



HALOGEN FREE PRODUCT PROPERTIES

Property	UNITS	Specification	Typical Value			
			TLM-510	TLM-510(HT)	TLM-710	
Glass Transition Temperature (Tg) by DSC, spec minimum	°C	150 /170/170 min	153	173	172	
Decomposition Temperature (Td)	°C	350 min	360	365	370	
TD-260 (Etched)	Minutes	35 min	> 60	> 60	> 60	
TD-288(Etched)	Minutes	10 min	> 50	> 50	> 60	
CTE X-Axis Y-Axis	ppm/°C	- -	13 15	13 15	13 15	
CTE Z-Axis	Pre-Tg	ppm/°C	60 max.	~ 40	30-50	~ 35
	Post-Tg		300 max.	~ 200	200 – 250	~ 190
	50 - 260 °C / Ambient to Tg		3.0% max.	135 (3.0%)	135 (2.9%)	110 (2.3%)
Thermal Stress 10 Sec @ 288 °C (Etched)	Seconds	Pass visual	> 200	> 200	>300	
Thermal Conductivity	W/mK	-	0.35	0.35	0.35	
Peel Strength (spec minimum)	0.5 oz. (17 micron)	Lb/inch (N/mm)	-	-	-	-
	1.0 oz. (35 micron)		6.0 (1.05)	7-9 (1.22-1.58)	7-9 (1.22-1.58)	7-9 (1.22-1.58)
Dielectric Constant (DK)	1 MHz	-	5.4 max.	4.90	4.80	4.80
	1 GHz	-	-	4.70	4.40	4.40
Loss Tangent (Df)	1 MHz	-	0.035 max.	0.020	0.015	0.015
	1 GHz	-	-	0.018	0.013	0.013
Volume Resistivity	Mohm-cm	10 ⁶	1 x 10 ¹⁰	3.2 x 10 ⁸	3.2 x 10 ⁸	
Surface Resistivity	Mohm	10 ⁴	1 x 10 ⁸	2.4 x 10 ⁷	2.4 x 10 ⁷	
Dielectric Breakdown, spec minimum	kV	40 min.	80	> 60	> 60	
Arc resistance	Seconds	60 min.	125	120	120	
Comparative Tracking Index (CTI)	Volts	-	175-250 (PLC=3)	175-250 (PLC=3)	175-250 (PLC=3)	
Moisture Absorption	%	0.35/0.50 max.	0.12	0.25	0.25	
Flexural Strength CW LW	psi	50,000 min. 60,000 min.	65,000 75,000	65,000 75,000	65,000 75,000	
Flammability	rating	V-0 min.	V-0	V-0	V-0	
Bow & Twist	%	0.75 max.	0.30	0.30	0.30	

Material Thickness Tested 1.5 mm. thickness , Cu 1/1 Oz.

Information contained in this data sheet represents typical or average values and does not constitute any warranty or guarantee.