

Park Electrochemical Nelco® N4000-12 High Speed/Low Loss, CAF Resistant Laminate and Prepreg

Category : Polymer , Thermoset , Epoxy

Material Notes:

The Nelco® N4000-12 series is an enhanced epoxy resin system designed for use in high speed, low loss applications requiring thermal stability, excellent signal speed and CAF resistance. Key Features and Benefits: Lead-Free Assembly Compatible Tg >190°C, robust thermal stability, High Speed and Low Loss Properties, CAF Resistant SI (Signal Integrity) option, High-Tg FR-4 processing. Applications/Qualifications: Lead-Free Assemblies, Fine-Line Multilayers, Backplanes, Surface-Mount Multilayers, BGA Multilayers, SIPs, MCM-Ls, Direct Chip Attach, Network Storage, Wireless Communications Infrastructure, High Speed Computing. Information provided by Park Electrochemical Corp.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Park-Electrochemical-Nelco-N4000-12-High-SpeedLow-Loss-CAF-Resistant-Laminate-and-Prepreg.php

Physical Properties	Metric	English	Comments
Density	1.90 g/cc	0.0686 lb/in ³	50% Resin Content; Internal Method
Water Absorption	0.090 %	0.090 %	IPC-TM-650.2.6.2.1

Mechanical Properties	Metric	English	Comments
Modulus of Elasticity	23.4 GPa	3400 ksi	Y; ASTM D3039
	28.3 GPa	4100 ksi	X; ASTM D3039
Poissons Ratio	0.14	0.14	Y; ASTM D3039
	0.16	0.16	X; ASTM D3039
Peel Strength	1.53 kN/m	8.70 pli	at elevated temperature; IPC-TM-650.2.4.8.2a
	1.61 kN/m	9.20 pli	after solder float; IPC-TM-650.2.4.8
	1.63 kN/m	9.30 pli	after exposure to process solutions; IPC-TM-650.2.4.8

Thermal Properties	Metric	English	Comments
CTE, linear	12.0 - 15.5 µm/m-°C	6.67 - 8.62 µin/in-°F	X/Y; IPC-TM-650.2.4.41
	@Temperature -40.0 - 125 °C	@Temperature -40.0 - 257 °F	
	60.05 µm/m-°C	33.36 µin/in-°F	Z-Axis Alpha 1; IPC-TM-650.2.4.41
	@Temperature 50.0 - 190 °C	@Temperature 122 - 374 °F	

Thermal Properties	260.21 $\mu\text{m/m-}^{\circ}\text{C}$ Metric	144.56 $\mu\text{in/in-}^{\circ}\text{F}$ English	Comments Z-Axis Alpha 2; IPC-TM-650.2.4.41
	@Temperature 190 - 260 $^{\circ}\text{C}$	@Temperature 374 - 500 $^{\circ}\text{F}$	
Specific Heat Capacity	1.21 J/g- $^{\circ}\text{C}$	0.290 BTU/lb- $^{\circ}\text{F}$	ASTM E1461
Thermal Conductivity	0.300 - 0.500 W/m-K	2.08 - 3.47 BTU-in/hr-ft ² - $^{\circ}\text{F}$	ASTM E1461
Glass Transition Temp, Tg	180 $^{\circ}\text{C}$	356 $^{\circ}\text{F}$	TMA; IPC-TM-650.2.4.24c
	190 $^{\circ}\text{C}$	374 $^{\circ}\text{F}$	DSC; IPC-TM-650.2.4.25c
	210 $^{\circ}\text{C}$	410 $^{\circ}\text{F}$	DMA (Tan δ Peak); IPC-TM-650.2.4.24.3
Decomposition Temperature	370 $^{\circ}\text{C}$	698 $^{\circ}\text{F}$	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+13 ohm-cm	1.00e+13 ohm-cm	E - 24/125; IPC-TM-650.2.5.17.1
	1.00e+14 ohm-cm	1.00e+14 ohm-cm	C - 96/35/90; IPC-TM-650.2.5.17.1
Surface Resistance	1.00e+12 ohm	1.00e+12 ohm	E - 24/125; IPC-TM-650.2.5.17.1
	1.00e+14 ohm	1.00e+14 ohm	C - 96/35/90; IPC-TM-650.2.5.17.1
Dielectric Constant	3.6	3.6	Stripline; IPC-TM-650.2.5.5.5
	@Frequency 1.00e+10 Hz	@Frequency 1.00e+10 Hz	
	3.7	3.7	Split Post Cavity
	@Frequency 1.00e+10 Hz	@Frequency 1.00e+10 Hz	
	3.7	3.7	RF Impedance; IPC-TM-650.2.5.5.9
	@Frequency 1.00e+9 Hz	@Frequency 1.00e+9 Hz	
Dielectric Strength	57.9 kV/mm	1470 kV/in	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>= 50000 V	>= 50000 V	IPC-TM-650.2.5.6
Dissipation Factor	0.0080	0.0080	Split Post Cavity
	@Frequency 2.50e+9 Hz	@Frequency 2.50e+9 Hz	
	0.0080	0.0080	Split Post Cavity
	@Frequency 1.00e+10 Hz	@Frequency 1.00e+10 Hz	

Electrical Properties	Hz Metric	Hz English	Comments
Arc Resistance	65 sec	65 sec	IPC-TM-650.2.5.1

Descriptive Properties	Value	Comments
Methylene Chloride Resistance (% Weight Change)	1	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)	>60	IPC-TM-650.2.4.24.1
Z Axis Expansion (%)	3.6	50°C to 260°C; IPC-TM-650.2.4.41

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