

Features & Benefits

- Thermal resistance 3mil, 0.05°C-in²/W (0.32°C-cm²/W)
- Product Thermal conductivity of 4.1 W/m-K
- High Voltage Strength
- High temperature applications
- Lead-free solder compatible
- Eutectic AuSn compatible
- RoHS compliant and environmentally green
- Available on aluminum and copper base substrates
 - Other substrates materials may be available

Thermal Clad Metal Core PCB's (MCPCB's) minimize thermal impedance and conducts heat more efficiently than standard printed wiring boards (PWB's). These substrates are more mechanically robust than Direct Bond Copper (DBC) construction.

The differentiating technology of Thermal Clad resides in the dielectric. This datasheet highlights the performance characteristics of Thermal Clad HT dielectric

Applications

- High power density applications where achieving low thermal resistance is required
- Power conversion
- Heat Rails
- Solid state relays

Configurations

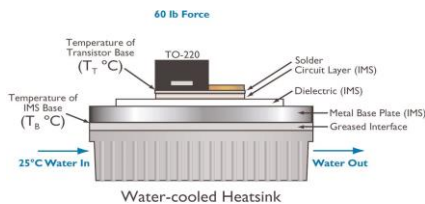
Base Metal **Thickness mm (mil)**

- 5052 Aluminum 0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80), 3.2 (125)
- 6061 Aluminum 0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80), 3.2 (125), 4.8 (190)
- 4045 Aluminum 1.5 (59), 2.0 (80)
- Copper C1100 0.5 (20), 0.8 (32), 1.0 (40)*, 1.5 (60)*, 3.2 (125)

* most common thicknesses

** other thicknesses and alloys may be available. Please contact TCLAD sales department

Test Thermal Performance of Insulated Metal Substrate (IMS®) TO-220 Set-up



$$\theta \left(\frac{^{\circ}\text{C}}{\text{W}} \right) = \frac{(T_T - T_B)}{40\text{W typ}}$$

Item	Thickness	Unit	Value	Method
Thermal Properties				
Product Thermal Conductivity		W/m-K	4.1	MET 5.4-01-40000
Dielectric Thermal Conductivity		W/m-K	2.2	ASTM D5470
Thermal Resistance	75µm (3mil)	°C-cm ² /W (°C-in ² /W)	0.32 (0.05)	ASTM D5470
	100µm (4mil)		0.49 (0.077)	
	150µm (6mil)		0.71 (0.11)	
	225µm (9mil)		1.03 (0.16)	
Thermal Impedance	75µm (3mil)	°C/W	0.45	MET 5.4-01-40000
	100µm (4mil)		0.53	
	150µm (6mil)		0.70	
	225µm (9mil)		0.90	
Electrical Properties				
Dielectric Constant		-s	7	ASTM D150
Dissipation Factor	75µm (3mil)	1KHz/1MHz	0.0033/0.0148	ASTM D150
	100µm (4mil)		TBD	
	150µm (6mil)		0.0038/0.0129	
	225µm (9mil)		0.0040/0.0130	
Capacitance	75µm (3mil)	pF/cm ² (pF/in ²)	85 (540)	ASTM D150
	100µm (4mil)		71 (450)	
	150µm (6mil)		43 (270)	
	225µm (9mil)		25 (160)	
Volume Resistivity		Ω-m	10 ¹⁴	ASTM D257
Surface Resistivity		Ω/sq	10 ¹³	ASTM D257
Breakdown Voltage	75µm (3mil)	KVAC	8.5	ASTM D149
	100µm (4mil)		9.3	
	150µm (6mil)		11.0	
	225µm (9mil)		20	
Mechanical Properties				
Color		-	White	Visual
Peel Strength @ 25°C		N/mm ((lb/in)	1.1 (6)	ASTM D2861
Glass Transition (T _g)		°C	150	ASTM E1356
CTE in X,Y,Z Axis <T _g		µm/m°C	25	ASTM D3386
CTE in X,Y,Z Axis >T _g		µm/m°C	95	ASTM D3386
Storage Modulus		GPa	16/7	ASTM D4065
Chemical Properties				
Water Vapor Retention		% Wt.	0.24	ASTM E595
Out-Gassing Total Mass Loss		% Wt.	0.28	ASTM E595
Collect Volatile Condensable Material		% Wt.	0.01	ASTM E595
Agency Ratings & Durability				
UL Maximum Operating Temperature (MOT)		°C	140	UL 746
UL Flammability		-	V-0	UL 94
UL Comparative Tracking Index		(CTI)	V-0	ASTM D3638/ IEC 60112
Solder Limit Rating		°C	325	UL 746

