

Thermally Conductive No Flow Prepreg for Heat-Sink Bonding

Description

Arlon's 99N thermally conductive no-flow Prepreg is a multifunctional epoxy Prepreg loaded with an engineered blend of microfine thermally conductive ceramic powder. 99N is designed to provide more than 4x the out-of-plane (Z-direction) thermal conductivity of conventional no-flow bonding materials for increasing the heat flow from high powered PWB's into heat sinks.

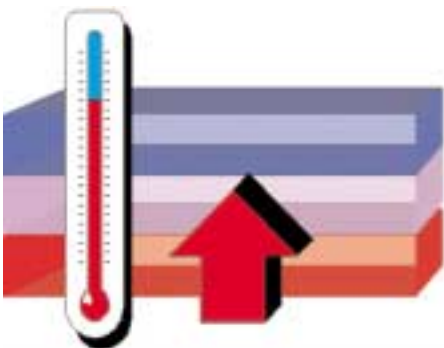
Controlled flow characteristics permit low pressure (as low as 100 psi) bonding white still providing excellent wet out and adhesion to a variety of heat sink materials including various Aluminum, Copper, Copper-Tungsten and Copper-Molybdenum alloys. Arlon's proprietary no-flow epoxy chemistry ensures that the product will not flow excessively into cutouts that are required in the heat sinks.

Features

- High Thermal Conductivity
- Standard Epoxy Lamination Temp
- High Lap Shear Strength Bonds
- Convenient Prepreg-Format
- No Flow Chemistry
- Low Pressure Lamination

Benefits

- Improved Heat Transfer to Heat Sink
- Seamless Process Implementation
- Bond to Most Heat-Sink Alloys
- No Messy Liquid or Paste Handling
- No Resin Flow into Cut-out Areas
- Laminate Without Damaging PWB's



Applications

Management of heat on PWB's has become a significant issue to the electronics industry. 99N is part of a family of no-flow products designed for rigid-flex and heat sink bonding applications. The unique place of 99N in this family is due to its thermal conductivity which is typically >1.2 W/m-K -- approximately 4 times as great as that of conventional heat sink bonding materials. Since heat transfer is directly proportional to the out of plane thermal conductivity of the bonding material use of 99N can substantially increase the rate of heat transfer from a PWB such as a power amp to a heat-sink. CTE (X/Y) of 19 ppm/°C is close to Copper and Aluminum, while CTE (Z) at only 24 ppm/°C minimizes out-of-plane stresses during processing.

Lamination Cycle

We recommend a nominal starting point cure cycle of 90 minutes at 182°C (360°F) with a heat up rate of approximately 5°C(9°F)/min. The product does not require postbake to achieve the required Tg and we do not recommend overcuring, which could potentially reduce the lap shear strength of the final bond. A lamination pressure as low as 100 psi can be used if damage to PWB's or concern for excessive flow-out into cutout areas is an issue.

When 99N is going to be used with PTFE printed circuit boards, it may be necessary to treat the PTFE surface with an inert gas plasma or with one of the available wet process sodium etchants to render the PTFE bondable.

As a minimum, metal surfaces should be prepared by a light uniform surface abrasion followed by careful cleaning to ensure that no grease or oils remain to interfere with bonding.

Availability

Arlon 99N is available as Style 106 Prepreg and can be provided in rolls nominally 36" x 125 yards long or cut to panels to meet customer's tooling standards.

Property	Test Method	Result
Thermal Conductivity (W/m-K)	ASTM-E-1461-01	>1.2
Lap Shear Strength to Aluminum (PSI)	ASTM-D-1002	1000 (nominal)
Tg (degrees C)	IPC-TM-650 2.4.24 (TMA)	170
Flammability	Meets Requirements of UL-94	V0
Nominal Pressed Thickness per Ply	IPC-TM-650 2.4.38	0.005"
Water Absorption (normalized to 0.062")	IPC-TM-650 2.6.2.1	$<0.1\%$
Flow (mils)	IPC-TM-650 2.3.17.2	0.100-0.150"
Dielectric Constant/Loss Tangent (1.5 GHz)	Arlon Test Method	5.8/0.013
Coefficient of Thermal Expansion (ppm/°C) X, Y, Z	IPC-TM-650 2.4.41	19, 19, 24
Dielectric Withstanding (Volts/mil)	ASTM-D-149	750
Density g/cc	ASTM-D-972 A	2.1

Data provided herein is provided for reference purposes only and are not intended to be sales specifications. Determination of the suitability of any of these materials for a particular application is the sole responsibility of the user. Furthermore, no suggestion for use, or material supplied shall be construed as a recommendation or inducement to violate any law or infringe on any patent. Product specifications may be subject to change.

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MATERIALS FOR ELECTRONICS

1100 Governor Lea Road, Bear, DE 19701 • Telephone: (302) 834-2100, (800) 635-9333 • Fax: (302) 834-2574
9433 Hyssop Drive, Rancho Cucamonga, CA 91730 • Telephone: (909) 987-9533 • Fax: (909) 987-8541
37 Rue Collange, 92300 LeVallois, Perret, France • Telephone: (33) 1-427-02642 • Fax: (33) 1-427-02798
44 Wilby Avenue, Little Lever, Bolton, Lancashire, BL31QE, U.K. • Telephone: (44) 120-457-6068 • Fax: (44) 120-479-6463
Bukit Batok West Avenue 8, Singapore 650170 • Telephone/Fax: (65) 665-0500
E-mail: substrates@arlonmed.com • Website: www.arlonmed.com

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Company**