



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

NPG-PYR

FEATURES

- Excellent dimensional stability, through-hole reliability and warp/twist.
- Excellent electrical, chemical and heat resistance properties.
- Flammability meets UL94V-0.
- High CTI value
- Other properties are similar to NPG-R.

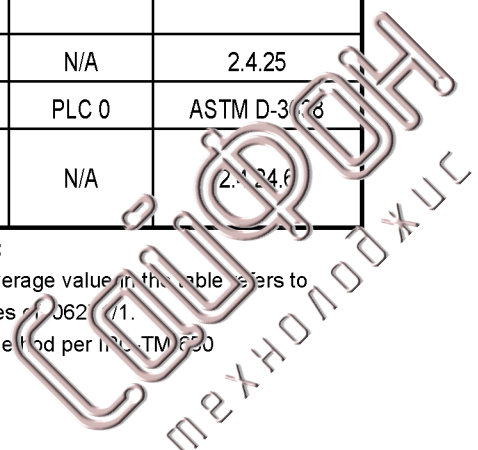
PERFORMANCE LIST

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	5 x10 ⁸ ~ 5x10 ⁹	10 ⁶ ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	5 x10 ⁶ ~ 5x10 ⁷	10 ⁴ ↑	2.5.17	
Permittivity 1MHZ	-	C-24/23/50	4.6-4.8	5.4 ↓	2.5.5.9	
Permittivity 1GHZ	-	C-24/23/50	4.1-4.3	-	2.5.5.9	
Loss Tangent 1MHZ	-	D-24/23/50	0.014-0.016	0.035 ↓	2.5.5.9	
Loss Tangent 1GHZ	-	D-24/23/50	0.012-0.014	-	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	0.05-0.10	0.35 ↓	2.6.2.1	
Flammability	-	C-48/23/50	94V0	94V0	UL94	
Peel strength 1 oz	lb/in	288°Cx10" solder floating	7-9	6 ↑	2.4.8	
Thermal stress	SEC	288°C solder dipping	200 ↑	10 ↑	2.4.13.1	
Pressure cooker (2 atm 120°C)	1/2 hr	SEC	288°C dipping	150 ↑	N/A	-
	1 hr	SEC	288°C dipping	150 ↑	N/A	-
	2 hr	SEC	288°C dipping	150	N/A	-
Flexural strength	LW	N/mm ²	A	430-500	415 ↑	2.4.4
	CW	N/mm ²	A	350-420	345 ↑	2.4.4
Dimensional stability X-Y axis	%	E-0.5/170	0.005-0.030	0.050 ↓	2.4.39	
Coefficient of thermal expansion	ppm/°C	X-Y axis	TMA	9-13	N/A	2.4.24
		Z-axis before Tg	TMA	30-50		
		Z-axis after Tg	TMA	200-230		
Glass transition temp	°C	DSC	150± 5	N/A	2.4.25	
Comparative Tracking Index	V	C-96/20/65	600	PLC 0	ASTM D-3763	
Decomposition Temperature (Td 5% W/L)	°C	TGA	350	N/A	2.4.24.6	

Data shown are nominal values for reference only.

NOTE:

The average value in this table refers to samples of 062 ± 0.1.
 Test method per IEC-60068-2-60





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

NPG-PYTL

FEATURES

- Excellent dimensional stability, through-hole reliability
- High CTI value
- Flammability meets UL94V-0.
- Excellent electrical, chemical and heat resistance properties.

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 ⁷	10 ⁴ ↑	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	3.8-4.0	-	2.5.5.9
Loss Tangent 1 MHZ	-	C-24/23/50	0.014-0.016	0.035 ↓	2.5.5.9
Loss Tangent 1 GHZ	-	C-24/23/50	0.012-0.014	-	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	7-9	6 ↑	2.4.8
Thermal stress	SEC	288°C solder dipping	200 ↑	10 ↑	2.4.13.1
Dimensional stability X-Y axis	%	E 4/105	0.01-0.03	0.05 ↓	2.4.39
Coefficient of thermal expansion X-Y axis	ppm/°C	TMA	9-13	N/A	2.4.24
Z-axis before Tg	ppm/°C	TMA	30-50		
Z-axis after Tg	ppm/°C	TMA	200-230		
Glass transition temp	°C	DSC	150 ± 5	N/A	2.4.25
Comparative Tracking Index	V	C-96/20/65	600	PLC 0	ASTM D-3638
Decomposition Temperature (Td 5% W/L)	°C	TGA	350	N/A	2.4.24.6

Data shown are nominal values for reference only.

NOTE:

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

CERTIFICATION UL

- UL File No. : E98983
- ANSI TYPE:No ANSI

