



# 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](http://www.isola-group.com) for further information.

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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 23, 2017

## 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

Property		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Test data generated from rigid laminate	Resin Content	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/mK	ASTM E1952
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	— $3.0 \times 10^8$ $7.0 \times 10^8$	MΩ-cm	2.5.17.1
Surface Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— $3.0 \times 10^6$ $2.0 \times 10^8$	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 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	97,100 54,100		2.4.4B
Tensile Strength	A. Length direction B. Cross direction	53,337 35,678		ASTM D3039
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.

[www.isola-group.com/products/all-printed-circuit-materials/market/networking-communication-systems/](http://www.isola-group.com/products/all-printed-circuit-materials/market/networking-communication-systems/)

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