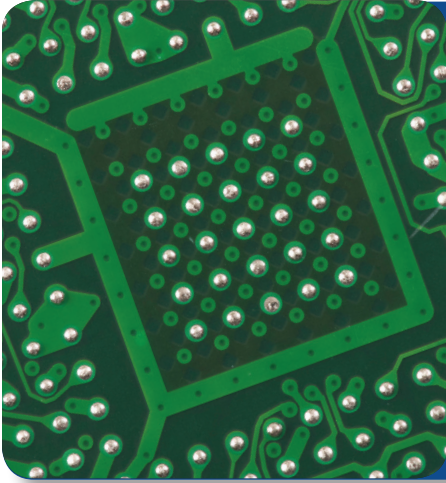


# 85NT

## POLYIMIDE NONWOVEN ARAMID LAMINATE AND PREPREG



85NT is a pure polyimide laminate and prepreg system ( $T_g=250^{\circ}\text{C}$ ), reinforced with a non-woven aramid substrate. 85NT 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 the aramid reinforcement.



### Features:

- Low in-plane (X,Y) CTE of 7-9 ppm/ $^{\circ}\text{C}$  allows attachment of SMT devices with minimal risk of solder joint due to CTE mismatch
- Nonwoven aramid reinforcement provides outstanding dimensional stability and enhanced registration for improved multilayer yields.
- Decomposition temperature of  $426^{\circ}\text{C}$ , compared with  $407^{\circ}\text{C}$  for pure polyimide, offering outstanding high-temperature processing stability
- Aramid reinforcement results in PCBs typically 25% lighter in weight than glass-reinforced laminates
- Laser and plasma ablatable for high speed formation of microvias and other features as small as  $25\mu\text{m}$  ( $\mu 0.001''$ )
- Electrical and mechanical properties meeting the requirements of IPC-4101/53
- Compatible with lead-free processing

### 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, HASL
- Applications with significant lifetimes with elevated temperature cycling, such as aircraft engine instrumentation, on-engine applications, or industrial sensors

## Typical Properties:

Property	Units	Value	Test Method
<b>1. Electrical Properties</b>			
Dielectric Constant			
@ 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 x 10 <sup>8</sup>	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	1.4 x 10 <sup>8</sup>	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	6.0 x 10 <sup>8</sup>	IPC TM-650 2.5.17.1
E24/125	MΩ	9.0 x 10 <sup>7</sup>	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
<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	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	7 - 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
<b>3. Mechanical Properties</b>			
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	-		ASTM D-3039
<b>4. Physical Properties</b>			
Water Absorption (0.062")	%	0.6	IPC TM-650 2.6.2.1
Specific Gravity	g/cm <sup>3</sup>	1.37	ASTM D792 Method A
Thermal Conductivity	W/mK	0.2	ASTM E1461
Flammability	class	n/a	UL-94

Results listed above are typical properties, provided without warranty, expressed or implied, and without liability. Properties may vary, depending on design and application. Arlon reserves the right to change or update these values.

## Availability:

Arlon Part Number	Fabric Style	Resin %	Mil/Ply	Flow %
85NT147	210	49	1.8	8
85NT247	220	49	2.9	8
85NT347	230	49	3.9	8
85NT153	210	53	1.9	10
85NT253	220	53	3.1	10
85NT353	230	53	4.3	10

## Recommended Process Conditions: \*

Process inner-layers through develop, etch, and strip using standard industry practices. Use brown oxide or alternatives on inner layers. 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 minutes
- 2) Control the heat rise to 7°F - 12°F (4°C - 6.5°C) per minute between 200°F and 300°F (93°C and 149°C)

Panel Size		Pressure	
in	cm	psi	kg/cm <sup>2</sup>
12 x 12	30 x 30	250	17
18 x 12	46 x 30	300	21
18 x 16	46 x 41	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 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

\* Refer to separate process guide for more details.

# 85NT

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