



# LOW LOSS PRODUCT PROPERTIES

Property		UNITS	Specification	Typical Value	
				TLM-510(D)	TLM-170(LD)
Glass Transition Temperature (Tg) by DSC, spec minimum		°C	170/180 min	170	185
Decomposition Temperature (Td)		°C	350 min	365	365
TD-288 (Etched)		Minutes	10 min	>60	>30
CTE X-Axis		ppm/°C	-	13	13
Y-Axis			-	15	15
CTE Z-Axis	Pre-Tg	ppm/°C	60 max.	~ 40	~ 40
	Post-Tg		300 max.	~ 225	~ 225
	50 - 260 °C		3.0% max.	135(2.9%)	125(2.6%)
Thermal Stress 10 Sec @ 288 °C (Etched)		Seconds	Pass visual	> 200	> 200
Thermal Conductivity		W/mK	-	0.35	-
Peel Strength (spec minimum)	0.5 oz. (17 micron)	Lb/inch (N/mm)	-	-	-
	1.0 oz. (35 micron)		5.0 /4.0 (0.87/0.70)	5-7 (0.87-1.22)	5-7 (0.87-1.22)
Dielectric Constant (DK)	1 MHz	-	5.4 max.	4.05	-
	1 GHz	-	-	3.90*	-
	10 GHz	-	-	-	3.80*
Loss Tangent (Df)	1 MHz	-	0.035 max.	0.015	-
	1 GHz	-	-	0.014*	-
	10 GHz	-	-	-	0.0075*
Volume Resistivity		Mohm-cm	10 <sup>6</sup>	4.4 x 10 <sup>8</sup>	5.1 x 10 <sup>8</sup>
Surface Resistivity		Mohm	10 <sup>4</sup>	2.0 x 10 <sup>7</sup>	1.4 x 10 <sup>7</sup>
Dielectric Breakdown, spec minimum		kV	40 min.	>60	>60
Arc resistance		Seconds	60 min.	120	120
Comparative Tracking Index (CTI)		Volts	-	175- 230 (PLC=3)	175- 230 (PLC=3)
Moisture Absorption		%	0.35 max.	0.25	0.25
Flexural Strength	CW	psi	50,000 min.	65,000	55,000
	LW		60,000 min.	75,000	65,000
Flammability		rating	V-0 min.	V-0	V-0
Bow & Twist		%	0.75 max.	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.

\*Sample thickness is 0.8mm and resin content 56%.

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