

**Green material****Hi-Tg Halogen free laminate and prepreg**

# TU-862 HF, TU-86P HF

TU-862 HF/TU-86P HF Hi-Tg halogen free materials are made of epoxy resin and E-glass fabric. Unlike conventional FR-4 material using brominated resin as flame retardant, TU-862 HF/TU-86P HF achieves flammability class of UL94V-0 by incorporating nitrogen compounds in the materials. The materials are compatible with the AOI process and exhibit the UV-block characteristic. TU-86P HF is designed for use with TU-862 HF for making multilayer printed wire boards. TU-862 HF is also available for single/double sided application. This series of green materials are designed to eliminate the use of halogenated resins due to the potential hazardous effects from the environmental concerns. These products are suitable for boards that need to survive severe thermal cycles, or to experience excessive assembly work. TU-862 HF laminates also exhibit superior chemical resistance, thermal stability for lead free soldering assembly and CAF resistance.

## PERFORMANCE AND PROCESSING ADVANTAGES

- Halogen, antimony, and red phosphorous free
- Lead free compatible
- Environmental friendly materials
- Compatible to PCB processes
- Very low coefficient of thermal expansion
- Moisture resistance
- Anti-CAF capability
- Higher Tg characteristics

## GENERAL INFORMATION

- Industry Approvals

UL Designation – ANSI Grade	FR-4
UL File Number	E189572
Flammability Rating	94V-0
Maximum Operating Temperature	130°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 5oz (HTE) for built-up & double sides and H to 2oz (MLS)  
 Prepregs: Available in roll or panel form  
 Glass Styles: 106, 1080, 2113, 2116, 1506 and 7628, etc.

**TYPICAL PROPERTIES FOR TU-862 HF LAMINATES**

PROPERTY	IPC-4101	SPEC	TYPICAL VALUES
<b>Thermal</b>			
Tg (DMA)			190 °C
Tg (TMA)	E-2/105+des	N/A	170 °C
Td (TGA)			390 °C
CTE x-axis	Ambient to Tg	-	11~15 ppm/°C
CTE y-axis	Ambient to Tg	-	11~15 ppm/°C
CTE z-axis	25 to 260°C	-	2.1 %
<b>Thermal Stress,</b>			
Solder Float , 288°C	A	> 10	> 60 sec
T-260			> 60 min
T-288	E-2/105+des	N/A	> 60 min
Flammability	E-24/125+des	94V-0	94V-0
<b>Electrical</b>			
<b>Permittivity (RC 50%)</b>			
1GHz ( HP 4291B )			4.4
5GHz ( SPC method )	C-24/23/50	< 5.4	4.5
10GHz ( SPC method )			4.4
<b>Loss Tangent (RC 50%)</b>			
1GHz ( HP 4291B )			0.010
5GHz ( SPC method )	C-24/23/50	< 0.035	0.014
10GHz ( SPC method )			0.015
Volume Resistivity	C-96/35/90	> 10 <sup>6</sup>	> 10 <sup>10</sup> MΩ·cm
Surface Resistivity	C-96/35/90	> 10 <sup>4</sup>	> 10 <sup>8</sup> MΩ
Electric Strength		>30 kV/mm	> 40 kV/mm
Dielectric Breakdown Voltage		>40 kV	> 50 kV
<b>Mechanical</b>			
<b>Young's Modulus</b>			
Warp Direction		G Pa	26
Fill Direction			24
<b>Flexural Strength</b>			
Lengthwise	A	> 60,000	>60,000 psi
Crosswise	A	> 50,000	>50,000 psi
Peel Strength, 1.0 oz. Cu foil	A	> 6	9~12 lb/inch
Water Absorption	E-1/105+des+D-24/23	< 0.8	0.15 %

## NOTE:

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