



**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-150TL**

**FEATURES**

- Multi-functional epoxy resin renders the material outstanding resistance, better dimensional stability, and through-hole reliability that benefit the performance of high layer count multilayer boards.
- HTE copper foil applied to prevent corner cracking.
- High luminance of epoxy contrast with copper for laser type AOI.
- UV solder mask may be applied simultaneously in order to increase yields.
- IPC-4101B specification is applicable.

**PERFORMANCE LIST**

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	5.0 x10 <sup>9</sup>	10 <sup>6</sup> ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	5.0 x10 <sup>7</sup>	10 <sup>4</sup> ↑	2.5.17	
Permittivity 1 MHZ	-	C-24/23/50	4.2-4.4	5.4 ↓	2.5.5.9	
Permittivity 1 GHZ	-	C-24/23/50	4.0-4.2	-	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	0.011-0.013	-	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-24/23/50+E-24/125	94V0	94V0	UL94	
Peel strength 1 oz	lb/in	288°Cx10" solder floating	10-14	6 ↑	2.4.8	
Thermal stress	SEC	288°C solder dipping	200 ↑	10 ↑	2.4.13.1	
Glass transition temp	°C	DSC	150 ± 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	
0.08	3	2112 1 ply	0.45	18	7628 x 2 + 1080 x 1
0.10	4	1080 2 plies	0.46	18	7667 2 plies
0.11	4	2116 1 ply	0.50	20	7628 3 plies
0.13	5	1080 2 plies	0.53	21	7628 3 plies
0.13sp	5	2116 1 ply	0.60	24	7628 3 plies
0.15	6	1506 1 ply	0.77	31	7628 4 plies
0.16	6	2112 2 plies	0.8	32	7628 4 plies
0.21	8	7628 1 ply	0.9	36	7628 5 plies
0.26	10	2116 2 plies	1.0	39	7628 5 plies
0.30	12	2116 3 plies	1.1	43	7628 6 plies
0.30sp	12	1506 2 plies	1.2	47	7628 6 plies
0.35	14	7628 2 plies			
0.38	15	7628 2 plies			

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

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

**Grain direction is shown on the Certificate of Conformance**

**■ CERTIFICATION UL**

• UL File No.: E98983

UL 746 Recognition

Minimum Material Thickness Inch (mm)	Sold Lts Temp Time °C sec	UL 94 Flame Class	Max. Operating Temp
0.002 (0.051)	288 30	94V-0	130