



# Tlam™ SS LLD

## Thermally Conductive PCB Substrate

### ULTRA-BRIGHT LED INSULATED METAL PRINTED CIRCUIT BOARD MATERIAL

Tlam SS LLD is a copper circuit layer and aluminum or copper base plate bonded together with LLD dielectric. LLD that are processed through standard FR4 print and etch operations.

LLD is designed for bright and ultra-bright LED module applications. LLD products have 6-8 times better thermal conductivity compared to FR4 and this is the key to keep components cool. LLD boards are processed through standard pick-and-place SMT and manual wire bond operations.

Standard constructions are made with 1 or 2 ounce copper and 0.040 (1) or 0.062 (1.6) inch (mm) thick aluminum.

### FEATURES AND BENEFITS

- RoHS compliant
- Environmentally green
- Lead-free solder compatible
- Uses standard FR4 print and etch processing

### APPLICATIONS

- Highway and street lights using LEDs
- Railroad crossing signal lights using LEDs
- BLU for large format LCD TVs
- General lighting

THERMAL PROPERTIES	UNITS	Tlam SS LLD04
Thermal Conductivity	watt/m <sup>2</sup> -K	2.0
Thermal Resistance	C-in <sup>2</sup> /Watt (C-cm <sup>2</sup> /Watt)	0.07 (0.504)
Glass Transition Temperature	°C	165
Operating Temperature, Maximum	°C	150
Heat Capacity	J/g°C	1.12
ELECTRICAL PROPERTIES	UNITS	Tlam SS LLD04
Dielectric Constant @ 1KHz/1MHz		5.1/4.8
Dissipation Factor @ 1KHz		0.007
Capacitance @ 1 KHz	pF/in <sup>2</sup> (pF/cm <sup>2</sup> )	287 (44.5)
Volume Resistivity @25°C	ohm-cm	1.0E+15
Volume Resistivity @150°C	ohm-cm	2.0E+12
Surface Resistivity	ohm	1.5E+12
Dielectric Withstand (VDC)	VDC	1800
Dielectric Breakdown (VAC)	VAC	2500

MECHANICAL PROPERTIES	UNITS	Tlam SS LLD04
Dielectric Thickness	inch (mm)	0.004 (0.102)
Peel Strength	pli (kgf/cm)	6.0 (1.1)
CTE < Tg XYZ axis	ppm/°C	16/36
CTE > Tg XYZ axis	ppm/°C	18/155
Tensile Strength@25/150 °C MD/TD	MPa	88/57
Elongation 25/150 °C	%	0.8/1.0
Young's Modulus @ 25/150 °C	MPa	13180/6810
Poisson's Ratio 25/150 °C		0.277/0.263
Flexural Strength 25 °C	MPa	142
AGENCY RATINGS & DURABILITY	UNITS	Tlam SS LLD04
UL Flammability	E165095	94V0
Solder Float (4 min. @ 288 °C)		Pass

Data for design engineer guidance only.  
Observed performance varies in application.  
Engineers are reminded to test the material in application.

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THR-DS-Tlam-SS-LLD 0110

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