250HR

High Performance Laminate and Prepreg Materials with High Thermal Reliability

Tg 150°C
Td 325°C
Dk 4.00
Df 0.020

IPC-4101 - /21 /24 /97 /101
UL - File Number E41625

Last Updated Mar 16, 2017

250HR laminate and prepreg materials are a high-performance 150°C glass transition temperature (Tg) FR-4 system for multilayer Printed Wiring Board (PWB) applications where maximum thermal performance and reliability are required.

The 250HR system is manufactured with a unique high-performance, multifunctional epoxy resin, reinforced with electrical grade (E-glass) glass fabric. This system provides improved thermal performance and low expansion rates in comparison to traditional FR-4 while retaining FR-4 processability. In addition to this superior thermal performance, the mechanical, chemical and moisture resistance properties all equal or exceed the performance of traditional FR-4 materials.

The 250HR system is also laser fluorescing and UV blocking for maximum compatibility with Automated Optical Inspection (AOI) systems, optical positioning systems and photoimagable solder mask imaging.

Product Attributes

High Thermal Reliability

Typical Market Applications

Aerospace & Defense
Computing, Storage & Peripherals
Networking & Communication Systems
Automotive & Transportation

Product Features

- Industry Recognition
  - UL File Number: E41625
  - Qualified to UL's MCIL Program
  - RoHS Compliant
- Processing Advantages
  - FR-4 process compatible
  - UV blocking and AOI fluorescence

Product Availability

- Standard Material Offering: Laminate
  - 2 to 93 mil (0.05 to 2.4 mm)
  - Available in full size sheet or panel form
- Copper Foil Type
  - HTE Grade 3
  - RTF (Reverse Treat Foil)
- Copper Weight
  - ½ to 2 oz (18 to 70 µm) available
  - Heavier copper available
  - Thinner copper foil available
- Standard Material Offering: Prepreg
  - Roll or panel form
- Glass Fabric Availability
  - E-glass
  - Square weave glass

250HR Specifications

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Property		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Test data generated from rigid laminate		50	%	2.3.16.2
Glass Transition Temperature (Tg) by DSC		150	°C	2.4.25C
Decomposition Temperature (Td) by TGA @ 5% weight loss		325	°C	2.4.24.6
Time to Delaminate by TMA (Copper removed)	A. T260 B. T288	30 >5	Minutes	2.4.24.1
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	65 250 3.4	ppm/°C ppm/°C %	2.4.24C
X/Y-Axis CTE	Pre-Tg	13	ppm/°C	2.4.24C
Thermal Conductivity		0.45	W/mK	ASTM E1952
Thermal Stress 10 sec @ 288ºC (550.4ºF)	A. Unetched B. Etched	Pass	Pass Visual	2.4.13.1
Dk, Permittivity	A. @ 2 GHz B. @ 5 GHz	4.00 3.90	—	Bereskin Stripline
Df, Loss Tangent	@ 2 GHz	0.020	—	Bereskin Stripline
Dk, Permittivity	@ 5 GHz	0.022	—	Bereskin Stripline
Volume Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— 2.4×10^8 2.3×10^8	M⍰-cm	2.5.17.1
Surface Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— 2.6×10^8 2.8×10^8	M⍰	2.5.17.1
Dielectric Breakdown		>50	kV	2.5.6B
Arc Resistance		105	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		48 (1200)	kV/mm (V/mil)	2.5.6.2A
Comparative Tracking Index (CTI)		3 (175-249)	Class (Volts)	UL 746A ASTM D3638
Peel Strength	A. Low profile copper foil and very low profile copper foil all copper foil >17 ⍰m [0.669 mil] B. Standard profile copper 1. After thermal stress 2. At 125ºC (257ºF) 3. After process solutions	1.05 (6.0) 1.58 (9.0) 1.23 (7.0) 1.58 (9.0)	N/mm (lb/inch)	2.4.8C 2.4.8.2A 2.4.8.3 2.4.8.3
Flexural Strength	A. Length direction B. Cross direction	86,000 84,100		2.4.4B
Tensile Strength	A. Length direction B. Cross direction	56,810 43,745		ASTM D3039
Moisture Absorption		0.3	%	2.6.2.1A
Flammability (Laminate & laminated prepreg)		V-0	Rating	UL 94
Max Operating Temperature		130	°C	UL 796

The data, while believed to be accurate and based on analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.