



Resin Coated Copper Foil

NPRCC

■ FEATURES

- Higher glass transition temperature
- Excellent filling ability
- Lower dielectric constant
- Thin dielectric and light weight
- Easy to drill by CO₂ laser
- Even surface for fine line and space usage
- Traditional FR-4 processability
- UL File number E98983

■ PRODUCT

Resin Thickness (μm)	Copper (μm)	RF%	VC%
60 ± 5	12(3/8 oz)	17 ± 8	0.75 ↓
80 ± 5	18(1/2 oz)	20 ± 8	
	36(1 oz)		

■ PERFORMANCE LIST

CHARACTERISTICS	UNIT	CONDITIONING	Typical Values
Glass Transition Temperature	°C	TMA	160 ± 5
	°C	DSC	180 ± 5
Coefficient of Thermal Expansion (Before Tg)	in/in/°C	TMA	6 x 10 ⁻⁵ ~ 9x10 ⁻⁵
Surface Flatness	μm	-	2-3
Flammability	-	C-48/23/50	V-0
Peel Strength H oz	lb/in	288°C x 10" solder floating	5-7
Thermal Stress	SEC	288°C solder dipping	120 ↑
Permittivity 1MHZ	-	C-24/23/50	3.6-3.8
Permittivity 1GHZ	-	C-24/23/50	3.0-3.2
Loss Tangent 1MHZ	-	C-24/23/50	0.02-0.04
Loss Tangent 1GHZ	-	C-24/23/50	0.01-0.03
Surface Resistivity	MΩ	C-96/35/90	1.0 x 10 ⁸
Volume Resistivity	MΩ-cm	C-96/35/90	3.0 x 10 ⁹

Data shown are nominal values for reference only.



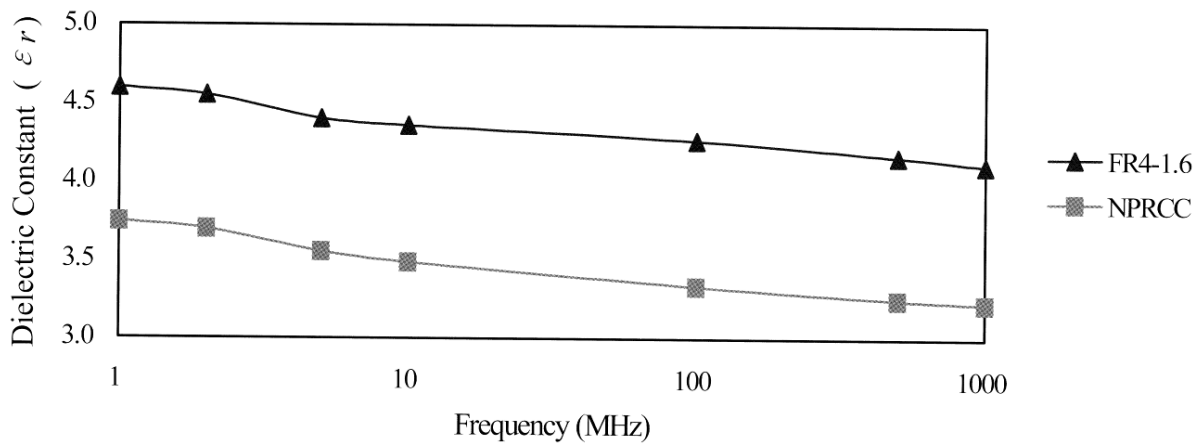
■ DIELECTRIC CONSTANT AND DISSIPATION FACTOR

A. Dielectric Constant (ϵr)

	1MHz	2MHz	5MHz	10MHz	100MHz	500MHz	1GHz
FR4-1.6	4.6007	4.5509	4.4014	4.3561	4.2628	4.1641	4.1101
NPRCC	3.7453	3.6973	3.5533	3.4827	3.332	3.2497	3.2231

