# ThunderClad 4HN_TU-943HN

**Core: TU-943HN**

**Prepreg: TU-943P HN**

**TU-943HN** is an advanced material designed for high speed computing, telecommunications, radio frequency super low loss filed applications. **TU-943HN** 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.

**TU-943HN** 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 0.0013@ 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
- Halogen Free

## Industry Approvals

- IPC-4101E Specification Number : /134
- UL File Number: E189572
- ANSI Grade: No-ANSI
- Flammability Rating: 94V-0
- Maximum Operating Temperature: 160℃

## Standard Availability

- Thickness: 0.002” [0.05mm] to 0.028” [0.71mm], 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: 1035, 1078 and other prepreg grades are available upon request.

The newly developed products are slightly modified and updated after more data has been collected.

| | Typical Values | Conditioning |
|---|---|---|
| **Thermal** | | |
| Tg (DMA)<br>Td (TGA) | 210 °C<br>430 °C | E-2/105 |
| CTE x/y axis<br>CTE z-axis α1<br>CTE z-axis α2<br>CTE z-axis | 12/13 ppm/°C<br>40 ppm/°C<br>220 ppm/°C<br>2.0 % | Ambient to Tg<br>Pre-Tg<br>Post-Tg<br>50 to 260°C |
| Thermal Stress, Solder Float, 288°C | > 120 sec | A |
| T-260<br>T-288<br>T-300 | > 60 min<br>> 60 min<br>> 60 min | E-2/105 |
| Flammability | 94V-0 | E-24/125 |
| **Electrical** | | |
| Permittivity (RC70%)<br>10 GHz (SPDR method)<br>Impedance simulation DK | <br>3.16<br>2.83 | E-2/105 |
| Loss Tangent (RC70%) 10 GHz (SPDR method) | 0.0013 | 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 | A |
| Dielectric Breakdown Voltage | > 50 KV | A |
| **Mechanical** | | |
| Young’s Modulus<br>Warp Direction<br>Fill Direction | <br>23 GPa<br>22 GPa | A |
| Flexural Strength<br>Lengthwise<br>Crosswise | <br>> 60,000 psi<br>> 50,000 psi | A |
| Peel Strength, 1.0 oz. HVLP Cu foil | 4~6 lb/in | A |
| Moisture Absorption | 0.08 % | E-1/105 + 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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