185HR

High Reliability Epoxy Laminate and Prepreg

Tg 180°C Td 340°C Dk 4.01 Df 0.020

IPC-4101 /98 /99 /101 /126 **UL - File Number E41625**

185HR laminate and prepreg materials are a proprietary, high-performance resin system with a Tg of 180°C for multilayer Printed Wiring Board (PWB) applications where maximum thermal performance and reliability are required.

PRODUCT FEATURES

Industry Recognition

- UL File Number: E41625
- Qualified to UL's MCIL Program
- RoHS Compliant

Performance Attributes

- CAF resistant
- Lead-free assembly compatible

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)

Copper Foil Type

- HTE Grade 3
- RTF (Reverse Treat Foil)

Copper Weight

- ½, 1 and 2 oz (18, 35 and 70 µm) available
- Heavier copper foil available
- Thinner copper foil available

Standard Material Offering: Prepreg

- Roll or panel form
- Tooling of prepreg panels

Glass Fabric Availability

- E-glass
- Square weave glass

185HR laminate and prepreg materials are manufactured using Isola's patented technology, reinforced with electrical grade (E-glass) glass fabric. This system delivers a 340°C decomposition temperature, a lower Z-axis expansion and offers lower loss compared to competitive products in this space. The 185HR system is also laser fluorescing and UV blocking for maximum compatibility with Automated Optical Inspection (AOI) systems, optical positioning systems and photoimageable solder mask imaging.

PRODUCT ATTRIBUTES

HIGH DENSITY INTERCONNECT

HIGH THERMAL RELIABILITY

TYPICAL MARKET APPLICATIONS

AUTOMOTIVE & TRANSPORTATION

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AEROSPACE & DEFENSE

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ORDERING INFORMATION:

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Typical Values Table

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		180	°C	2.4.25C
Glass Transition Temperature (Tg) by DMA		185	°C	2.4.24.4
Decomposition Temperature (Td) by TGA @ 5% weight loss		340	°C	2.4.24.6
Time to Delaminate by TMA (Copper removed)	A. T260 B. T288	60 >15	Minutes	2.4.24.1
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	40 220 2.7	ppm/°C ppm/°C %	2.4.24C
X/Y-Axis CTE	Pre-Tg	13/14	ppm/°C	2.4.24C
Thermal Conductivity		0.4	W/m·K	ASTM E1952
Thermal Stress 10 sec @ 288ºC (550.4ºF)	A. Unetched B. Etched	Pass	Pass Visual	2.4.13.1
Dk, Permittivity	A. @ 100 MHz B. @ 1 GHz C. @ 2 GHz D. @ 5 GHz E. @ 10 GHz	4.13 4.04 4.01 3.88 3.88	—	2.5.5.3 Bereskin Stripline Bereskin Stripline Bereskin Stripline Bereskin Stripline
Df, Loss Tangent	A. @ 100 MHz B. @ 1 GHz C. @ 2 GHz D. @ 5 GHz E. @ 10 GHz	0.0158 0.0192 0.0200 0.0235 0.0236	—	2.5.5.3 Bereskin Stripline Bereskin Stripline Bereskin Stripline Bereskin Stripline
Volume Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— 3.0×10^8 7.0×10^8	MΩ-cm	2.5.17.1
Surface Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— 3.0×10^6 2.0×10^8	MΩ	2.5.17.1
Dielectric Breakdown		>50	kV	2.5.6B
Arc Resistance		115	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		54 (1350)	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 µm [0.669 mil] B. Standard profile copper 1. After thermal stress 2. At 125ºC (257ºF) 3. After process solutions	>0.79 (>4.5) >0.79 (>4.5) >0.79 (>4.5) >0.79 (>4.5)	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	669 (97.1) 373 (54.1)	MPa (kpsi)	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	367 (53.3) 246 (35.7)	MPa (kpsi)	ASTM D3039
Young's Modulus	A. Length direction B. Cross direction	3770 3337	ksi	ASTM D790-15e2
Poisson's Ratio	A. Length direction B. Cross direction	0.172 0.155	—	ASTM D3039
Moisture Absorption		0.15	%	2.6.2.1A
Flammability (Laminate & laminated prepreg)		V-0	Rating	UL 94
Relative Thermal Index (RTI)		130	°C	UL 796

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NOTES

Visit our site http://www.isola-group.com for more details.
Revisions:
A: Initial release - 4/17
B: Corrected units for Flexural and Tensile Strength - 8/18
C: Change MOT to RTI 5/19
D: Changed Peel Strength to >0.79(>4.5) 4/22

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