35N

ARLON ELECTRONIC MATERIALS

Polyimide Laminate and Prepreg

35N is a pure polyimide laminate and prepreg system for applications requiring high temperature performance. High Tg (250°C) results in low Z-direction expansion for resistance to PTH failure during PWB processing, and minimizes risk of latent PTH defects in-service. Reduced temperature and time to cure offers improved throughput compared to traditional polyimide cycles.

Features:

- Meets IPC4101/40 and /41 description and specification
- UL recognized as UL-94 V-1
- Best-in-Class thermal properties
  - Tg=> 250°C
  - Decomposition temperature >407°C
- 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
- 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

35N

Typical Properties:

Property	Units	Value	Test Method
Electrical Properties			
Dielectric Constant @ 1 MHz	Multilayer ~ 50% RC	4.2	IPC TM-650 2.5.5.3
@ 1 GHz	Multilayer ~ 50% RC	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	1.2×10^8	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	5.0×10^8	IPC TM-650 2.5.17.1
E24/125	MΩ	3.7×10^8	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1400 (55.9)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	>40	IPC TM-650 2.5.6
Arc Resistance	sec	165	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	363	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	11	IPC TM-650 2.4.24.1
CTE (X,Y)	ppm/°C	16	IPC TM-650 2.4.41
CTE (Z)			
< Tg	ppm/°C	51	IPC TM-650 2.4.24C
> Tg	ppm/°C	158	IPC TM-650 2.4.24C
z-axis Expansion (50-260ºC)	%	1.2	IPC TM-650 2.4.24C
Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb./in (N/mm)	6.3 (1.1)	IPC TM-650 2.4.8C
At Elevated Temperatures	lb./in (N/mm)	6.3 (1.1)	IPC TM-650 2.4.8.2A
After Process Solutions	lb./in (N/mm)	6.0 (1.1)	IPC TM-650 2.4.8C
Young's Modulus CD/MD	Mpsi (GPa)	3.5/4.2 (24.1/28.9)	ASTM E111
Tensile Strength CD/MD	kpsi (MPa)	48/65 (330/445)	ASTM D3039
Poisson's Ratio	-	0.17	ASTM E13204
Physical Properties			
Water Absorption (0.062")	%	0.26	IPC TM-650 2.6.2.1A
Density	g/cm3	1.6	ASTM D792 Method A
Thermal Conductivity	W/mK	0.2	ASTM E1461
Flammability	class	V1	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.

35N

Availability:

Arlon Part Number	Glass Style	Resin (%)	Scaled Flow Hf (mils)	Scaled Flow Δ H (mils)
35N0672	106	72	1.7 ± 0.3	0.75 ± 0.20
35N8063	1080	63	2.4 ± 0.3	0.75 ± 0.20
35N2355	2313	55	3.4 ± 0.3	0.75 ± 0.20
35N2650	2116	50	4.1 ± 0.3	0.75 ± 0.20
35N2840	7628	40	6.6 ± 0.3	0.75 ± 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 4.5°C - 6.5°C (8°F - 12°F) per minute between 100°C and150°C (210°F and 300°F). Vacuum lamination is preferred. Start point vacuum lamination pressures are shownin 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 213˚C (415˚F). Start cure time when product temperature > 210˚ C (410˚F)

4) Cure time at temperature = 90 minutes
NOTE: For sequential lamination use 60 minutes for the first lamination and 90 minutes for the final.

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 35N

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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