



Validation Services LISTED Tg 200°C Halogen Free Laminate and Prepreg



TU-865

TU-865 Tg200 material is made of epoxy resin and E-glass fabric. It's a halogen free material and design to have both features for harsh environment, high reliability application and superior electrical performance at the same time. TU-865 achieves flammability class of UL94V-0 by incorporating phosphorous and nitrogen compounds. The material is compatible with the AOI process and exhibit the UV-block characteristic. TU-865P is prepreg designed for use with TU-865 laminate for making multilayer printed wire boards. TU-865 is also available for single/double sided application. This series of green materials eliminate the use of halogenated resins with excellent performance due to the potential hazardous effects from the environmental concerns. These products are suitable for boards that need to survive severe thermal cycling, or to experience excessive assembly work. TU-865 laminates also exhibit superior chemical resistance, dimensional stability and moisture resistivity for lead free soldering assembly and CAF resistance.

Applications

- Automotives, Harsh environments
- Servers, Telecom, Base station

Performance and Processing Advantages

- Halogen, antimony, and red phosphorous free
- High Tg characteristics
- Mid-loss performance category material
- Low coefficient of thermal expansion
- Excellent moisture resistance
- Lead free processing compatible
- Anti-CAF capability
- Environmental friendly materials

Industry Approvals

- IPC-4101E Type Designation : /127, /128, /130
- IPC-4101E/130 Validation Services QPL Certified
- UL Designation – ANSI Grade: FR-4.1
- 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 12 oz
- Prepregs: Available in roll or panel form
- Glass Styles: 106, 1080, 2113, 2116, 1506 and 7628 etc.



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Typical Properties for TU-865 Laminate			
	Typical Values	Conditioning	IPC-4101 /130
Thermal			
Tg (DMA)	220°C	E-2/105	> 170°C
Tg (DSC)	200°C		
Tg (TMA)	185°C		
Td (TGA)	370°C		
CTE x-axis	11~15 ppm/°C	E-2/105	N/A
CTE y-axis	11~15 ppm/°C		
CTE z-axis	1.8 %		< 3.0%
Thermal Stress, Solder Float, 288°C	> 60 sec	A	> 10 sec
T260	> 60 min	E-2/105	> 30 min
T288	> 60 min		
T300	> 30 min		> 2 min
Flammability	94V-0	E-24/125	94V-0
Electrical			
Permittivity (RC50%) 1 GHz (SPC method/HP4291B) 10GHz (SPC method)	4.6/4.3 4.4	E-2/105	N/A
Loss Tangent (RC50%) 1 GHz (SPC method/HP4291B) 10GHz (SPC method)	0.013/0.010 0.014		
Volume Resistivity	> 10 ¹⁰ MΩ·cm	C-96/35/90	> 10 ⁶ MΩ·cm
Surface Resistivity	> 10 ⁸ MΩ	C-96/35/90	> 10 ⁴ MΩ
Electric Strength	> 40 kV/mm	-	> 30 KV/mm
Dielectric Breakdown	> 50 KV	-	> 40 KV
Mechanical			
Flexural Strength Lengthwise Crosswise	> 60,000 psi > 50,000 psi	A A	> 60,000 psi > 50,000 psi
Peel Strength, 1.0 oz. Cu foil	6~9 lb/in	A	> 4 lb/in
Water Absorption	0.13 %	E-1/105+D-24/23	< 0.8 %