84N

ARLON
ELECTRONIC MATERIALS

Polyimide Prepreg

84N is a high performance ceramic-filled polyimide prepreg based on Arlon's 85N pure polyimide system, designed for use in filling etched areas in polyimide multilayers that contain thick copper layers and for filling clearance holes in metal cores. The ceramic filler in the resin serves to reduce shrinkage and inhibit crack formulation during through-hole drilling in filled clearance areas.

Features:

- Meets IPC4101/40 and /41 description and specification
  - Pure polyimide, no secondary resin
  - No epoxy added, blended or reacted
- Best-in-Class thermal properties
  - Tg=> 250°C
  - Decomposition temperature >407°C
  - T300>60 min.
- Low Z-axis expansion
  - 1.2% between 50-260°C (vs. 2.5-4.0% for typical high-performance epoxies)
  - 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
- Toughened chemistry resists resin fracturing
- Halogen-free chemistry
- Compatible with lead-free processing
- RoHS/WEEE compliant

Typical Applications:

- PCB's that are subjected to high temperatures during processing, such as lead-free soldering, HASL, IR Reflow
- Applications with long term exposure to high temperatures such as aircraft engine instrumentation, down hole drilling, under-hood automotive controls, burn-in boards, or industrial sensors

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Typical Properties:

Property	Units	Value	Test Method
Electrical Properties			
Dielectric Constant @ 1 MHz	Prepreg @ 75% RC	4.2	IPC TM-650 2.5.5.3
Dissipation Factor @ 1 MHz		0.01	IPC TM-650 2.5.5.3
@ 1 GHz		N/A	IPC TM-650 2.5.5.9
Volume Resistivity			
C96/35/90	MΩ-cm	1.5×10^8	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	3.0×10^8	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	1.6×10^9	IPC TM-650 2.5.17.1
E24/125	MΩ	1.6×10^8	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1451 (57.1)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	>41	IPC TM-650 2.5.6
Arc Resistance	sec	143	IPC TM-650 2.5.1
Thermal Properties			
Glass Transition Temperature (Tg)			
TMA	°C	=>250	IPC TM-650 2.4.24C
Decomposition Temperature			
Initial	°C	387	IPC TM-650 2.4.24.6
5% weight loss	°C	407	IPC TM-650 2.4.24.6
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	48	IPC TM-650 2.4.24C
> Tg	ppm/°C	150	IPC TM-650 2.4.24C
z-axis Expansion (50-260ºC)	%	1.0	IPC TM-650 2.4.24C
Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb./in (N/mm)	7.1 (1.2)	IPC TM-650 2.4.8C
At Elevated Temperatures	lb./in (N/mm)	7.1 (1.2)	IPC TM-650 2.4.8.2A
After Process Solutions	lb./in (N/mm)	7.1 (1.2)	IPC TM-650 2.4.8
Young's Modulus CD/MD	Mpsi (GPa)	4.1 (28.2)	ASTM E111
Tensile Strength CD/MD	kpsi (MPa)	65/49 (440/330)	ASTM D3039
Poisson's Ratio	-	0.18	ASTM E13204
Physical Properties			
Water Absorption (0.062")	%	0.27	IPC TM-650 2.6.2.1A
Density	g/cm3	1.65	ASTM D792 Method A
Thermal Conductivity	W/mK	0.25	ASTM E1461
Flammability	class	HB	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.

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Availability:

Arlon Part Number	Glass Style	Resin (%)	Nominal Flow (%)	Ho (mils)	Δ H (mils)
84N0675-HF	106	75	45	2.4	
84N0680HF01	106	80	47	3.1	1.0

Recommended Process Conditions:

84N is recommended for etched areas in copper layers and clearance holes, and the high resin flow is designed to flow readily into the holes. The actual pressed thickness of the glass plus resin that will be left after flow-out into the holes may vary depending on the density of holes to be filled. It is recommended that to ensure maximum effectiveness of the hole-filling process, at least two plies of 84N be used on each side of the material to be filled (more may be needed for thicker systems), backed up by a single ply of standard 85N1080 or 106 to serve as a hydraulic medium to drive the filled resin into clear via holes. When using the 84N as prepreg with etched inner layers the pressed thickness depends on the amount and thickness of copper on inner layers. The Ho value is the theoretical thickness if there were no flow or fill of inner layer copper.

NOTE: The 84N0675HF grade has reduced resin content to provide a lower pressed thickness. Customer should use the 84N0680HF grade for most applications as the lower resin grade may be marginal in hole fill for many applications.

Lamination Cycle:

1) Pre-vacuum for 30 - 45 minutes

2) Control the heat rise to 4.5°C - 6.5°C (8°F - 12°F) per minute between 100°C and150°C (210°F and 300°F). Vacuum lamination is prefered. Start point vacuum lamination pressures are shown in the table below:

Panel Size		Pressure	
in.	mm	psi	kg/cm2
12 x 18	305 x 457	275	19
16 x 18	406 x 457	350	25
18 x 24	457 x 610	400	28

3) Set cure temperature at 218˚C (425˚F). Start cure time when product temperature > 213˚ C (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 0.0 18” (0.45mm) 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 84N

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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...*Challenge Us!*

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