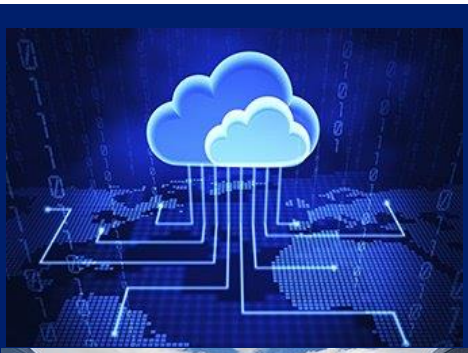
N4000-13

High-Speed Multifunctional Epoxy Laminate & Prepreg

AGC
Your Dreams, Our Challenge

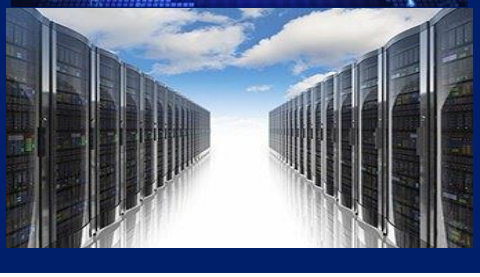
Benefits

- Low DF and DK
- Excellent thickness control for tight tolerance
- Support for advanced technology PWB designs
- Available in a variety of constructions



Applications

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



N4000-13 series is an enhanced epoxy resin system engineered to provide both outstanding thermal and high signal speed/low signal loss properties for use in high speed storage networks and wireless communication infrastructure.

Excellent Electrical Properties

- Excellent thickness control for tight tolerance impedance applications
- Support for advanced technology PWB designs
- Low DK and DF

Thermal and Mechanical Properties

- Tg > 210°C
- Low Z-CTE and proven CAF resistance provide long-term reliability for RF and digital applications
- Lead-free assembly compatibility to 245°C *
- Long-term reliability

Excellent CAF Performance

- CAF resistant materials after high temperature reflow

High-Tg FR-4 Processing

- Processes similar to traditional high Tg FR-4 materials
- 90 mins press at 193°C and 275-350 psi

Meets UL 94V-0 and IPC-4101/29, /98, /99 and /101 Specifications
UL file number: E36295

** Lead-free assembly compatibility is design dependent. Contact your local technical representative to review your specific design.*

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)	0.009		
	@ 10 GHz (Stripline)	0.009		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	10^7		
Electric Strength		$4.7x10^4$ (1200)	V/mm (V/mil)	IPC-TM-650.2.5.6.2
Thermal Properties				
*Glass Transition Temperature (Tg)	DMA(°C) (Tan d Peak)	240	°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	30+	minutes	IPC-TM-650.2.4.24.1
T-288	Time to delamination @ 288°C	10+	minutes	IPC-TM-650.2.4.24.1
Thermal Conductivity		0.350	W/mK	ASTM E1461
Mechanical Properties				
Peel Strength	1 oz (35µ) Cu	1.31 (7.9)	N/mm (lbf/inch)	IPC-TM-650.2.4.8
	After Solder Float	1.31 (7.5)	N/mm (lbf/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 CTE Alpha 1 (50°C to Tg)		70	ppm/°C	IPC-TM-650.2.4.24
Z Axis CTE Alpha 2 (Tg to 260°C)		280	ppm/°C	IPC-TM-650.2.4.24
Z Axis Expansion	50°C to 260°C	3.5	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)		28.5 / 22.4 (4.2 / 3.3)	GN/m2 (psi x 10^6)	ASTM D3039
Poisson's Ratios (X / Y)		0.13 / 0.11		
Chemical / Physical Properties				
Moisture Absorption		0.1	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
- N4000-13 can be manufactured in laminate thickness from 2 mil (0.05 mm) and up.
- N4000-13 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®

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