

# 85N

## Polyimide Laminate and Prepreg



85N is the ultimate polyimide and laminate and prepreg system for PWB's requiring resistance to high temperature, both in process and in end-use application. Bromine-free chemistry provides Best-in-Class thermal stability for applications with sustained high in-use temperatures as well as for use in lead-free soldering applications.



### Features:

- Polyimide with best-in-class thermal properties, including Tg of 250°C, decomposition temperature >400°C, and T300>60 min.
- Low Z-axis expansion of 1.2% between 50-260°C (vs. 2.5-4.0% for typical high-performance epoxies) offering superior PTH reliability through process and in-service
- Low Z-axis expansion minimizes the risk of latent PTH defects caused during solder reflow and device attachment.
- Decomposition temperature of 407°C, compared with 300-360°C for typical high-performance epoxies, offering outstanding long-term high-temperature performance
- Electrical and mechanical properties meeting the requirements of IPC-4101/40 and /41
- Toughened chemistry resists resin fracturing
- Halogen-free chemistry
- Compatible with lead-free processing
- RoHS/WEEE compliant

### Typical Applications:

- PCBs that are subjected to high temperatures during processing, such as lead-free soldering, HASL, IR Reflow
- Applications with significant lifetimes at high temperatures, such as aircraft engine instrumentation, down hole drilling, under-hood automotive controls, burn-in boards, or industrial sensors

## Typical Properties:

Property	Units	Value	Test Method
<b>1. Electrical Properties</b>			
Dielectric Constant @ 1 MHz	—	4.2	IPC TM-650 2.5.5.3
@ 1 GHz	—	4.0	
Dissipation Factor @ 1 MHz		0.01	IPC TM-650 2.5.5.9
@ 1 GHz		N/A	
Volume Resistivity			
C96/35/90	MΩ-cm	1.5 x 10 <sup>8</sup>	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	3.0 x 10 <sup>10</sup>	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	1.6 x 10 <sup>9</sup>	IPC TM-650 2.5.17.1
E24/125	MΩ	1.6 x 10 <sup>9</sup>	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1450 (57.1)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	>40	IPC TM-650 2.5.6
Arc Resistance	sec	143	IPC TM-650 2.5.1
<b>2. Thermal Properties</b>			
Glass Transition Temperature (Tg)			
TMA	°C	250	IPC TM-650 2.4.24
DSC	°C		IPC TM-650 2.4.25
Decomposition Temperature (Td)			
Initial	°C	387	IPC TM-650 2.3.41
5%	°C	407	IPC TM-650 2.3.41
T260	min	>60	IPC TM-650 2.4.24.1
T288	min	>60	IPC TM-650 2.4.24.1
T300	min	>60	IPC TM-650 2.4.24.1
CTE (X,Y)	ppm/°C	16	IPC TM-650 2.4.41
CTE (Z)			
< Tg	ppm/°C	55	IPC TM-650 2.4.24
> Tg	ppm/°C	149	IPC TM-650 2.4.24
z-axis Expansion (50-260°C)	%	1.2	IPC TM-650 2.4.24
<b>3. Mechanical Properties</b>			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb/in (N/mm)	6.4 (1.1)	IPC TM-650 2.4.8
At Elevated Temperatures	lb/in (N/mm)	6.4 (1.1)	IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)	6.4 (1.1)	IPC TM-650 2.4.8
Young's Modulus CD/MD	Mpsi (GPa)	3.6/4.1 (24.8/28.2)	IPC TM-650 2.4.18.3
Tensile Strength CD/MD	kpsi (MPa)	48/64 (330/440)	IPC TM-650 2.4.18.3
Poisson's Ratio	-	0.18	ASTM D-3039
<b>4. Physical Properties</b>			
Water Absorption (0.062")	%	0.27	IPC TM-650 2.6.2.1
Specific Gravity	g/cm <sup>3</sup>	1.6	ASTM D792 Method A
Thermal Conductivity	W/mK	0.2	ASTM E1461
Flammability	class	HB	UL-94

## Availability:

Arlon Part Number	Glass Style	Resin %	Scaled Flow Hf (mils)	Scaled Flow ΔH (mils)
85N0672	106	72	1.7 ± 0.3	0.75 ± 0.20
85N8063	1080	63	2.4 ± 0.3	0.75 ± 0.20
85N2355	2313	55	3.4 ± 0.3	0.75 ± 0.20
85N2650	2116	50	4.1 ± 0.3	0.75 ± 0.20
85N2840	7628	40	6.6 ± 0.3	0.70 ± 0.20

## Recommended Process Conditions:

Process inner-layers through develop, etch, and strip using standard industry practices. Use brown oxide on inner layers. Adjust dwell time in the oxide bath to ensure uniform coating. Bake inner layers in a rack for 60 minutes at 107°C - 121°C (225°F - 250°F) immediately prior to lay-up. Store prepreg at 60-70°F at or below 30% RH. Vacuum desiccate the prepreg for 8 - 12 hours prior to lamination.

### Lamination Cycle:

- 1) Pre-vacuum for 30 - 45 minutes
- 2) Control the heat rise to 4°C - 6°C (8°F - 12°F) per minute between 65°C and 121°C (150°F and 250°F). Vacuum lamination is preferred. Start point vacuum lamination pressures are shown in the table below:

Panel Size		Pressure		Pressure/29" Vacuum	
in	cm	psi	kg/cm <sup>2</sup>	psi	kg/cm <sup>2</sup>
12 x 18	40 x 46	275	19	200	14.0
16 x 18	30 x 46	350	25	250	17.5
18 x 24	46 x 61	400	28	300	21.0

- 3) Set cure temperature at 218°C (425°F). Start cure time when product temperature = 213° (415°F)
- 4) Cure time at temperature = 120 minutes
- 5) Cool down under pressure at ≤ 5°C/min (10°F/min)

Drill at 350 SFM. Undercut bits are recommended for vias 0.018" (0.045cm) and smaller

De-smear using alkaline permanganate or plasma with settings appropriate for polyimide;

plasma is preferred for positive etchback

Conventional plating processes are compatible with 85N

Standard profiling parameters may be used; chip breaker style router bits are not recommended

Bake for 1 - 2 hours at 250°F (121°C) prior to solder to reflow of HASL

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