

Features & Benefits

- Thermal resistance 100μm, 0.11°C-in²/W
- Product Thermal conductivity of 4 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 as a laminated panel, RCC or prepreg**
- Available on aluminum and copper base substrates**
- 4045 aluminum alloy complements SFL 3E in improving solder joint reliability.

Thermal Clad SFL-4 laminates and prepreps 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 4.

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)

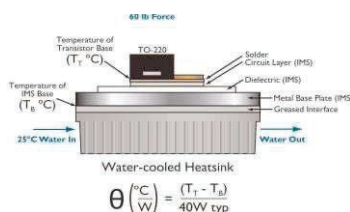
- ED Copper 1oz (35), 2oz (70), 3oz (105), 4oz (140), 6oz (210)
- RA 8oz (280), 10oz (350)

* Most common thicknesses

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

We provide custom solutions for your applications. For Further inquiries, please contact your local sales agent or directly to TCLAD sales sales@tclad.com

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



Item	Thickness	Unit	Value (Typ.)	Method
Thermal Properties				
Product Thermal Conductivity		W/m-K	4	TO-220
Dielectric Thermal Conductivity		W/m-K	2.5	ASTM D5470
Thermal Resistance	100µm (4mil)	°C-in²/W	0.11	ASTM D5470
Thermal Impedance	100µm (4mil)	°C/W	0.25	TO-220
Electrical Properties				
Dielectric Constant		-	4.9	IPC-TM-650 2.5.5.3
Dissipation Factor	100µm (4mil)	1MHz	0.022	IPC-TM-650 2.5.5.3
Capacitance	100µm (4mil)	pF	18	IPC-TM-650 2.5.5.3
Volume Resistivity		Ω-cm	10¹⁵	IPC-TM-650 2.5.17.1
Surface Resistivity		Ω/sq	10¹³	IPC-TM-650 2.5.17.1
Breakdown Voltage	80µm (2mil)	KVAC	4	ASTM D149
	100µm (4mil)		5	
	150µm (6mil)		7	
Mechanical Properties				
Color		-	Dark Gray	Visual
Peel Strength @ 25°C		N/mm	>1.4	IPC TM-650 2.4.8
Glass Transition (Tg)		°C	55	IPC TM-650 2.4.25
CTE in X,Y/Z Axis <Tg		µm/m°C	16	IPC TM-650 2.4.24.5
CTE in X,Y/Z Axis >Tg		µm/m°C	25	IPC TM-650 2.4.24.5
Storage Modulus		GPa	17 (25 °C) 0.9 (125 °C)	ASTM D4065
Decomposition Temperature (2% loss)		°C	350	IPC TM-650 2.4.24.6
Decomposition Temperature (5% loss)		°C	400	IPC TM-650 2.4.24.6
Chemical Properties				
Water Absorption		% Wt.	<0.5	ASTM E595
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	110	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

