

METEORWAVE® 4000

Ultra Low Loss Materials Laminate & Prepreg



Benefits

- Excellent Electrical Properties
- Stable dielectric performance over a wide frequency range
- High Conductive Anodic Filament (CAF) resistance
- Available in a variety of constructions

Applications

- 25 GHz and above, Infrastructure
- Automotive Radar
- High Speed Switches



Meteorwave® 4000 high speed / ultra low loss materials offer advanced electric performance and high reliability for use in next generation core routers, high speed switches, supercomputers and applications where low signal attenuation, high reliability and high data transfer rates are critical. Meteorwave products are designed to facilitate high temperature lead-free assemblies and high layer count printed circuit board designs that require high reliability, CAF resistance and low Z-axis expansion..

Excellent Electrical Properties

- I Ultra low loss
- I Stable Dk/Df versus frequency when tested over various environmental conditions
- I Low DK

Thermal and Mechanical Properties

- I Very low Z-axis expansion for high reliability
- I Lead-free assembly compatibility
- I Good Peel Strength
- I Excellent IST performance

Excellent CAF Performance

- I CAF resistant materials after high temperature reflow

High-Tg FR-4 Processing

- I Processes similar to other high-Tg materials
- I 90 minutes cure at 216°C and 400-500 psi

Meets UL 94V-0 and IPC4101 /102 specifications

UL file number: E36295

| Properties | Conditions | Typical Value | Unit | Test Method |
|--|---|----------------------------|---|---------------------|
| Electrical Properties | | | | |
| Dielectric Constant | @ 2 GHz | 3.4 | | IPC-TM-650.2.5.5.5 |
| | @ 10 GHz | 3.3 | | |
| Dissipation Factor | @ 2 GHz | 0.0019 | | |
| | @ 10 GHz | 0.0024 | | |
| Volume Resistivity | C - 96 / 35 / 90 | 4.70 x 10 ⁶ | MΩ - cm | IPC-TM-650.2.5.17.1 |
| | E - 24 / 125 | 5.20 X 10 ⁸ | | |
| Surface Resistivity | C - 96 / 35 / 90 | 1.30 X 10 ⁶ | MΩ | IPC-TM-650.2.5.17.1 |
| | E - 24 / 125 | 7.40 x 10 ⁷ | | |
| Electric Strength | | 4.6x10 ⁴ (1800) | V/mm (V/mil) | IPC-TM-650.2.5.6.2 |
| Thermal Properties | | | | |
| *Glass Transition Temperature (Tg) | DMA(°C) (Tan d Peak) | 200 | °C | IPC-TM-650.2.4.24.3 |
| Degradation Temperature (TGA) | Degradation Temp (TGA) (5% wt. loss) | 390 | °C | IPC-TM-650.2.3.40 |
| T-300 | Time to delamination @ 300°C | >120 | minutes | IPC-TM-650.2.4.24.1 |
| Thermal Conductivity | | 0.45 | W/mK | ASTM E1461 |
| Mechanical Properties | | | | |
| Peel Strength | 1 oz (35μ) Cu | 1.02 (5.8) | N/mm (lbf/inch) | IPC-TM-650.2.4.8 |
| | After Solder Float | 1.00 (5.5) | N/mm (lbf/inch) | IPC-TM-650.2.4.8 |
| X / Y CTE | -40°C to + 125°C | 10 / 14 | ppm/°C | IPC-TM-650.2.4.41 |
| Z Axis CTE Alpha 1 / Alpha 2 (55% RC) | 50°C to Tg / Tg to 260°C | 55 / 260 | ppm/°C | IPC-TM-650.2.4.24 |
| Z Axis Expansion (43% RC) | 50°C to 260°C | 2.1 | % | IPC-TM-650.2.4.24 |
| Young's Modulus (X / Y) | | 18.6 / 17.9 (2.7 / 2.6) | GN/m ² (psi x 10 ⁶) | ASTM D3039 |
| Poisson's Ratios (X / Y) | | 0.170 / 0.163 | | |
| Flexural Strength (W / F) | @ 125°C | 356 / 328 (51.7 / 47.6) | GN/m ² (psi x10 ⁶) | |
| | @ 150°C | 346 / 305 (50.2 / 44.3) | GN/m ² (psi x10 ⁶) | |
| Chemical / Physical Properties | | | | |
| Moisture Absorption | | 0.08 | wt. % | IPC-TM-650.2.6.2.1 |

* DMA is the preferred method for measuring Tg - other methods may be less accurate.

- All test data provided are typical values and not intended to be specification values. For review of critical specification tolerances, please contact a company representative directly
- Meteorwave® 4000 series can be manufactured in laminate thickness from 2 mil (0.050 mm) and up.
- Meteorwave® 4000 series is available in most common panel sizes.
- Please contact AGC for availability of any other constructions, copper weights and glass styles including ultra-low profile copper and RTFOIL®

