N4000-12

High-Speed / Low Loss Epoxy Laminate & Prepreg

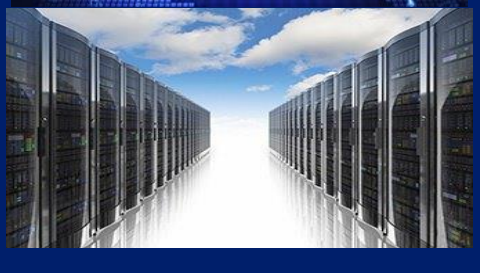
AGC
Your Dreams, Our Challenge

Benefits

- Appropriate for applications in the 1-10 GHz range
- Low Df and Dk
- CAF resistance
- Available in a variety of constructions

Applications

- High Speed Storage Networks
- Internet Switches / Routing Systems
- Wireless Communication Infrastructure
- Backplanes



N4000-12 is an enhanced epoxy resin system designed for use in high speed, low loss applications requiring thermal stability, excellent signal speed and CAF resistance.

High Speed and Low Loss Properties

- Appropriate for applications in the 1-10 GHz range
- Low Df and Dk for low signal distortion and faster signal propagation

Thermal and Mechanical Properties

- Tg > 190°C
- Lead-free assembly compatibility. Suitable for assemblies with a maximum reflow temperature of 245 - 260°C
- T_{260} >60 minutes
- Low Z-Axis CTE

Excellent CAF Performance

- The low Z-CTE and proven CAF resistance provide long-term reliability for both RF and digital applications

High-Tg FR-4 Processing

- Processes similar to traditional high Tg FR-4 materials
- 75 min press at 193°C and 200-300 psi

Meets UL 94V-0 and IPC-4101/29 Specifications
UL file number: E36295

Properties	Conditions	Typical Value	Unit	Test Method
Electrical Properties				
Dielectric Constant (50% resin content)	@ 2.5 GHz (Split Post Cavity)	3.7		
	@ 10 GHz (Stripline)	3.6		IPC-TM-650.2.5.5.5
Dissipation Factor (50% resin content)	@ 2.5 GHz (Spilt Post Cavity)	0.008		
	@ 10 GHz (Stripline)	0.008		IPC-TM-650.2.5.5.5
Volume Resistivity	C - 96 / 35 / 90	10^8	MΩ - cm	IPC-TM-650.2.5.17.1
	E – 24 / 125	10^7		
Surface Resistivity	C - 96 / 35 / 90	10^7	MΩ	IPC-TM-650.2.5.17.1
	E - 24 / 125	10^6		
Electric Strength		$5.8x10^4$ (1470)	V/mm (V/mil)	IPC-TM-650.2.5.6.2
Thermal Properties				
*Glass Transition Temperature (Tg)	DMA(°C) (Tan d Peak)	210	°C	IPC-TM-650.2.4.24.3
Degradation Temperature (TGA)	Degradation Temp (TGA) (5% wt. loss)	350	°C	IPC-TM-650.2.4.24.6
T-260	Time to delamination @ 260°C	60+	minutes	IPC-TM-650.2.4.24.1
Mechanical Properties				
Peel Strength	1 oz (35µ) Cu After Solder Float	1.61 (9.2)	N/mm (lbf/inch)	IPC-TM-650.2.4.8
X / Y CTE	-40°C to + 125°C	12 / 15.5	ppm/°C	IPC-TM-650.2.4.41
Z Axis CTE Alpha 1 (50°C to Tg)		60	ppm/°C	IPC-TM-650.2.4.24
Z Axis CTE Alpha 2 (Tg to 260°C)		260	ppm/°C	IPC-TM-650.2.4.24
Z Axis Expansion	50°C to 260°C	3.6	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)		28.3 / 23.4 (4.1 / 3.4)	GN/m2 (psi x 10^6)	ASTM D3039
Poisson's Ratios (X / Y)		0.16 / 0.14		
Chemical / Physical Properties				
Moisture Absorption		0.09	wt. %	IPC-TM-650.2.6.2.1

* 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
- N4000-12 can be manufactured in laminate thickness from 2 mil (0.05 mm) and up.
- N4000-12 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®

agc-ml.multimaterial@agc.com