



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

NPG-171

■ FEATURES

- Halogen, antimony, and red phosphorous free
- Flammability meets UL 94V-0
- Excellent long term reliability
- UV blocking type
- Superior CAF-Resistance (Anti-migration)
- Reactive type flame retardants
- High Tg 170°C (DSC) and low C.T.E will provide excellent dimensional stability and through-hole reliability
- ANSI type: FR-4.1

■ PERFORMANCE LIST

Characteristics		Unit	Condition	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 1GHz		-	C-24/23/50	4.1-4.2	-	2.5.5.9
Loss Tangent 1GHz		-	D-24/23/50	0.007-0.009	-	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	0.04-0.08	0.8 ↓	2.6.2.1
Flammability		-	C-48/23/50	V-0	V-0	UL94
Peel strength 1 oz (≥0.5mm)		lb/in	288°Cx10" solder floating	8~9	6 ↑	2.4.8
Thermal stress		SEC	288°C solder dipping	300 ↑	10 ↑	2.4.13.1
Pressure cooker (2 atm 120°C)	1/2 hr	SEC	288°C dipping	300 ↑	N/A	-
	1 hr	SEC	288°C dipping	300 ↑	N/A	-
	2 hrs	SEC	288°C dipping	300	N/A	-
Flexural strength	LW	N/mm ²	A	475-550	415 ↑	2.4.4
	CW	N/mm ²	A	360-440	345 ↑	2.4.4
Dimensional stability X-Y axis		%	E-2/150	0.005-0.030	0.050 ↓	2.4.39
Coefficient of thermal expansion X-Y axis Z-axis before Tg Z-axis after Tg		ppm/°C ppm/°C ppm/°C	TMA TMA TMA	8-12 30-40 200-220	N/A	2.4.24
Glass transition temp		°C	DSC	170 ± 5	N/A	2.4.25
Decomposition temperature (Td 5% W/L)		°C	TGA	380	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



■ CONSTRUCTION

THICKNESS mm mil	CONSTRUCTION	THICKNESS mm mil	CONSTRUCTION
0.05 sp 2	1067 1 ply	0.35 14	7628 2 plies
0.08 1p 3	1086 1 ply	0.38 15	7628 2 plies
0.10 4	1080 2 plies	0.45 sp 18	1506 3 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
0.13 sp 5	2116 1 ply	0.60 24	7628 3 plies
0.15 6	1506 1 ply	0.77 30	7628 4 plies
0.18 sp 7	7627 1 ply	0.8 31.5	7628 4 plies
0.20 8	2116 2 plies	0.9 36	7628 5 plies
0.25 sp 10	2155 2 plies	1.0 39	7628 5 plies
0.30 12	2116 3 plies	1.1 43	7628 6 plies
0.30 sp 12	1506 2 plies	1.2 47	7628 6 plies

• 1.2, 1.1, 1.0, 0.9, 0.8, 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
0.002 (0.05) to 0.047 (1.2)	H (17) 1.0 (35) 2.0 (70) 3.0 (102)	48.8 x 36.6 1240 x 0930 48.8 x 40.5 1240 x 1030 48.8 x 42.5 1240 x 1080	IPC-4101E 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.



**Glass cloth base epoxy resin
Flame retardant prepreg**

NPG -171B

■ FEATURES

- Halogen, antimony, and red phosphorous free
- Rheology of resin controlled to benefit the lamination of the boards.
- Modified phosphorous epoxy provides excellent heat and chemical resistance.
- Tg: 170±5℃

