33N

ARLON ELECTRONIC MATERIALS

Polyimide Laminate and Prepreg

33N is a flame retardant (UL94 V-0) polyimide laminate and prepreg system where the excellent high performance properties of polyimide need to be combined with flame retardance. High Tg (250°C) results in low overall z-axis expansion, and minimizes risk of latent PTH defects in-service.

Features:

- Meets IPC4101/40 and /41 description and specification
- UL recognized as UL94 V-0
- Best-in-Class thermal properties
  - Tg=> 250°C
  - Decomposition temperature 390°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 390°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

33N

Typical Properties:

Property	Units	Value	Test Method
Electrical Properties			
Dielectric Constant @ 1 MHz	Multilayer ~ 50% RC	4.25	IPC TM-650 2.5.5.3
@ 1 GHz	Multilayer ~ 50% RC	4.1	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	7.2×10^7	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	4.5×10^8	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	4.1×10^8	IPC TM-650 2.5.17.1
E24/125	MΩ	1.6×10^9	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	1290 (50.8)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	>40	IPC TM-650 2.5.6
Arc Resistance	sec	170	IPC TM-650 2.5.1
Thermal Properties			
Glass Transition Temperature (Tg)			
TMA	°C	>250	IPC TM-650 2.4.24C
DSC	°C	N/A	IPC TM-650 2.4.25D
Decomposition Temperature			
Initial	°C	353	IPC TM-650 2.4.24.6
5% weight loss	°C	389	IPC TM-650 2.4.24.6
T260	min	>60	IPC TM-650 2.4.24.1
T288	min	23	IPC TM-650 2.4.24.1
T300	min	8	IPC TM-650 2.4.24.1
CTE (X,Y)	ppm/°C	16	IPC TM-650 2.4.41
CTE (Z)			
< Tg	ppm/°C	53	IPC TM-650 2.4.24C
> Tg	ppm/°C	164	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)	7.2 (1.2)	IPC TM-650 2.4.8C
At Elevated Temperatures	lb./in (N/mm)	7.2 (1.2)	IPC TM-650 2.4.8.2A
After Process Solutions	lb./in (N/mm)	7.5 (1.3)	IPC TM-650 2.4.8C
Young's Modulus CD/MD	Mpsi (GPa)	3.2	ASTM E111
Tensile Strength CD/MD	kpsi (MPa)		ASTM D3039
Poisson's Ratio	-	0.15	ASTM E13204
Physical Properties			
Water Absorption (0.062")	%	0.21	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	V-0	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.

33N

Availability:

Arlon Part Number	Glass Style	Resin (%)	Scaled Flow Hf (mils)	Scaled Flow Δ H (mils)
33N0672	106	72	1.9 ± 0.3	0.55 ± 0.20
33N8063	1080	63	2.6 ± 0.3	0.55 ± 0.20
33N2355	2313	55	3.6 ± 0.3	0.55 ± 0.20
33N2650	2116	50	4.3 ± 0.3	0.55 ± 0.20
33N2840	7628	40	6.8 ± 0.3	0.55 ± 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. 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).

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 cycle timer when product temperature reaches 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

5) Cool down under pressure at ≤ 6°C/min (12°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 33N

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

ELECTRONIC MATERIALS

...Challenge Us!

For samples, technical assistance and customer service, please contact Arlon Electronic Materials at the following locations:

NORTH AMERICA:

Arlon EMD, 9433 Hyssop Drive, Rancho Cucamonga, CA
Tel: (909) 987-9533 • Fax: (909) 987-8541

FRANCE:

CCI Eurolam
9, rue Marcelin Bertholet
92160 Antony, France

Phone: (33) 146744747
Fax: (33) 146666313

GERMANY:

CCI Eurolam
Otto-Hahn-Str. 46 63303
Dreiech Germany

Phone: (49) 610339920
Fax: (49) 6103399229

UK & SCANDINAVIA:

CCI Eurolam – UK
Ulness Walton Lane
Leyland, PR26 8NB, UK

Phone: (44) 1772452236
Fax: (44) 1772456859

ISRAEL:

Tech Knowledge, Ltd. 159 Yigal Alon Street,
Tel Aviv 6744367, Israel

Phone: (972) 36958117
Fax: (972) 36917117

ITALY:

Dralmi,SAS
Via Cellini 5
20129 Milano Italy

Phone: (39) 025460507
Fax: (39) 0255013199

TAIWAN:

Advantic Technology Inc. (ATI)
9F No. 493 Wen-zhong Rd,
Taoyuan County 330,
Taiwan (R.O.C.)

Phone: (886) 3-3260047
Fax: (886) 3-3260063

SINGAPORE:

C.T.S. Industries Pte Ltd
47 Kaki Bukit Place
Singapore 416225

Phone: (65) 6276 3328
Fax: (65) 6276 3336

JAPAN:

Nakao Corp.
12-8 Nihonbashi Hisamatsu-Cho Tokyo
103-0005 Japan

Phone: (81) 336623201
Fax: (81) 336617118

KOREA

UniMicrotek Co. Ltd.
478 Baekbeom-Ro, Bupyeong-Gu
Incheon, Korea

Phone: (82) 32-424-1776
Fax: (82) 505-720-1785

CHINA:

Zack Peng
Room 6A, Unit 2, Bldg 2
Jin Cheng Shi Dai, Tian Road
Shenzhen, China 518103

Phone: (86) 75528236491
Fax: (86) 75528236463

INDIA:

Synertec
301 Raheja Chambers,12 Museum Rd
Bangalore, India 560001

Phone: (91) 80-25585432
Fax: (91) 80-25588565