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Core: TU-933+

Prepreg: TU-933P+

ThunderClad 3+ is an advanced material designed for high speed computing, telecommunications, radio frequency super low loss filed applications. ThunderClad 3+'s electrical performance is competitive with PTFE-based, hydrocarbon-based very low loss materials, but capable for high layer count circuit board design with excellent thermal reliability.

ThunderClad 3+ laminates also exhibit excellent moisture resistance, improved CTE, superior chemical resistance, thermal stability, CAF resistance, and also compatible with modified FR-4 processes.

Applications

- Radio frequency
- Backplane, High performance computing
- Line cards, Storage
- Servers, Telecom, Base station
- Office Routers

Performance and Processing Advantages

- Excellent electrical and thermal properties
- Dielectric constant is 3.16 @ 10GHz
- Dissipation factor is 0.0021 @ 10GHz
- Stable and flat Dk/Df performance over frequency and temperature variance.
- Compatible with modified FR-4 processes
- Excellent moisture resistance and Lead Free reflow process compatible
- Improved z-axis thermal expansion
- Superior dimensional stability, thickness uniformity and flatness
- Anti-CAF capability
- Excellent through-hole and soldering reliability

Industry Approvals

- IPC-4101E Specification Number: /102
- IPC-4101E/102 Validation Services QPL Certified
- UL File Number: E189572
- ANSI Grade: No-ANSI
- Flammability Rating: 94V-0
- Maximum Operating Temperature: 140°C

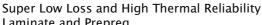
Standard Availability

- Thickness: 0.002" [0.05mm] to 0.062" [1.58mm], available in sheet or panel form
- Copper Foil Cladding: 1/3 to 5 oz for built-up & double sides
- Prepregs: Available in roll or panel form
- Glass Styles: 1035, 1078, 2116 and other prepreg grades are available upon request.





LISTED





Lead Free





Delivering Value through Innovation and Dedication

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Typical Properties Typical Values Conditioning Thermal Tg (DMA) 220 °C Tg (TMA) 170°C E-2/105Td (TGA) 390 °C CTE a1 35 ppm/°C CTE α2 240 ppm/°C E-2/1052.5 % CTE z-axis Thermal Stress, Solder Float, 288°C > 120 sec T-260 > 60 min T-288 > 60 min E-2/105T-300 > 60 min Flammability 94V-0 E-24/125 Electrical Permittivity (RC64%) 10 GHz (SPC method) 3.16 E-2/105Loss Tangent (RC64%) 10 GHz (SPC method) 0.0021 E-2/105Volume Resistivity $> 10^{10}~M\Omega \cdot cm$ C-96/35/90 $> 10^8 \ M\Omega$ C-96/35/90 **Surface Resistivity Electric Strength** > 40 KV/mm Dielectric Breakdown Voltage > 50 KV Α Mechanical Young's Modulus Warp Direction 23 GPa Α Fill Direction 21 GPa Flexural Strength Lengthwise > 60,000 psi Α > 50,000 psi Crosswise Peel Strength, 1.0 oz. Cu foil 4~7 lb/in Α

NOTE:

Moisture Absorption

- 1. Property values are for information purposes only and not intended for specification.
- 2. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

0.06 %

3. This product is based on a patent pending technology.



E-1/105 + D-24/23