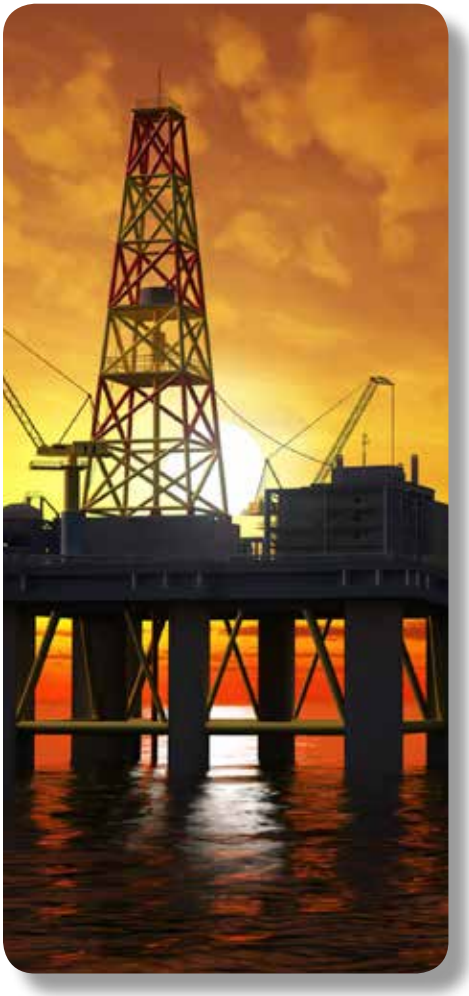
84N

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:

- High Tg polyimide (>250°C) with Thermal Decomposition temperature (Td) >400°C and T300>60 minutes
- Low Z-axis expansion of 1% between 50-250°C offers improved PTH reliability through manufacture, assembly and in-service
- 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, ceramic filled chemistry resists resin fracturing
- Halogen-free chemistry
- Ideal for lead-free processing
- RoHS/WEEE compliant

Typical Applications:

- MLB's that are designed with clearance holes in metal cores or for thick metal power and ground planes that require the thermal stability of polyimide
- Applications requiring significant lifetimes at elevated temperatures, such as aircraft engine instrumentation, down hole drilling, under-hood automotive applications industrial sensor systems and burn-in testing of IC's.

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84N

Typical Properties:

Property	Units	Value	Test Method
1. Electrical Properties			
Dielectric Constant			
@ 1 MHz	Prepreg @ 75% RC	4.2	IPC TM-650 2.5.5.3
@ 1 GHz	-	4.0	IPC TM-650 2.5.5.9
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
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	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	48	IPC TM-650 2.4.24
> Tg	ppm/°C	150	IPC TM-650 2.4.24
z-axis Expansion (50-260°C)	%	1.0	IPC TM-650 2.4.24
3. Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb/in (N/mm)	7.1 (1.2)	IPC TM-650 2.4.8
At Elevated Temperatures	lb/in (N/mm)	7.1 (1.2)	IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)	7.1 (1.2)	IPC TM-650 2.4.8
Young's Modulus	Mpsi (GPa)	4.1 (28.2)	IPC TM-650 2.4.18.3
Flexural Strength	Kpsi (MPa)		
Tensile Strength (MD/CD)	Kpsi (MPa)	65/49 (440/330)	
Poisson's Ratio	-	0.18	ASTM D-3039
4. Physical Properties			
Water Absorption (0.062")	%	0.27	IPC TM-650 2.6.2.1
Specific Gravity	g/cm^3	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.

Availability:

Arlon Part Number	Glass Style	Resin %	Nominal Flow (%)	Ho (mils)	△H (mils)
84N0675-HF	106	75	45	2.4	
84N0680-HF	106	80	50	3.1	
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 on the 84N 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 85N 1080 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 depend 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°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^2	psi	kg/cm^2
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˚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 0.018” (0.045 cm) 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 121°C (250°F) prior to solder to reflow of HASL

ELECTRONIC MATERIALS

Arlon Electronic Materials...
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