

Polyimide Laminate and Prepreg

Isola Laminate Systems offers a product line of polyimide-based prepreg and copper clad laminates for high temperature printed circuit applications. These products consist of a flame resistance, polyimide resin system suitable for military, commercial or industrial electronic applications requiring superior performance and the utmost in thermal properties. They utilize a polyimide and thermoplastic blend resin, fully cured without the use of MDA (Methylene Dianiline). This results in a polymer with a high Tg without the characteristic difficulties of brittleness and low initial bond strength associated with traditional thermoset polyimides.

Performance and Processing Advantages

- **High Tg - 260 °C (TMA)**
Greater thermal performance over epoxy-bismaleimide blends
- **Maintains Bond Strength at High Temperature**
- **Tough Resin System**
Improved processing due to less brittleness
Less delamination from machining
- **Flammability Rating V-0**
- **Non-MDA (Methylene Dianiline) Chemistry**
Meets all OSHA 1910.1050 requirements

Purchasing Information

- **Industry Approvals**
IPC-4101A /41
UL Recognized – GPY, File Number E41625
- **Standard Availability**
Thickness: 0.0025" [.05 mm] to 0.125" [3.2 mm]
Available in sheet or panel form
Copper Foil Cladding: Grade 3 (HTE), ½, 1 and 2 oz.
Foil Options: Double treat, Copper-Invar-Copper
Prepregs: Available in roll or panel form
Glass Styles: 106, 1080, 2313, 2116, and 7628

P96 Typical Laminate Properties, 0.008" [0.20mm]

| PROPERTY | UNITS | IPC-4101A Spec /41 | P96 Value | CONDITIONING |
|-------------------------------|-----------------|-------------------------|------------------------|--|
| Thickness | inches mm | 0.0197 [<0.50] | .008 [0.20] | — — |
| Glass Construction | — | — | 2313/2116 | — |
| Retained Resin | % | — | 47 | — |
| Thermal | | | | |
| Tg (DSC) | °C | 250 min. | 260 | E-2/105 |
| CTE x-axis | ppm/°C | — | 13 | Ambient to Tg |
| y-axis | ppm/°C | — | 17 | Ambient to Tg |
| z-axis | ppm/°C | — | 60 | Ambient to 288°C |
| Thermal Stress, 10 s @, 288°C | seconds | pass visual | NA | Condition A |
| Thermal Stress, 10 s @, 288°C | seconds | — | >1100 | E-2/105 |
| Electrical | | | | |
| Permittivity (DK) @ | | | | |
| 1 MHz (2 Fluid Cell) | — | 5.4 max. | 4.6 | C-24/23/50 |
| 500 MHz (HP4291) | — | — | 4.0 | C-24/23/50 |
| 1GHz (HP4291) | — | — | 4.0 | C-24/23/50 |
| Loss Tangent (DF) @ | | | | |
| 1 MHz (2 Fluid Cell) | — | 0.035 max. | 0.014 | C-24/23/50 |
| 500 MHz (HP4291) | — | — | 0.012 | C-24/23/50 |
| 1 GHz (HP4291) | — | — | 0.014 | C-24/23/50 |
| Volume Resistivity | megohms-cm | 1x10 ⁴ min. | 1.5x10 ⁹ | C-96/35/90 |
| | megohms-cm | 6x10 ⁴ min. | 2.3x10 ⁸ | E-24/204 |
| Surface Resistivity | megohms | 1x10 ⁴ min. | 3.0x10 ⁶ | C-96/35/90 |
| | megohms | 6x10 ⁴ min. | 2.1x10 ⁵ | E-24/204 |
| Electric Strength | volt/mil | 737 min. | 1424 | D-48/50 |
| | [volts/mm] | [2.90x10 ⁴] | [5.6x10 ⁴] | D-48/50 |
| Arc Resistance | seconds | 120 min. | 135 | D-48/50 |
| Comparative Tracking | volts | — | <175 | ASTM D-36/38-85 |
| Index | PLC-UL | — | 4 | UL 746A |
| Physical | | | | |
| Peel Strength, RTF ½ oz. | lb/in [Kg/M] | AABUS* AABUS | 5.0 [90] | After Thermal Stress After Thermal Stress |
| Peel Strength, Std. 1 oz. | lb/in [Kg/M] | 4.0 min. [70] min. | 7.9 [141] | After Thermal Stress After Thermal Stress |
| | lb/in [Kg/M] | — | 6.4 [114] | E-1/170 E-1/170 |
| Flammability | rating | HB | V-0 | UL94 |
| Moisture Absorption | % | 1.0 max. | 0.40** | D-24/23 |

* As agreed upon between user and supplier

** Material Thickness Tested 0.028"

ORDERING INFORMATION

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Pre-Conditioning Nomenclature

| Letter | Meaning |
|--------|--|
| A | No conditioning |
| C | Preconditioning in moist air |
| D | Preconditioning by immersion in H ₂ O |
| des | Preconditioning by drying over a desiccant |
| E | Preconditioning at temperature |
| R | Recovering 1~2 hours @ 15 - 35°C & 73 - 77% RH |
| T | Testing at a given temperature |

Examples

C-96/40/92: 96 hours conditioning @ 40°C & 92% RH

D-24/23: 24 hours immersion in H₂O @ 23°C

E-1/100: temperature conditioning in 1 hour @ 100°C

E-1008/100: temperature conditioning 1008 hours @ 100°C

E-1/105 + des: temperature conditioning 1 hour @ 105°C drying over desiccant

D-24/23: immersion in H₂O @ 23°C for 24 hours

"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"