

Quick Cooler

Thermal Interface Materials



Hard Pad Type Series

TP-H1000 : Low Thermal Conductivity (0.5~1.5 W/mK)

TP-H2000 : Medium Thermal Conductivity (2.0~2.5 W/mK)

TP-H3000 : High Thermal Conductivity (≥ 3.0 W/mK)

Soft Pad Type Series

TP-S1000 : Low Thermal Conductivity (1.0 W/mK)

TP-S2000 : High Thermal Conductivity (2.0~2.5 W/mK)

TP-S3000 : Specially High Thermal Conductivity (≥ 3.0 W/mK)

Thermal + EMI Absorbing Hybrid Type Series

Siloxane & Halogen Free

NS-T2 : Medium Thermal Conductivity (2.5 W/mK)

NS-T3 : High Thermal Conductivity (3.0 W/mK)

Thermal Grease Type Series

TG-3 : Medium Thermal Conductivity (3.0 W/mK)



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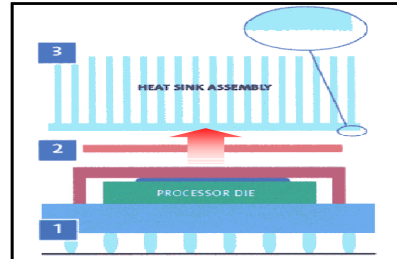
CSC

CSC THERMAL CONDUCTIVE PAD

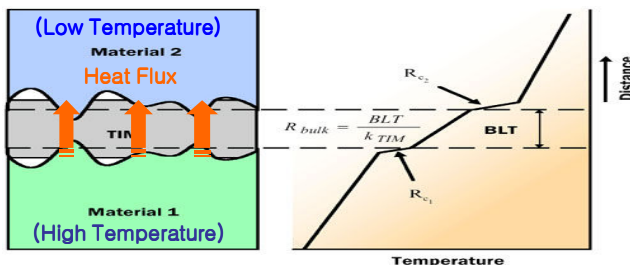
Introduction to Thermal Interface Material

Mechanism of Heat Transfer

- ① Heat transfer in semiconductor package : materials and design problems
- ② Heat transfer from TIM to heat sink : function of TIM
- ③ Heat transfer from heat sink to air : function of cooler



Heat Transfer Rate

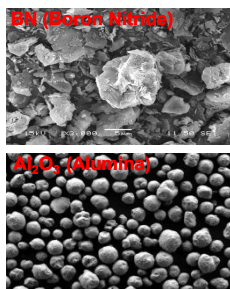


Heat Transfer Rate Q :
(Fourier equation)

$$Q = k \cdot A \cdot \Delta T / d$$

k : Thermal conductivity of TIM
 A : Contact area
 ΔT : Temperature gradient
 d : Contact distance

Composition of TIM



Ceramic fillers

+

Polymer
(Silicone/Acrylic)

Precision Compounding Technique
: surface modification, powder blending

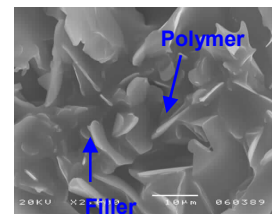
High Density Sheet or Grease!



Thermal Conductivity(k) of Various Materials

Material	k(W/mK)	Material	k(W/mK)	Material	k(W/mK)
CNT	2,000	AlN	180	Epoxy	0.300
Ag	427	SiC	115	SI rubber	0.160
Cu	398	Alumina	36	Water	0.610
Al	237	BN	60	Ethanol	0.166
Al alloy	120	Quartz	1.38	Air	0.026
Si	148	Glass	1.0	Hydrogen	0.181
Fe	79	MgO	26	Styrofoam	0.024

Cross-section of TIM



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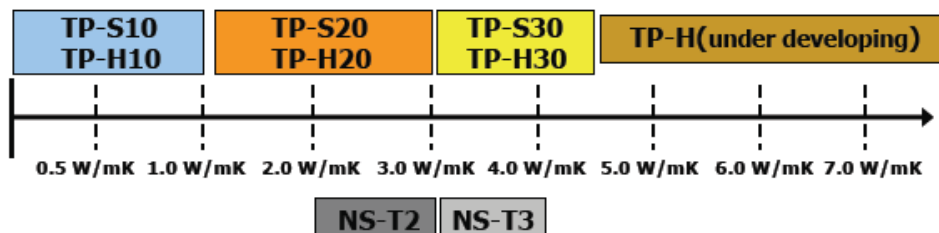
CSC Paste Division

CSC THERMAL CONDUCTIVE PAD

CSC's THERMAL INTERFACE MATERIALS

	Characteristics	Standards
Thermal	Use Temperature (℃)	-
	Thermal Conductivity (W/mK)	ASTM D 5470
Electrical	Volume Resistivity (Ω·cm)	ASTM D 257
	Breakdown Voltage (kV)	ASTM D 149
Mechanical	Specific Gravity (g/cc)	ASTM D 792
	Hardness (Shore A)	ASTM D 2240
	Tensile Strength (kgf/cm ²)	ASTM D 412
	Elongation (%)	ASTM D 412

TP Series



NS-T Series

T (A) – (S/H) 0000

T : Changsung Thermal Solution
(A) : Product Type
 ex.) P - Pad, G - Grease Type
NS : Noise Suppressor

(S/H) : Sheet Type
 ex.) S : Soft Pad, H : Hard Pad
0000 : Thermal Conductivity/Thickness
 ex.) 1010 : 1 W/mK, 1.0 mm(T)
 3017 : 3 W/mK, 1.7 mm(T)

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