



185HR

High-Tg, Low-CTE Materials with High Thermal Reliability

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.

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 Thermal Reliability

Typical Market Applications

Automotive & Transportation , Medical, Industrial & Instrumentation , Aerospace & Defense , Consumer Electronics , Networking & Communication Systems

ORDERING INFORMATION:

Contact your local sales representative or visit www.isola-group.com for further information.

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High Thermal Reliability

Data Sheet

Tg 180°C

Td 340°C

Dk 4.01

Df 0.0200

IPC-4101 - / 98 / 99 / 101 / 126

UL - File Number E41625

Last Updated May 7, 2019
Revision No: C

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
 - 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
 - Tooling of prepreg panels
- Glass Fabric Availability
 - E-glass
 - Square weave glass

185HR Typical Values

Last Updated May 7, 2019

Property	Typical Value	Units	Test Method	
		Metric (English)	IPC-TM-650 (or as noted)	
Test data generated from rigid laminate				
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				
Thermal Stress 10 sec @ 288°C (550.4°F)	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				
Arc Resistance		>50	kV	2.5.6B
Electric Strength (Laminate & laminated prepreg)				
		115	Seconds	2.5.1B
Comparative Tracking Index (CTI)				
		54 (1350)	kV/mm (V/mil)	2.5.6.2A
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 125°C (257°F) 3. After process solutions	0.969 (5.5) 1.06 (5.9) 1.06 (5.9) 0.969 (5.5)	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	97.1 54.1	ksi	2.4.4B
Tensile Strength				
	A. Length direction B. Cross direction	53.3 35.7	ksi	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
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.

<https://www.isola-group.com/products/all-printed-circuit-materials/185hr/>

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NOTE

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Revisions:

A: Initial release - 4/17

B: Corrected units for Flexural and Tensile Strength - 8/18

C: Change MOT to RTI 5/19