4850.

### APPLICATION

Material may flow when oriented vertically, especially at higher temperatures. This does not affect thermal performance, but should be considered if appearance is important.

# THERMFLOW® Phase-Change Thermal Interface Pads

THERMFLOW® Phase-Change Thermal Interface Pads									
Typical Properties	PC07DM-7	T710 with PSA	T725	T766	T557	T558	T777	Test Method	
Color	Pink	Light gray / off-white	Pink	Purple / Gray foil	Gray	Gray / Gray foil	Gray	Visual	
Carrier	1 mil polyester	2 mil Fiberglass	None - Free Film	1 mil Metal Foil	None - Free film	1 mil Metal Foil	None - Free film	--	
Standard Thicknesses, mm (in)	0.178 (0.007)	0.138 (0.0055)	0.125 (0.005)	0.088 (0.0035)	0.125 (0.005)	0.115 (0.0045)	0.115 (0.0045)	ASTM D374	
Specific Gravity	1.1	1.15	1.1	2.6	2.4	3.65	1.95	ASTM D792	
Phase Transition Temperature, °C	55	45	55	55	45 / 62	45 / 62	45 / 62	ASTM D3418	
Weight Loss, 125°C for 48 Hours	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	--	
Thermal Impedance @ 70°C, °C-cm <sup>2</sup> /W (°C-in <sup>2</sup> /W)									
@ 69 kPa (10 psi)	2.26 (0.35)	1.48 (0.23)	0.71 (0.11)	0.97 (0.15)	0.13 (0.02)	0.19 (0.03)	0.13 (0.02)		
@ 172 kPa (25 psi)	1.93 (0.30)	1.03 (0.16)	0.39 (0.06)	0.58 (0.09)	0.097 (0.015)	0.13 (0.02)	0.097 (0.015)	ASTM D5470	
@ 345 kPa (50 psi)	1.81 (0.28)	0.77 (0.12)	0.26 (0.04)	0.39 (0.06)	0.052 (0.008)	0.097 (0.015)	0.035 (0.0055)		
Operating Temperature Range, °C (°F)	-55 to 125 (-67 to 257)	-55 to 125 (-67 to 257)	-55 to 125 (-67 to 257)	-55 to 125 (-67 to 257)	-55 to 125 (-67 to 257)	-55 to 125 (-67 to 257)	-55 to 125 (-67 to 257)	--	
Volume Resistivity, ohm-cm	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup> Metal Foil*	Nonconductive	Nonconductive / Metal Foil*	Nonconductive	ASTM D257	
Voltage Breakdown (Vac)	5,000	N/A	N/A	N/A	N/A	N/A	N/A	ASTM D149	
Flammability Rating	Not Tested	Not Tested	V-0	Not Tested	Not Tested	Not Tested	V-0	UL 94	
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Chomerics Certification	
Shelf Life, months from date of shipment	12	12	12	12	12	12	12	Chomerics	

\*Phase-change material exhibits 10<sup>14</sup> ohm-cm volume resistivity. Metal foil is electrically conductive.

# THERMFLOW® Phase-Change Thermal Interface Pads

## TRADITIONAL PHASE CHANGE MATERIALS (PCM)

### PC07DM-7

- Utilizes proven T725 phase-change material
- Polyester dielectric layer offers excellent mechanical and electrical properties
- Inherently tacky – no adhesive required
- Good thermal properties

### T710

- General use material
- Good thermal performance
- Low deflection force required
- Fiberglass provides dielectric standoff
- Available with and without adhesive

### T725

- Excellent thermal performance
- Inherently tacky – no adhesive required
- Ideal for vertical applications
- Sticky nature limits flowing in vertical applications

### T766

- Excellent thermal performance
- Protective foil eliminates top liner
- Inherently tacky – no adhesive required
- Sticky nature limits flowing in vertical applications

## POLYMER SOLDER HYBRID MATERIALS (PSH)

### T557

- Superior thermal performance
- Dispersed solder filler offers added thermal performance
- Resin system designed for higher temperature reliability
- Inherently tacky – no adhesive required

### T558

- Superior thermal performance
- Conformal foil allows clean break/rework and eliminates top liner
- Dispersed solder filler offers added thermal performance

- Resin system designed for higher temperature reliability
- Inherently tacky – no adhesive required

### T777

- Superior thermal performance
- Ideal solution for mobile microprocessors
- Dispersed solder filler offers added thermal performance
- Resin system designed for higher temperature reliability
- Inherently tacky – no adhesive required
- End user license agreement may apply

## Ordering Information

THERMFLOW materials are supplied in several standard formats (see part number guide below).

Custom die-cut shapes can also be provided on kiss-cut rolls by Chomerics' extensive network of distributor/ fabricators. To ease release liner removal, an optional tab can be added.

Standard tolerances for slitting widths and individually cut pieces are  $\pm 0.020$  inch ( $\pm 0.51$  mm).

### Part Number:



WW	XX	YYYY	ZZZZ
4 = Roll stock	10 = 100 ft. 40 = 400 ft. XX = Custom length	YYYY = Roll stock width: Examples 0100 = 1" 0750 = 7.5" 2400 = 24"	ZZZZ = Material class (T710, T725, T766, T557, T558, T777)
6 = Roll stock with PSA			ZZZZ = T710 only product available with PSA. (no need for PSA) All others are inherently tacky
8 = Roll stock with PSA and release tabs			
9 = Custom die-cut part	11 = without PSA 12 = with PSA one side	Custom Part Number. Contact Chomerics	ZZZZ = Material class (T710, T725, T766, T557, T558, T777)