Test Condition: C-24/23/50

Frequency vs. ϵr curve

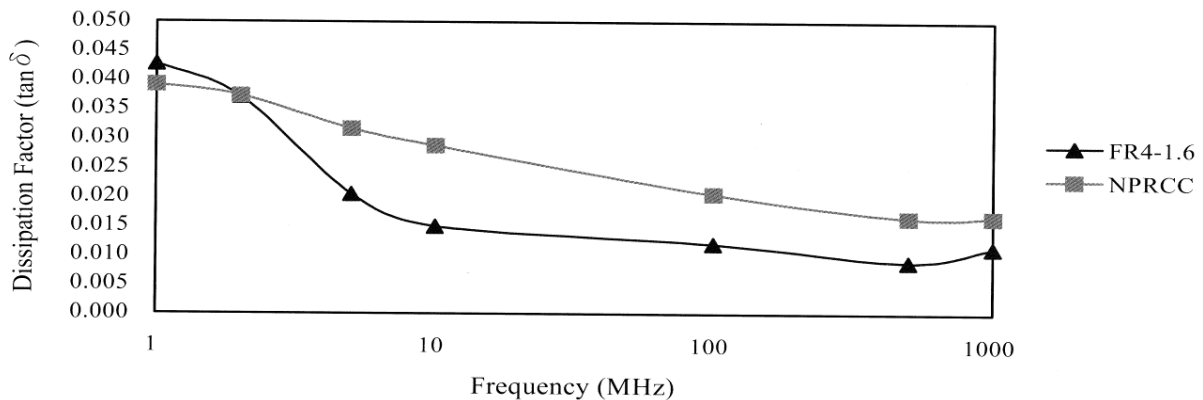


B. Dissipation Factor ($\tan \delta$)

	1MHz	2MHz	5MHz	10MHz	100MHz	500MHz	1GHz
FR4-1.6	0.042751	0.037166	0.020411	0.01491	0.011922	0.00887	0.011303
NPRCC	0.0392	0.0373	0.031599	0.028771	0.020463	0.016398	0.016504

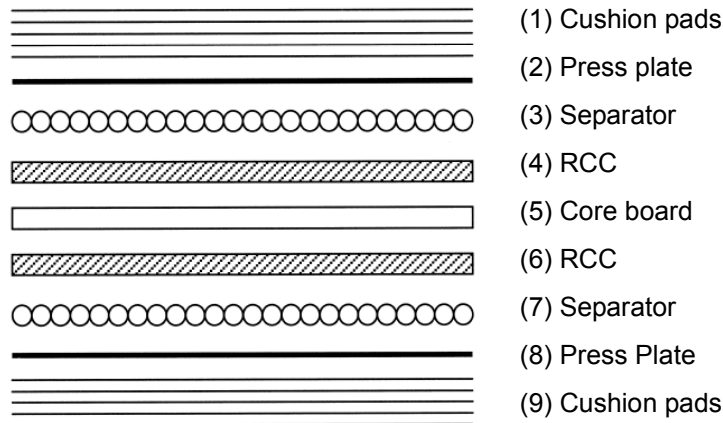
Test Condition: C-24/23/50

Frequency vs. $\tan \delta$ curve





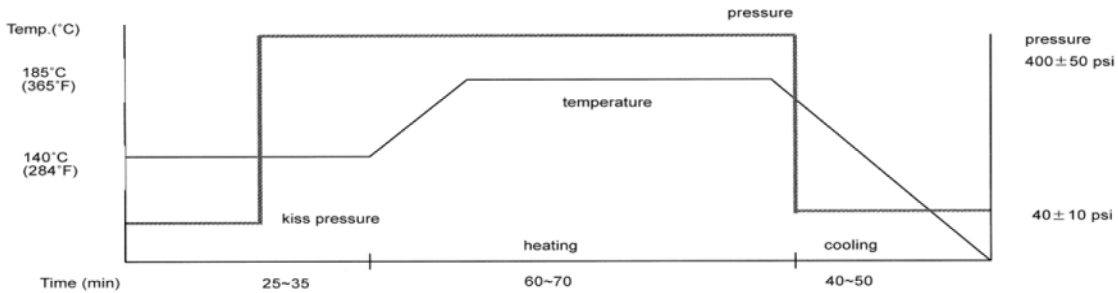
■ **THE MANNER OF LAY-UP**



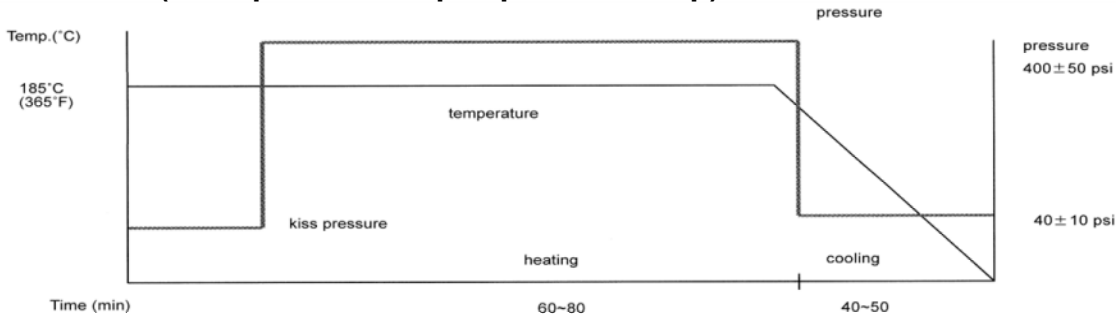
■ **LAMINATION**

Recommended press cycles:

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



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



C. Vacuum

	Vacuum (mmHg)	Time (min)
Step 1	760	0
Step 2	≤ 50	1-5
Step 2	≤ 50	40-60

Suggestions:

1. Heating rate of material between 70°C and 140°C, 1-3°C/min, is acceptable.
2. Temperature of material over 170°C must be held for at least 40 min to allow epoxy resin to fully cure.
3. Cooling rate of material should be kept under 2.5°C/min when the temperature of material is over 100°C, in order to avoid introducing twist.
4. A vacuum of less than 50 mmHg will be needed to eliminate voids