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

Issued: 2008/09/01
New: 2014/04/30

Glass cloth base BT resin
flame retardant copper clad laminate

NPG-200R

■ FEATURES

- High Tg 205℃(DMA)
- Excellent dimension stability through-hole reliability
- Excellent electrical, chemical and heat resistance properties
- Outstanding heat resistance

■ Product Application

- BGA Multilayers
- High layers count PWB
- Wireless communication
- MCM
- Direct Chip Attach

■ PERFORMANCE LIST

Characteristics		Unit	Conditioning	Typical Values	SPEC	Test Method
Volume resistivity		MΩ-cm	C-96/35/90	$3 \times 10^9 \sim 3.4 \times 10^{10}$	10^6 ↑	2.5.17
Surface resistivity		MΩ	C-96/35/90	$5 \times 10^8 \sim 5.7 \times 10^9$	10^4 ↑	2.5.17
Permittivity 1MHZ		-	C-24/23/50	4.1-4.5	5.4 ↓	2.5.5.9
Permittivity 1GHZ		-	C-24/23/50	3.9-4.3	-	2.5.5.9
Loss Tangent 1MHZ		-	D-24/23/50	0.012-0.014	0.035 ↓	2.5.5.9
Loss Tangent 1GHZ		-	D-24/23/50	0.010-0.012	-	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	0.10-0.14	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	600 ↑	10 ↑	2.4.13.1
Pressure cooker (2 atm 120℃)	1/2 hr	SEC	288℃ dipping	600 ↑	N/A	-
	1 hr	SEC	288℃ dipping	600 ↑	N/A	-
	2 hr	SEC	288℃ dipping	600 ↑	N/A	-
Flexural strength	LW	N/mm^2	A	440-520	415 ↑	2.4.4
	CW	N/mm^2	A	380-440	345 ↑	2.4.4
Dimensional stability X-Y axis		%	E-0.5/170	0.008-0.020	0.050 ↓	2.4.39
Coefficient of thermal expansion X-Y axis Z-axis before Tg Z-axis after Tg		 ppm/℃ ppm/℃ ppm/℃	 TMA TMA TMA	 12-16 35-45 180-210	N/A	2.4.24
Glass transition temp		℃	DMA	205± 10	N/A	2.4.25
Decomposition Temperature (Td 5% W/L)		℃	TGA	383	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" [illegible]
Test method per IPC-TM-650

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Glass cloth base epoxy resin
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NPG-200TL

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Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method
Volume resistivity	MΩ-cm	C-96/35/90	3.4 x10^{10}	10^6 ↑	2.5.17
Surface resistivity	MΩ	C-96/35/90	5.7 x10^9	10^4 ↑	2.5.17
Permittivity 1 MHZ	-	C-24/23/50	3.9-4.3	5.4 ↓	2.5.5.9
Permittivity 1 GHZ	-	C-24/23/50	3.7-4.1	-	2.5.5.9
Loss Tangent 1 MHZ	-	C-24/23/50	0.012-0.014	0.035 ↓	2.5.5.9
Loss Tangent 1 GHZ	-	C-24/23/50	0.010-0.012	-	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	0.15-0.18	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	600 ↑	10 ↑	2.4.13.1
Glass transition temp	℃	DMA	205 ± 10	N/A	2.4.25
Dimensional stability X-Y axis	%	E 4/105	0.010-0.020	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	 11-15 30-45 160-210	N/A	2.4.24
Decomposition Temperature (Td 5% W/L)	℃	TGA	383	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

■ CONSTRUCTION:

THICKNESS mm	mil	CONSTRUCTION		THICKNESS mm	mil	CONSTRUCTION	
0.05	2	106	1 PLY	0.35	14	7628	2 plies
0.08	3	2112	1PLY	0.38	15	7628	2 plies
0.10	4	1080	2 plies	0.45	17	7628x2+1080x1	
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	30	7628	4 plies
0.16	6	2112	2 plies	0.8	31.5	7628	4 ples
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

• 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 INCH	mm	THICKNESS TOLERANCE
0.004 (0.1) to 0.039 (1.0)	H (17)	2.0 (70)	48.8 x 36.6	1240 x 0930	IPC-4101C SPEC CLASS C/M
	1.0 (35)	3.0 (105)	48.8 x 40.5	1240 x 1030	
			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.

■ CERTIFICATION UL

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