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NAN YA PLASTICS CORPORATION
ELECTRONIC MATERIALS DIVISION.
COPPER CLAD LAMINATE DEPARTMENT

**Glass cloth base epoxy resin
flame retardant copper clad laminate**

NO. 201. TUNG HWA N. ROAD,
TAIPEI, TAIWAN.

NP-180TL

FEATURES

- High Tg 175°C (DSC)
- Excellent dimensional stability through-hole reliability
- Excellent electrical, chemical and heat resistance properties
- IPC-4101C specification is applicable
- U.L. designation:ANSI grade FR-5
- U.L. file number E98983
- Outstanding heat resistance
- High luminance of multi-functional epoxy contrast with copper for A.O.I.

PERFORMANCE LIST

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	5.0 x10 ⁹	10 ⁶ ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	5.0 x10 ⁸	10 ⁴ ↑	2.5.17	
Permittivity 1 MHZ	-	C-24/23/50	4.3-4.5	5.4 ↓	2.5.5.9	
Permittivity 1 GHZ	-	C-24/23/50	4.1-4.3	-	2.5.5.9	
Loss Tangent 1 MHZ	-	C-24/23/50	0.015-0.020	0.035 ↓	2.5.5.9	
Loss Tangent 1 GHZ	-	C-24/23/50	0.014-0.018	-	2.5.5.9	
Arc resistance	SEC	D-48/50+D-0.5/23	120 ↑	60 ↑	2.5.1	
Dielectric breakdown	KV	D-48/50	60 ↑	40 ↑	2.5.6	
Moisture absorption	%	D-24/23	0.20-0.30	0.35 ↓	2.6.2.1	
Flammability	-	C-48/23/50	94V0	94V0	UL94	
Peel strength 1 oz	lb/in	288°Cx10" solder floating	8-10	6 ↑	2.4.8	
Thermal stress	SEC	288°C solder dipping	600 ↑	10 ↑	2.4.13.1	
Glass transition temp	°C	DSC	175 ± 5	N/A	2.4.25	
Dimensional stability X-Y axis	%	E 4/105	0.01-0.03	0.05 ↓	2.4.39	
Coefficient of thermal expansion	ppm/°C	TMA	50-70	N/A	2.4.24	
						Z-axis before Tg
						Z-axis after Tg

NOTE:

The average value in the table refers to samples of .020" 1/1.
Test method per IPC-TM-650

Data shown are nominal values for reference only.

■ CONSTRUCTION:

THICKNESS		CONSTRUCTION	THICKNESS		CONSTRUCTION
mm	mil		mm	mil	
0.10	4	1080 2 plies	0.38	15	7628 2 plies
0.11	4	2116 1 ply	0.45	18	7628x2+1080x1
0.13	5	1080 2 plies	0.50	20	7628 3 plies
0.13sp	5	2116 1 ply	0.53	21	7628 3 plies
0.15	6	1506 1 ply	0.60	24	7628 3 plies
0.16	6	2112 2 plies	0.77	31	7628 4 plies
0.21	8	7628 1 ply	0.8	32	7628 4 plies
0.26	10	2116 2 plies	0.9	36	7628 5 plies
0.30	12	2116 3 plies	1.0	39	7628 5 plies
0.30sp	12	1506 2 plies	1.1	43	7628 6 plies
0.35	14	7628 2 plies	1.2	47	7628 6 plies

• 1.2, 1.1, 1.0, 0.9 0.77 mm THICKNESS INCLUDE CLADDING, ALL OTHERS EXCLUDE CLADDING

■ PRODUCT SIZE & THICKNESS

THICKNESS INCH(mm)	COPPER CLADDING OZ (µm)	SIZE		THICKNESS TOLERANCE
		INCH	mm	
0.004 (0.1)	0.5 (17)	48.8 x 36.6	1240 x 0930	IPC-4101C SPEC CLASS C/M
to	1.0 (35)	48.8 x 40.5	1240 x 1030	
0.039(1.0)	2.0 (70)	48.8 x 42.5	1240 x 1080	

■ Keeping the core and prepreg in the same grain direction is crucial to ensure the flatness of multilayer boards.

Grain direction is shown on the Certificate of Conformance

■ This material can not be used in horizontal brown oxide process.

■ CERTIFICATION UL

• UL File No. : E98983

Minimum Material Thickness Inch (mm)	Clad cond. Thickness min. max. mils mils (mic) (mic)		Max. Area Diameter Inch (mm)	Sold Lts Temp Time °C sec	UL 94 Flame class	Max. Operating Temp
	0.004 (0.101)	0.68 (17)				