NAN YA PLASTICS CORPORATION
ELECTRONIC MATERIALS DIVISION.
COPPER CLAD LAMINATE DEPARTMENT
NO. 201. TUNG HWA N. ROAD, TAIPEI, TAIWAN.

Issued: 2010/09/08
New: 2014/04/30

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.
- Flammiability meets UL94V-0.
- High CTI value
- Other properties are similar to NPG-R.

■ PERFORMANCE LIST

haracteristics		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℃x10” solder floating	7-9	6 ↑	2.4.8
Thermal stress		SEC	288℃ solder dipping	200 ↑	10 ↑	2.4.13.1
Pressure cooker (2 atm 120℃)	1/2 hr	SEC	288℃ dipping	150 ↑	N/A	-
	1 hr	SEC	288℃ dipping	150 ↑	N/A	-
	2 hr	SEC	288℃ 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						
X-Y axis		ppm/℃	TMA	9-13	N/A	2.4.24
Z-axis before Tg		ppm/℃	TMA	30-50		
Z-axis after Tg		ppm/℃	TMA	200-230		
Glass transition temp		℃	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)		℃	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 .062” 1/1.
Test method per IPC-TM-650

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Glass cloth base epoxy resin
flame retardant copper clad laminate

NPG-PYTL

■ FEATURES

- Excellent dimensional stability, through-hole reliability
- Flammiability meets UL94V-0.
- High CTI value
- 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℃x10" solder floating	7-9	6↑	2.4.8
Thermal stress	SEC	288℃ 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 Z-axis before Tg Z-axis after Tg	ppm/℃ ppm/℃ ppm/℃	TMA TMA TMA	9-13 30-50 200-230	N/A	2.4.24
Glass transition temp	℃	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)	℃	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