

Park Electrochemical Nelco® N4000-13 SI® High-Speed Multifunctional Epoxy Laminate and Prepreg

Category : Polymer , Thermoset , Epoxy

Material Notes:

The Nelco® N4000-13 series is an enhanced epoxy resin system engineered to provide both outstanding thermal and high signal speed / low signal loss properties. N4000-13 SI® is excellent for applications that require optimum signal integrity and precise impedance control, while maintaining high reliability through CAF and thermal resistance. Key Features and Benefits: Lead-Free Assembly Compatible Tg >210°C, outstanding thermal, electrical and signal loss properties CAF Resistant Signal Integrity and Buried Capacitance™ Options High-Tg FR-4 processing Available in a variety of constructions Applications/Qualifications: Fine-Line Multilayers Backplanes Surface-Mount Multilayers BGA Multilayers MCM-Ls CSP Attachment Wireless Communications Infrastructure High Speed Services High Speed Storage Networks Internet Switching / Routing Systems Information provided by Park Electrochemical Corp.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Park-Electrochemical-Nelco-N4000-13-SI-High-Speed-Multifunctional-Epoxy-Laminate-and-Prepreg.php

Physical Properties	Metric	English	Comments
Density	1.79 g/cc	0.0647 lb/in ³	50% Resin Content; Internal Method
Water Absorption	0.10 %	0.10 %	IPC-TM-650.2.6.2.1

Mechanical Properties	Metric	English	Comments
Modulus of Elasticity	15.9 GPa	2300 ksi	Y; ASTM D3039
	16.5 GPa	2400 ksi	X; ASTM D3039
Poissons Ratio	0.17	0.17	Y; ASTM D3039
	0.18	0.18	X; ASTM D3039
Peel Strength	1.31 kN/m	7.50 pli	after solder float; IPC-TM-650.2.4.8
	1.42 kN/m	8.10 pli	at elevated temperature; IPC-TM-650.2.4.8.2a
	1.58 kN/m	9.00 pli	after exposure to process solutions; IPC-TM-650.2.4.8

Thermal Properties	Metric	English	Comments
CTE, linear	9.00 - 13.0 µm/m-°C	5.00 - 7.23 µin/in-°F	X/Y; IPC-TM-650.2.4.41
	@Temperature -40.0 - 125 °C	@Temperature -40.0 - 257 °F	
	70.06 µm/m-°C	38.92 µin/in-°F	Z-Axis Alpha 1; IPC-TM-650.2.4.41
	@Temperature 50.0 - 210 °C	@Temperature 122 - 410 °F	

Thermal Properties	Metric 280.22 µm/m-°C	English 155.68 µin/in-°F	Comments
	@Temperature 210 - 260 °C	@Temperature 410 - 500 °F	Z-Axis Alpha 2; IPC-TM-650.2.4.41
Specific Heat Capacity	1.30 J/g-°C	0.310 BTU/lb-°F	ASTM E1461
Thermal Conductivity	0.294 W/m-K	2.04 BTU-in/hr-ft²-°F	ASTM E1461
Glass Transition Temp, Tg	200 °C	392 °F	TMA; IPC-TM-650.2.4.24c
	210 °C	410 °F	DSC; IPC-TM-650.2.4.25c
	240 °C	464 °F	DMA (Tan δ Peak); IPC-TM-650.2.4.24.3
Decomposition Temperature	350 °C	662 °F	5% weight loss; TGA; IPC-TM-650.2.4.24.6
Flammability, UL94	V-0	V-0	

Electrical Properties	Metric	English	Comments
Volume Resistivity	1.00e+14 ohm-cm	1.00e+14 ohm-cm	C - 96/35/90; IPC-TM-650.2.5.17.1
	1.00e+14 ohm-cm	1.00e+14 ohm-cm	E - 24/125; IPC-TM-650.2.5.17.1
Surface Resistance	1.00e+13 ohm	1.00e+13 ohm	C - 96/35/90; IPC-TM-650.2.5.17.1
	1.00e+13 ohm	1.00e+13 ohm	E - 24/125; IPC-TM-650.2.5.17.1
Dielectric Constant	3.2	3.2	Split Post Cavity
	@Frequency 2.50e+9 Hz	@Frequency 2.50e+9 Hz	
	3.2	3.2	Stripline; IPC-TM-650.2.5.5.5
	@Frequency 1.00e+10 Hz	@Frequency 1.00e+10 Hz	
	3.3	3.3	Split Post Cavity
	@Frequency 1.00e+10 Hz	@Frequency 1.00e+10 Hz	
	3.4	3.4	RF Impedance; IPC-TM-650.2.5.5.9
	@Frequency 1.00e+9 Hz	@Frequency 1.00e+9 Hz	
Dielectric Strength	39.4 kV/mm	1000 kV/in	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>= 50000 V	>= 50000 V	IPC-TM-650.2.5.6
Dissipation Factor	0.0070	0.0070	Split Post Cavity
	@Frequency 1.00e+10	@Frequency 1.00e+10	

Electrical Properties	Hz Metric	Hz English	Comments
	0.0080	0.0080	
	@Frequency 2.50e+9 Hz	@Frequency 2.50e+9 Hz	Split Post Cavity
	0.0080	0.0080	
	@Frequency 1.00e+10 Hz	@Frequency 1.00e+10 Hz	Stripline; IPC-TM-650.2.5.5.5
Arc Resistance	123 sec	123 sec	IPC-TM-650.2.5.1

Descriptive Properties	Value	Comments
Methylene Chloride Resistance (% Weight Change)	0.7	IPC-TM-650.2.3.4.3
Pressure Cooker	Pass	60 min then solder dip @288°C until failure (max 10 min.); IPC-TM-650.2.6.16 (modified)
T260 (minutes)	>30	IPC-TM-650.2.4.24.1
T288 (minutes)	>10	IPC-TM-650.2.4.24.1
Z Axis Expansion (%)	3.5	50°C to 260°C; IPC-TM-650.2.4.41

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