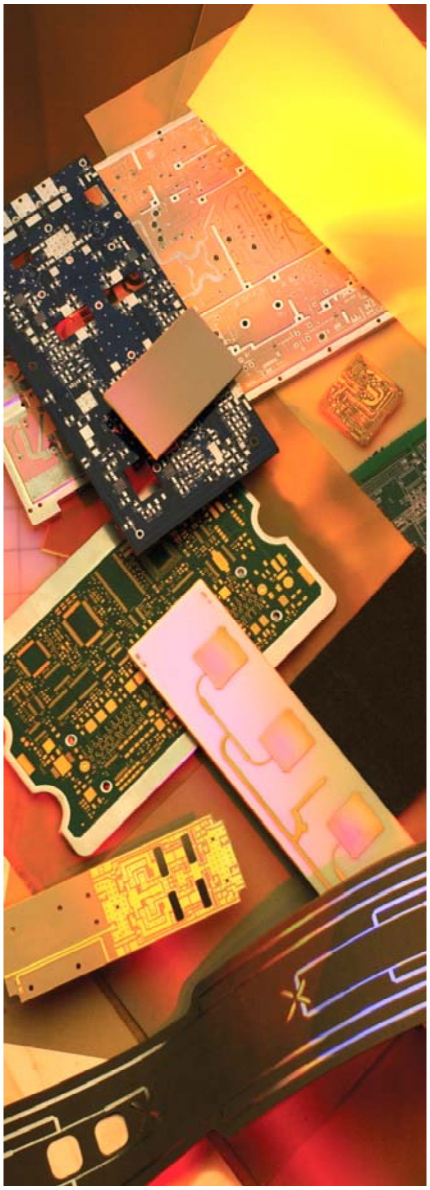
85NT

Polyimide Nonwoven Aramid Laminate And Prepreg



85NT is a pure polyimide laminate and prepreg system (Tg = 250°C), reinforced with a non-woven aramid substrate. This system combines the high-reliability features of polyimide (improved PTH reliability and temperature stability) with the low in-plane (x,y) expansion and outstanding dimensional stability of a non-woven aramid reinforcement.

Features:

- Low in-plane (x,y) expansion of 6-9 ppm/°C allows attachment of SMT devices with minimal risk of solder failure joint failure due to CTE mismatch
- Nonwoven aramid reinforcement provides outstanding dimensional stability and enhanced registration for improved multilayer yields.
- Decomposition temperature of 426°C, compared with 300-360°C for typical high-performance epoxies, offering outstanding high-temperature lifetime performance
- Polymeric reinforcement results in PCBs typically 25% lighter in weight than conventional glass-reinforced laminates
- Laser and plasma ablatable for high speed formation of microvias and other features as small as 25µm
- Electrical and mechanical properties meeting the requirements of IPC-4101/53
- Compatible with lead-free processing
- RoHS/WEEE compliant

Typical Applications:

- Military and commercial avionics, missiles and missile defense, satellites, and other high-reliability SMT applications requiring low in-plane (x,y) CTE values
- PCBs that are subjected to high temperatures during processing, such as lead-free soldering
- Applications with significant lifetimes at elevated temperatures, such as aircraft engine instrumentation, on-engine applications, or industrial sensors

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Typical Properties:

85NT

Property	Units	Value	Test Method
1. Electrical Properties			
Dielectric Constant *(may vary with Resin %)*			
@ 1 MHz	-	3.6	IPC TM-650 2.5.5.3
@ 1 GHz	-		IPC TM-650 2.5.5.9
Dissipation Factor			
@ 1 MHz	-	0.014	IPC TM-650 2.5.5.3
@ 1 GHz	-		IPC TM-650 2.5.5.9
Volume Resistivity			
C96/35/90	MΩ-cm	2.0×10^8	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	1.4×10^8	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	6.0×10^8	IPC TM-650 2.5.17.1
E24/125	MΩ	9.0×10^7	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1000 (39.4)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV		IPC TM-650 2.5.6
Arc Resistance	sec	160	IPC TM-650 2.5.1
2. Thermal Properties			
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	393	IPC TM-650 2.3.41
5%	°C	426	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	6 - 9	IPC TM-650 2.4.41
CTE (z)			
< Tg	ppm/°C	93	IPC TM-650 2.4.24
> Tg	ppm/°C	279	IPC TM-650 2.4.24
z-axis Expansion (50-260°C)	%	2.3	IPC TM-650 2.4.24
3. Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb/in (N/mm)	4.3 (0.8)	IPC TM-650 2.4.8
At Elevated Temperatures	lb/in (N/mm)	4.3 (0.8)	IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)	3.9 (0.7)	IPC TM-650 2.4.8
Young's Modulus	Mpsi (GPa)	2.3 (16)	IPC TM-650 2.4.18.3
Flexural Strength	kpsi (MPa)	34 (234)	IPC TM-650 2.4.4
Tensile Strength	kpsi (MPa)	6.5 (45)	IPC TM-650 2.4.18.3
Compressive Modulus	kpsi (MPa)		ASTM D-695
Poisson's Ratio (x, y)	-		ASTM D-3039
4. Physical Properties			
Water Absorption (0.062")	%	0.6	IPC TM-650 2.6.2.1
Specific Gravity	g/cm^3	1.37	ASTM D792 Method A
Thermal Conductivity	W/mK	0.2	ASTM E1461
Flammability	class	n/a	UL-94

Availability:

Arlon Part Number	Glass Style	Resin %	Mil/Ply	Flow %
85NT147	E210	49	1.7	8
85NT247	E220	49	3	8
85NT347	E230	49	3.8	8

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 225°F - 250°F (107°C - 121°C) immediately prior to lay-up. 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 8°F - 12°F (4°C - 6°C) per minute between 150°F and 250°F (65°C and 121°C)

Panel Size		Pressure	
in	cm	psi	kg/sq cm
12 x 12	40 x 40	250	17
12 x 18	40 x 46	300	21
16 x 18	30 x 46	350	25
18 x 24	46 x 61	400	27

3) Product temperature at start of cure = 425°F (218°C).

4) Cure time at temperature = 3.0 hours

5) Cool down under pressure at ≤ 10°F/min (6°C/min)

Drill at 350-400 SFM. Undercut bits are recommended for vias 0.023” (0.9cm) 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 85NT

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 reflow or HASL

Optimal processing requirements may vary depending on specific equipment and operating conditions. These recommendations are offered only as a starting point.

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