N4000-29

Lead Free, High-Tg Materials
Laminate & Prepreg

AGC
Your Dreams, Our Challenge

Benefits

- Excellent Thermal stability, Low Z-axis Expansion
- Withstands multiple reflow excursions / repair operations
- High Tg
- Good moisture resistance
- Compatible for use with Meteorwave products

Applications

- Lead-Free Assembly Structures
- Large Format Backplanes
- High Temp Underhood Automotive
- Telecommunications Infrastructure
- Data Storage

N4000-29 is an advanced, lead-free, low-CTE, high Tg (185°C by DSC) multifunctional epoxy PCB material with a high Tg, excellent thermal stability and good moisture resistance. N4000-29 has been designed for use both standard and high-performance, lead-free applications including lead-free assemblies, large format backplanes, tight tolerance via to via, High I/O count BGA, extreme layer count multilayers, lead-free DCA, high temperature underhood automotive, telecommunications infrastructure and sophisticated data storage.

Thermal and Mechanical Properties

- Low Z-axis expansion improves through-hole reliability
- Excellent for high layer count assemblies
- Designed to withstand multiple reflow excursions and repair operations
- Proven IST testing results
- Exceptional peel strength
- Extremely low Z-CTE
- High Tg and excellent thermal stability
- Improved thermal stability, CAF and moisture resistance when compared to traditional FR-4
- CAF Resistant - Providing long term reliability in end products

Hybrid Applications

- Compatible with all Meteorwave products for hybrid applications to reduce package cost

Optimized FR-4 processing

- Superior rheology providing consistent controlled flow and superior via topography
- 75 min press at 185°C and 200-300 psi

Meets UL 94V-0 and IPC-4101/98, /99, /126 and /129 Specifications
UL file number: E36295

Properties	Conditions	Typical Value	Unit	Test Method
Electrical Properties				
Dielectric Constant	@ 2 GHz	4.23		IPC-TM-650.2.5.5.5
	@ 10 GHz	4.16		
Dissipation Factor	@ 2.5 GHz	0.015		
	@ 10 GHz	0.017		
Volume Resistivity	C - 96 / 35 / 90	8.10 x 10^7	MΩ - cm	IPC-TM-650.2.5.17.1
	E – 24 / 125	1.90 X 10^8		
Surface Resistivity	C - 96 / 35 / 90	5.60 X 10^6	MΩ	IPC-TM-650.2.5.17.1
	E - 24 / 125	1.80 x 10^7		
Electric Strength		4.2x10^4 (1100)	V/mm (V/mil)	IPC-TM-650.2.5.6.2
Thermal Properties				
*Glass Transition Temperature (Tg)	DMA (°C) (Tan d Peak)	199	°C	IPC-TM-650.2.4.24.3
	DSC (°C)	185	°C	IPC-TM-650.2.4.25c
Degradation Temperature (TGA)	Degradation Temp (TGA) (5% wt. loss)	350	°C	IPC-TM-650.2.3.40
T-260	Time to delamination @ 260°C	> 60	minutes	IPC-TM-650.2.4.24.1
T-288	Time to delamination @ 288°C	20	minutes	IPC-TM-650.2.4.24.1
Thermal Conductivity		0.46	W/mK	ASTM E1461
Mechanical Properties				
Peel Strength	1 oz (35µ) Cu	1.72 (9.8)	N/mm (lbf/inch)	IPC-TM-650.2.4.8
	After Solder Float	1.81 (10.1)	N/mm (lbf/inch)	IPC-TM-650.2.4.8
X / Y CTE	-40°C to + 125°C	12 / 15	ppm/°C	IPC-TM-650.2.4.41
Z Axis CTE Alpha 1 / Alpha 2 (55% RC)	50°C to Tg / Tg to 260°C	55 / 265	ppm/°C	IPC-TM-650.2.4.24
Z Axis Expansion (43% RC)	50°C to 260°C	3.0	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)		22.6 / 18.2 (3.6 / 2.9)	GN/m^2 (psi x 10^6)	ASTM D3039
Poisson's Ratios (X / Y)		0.18 / 0.16		
Chemical / Physical Properties				
Moisture Absorption		0.15	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
- N4000-29 can be manufactured in laminate thickness from 2 mil (0.05 mm) and up.
- N4000-29 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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