# ThunderClad 200G

**Core: TU-885**

**Prepreg: TU-885P**

ThunderClad 200G ( TU-885 ) is a very low loss category material based on a high performance modified FR-4 resin. This material is reinforced with regular woven E-glass and designed with very low dielectric constant and dissipation factor resin system for high speed low loss, radio frequency and wireless applications. ThunderClad 200G material is suitable for environmental protection lead free process and also compatible with FR-4 processes. ThunderClad 200G laminates also exhibit excellent moisture resistance, improved CTE, superior chemical resistance, thermal stability and CAF resistance.

## Applications

- Radio frequency
- High speed 200G switch, routers
- Backplane, High performance computing
- Line cards, Storage

## Performance and Processing Advantages

- Excellent electrical properties & MOT level
- Dielectric constant is 3.45 @ 10GHz
- Dissipation factor is 0.0032 @ 10GHz
- Stable and flat Dk/Df performance over frequency and temperature
- Compatible with modified FR-4 processes
- Excellent moisture resistance and Lead Free reflow process compatible
- Improved z-axis thermal expansion
- Anti-CAF capability
- Excellent through-hole and soldering reliability
- Halogen Free

## Industry Approvals

- IPC-4101E Specification Number: /134
- IPC-4101E/134 Validation Services QPL Certified
- UL File Number : E189572
- ANSI Grade : No-ANSI
- Flammability Rating: 94V-0
- Maximum Operating Temperature: 160°C

## Standard Availability

- Thickness: 0.002”[0.05mm] to 0.030” [0.76mm], available in sheet or panel form
- Copper Foil Cladding: 1/3 to 2 oz for built-up & double sides
- Prepregs: Available in roll or panel form
- Glass Styles: 106, 1078, 3313, 2116 and other prepreg grades are available upon request



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## Typical Properties

| | Typical Values | Test Condition |
|---|---|---|
| **Thermal** | | |
| Tg (DMA)<br>Tg (TMA)<br>Td (TGA) | 240 °C<br>200 °C<br>430 °C | E-2/105+des |
| CTE x/y axis<br>CTE z-axis α1<br>CTE z-axis α2<br>CTE z-axis | 12/13 ppm/°C<br>35 ppm/°C<br>200 ppm/°C<br>2.0 % | Ambient to Tg<br>Pre-Tg<br>Post-Tg<br>50 to 260°C |
| Thermal Stress,<br>Solder Float, 288°C | > 60 sec | A |
| T-260<br>T-288<br>T-300 | > 60 min<br>> 60 min<br>> 60 min | E-2/105+des |
| Flammability | 94V-0 | E-24/125+des |
| **Electrical** | | |
| Permittivity (RC70%)<br>10GHz (SPC method)<br>Impedance simulation DK | <br>3.45<br>2.93 | E-2/105 |
| Loss Tangent (RC70%)<br>10GHz (SPC method) | <br>0.0032 | E-2/105 |
| Volume Resistivity | > $10^{10}$ MΩ·cm | C-96/35/90 |
| Surface Resistivity | > $10^{8}$ MΩ | C-96/35/90 |
| Electric Strength | > 40 KV/mm | - |
| Dielectric Breakdown Voltage | > 50 KV | - |
| **Mechanical** | | |
| Young's Modulus<br>Warp Direction<br>Fill Direction | <br>31 GPa<br>29 GPa | <br>A |
| Flexural Strength<br>Lengthwise<br>Crosswise | <br>> 60,000 psi<br>> 50,000 psi | <br>A<br>A |
| Peel Strength,<br>1.0 oz. HVLP Cu foil | <br>4~6 lb/in | <br>A |
| Water Absorption | 0.08 % | E-1/105+des+D-24/23 |

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



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