TCLAD

Technical Data

SFL-3E Dielectric

Features & Benefits

- Thermal resistance 100µm, 0.13°C-in²/W
- Product Thermal conductivity of 3 W/m-K
  - (2oz Cu x 100µm SFL 3E x 1.5 Al)
- Low Modulus
- High Voltage Strength
- Lead-free solder compatible
- Eutectic AuSn compatible
- RoHS compliant and environmentally green
- Available on aluminum and copper base substrates
- 4045 aluminum alloy complements SFL 3E in improving solder joint reliability.

Thermal Clad SFL-3E Laminates and prepregs are specifically designed to improve solder joint reliability as a result of CTE mismatch between the component package and the baseplate metal.

The differentiating technology of Thermal Clad resides in the dielectric. This datasheet highlights the performance characteristics of Thermal Clad SFL 3E

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)*, 1.6 (63)*, 2.0 (80), 3.2 (125)
- 6061 Aluminum 0.8 (32), 1.0 (40)*, 1.6 (63)*, 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)*, 1.58 (62)*, 3.2 (125)

Copper Foil **Weight oz (thickness µm)**

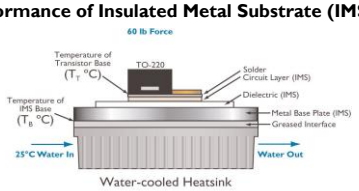
- ED Copper 1oz (35), 2oz (70), 3oz (105), 4oz (140), 6oz (210)
- RA 8oz (280), 10oz (350)

* Most common thicknesses

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

Item	Thickness	Unit	Value	Method
Thermal Properties				
Product Thermal Conductivity		W/m-K	3	TO-220
Dielectric Thermal Conductivity		W/m-K	1.6	ASTM D5470
Thermal Resistance	100µm (4mil)	°C-in²/W	<0.13	ASTM D5470
Thermal Impedance	100µm (4mil)	°C/W	0.33	TO-220
Electrical Properties				
Dielectric Constant		-	7.9	IPC-TM-650 2.5.5.3
Dissipation Factor	100µm (4mil)	1MHz	0.025	IPC-TM-650 2.5.5.3
Capacitance	100µm (4mil)	pF/cm²	0.7	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 (2mil)	KVAC	5	ASTM D149
	100µm (4mil)		7	
	150µm (6mil)		9	
Mechanical Properties				
Color		-	Off-white	Visual
Peel Strength @ 25°C		N/mm	>1.4	IPC TM-650 2.4.8
Glass Transition (Tg)		°C	55	IPC TN-650 2..4.25
CTE in X,Y/Z Axis <Tg		µm/m°C	24	IPC TM-650 2.4.24.5
CTE in X,Y/Z Axis >Tg		µm/m°C	37	IPC TM-650 2.4.24.5
Storage Modulus		GPa	0.5	ASTM D4065
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	140	UL 746
UL Flammability		-	V-0	UL 94
UL Comparative Tracking Index		(CTI)	0 / 600	ASTM D3638/ IEC 60112
Solder Limit Rating		°C	325	UL 746

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



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

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Made at our Taiwan or Kunshan China factory

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