



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.

High Performance

185HR Data Sheet

Tg 180, Td 340
Dk 4.01, Df 0.020
/21 /24 /26 /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
- 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-4101C /21 /24 /26 /98 /99 /101 /126
 - ▶ UL – File Number E41625
 - ▶ Qualified to UL's MCIL Program

185HR Specifications

Property		Typical Values			
		Typical Value	Specification	Units	Test Method
				Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC		180	170-200	°C	2.4.25
Glass Transition Temperature (Tg) by DMA		185	170-200	°C	2.4.25
Decomposition Temperature (Td) by TGA @ 5% weight loss		340	–	°C	ASTM D3850
T260		60	–	Minutes	ASTM D3850
T288		>15	–	Minutes	ASTM D3850
CTE, Z-axis	A. Pre-Tg	40	AABUS	ppm/°C	2.4.24
	B. Post-Tg	220	–		
CTE, X-, Y-axes	A. Pre-Tg	13/14	AABUS	ppm/°C	2.4.24
	B. Post-Tg	14/17	–		
Z-axis Expansion (50 to 260°C)		2.7	–	%	2.4.24
Thermal Conductivity		0.4	–	W/mK	ASTM D5930
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched	Pass	Pass Visual	Rating	2.4.13.1
	B. Etched				
Dk, Permittivity (Laminate & prepreg as laminated) Tested at 50% resin	A. @ 100 MHz (HP4285A)	4.13	5.4	–	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
Df, Loss Tangent (Laminate & prepreg as laminated) Tested at 50% resin	A. @ 100 MHz (HP4285A)	0.0158	0.035	–	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
Volume Resistivity	A. 96/35/90	–	1.0x10 ⁶	MΩ-cm	2.5.17.1
	B. After moisture resistance	3.0x10 ⁸	–		
	C. At elevated temperature	7.0x10 ⁸	1.0x10 ³		
Surface Resistivity	A. 96/35/90	–	1.0x10 ⁴	MΩ	2.5.17.1
	B. After moisture resistance	3.0x10 ⁶	–		
	C. At elevated temperature	2.0x10 ⁹	1.0x10 ³		
Dielectric Breakdown		>50	–	kV	2.5.6
Arc Resistance		115	60	Seconds	2.5.1
Electric Strength (Laminate & prepreg as laminated)		54 (1350)	30 (750)	kV/mm (V/mil)	2.5.6.2
Comparative Tracking Index (CTI)		3 (175-249)	–	Class (Volts)	UL-746A ASTM D3638
Peel Strength	A. Low profile copper foil and very low profile – all copper weights >17 microns	0.969 (5.5)	0.70 (4.0)	N/mm (lb/inch)	2.4.8
	B. Standard profile copper	1.06 (5.9) 1.06 (5.9) 0.969 (5.5)	0.80 (4.5)		2.4.8.2
	1. After thermal stress		0.70 (4.0)		2.4.8.3
	2. At 125°C (257°F)		0.55 (3.5)		–
Flexural Strength	A. Lengthwise direction	97,100	–	lb/inch ²	2.4.4
	B. Crosswise direction	54,100	–		
Tensile Strength	A. Lengthwise direction	53,337	–	lb/inch ²	–
	B. Crosswise direction	35,678	–		
Young's Modulus	A. Grain direction	3770	–	ksi	ww
	B. Fill direction	3337	–		
Poisson's Ratio	A. Grain direction	0.172	–	–	xx
	B. Fill direction	0.155	–		
Moisture Absorption		0.15	–	%	2.6.2.1
Flammability (Laminate & prepreg as laminated)		V-0	–	Rating	UL 94
Max Operating Temperature		130	UL Cert	°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.