

N4000-12 SI®

High-Speed / Low Loss Epoxy Laminate & Prepreg



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 SI® is an enhanced epoxy resin system designed for use in high speed, low loss applications requiring thermal stability, excellent signal speed and CAF resistance. SI glass provides enhanced electrical performance for even the most demanding applications.

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

- $T_g > 190^\circ\text{C}$
- Lead-free assembly compatibility. Suitable for assemblies with a maximum reflow temperature of $245 - 260^\circ\text{C}$
- $T_{260} > 60$ 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)	3.4		
	@ 10 GHz (Stripline)	3.3		IPC-TM-650.2.5.5.5
Dissipation Factor (50% resin content)	@ 2.5 GHz (Spilt Post Cavity)	0.006		
	@ 10 GHz (Stripline)	0.007		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 ⁸		
Surface Resistivity	C - 96 / 35 / 90	10 ⁷	MΩ	IPC-TM-650.2.5.17.1
	E - 24 / 125	10 ⁶		
Thermal Properties				
*Glass Transition Temperature (Tg)	DMA(°C) (Tan d Peak)	210	°C	IPC-TM-650.2.4.24.2
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
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 SI® can be manufactured in laminate thickness from 2 mil (0.05 mm) and up.
- N4000-12 SI® 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®

