



# N4800-20

## N4800-20 SI®



### High-Speed Multifunctional Epoxy Laminate & Prepreg

*N4800-20 and N4800-20 SI® are high performance enhanced epoxy systems for multilayer PCBs requiring maximum thermal and stable electrical performance. N4800-20 and N4800-20 SI® are designed to be lead-free assembly compatible and CAF resistant. N4800-20 SI® is available with SI® glass for optimal signal integrity and impedance control.*

#### Key Features

##### Excellent Electrical Properties

- Low Df electrical performance
- Stable electrical properties versus frequency when tested over environmental conditions
- SI® glass available for low-loss applications and enhanced performance

##### Lead-Free Assembly Compatible

- Formulated to withstand multiple 260°C lead-free excursions

##### CAF Resistant

- CAF resistant material providing long term field reliability

##### Thermal and Mechanical Properties

- Very low Z-axis expansion for high reliability
- Excellent performance in fine pitch designs with small material webs between through holes
- Excellent peel strength
- Designed for high layer count multilayers

##### High-Tg FR-4 processing

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

##### Available in a variety of constructions

- Available in a wide variety of constructions, copper weights and glass styles including ultra low profile copper, standard copper, double treat and RTFOIL®
- Available as a 2 mil core product meeting the specifications of a capacitive laminate
- Meets UL 94V-0 with a 140°C MOT rating
- Meets IPC-4101/72 specifications and meets the requirements of IPC-4101/99, /101 and /126
- All of Park's electronic materials are RoHS compliant

#### Applications

- Fine-Line Multilayers
- Backplanes
- Surface-Mount Multilayers
- BGA Multilayers
- MCM-Ls
- CSP Attachment
- Wireless Communication Infrastructure
- High Speed Services
- High Speed Storage Networks
- Internet Switching / Routing Systems

Park's UL file number: E36295

# N4800-20 and N4800-20 SI®

## High-Speed Multifunctional Epoxy Laminate & Prepreg

Mechanical Properties	N4800-20	N4800-20 SI®	U.S. Units	N4800-20	N4800-20 SI®	Metric	Test Method
Peel Strength - 1 oz. (35 micron) Cu							
After Solder Float	7.0	7.0	lb / inch	1.23	1.23	N / mm	IPC-TM-650.2.4.8
At Elevated Temperature	6.5	6.5	lb / inch	1.14	1.14	N / mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	7.0	7.0	lb / inch	1.23	1.23	N / mm	IPC-TM-650.2.4.8
X / Y CTE [-40°C to +125°C]	10 - 14	10 - 14	ppm / °C	10 - 14	10 - 14	ppm / °C	IPC-TM-650.2.4.41
Z Axis CTE Alpha 1 [50°C to Tg]	27	31	ppm / °C	27	31	ppm / °C	IPC-TM-650.2.4.24
Z Axis CTE Alpha 2 [Tg to 260°C]	205	210	ppm / °C	205	210	ppm / °C	IPC-TM-650.2.4.24
Z Axis Expansion [50°C to 260°C] 43% RC	1.8	1.8	%	1.8	1.8	%	IPC-TM-650.2.4.24
Z Axis Expansion [50°C to 260°C] 55% RC	2.0	2.0	%	2.0	2.0	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)	4.0 / 3.7	3.2 / 2.9	psi x 10 <sup>6</sup>	27.6 / 25.5	22.1 / 20.0	GN / m <sup>2</sup>	ASTM D3039
Poisson's Ratios (X / Y)	0.177 / 0.154	0.189 / 0.168		0.177 / 0.154	0.189 / 0.168		ASTM D3039
Thermal Conductivity	0.47	0.47	W / mK	0.47	0.47	W / mK	ASTM E1461
Specific Heat	0.82	0.91	J / gK	0.82	0.91	J / gK	ASTM E1461
<b>Electrical Properties</b>							
Dielectric Constant (65% resin content)							
@ 2 GHz (Stripline)	3.56	3.29		3.56	3.29		IPC-TM-650.2.5.5.5
@ 10 GHz (Stripline)	3.55	3.24		3.55	3.24		IPC-TM-650.2.5.5.5
Dissipation Factor (65% resin content)							
@ 2 GHz (Split Post Cavity)	0.0073	0.0061		0.0073	0.0061		
@ 10 GHz (Split Post Cavity)	0.0075	0.0064		0.0075	0.0064		
Volume Resistivity							
C - 96 / 35 / 90	4.21x10 <sup>8</sup>	4.20x10 <sup>7</sup>	MΩ - cm	4.21x10 <sup>8</sup>	4.20x10 <sup>7</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
E - 24 / 125	6.29x10 <sup>8</sup>	2.50x10 <sup>8</sup>	MΩ - cm	6.29x10 <sup>8</sup>	2.50x10 <sup>8</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity							
C - 96 / 35 / 90	5.48x10 <sup>8</sup>	3.50x10 <sup>6</sup>	MΩ	5.48x10 <sup>8</sup>	3.50x10 <sup>6</sup>	MΩ	IPC-TM-650.2.5.17.1
E - 24 / 125	2.91x10 <sup>8</sup>	8.80x10 <sup>7</sup>	MΩ	2.91x10 <sup>8</sup>	8.80x10 <sup>7</sup>	MΩ	IPC-TM-650.2.5.17.1
Electric Strength	1660	1900	V / mil	4.2x10 <sup>4</sup>	4.8x10 <sup>4</sup>	V / mm	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>50	>50	kV	>50	>50	kV	IPC-TM-650.2.5.6
Arc Resistance	145	145	seconds	145	145	seconds	IPC-TM-650.2.5.1
<b>Thermal Properties</b>							
Glass Transition Temperature (Tg)							
DSC (°C)	200	200	°C	200	200	°C	IPC-TM-650.2.4.25c
TMA (°C)	180	180	°C	180	180	°C	IPC-TM-650.2.4.24c
DMA (°C) (Tan δ Peak)	210	210	°C	210	210	°C	IPC-TM-650.2.4.24.3
Degradation Temp (TGA) (5% wt. loss)	360	360	°C	360	360	°C	IPC-TM-650.2.3.40
Pressure Cooker-60 min then solder dip @288°C until failure (max 10 min.)	pass	pass		pass	pass		IPC-TM-650.2.6.16 (modified)
T288	40	40	minutes	40	40	minutes	IPC-TM-650.2.4.24.1
T300	10	10	minutes	10	10	minutes	IPC-TM-650.2.4.24.1
<b>Chemical / Physical Properties</b>							
Moisture Absorption	0.07	0.07	wt. %	0.07	0.07	wt. %	IPC-TM-650.2.6.2.1
Methylene Chloride Resistance	0.09	0.09	% wt. chg.	0.09	0.09	% wt. chg.	IPC-TM-650.2.3.4.3
Density [50% resin content]	1.92	1.83	g / cm <sup>3</sup>	1.92	1.83	g / cm <sup>3</sup>	Internal Method

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.

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### For Information about Park's materials:

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