

isola

FR402

Tetrafunctional Epoxy Laminate and Prepreg

FR402 consists of a modified tetrafunctional epoxy resin system engineered for multilayer applications that require performance characteristics exceeding those of difunctional epoxies.

The formulation of FR402 is designed to enhance throughput and accuracy of laser based Automated Optical Inspection (AOI) equipment. FR402 offers superior resistance to chemical and thermal degradation.

Product Attributes

Legacy Materials

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Data Sheet

Tg 140°C

Td 320°C

Dk 4.25

Df 0.015

IPC-4101/21

UL - File Number E41625

Last Updated December 7, 2017
Revision No: 6

Product Features

Product Availability

| Property | Typical Value | Units | Test Method |
|--|--|--|--|
| | | Metric (English) | IPC-TM-650 (or as noted) |
| Glass Transition Temperature (Tg) by DSC | 140 | °C | 2.4.25C |
| Decomposition Temperature (Td) by TGA @ 5% weight loss | 315 | °C | 2.4.24.6 |
| Time to Delaminate by TMA (Copper removed) | A. T260 B. T288 | 30 >5 | Minutes 2.4.24.1 |
| Z-Axis CTE | A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion) | 50 250 4.2 | ppm/°C ppm/°C % 2.4.24C |
| X/Y-Axis CTE | Pre-Tg | 15 | ppm/°C 2.4.24C |
| Thermal Conductivity | | .36 | W/mK ASTM E1952 |
| Thermal Stress 10 sec @ 288°C (550.4°F) | A. Unetched B. Etched | Pass | Pass Visual 2.4.13.1 |
| Dk, Permittivity | A. @ 100 MHz B. @ 500 MHz C. @ 1 GHz | 4.60 4.27 4.25 | — 2.5.5.3 2.5.5.9 2.5.5.5 |
| Df, Loss Tangent | A. @ 100 MHz B. @ 500 MHz | 0.016 0.015 | — 2.5.5.3 2.5.5.9 |
| Dk, Permittivity | @ 1 GHz | 0.015 | — 2.5.5.5 |
| Volume Resistivity | A. C-96/35/90 B. After moisture resistance C. At elevated temperature | 4.0×10^8 — 7.0×10^7 | MΩ-cm 2.5.17.1 |
| Surface Resistivity | A. C-96/35/90 B. After moisture resistance C. At elevated temperature | 3.0×10^6 — 6.0×10^6 | MΩ 2.5.17.1 |
| Dielectric Breakdown | | >50 | kV 2.5.6B |
| Arc Resistance | | 120 | Seconds 2.5.1B |
| Electric Strength (Laminate & laminated prepreg) | | 29 (1100) | kV/mm (V/mil) 2.5.6.2A |
| Comparative Tracking Index (CTI) | | 3 (175-249) | Class (Volts) UL 746A ASTM D3638 |
| Peel Strength | A. Low profile copper foil and very low profile copper foil all copper foil >17 μm [0.669 mil] B. Standard profile copper 1. After thermal stress 2. At 125°C (257°F) 3. After process solutions | 1.05 (8.0) 1.45 (9.0) 1.25 (8.0) 1.45 (9.0) | N/mm (lb/inch) 2.4.8C 2.4.8.2A 2.4.8.3 2.4.8.3 |
| Flexural Strength | A. Length direction B. Cross direction | 92,000 62,300 | ksi 2.4.4B |
| Tensile Strength | A. Length direction B. Cross direction | 60,000 43,150 | ksi ASTM D3039 |
| Young's Modulus | A. Length direction B. Cross direction | 3500 3000 | ksi ASTM D790-15e2 |
| Moisture Absorption | | 0.3 | % 2.6.2.1A |
| Flammability (Laminate & laminated prepreg) | | V-0 | Rating UL 94 |
| Max Operating Temperature | | 130 | °C UL 796 |

The data, while believed to be accurate and based on analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

