



## 185HR Laminate and Prepreg

**185HR** is 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 products 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.

[www.isola-group.com/products/185HR](http://www.isola-group.com/products/185HR)

### 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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High Performance

# 185HR Data Sheet

Tg 180, Td 340  
Dk 4.01, Df 0.020  
/98 /99/ 101 /126

## Features

- High Thermal Performance
  - ▶ Tg: 180°C (DSC) (Base Laminate)
  - ▶ Td: 340°C (TGA @ 5% wt loss)
  - ▶ Low CTE for reliability
- T260: 60 minutes
- T288: >15 minutes
- CAF Resistant
- Lead-free Compatible and RoHS Compliant
- UV Blocking and AOI Fluorescence
  - ▶ High throughput and accuracy during PCB fabrication and assembly
- Superior Processing
  - ▶ Closest to conventional FR-4 processing
- Core Material Standard Availability
  - ▶ Thickness: 0.002" (0.05 mm) to 0.060"/0.062" (1.5 mm)
  - ▶ Available in full size sheet or panel form
- Prepreg Standard Availability
  - ▶ Roll or panel form
  - ▶ Tooling of prepreg panels available
- Copper Foil Type Availability
  - ▶ Standard HTE Grade 3
  - ▶ RTF (Reverse Treat Foil)
- Copper Weights
  - ▶ ½, 1 and 2 oz (18, 35 and 70 µm) available
  - ▶ Heavier copper available upon request
  - ▶ Thinner copper foil available upon request
- Glass Fabric Availability
  - ▶ Standard E-glass
  - ▶ Square weave glass fabric available
- Industry Approvals
  - ▶ IPC-4101D-WAM1 /98 /99/ 101 /126 (IPC-4101C /21 /24 /26 /98 /99 /101 /126)
  - ▶ UL – File Number E41625
  - ▶ Qualified to UL's MCIL Program

# 185HR Typical Values

Property		Typical Values		
		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
<b>Glass Transition Temperature (Tg) by DSC</b>		180	°C	2.4.25
<b>Glass Transition Temperature (Tg) by DMA</b>		185	°C	2.4.25
<b>Decomposition Temperature (Td) by TGA @ 5% weight loss</b>		340	°C	ASTM D3850
<b>T260</b>		60	Minutes	ASTM D3850
<b>T288</b>		>15	Minutes	ASTM D3850
<b>CTE, Z-axis</b>	A. Pre-Tg	40	ppm/°C	2.4.24
	B. Post-Tg	220		
<b>CTE, X-, Y-axes</b>	A. Pre-Tg	13/14	ppm/°C	2.4.24
	B. Post-Tg	14/17		
<b>Z-axis Expansion (50 to 260°C)</b>		2.7	%	2.4.24
<b>Thermal Conductivity</b>		0.4	W/mK	ASTM D5930
<b>Thermal Stress 10 sec @ 288°C (550.4°F)</b>	A. Unetched	Pass	Rating	2.4.13.1
	B. Etched			
<b>Dk, Permittivity (Laminate &amp; prepreg as laminated) Tested at 50% resin</b>	A. @ 100 MHz (HP4285A)	4.13	-	2.5.5.3
	B. @ 1 GHz (HP4291A)	4.04		2.5.5.9
	C. @ 2 GHz (Bereskin Stripline)	4.01		2.5.5.5
	D. @ 5 GHz (Bereskin Stripline)	3.88		2.5.5.5
	E. @ 10 GHz (Bereskin Stripline)	3.88		2.5.5.5
<b>Df, Loss Tangent (Laminate &amp; prepreg as laminated) Tested at 50% resin</b>	A. @ 100 MHz (HP4285A)	0.0158	-	2.5.5.3
	B. @ 1 GHz (HP4291A)	0.0192		2.5.5.9
	C. @ 2 GHz (Bereskin Stripline)	0.0200		2.5.5.5
	D. @ 5 GHz (Bereskin Stripline)	0.0235		2.5.5.5
	E. @ 10 GHz (Bereskin Stripline)	0.0236		2.5.5.5
<b>Volume Resistivity</b>	A. 96/35/90	-	MΩ-cm	2.5.17.1
	B. After moisture resistance	3.0x10 <sup>8</sup>		
	C. At elevated temperature	7.0x10 <sup>8</sup>		
<b>Surface Resistivity</b>	A. 96/35/90	-	MΩ	2.5.17.1
	B. After moisture resistance	3.0x10 <sup>6</sup>		
	C. At elevated temperature	2.0x10 <sup>8</sup>		
<b>Dielectric Breakdown</b>		>50	kV	2.5.6
<b>Arc Resistance</b>		115	Seconds	2.5.1
<b>Electric Strength (Laminate &amp; prepreg as laminated)</b>		54 (1350)	kV/mm (V/mil)	2.5.6.2
<b>Comparative Tracking Index (CTI)</b>		3 (175-249)	Class (Volts)	UL-746A ASTM D3638
<b>Peel Strength</b>	A. Low profile copper foil and very low profile – all copper weights >17 microns	0.969 (5.5)	N/mm (lb/inch)	2.4.8
	B. Standard profile copper	1.06 (5.9)		2.4.8.2
	1. After thermal stress	1.06 (5.9)		2.4.8.3
	2. At 125°C (257°F)	0.969 (5.5)		-
<b>Flexural Strength</b>	A. Lengthwise direction	97,100	lb/inch <sup>2</sup>	2.4.4
	B. Crosswise direction	54,100		
<b>Tensile Strength</b>	A. Lengthwise direction	53,337	lb/inch <sup>2</sup>	-
	B. Crosswise direction	35,678		
<b>Young's Modulus</b>	A. Grain direction	3770	ksi	ASTM D790-15e2
	B. Fill direction	3337		
<b>Poisson's Ratio</b>	A. Grain direction	0.172	-	ASTM D3039-95a
	B. Fill direction	0.155		
<b>Moisture Absorption</b>		0.15	%	2.6.2.1
<b>Flammability (Laminate &amp; prepreg as laminated)</b>		V-0	Rating	UL 94
<b>Max Operating Temperature</b>		130	°C	-

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/185HR](http://www.isola-group.com/products/185HR)

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