



NorCLAD™ MICROWAVE LAMINATES



TECHNICAL FEATURE

FEATURES AND BENEFITS

- Low Loss
- Low Cost
- Thermal Stability
- Isotropic Properties

TYPICAL APPLICATIONS

- GPS
- UAV
- SatCom Subscriber
- Broadband ComLink

DESIGN NOTES

NorCLAD Laminates, made from a modified version of the thermoplastic PPO (Polyphenylene Oxide), have an ideal dielectric constant of 2.55, very uniform and reproducible electrical properties, and are very stable over temperature.

When first introduced in the early 1960s PPO was touted as the ultimate dielectric for use as a microwave laminate. However, as a circuit board material, its usage was limited due to the solvent based processing chemicals used at the time. NorCLAD, being impervious to today's aqueous processing chemicals is ideal for RF and Microwave applications, at a price well below materials offering comparable performance.

PROPERTY	VALUE	UNITS	DIRECTION	FREQUENCY	TEST METHOD/CONDITION
Dielectric Constant	2.55 +/- .05	-	Z	3 GHz	IPC-TM-650
Dissipation Factor	0.0011	-	Z	3 GHz	IPC-TM-650
Dielectric Strength (0.125")	500	V/mil	Z	-	ASTM D 149
Volume Resistivity	10 ¹⁷	ohm • cm	Z	-	ASTM D 257
Maximum Temperature	175	°C	-	-	Short Duration
Thermal Conductivity	0.23	W/m/°C	Z	-	ASTM C 518
Specific Gravity	1.12	-	-	-	ASTM D 792
Thermal Expansion (Unclad Dielectric)	53 53 53	ppm/°C ppm/°C ppm/°C	X Y Z	- - -	ASTM E 831 ASTM E 831 ASTM E 831
Water Absorption	0.06-0.07	%	-	-	ASTM D 570
Copper Peel (Average)	6-8	lbs/in	-	-	
Operating Temperature	-55 to 125	°C	-	-	
RoHS Compliant	Yes	Compliance Statement Available Upon Request			
Color, Dielectric	Black				

NorCLAD ORDERING INFORMATION

DIELECTRIC THICKNESS	PANEL SIZE	COPPER WEIGHT/THICKNESS
0.060" (1.524mm) 0.090" (2.286mm) 0.125" (3.175mm) 0.250" (6.350mm) 0.375" (9.525mm) 0.500" (12.70mm)	20" x 22" (508mm x 559mm)	½ oz/ft ² (17 microns) 1 oz/ft ² (35 microns) 2 oz/ft ² (70 microns)

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