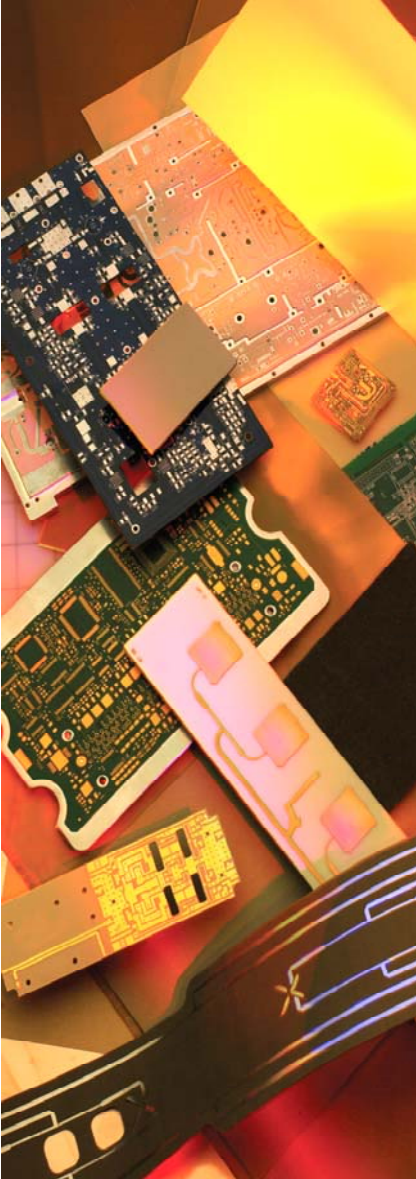


47N

EPOXY LOW-FLOW PREPREG



47N is a low-flow epoxy prepreg engineered for binding multilayer epoxy rigid-flex or attaching heat sinks to multilayer PCBs. An optional low lamination temperature protects components already mounted on the PCB.

Features:

- Tetrafunctional modified epoxy resin system with a Tg of 130°C
- Optimized bond to aluminum and copper heat sinks – typical lap shear 1000 PSI
- Cure temperature as low as 300°F (150°C)
- Engineered with discrete flow ranges and fiberglass styles for optimal process flexibility
- Electrical and mechanical properties meeting the requirements of IPC-4101/21, modified to be “Low-Flow”
- RoHS/WEEE compliant
- Cost competitive for high volume commercial applications

Typical Applications:

- Bonding multilayer epoxy rigid-flex
- Attaching heat sinks to multilayer PCBs
- Dielectric insulators

Typical Properties:

47N

Property	Units	Value	Test Method
1. Electrical Properties			
Dielectric Constant <i>(may vary with Resin %)</i>			
@ 1 MHz	-	4.3	IPC TM-650 2.5.5.3
@ 1 GHz	-		IPC TM-650 2.5.5.9
Dissipation Factor			
@ 1 MHz	-	0.022	IPC TM-650 2.5.5.3
@ 1 GHz	-		IPC TM-650 2.5.5.9
Volume Resistivity			
C96/35/90	MΩ-cm	5.1 x 10 ⁷	IPC TM-650 2.5.17.1
E24/125	MΩ-cm	7.4 x 10 ⁷	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	MΩ	8.8 x 10 ⁶	IPC TM-650 2.5.17.1
E24/125	MΩ	1.5 x 10 ⁶	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		IPC TM-650 2.5.1
2. Thermal Properties			
Glass Transition Temperature (Tg)			
TMA	°C		IPC TM-650 2.4.24
DSC	°C	130	IPC TM-650 2.4.25
Decomposition Temperature (Td)			
Initial	°C		IPC TM-650 2.3.41
5%	°C		IPC TM-650 2.3.41
T260	min	18	IPC TM-650 2.4.24.1
T288	min		IPC TM-650 2.4.24.1
T300	min		IPC TM-650 2.4.24.1
CTE (x,y)	ppm/°C	15-17	IPC TM-650 2.4.41
CTE (z)			
< Tg	ppm/°C	85	IPC TM-650 2.4.24
> Tg	ppm/°C		IPC TM-650 2.4.24
z-axis Expansion (50-260°C)	%		IPC TM-650 2.4.24
3. Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb/in (N/mm)	9.0 (1.6)	IPC TM-650 2.4.8
At Elevated Temperatures	lb/in (N/mm)		IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)		IPC TM-650 2.4.8
Young's Modulus	Mpsi (GPa)	2.6 (17.9)	IPC TM-650 2.4.18.3
Flexural Strength	kpsi (MPa)		IPC TM-650 2.4.4
Tensile Strength	kpsi (MPa)		IPC TM-650 2.4.18.3
Compressive Modulus	kpsi (MPa)		ASTM D-695
Poisson's Ratio (x, y)	-	0.17	ASTM D-3039
4. Physical Properties			
Water Absorption (0.062")	%	0.1	IPC TM-650 2.6.2.1
Specific Gravity	g/cm ³	1.75	ASTM D792 Method A
Thermal Conductivity	W/mK	0.25	ASTM E1461
Flammability	class	V-0	UL-94

Availability:

Arlon Part Number	Glass Style	Resin %	Mil/Ply	Flow %
47N0475	104	75	0.0021	0.030"-0.090"
47N0672	106	72	0.0024	0.030"-0.090"
47N8065	1080	65	0.0032	0.030"-0.080"
47N067201	106	72	0.0024	0.050-0.100"
47N806501	1080	65	0.0032	0.050"0.100"

Recommended Process Conditions:

Process inner-layers through develop, etch, and strip using standard industry practices. 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 - 45 minutes
- 2) Control the heat rise to 8°F - 12°F (4°C - 6°C) per minute between 150°F and 250°F (65°C and 121°C)
- 3) Lamination Pressure: 150-300 PSI (11-21 Kg/cm²) depending on complexity
- 4) Product temperature at start of cure = 340°F (171°C).
- 5) Cure time at temperature = 60 minutes
- 6) Cool down under pressure at $\leq 10^{\circ}\text{F}/\text{min}$ (6°C/min)

Drill at 350-400 SFM. Undercut bits are recommended for vias 0.023" (0.9cm) and smaller

De-smear using alkaline permanganate or plasma with settings appropriate for epoxy; plasma is preferred for positive etchback

Conventional plating processes are compatible with 47N

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

47N

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