



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

NPG-200R

FEATURES

- High Tg 205°C (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

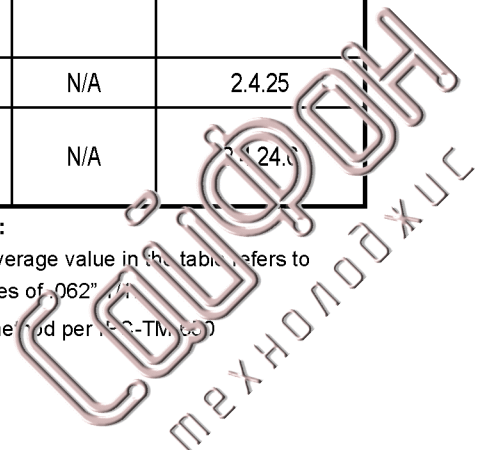
PERFORMANCE LIST

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	3 x10 ⁹ ~ 3.4x10 ¹⁰	10 ⁶ ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	5 x10 ⁸ ~ 5.7x10 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°Cx10" solder floating	7-9	6 ↑	2.4.8	
Thermal stress	SEC	288°C solder dipping	600 ↑	10 ↑	2.4.13.1	
Pressure cooker (2 atm 120°C)	1/2 hr	SEC	288°C dipping	600 ↑	N/A	-
	1 hr	SEC	288°C dipping	600 ↑	N/A	-
	2 hr	SEC	288°C 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/°C	TMA	12-16	N/A	2.4.24	
	ppm/°C	TMA	35-45			
	ppm/°C	TMA	180-210			
Glass transition temp	°C	DMA	205± 10	N/A	2.4.25	
Decomposition Temperature (Td 5% W/L)	°C	TGA	383	N/A	2.4.26	

Data shown are nominal values for reference only.

NOTE:

The average value in the table refers to samples of .062" thick.
 Test method per IPC-TM-650





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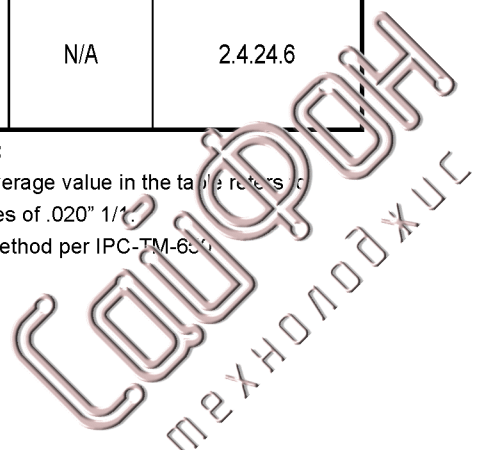
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Surface resistivity	MΩ	C-96/35/90	5.7 x10 ⁹	10 ⁴ ↑	2.5.17
Permittivity 1 MHZ	-	C-24/23/50	3.9-4.3	5.4 ↓	2.5.5.9
Permittivity 1 GHZ	-	C-24/23/50	3.7-4.1	-	2.5.5.9
Loss Tangent 1 MHZ	-	C-24/23/50	0.012-0.014	0.035 ↓	2.5.5.9
Loss Tangent 1 GHZ	-	C-24/23/50	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°C x10" solder floating	7-9	6 ↑	2.4.8
Thermal stress	SEC	288°C solder dipping	600 ↑	10 ↑	2.4.13.1
Glass transition temp	°C	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	ppm/°C	TMA	11-15	N/A	2.4.24
Z-axis before Tg	ppm/°C	TMA	30-45		
Z-axis after Tg	ppm/°C	TMA	160-210		
Decomposition Temperature (Td 5% W/L)	°C	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		CONSTRUCTION	THICKNESS		CONSTRUCTION
mm	mil		mm	mil	
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 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

• 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		SIZE		THICKNESS TOLERANCE
	OZ	(μ m)	INCH	mm	
0.004 (0.1) to 0.039 (1.0)	H (17) 1.0 (35)	2.0 (70) 3.0 (105)	48.8 x 36.6 48.8 x 40.5 48.8 x 42.5	1240 x 0930 1240 x 1030 1240 x 1080	IPC-4101C SPEC CLASS C/M

■ 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

