TCLAD

Technical Data

SFL-3 Dielectric

Features & Benefits

- Thermal resistance 100µm, 0.12°C-in²/W
- Product Thermal conductivity of 3 W/m-K
  - (2oz Cu x 100µm SFL-3 x 1.5 Al)
- High Voltage Strength
- Lead-free solder compatible
- RoHS compliant and environmentally green
- Available as laminated panels, RCC and Prepreg
- Available on aluminum and copper base substrates
- SFL-3 provides the advantages of high thermal conductivity, reliability, and low thermal resistance.
- SFL is a 3-layer structure, which includes layers of copper foil, ceramic filled polymer, and base metal.
- The insulator is made by a unique polymer composite that combine epoxy resin and high thermal conductivity filler, and the thermal conductivity is much higher than the traditional epoxy filled glass fiber system.
- Thermal Clad SFL-3 Laminates and prepregs are specifically designed for mid performance applications where cost control is a major factor.
- The differentiating technology of Thermal Clad resides in the dielectric. This datasheet highlights the performance characteristics of Thermal Clad SFL-3 dielectric.

Applications

- LED headlight & foglamps and other applications where ceramic based components are used and improved solder joint reliability is required.

Configurations

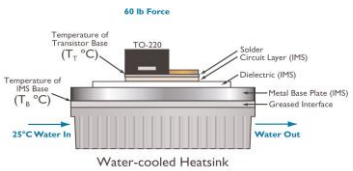
Base Metal	Thickness mm (mil)
5052 Aluminum	0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80)
6061 Aluminum	0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80)
1050 Aluminum	0.8 (32), 1.0 (40)*, 1.5 (59)*, 2.0 (80)
4045 Aluminum	1.5 (59), 2.0 (80)
Copper C1100	1.0 (40)*, 1.5 (59)*, 2.0 (80)

Copper Foil	Weight oz (thickness µm)
ED Copper	1oz (35), 2oz (70), 3oz (105), 4oz (140), 6oz (210)
RA	8oz (280), 10oz (350)

* Most common thicknesses

** Other thicknesses and alloys may be available. Please contact TCLAD sales department for more information.

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



Item	Thickness	Unit	Value	Method
Thermal Properties				
Product Thermal Conductivity		W/m-K	3	TO-220
Dielectric Thermal Conductivity		W/m-K	1.7	ASTM D5470
Thermal Resistance	100µm (4mil)	°C-in²/W	<0.12	ASTM D5470
Thermal Impedance	100µm (4mil)	°C/W	0.33	TO-220
Electrical Properties				
Dielectric Constant		-	5.1	IPC-TM-650 2.5.5.3
Dissipation Factor	100µm (4mil)	1MHz	0.023	IPC-TM-650 2.5.5.3
Capacitance	100µm (4mil)	pF/cm²	0.45	IPC-TM-650 2.5.5.3
Volume Resistivity		Ω-cm	10^{15}	IPC-TM-650 2.5.17.1
Surface Resistivity		Ω/sq	10^{13}	IPC-TM-650 2.5.17.1
Breakdown Voltage	80µm (3.2mil)	KVAC	5	ASTM D149
	100µm (4mil)		6	
	150µm (6mil)		8	
Mechanical Properties				
Color		-	Off-white	Visual
Peel Strength @ 25°C		N/mm	>1.4	IPC TM-650 2.4.8
Glass Transition (Tg)		°C	140	IPC TN-650 2..4.25
CTE in X,Y/Z Axis <Tg		µm/m°C	25	IPC TM-650 2.4.24.5
CTE in X,Y/Z Axis >Tg		µm/m°C	32	IPC TM-650 2.4.24.5
Chemical Properties				
Water Absorption		% Wt.	<0.5	IPC TM-650 2.6.2.1
Out-Gassing Total Mass Loss		% Wt.	<0.1	ASTM E595
Collect Volatile Condensable Material		% Wt.	< 0.1	ASTM E595
Agency Ratings & Durability				
UL Maximum Operating Temperature (MOT)		°C	130	UL 746
UL Flammability		-	V-0	UL 94
UL Comparative Tracking Index		(CTI)	0 / 600	ASTM D3638/ IEC 60112
Solder Limit Rating		°C	300	UL 746

TCLAD Inc.
1600 Orrin Rd,
Prescott WI 54021
+1 715-5898
www.tclad.com

Made at our Taiwan or Kunshan China factory

Rev 2023 D08-001