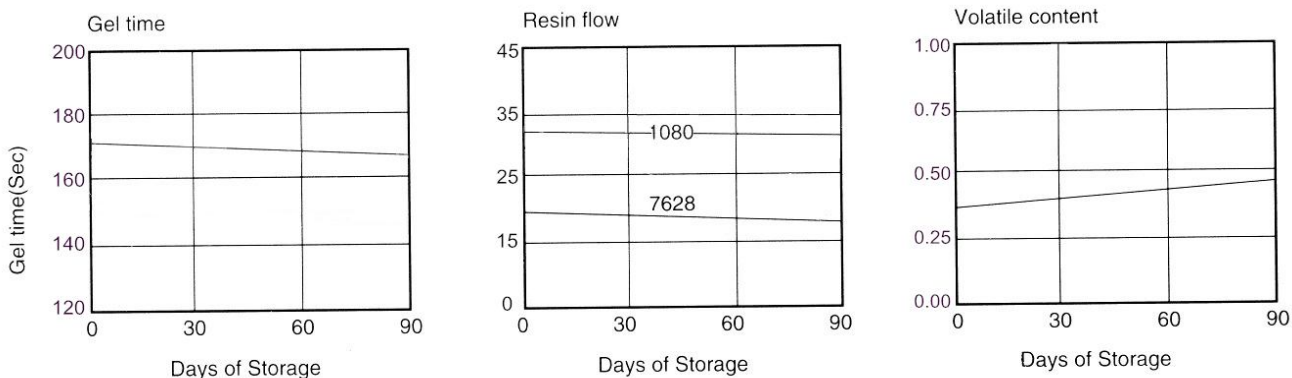
■ PERFORMANCE LIST

Specification: IPC-4101E is applicable

Data shown are nominal values for reference only

Glass style	RC%	GT sec (171℃)	VC%	After Pressed Thickness (per ply)	
				mm	mil
7628HR	52 ± 3	170 ± 20	0.75 ↓	0.193 ± 0.01	7.6 ± 0.4
7628MR	49 ± 3			0.183 ± 0.01	7.2 ± 0.4
7628	45 ± 3			0.173 ± 0.01	6.8 ± 0.4
1506MR	54 ± 3			0.157 ± 0.01	6.2 ± 0.4
1506	50 ± 3			0.145 ± 0.01	5.7 ± 0.4
2116HR	60 ± 3			0.120 ± 0.01	4.7 ± 0.4
2116MR	56 ± 3			0.109 ± 0.01	4.3 ± 0.4
2116	52 ± 3			0.097 ± 0.01	3.8 ± 0.4
2113	58 ± 3			0.081 ± 0.01	3.2 ± 0.4
2112	62 ± 3			0.069 ± 0.008	2.7 ± 0.3
1080HR	70 ± 3			0.064 ± 0.008	2.5 ± 0.3
1080MR	67 ± 3			0.061 ± 0.008	2.4 ± 0.3
1080	64 ± 3			0.058 ± 0.008	2.3 ± 0.3
106	70 ± 3			0.040 ± 0.008	1.6 ± 0.3

Storage Stability



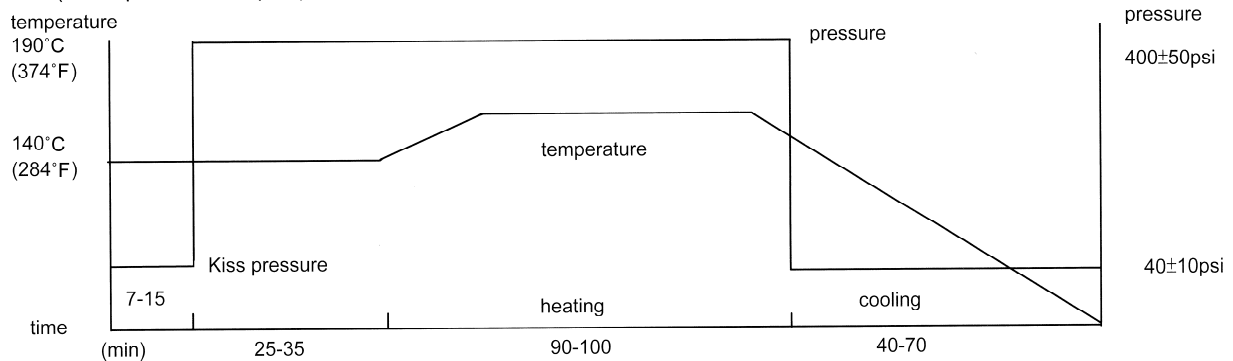
Storage Condition : 20℃ 50% RH for 3 months
: Max. 5℃ for 6 months

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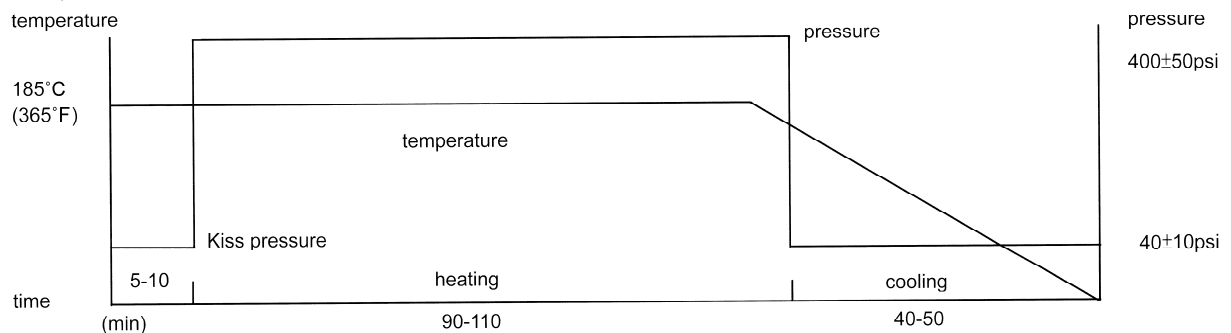


Recommended press cycles:

A:2T2P(2 temperature step/2 pressure step)



B:1T2P(1 temperature step/2 pressure step)



Suggestions:

1. Heating rate of material between 70°C(158°F) and 140°C(284°F)
1~3°C/min (1.8~5.4°F/min) is acceptable.
1.5~2.5°C/min (2.7~4.5°F/min) would be better.
2. Temperature of material over 170°C(338°F) must be held for at least 60min to allow resin to fully cure.
3. The pressure should be kept below 100psi during cooling to ambient temperature.
4. Cooling rate of material should be kept under 2.5°C/min (4.5°F/min) when the temperature of material is over 100°C(212°F), in order to avoid introducing twist.

CERTIFICATION UL

- UL File No.: E98983
- ANSI TYPE: FR-4.1
- UL 746 Recognition

Minimum Material Thickness inch (mm)	Clad cond. Thickness Min. Max. mils mils (μm) (μm)	Max. Area Diameter inch (mm)	Solder Lts Temp Time °C sec	UL 94 Flame Class	Max. Operating Temp
0.0016 (0.04)	0.59 4.02 (15) (102)	2.0 (50.8)	288 30	94V-0	130