

# N4380-13 RF

## Microwave Performance, Modified Epoxy Laminate & Prepreg

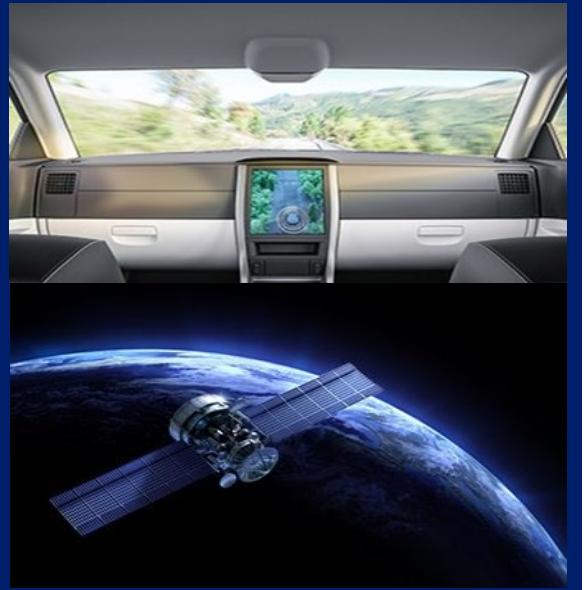


### Benefits

- Advanced Electrical Performance
- Stable dielectric performance over a wide frequency range
- Can be used for both RF and digital layers in hybrid multilayer
- Available in a variety of constructions

### Applications

- 802.11 a, b and g Antennas
- Automotive
- Telecommunications
- High Speed Computing
- Commercial RF Applications



N4380-13 RF enhanced epoxy resin system is specifically engineered to provide a unique solution for design applications that demand outstanding thermal properties, tight dielectric constant tolerance and low signal loss properties. N4380-13 RF combines tightly controlled RF electrical properties with the mechanical reliability and competitive advantages of a FR-4 material.

### Tightly Controlled Electrical Properties

- Consistency in performance-sensitive applications
- Suitable for high-layer count sophisticated PWB, RF and Antenna designs
- Can be used for both the RF and the digital layers in hybrid multilayer applications

### Thermal and Mechanical Properties

- $T_g > 210^\circ\text{C}$
- Lead-free assembly compatibility
- Good Peel Strength
- Excellent IST performance

### N4000-13 based material

- Industry standard material providing years of usage data
- Does not use expensive and abrasive ceramic fillers

### Excellent CAF Performance

- Long term reliability in end products

### High-Tg FR-4 Processing

- Ease of processing through more conventional processes
- 90 minutes press at  $193^\circ\text{C}$  and 275-350 psi.
- Will adhere to most epoxy prepregs and bond plies

Meets UL 94V-0 and IPC-4101/29 Specifications

UL file number: E36295

Properties	Conditions	Typical Value	Unit	Test Method
<b>Electrical Properties</b>				
Dielectric Constant	@ 10 GHz	3.80		IPC-TM-650.2.5.5.5
Dissipation Factor	@ 10 GHz	0.009		IPC-TM-650.2.5.5.5
Volume Resistivity	C - 96 / 35 / 90	10 <sup>8</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
	E - 24 / 125	10 <sup>7</sup>		
Surface Resistivity	C - 96 / 35 / 90	10 <sup>7</sup>	MΩ	IPC-TM-650.2.5.17.1
	E - 24 / 125	10 <sup>7</sup>		
Electric Strength		4.7x10 <sup>4</sup> (1200)	V/mm (V/mil)	IPC-TM-650.2.5.6.2
<b>Thermal Properties</b>				
*Glass Transition Temperature (Tg)	DMA(°C) (Tan d Peak)	240	°C	IPC-TM-650.2.3.40
Degradation Temperature (TGA)	Degradation Temp (TGA) (5% wt. loss)	350	°C	IPC-TM-650.2.4.24.1
T-260	Time to delamination @ 260°C	30+	minutes	IPC-TM-650.2.4.24.1
Thermal Conductivity		0.35	W/mK	ASTM E1461
<b>Mechanical Properties</b>				
Peel Strength	1 oz (35μ) Cu	1.31 (7.9)	N/mm (lb/inch)	IPC-TM-650.2.4.8
	After Solder Float	1.31 (7.5)	N/mm (lb/inch)	IPC-TM-650.2.4.8
X / Y CTE	-40°C to + 125°C	10 / 14	ppm/°C	IPC-TM-650.2.4.41
Z Axis Expansion	50°C to 260°C	3.5	%	IPC-TM-650.2.4.24
<b>Chemical / Physical Properties</b>				
Moisture Absorption		0.1	wt. %	

\* DMA is the preferred method for measuring Tg - other methods may be less accurate.

- All test data provided are typical values and not intended to be specification values. For review of critical specification tolerances, please contact a company representative directly
- N4380-13RF can be manufactured in laminate thickness from 2 mil (0.05 mm) and up.
- N4380-13RF is available in most common panel sizes.
- Please contact AGC for availability of any other constructions, copper weights glass styles including very low profile copper and RTFOIL®

