

# isola

## I-Speed®

### High Performance Laminate and Prepreg

I-Speed® is a 180°C Tg FR-4 resin system for multilayer PWB applications where maximum thermal performance and reliability are required.

I-Speed® laminate and prepreg products are manufactured with Isola's patentable high performance multifunctional resin system, reinforced with electrical grade (E-glass) glass fabric. This system delivers a 15% improvement in Z-axis expansion and offers 25% more electrical bandwidth (lower loss) than competitive products in this space. These properties coupled with superior moisture resistance at reflow, result in a product that bridges the gap from both a thermal and electrical perspective.

I-Speed® is also available with low Dk glass fabric. The low Dk glass significantly reduces the Dk of the material to 3.30, allowing increased trace widths and also reduces skew caused by Dk differences between the glass and resin. The I-Speed® system is laser fluorescing and UV blocking for maximum compatibility with Automated Optical Inspection (AOI) systems, optical positioning systems and photoimagable solder mask imaging.

### Product Attributes

High Thermal Reliability , High Speed Digital , High Density Interconnect

### Typical Market Applications

Computing, Storage & Peripherals , Networking & Communication Systems , Aerospace & Defense , Medical, Industrial & Instrumentation

High Thermal Reliability

## Data Sheet

Tg 180°C

Td 360°C

Dk 3.64

Df 0.0060

IPC-4101/98 /99 /101 /126

UL - File Number E41625

Last Updated December 7, 2017  
Revision No: 14

### Product Features

### Product Availability

Property	Typical Value	Units	Test Method	
		Metric (English)	IPC-TM-650 (or as noted)	
Glass Transition Temperature (Tg) by DSC	180	°C	2.4.25C	
Decomposition Temperature (Td) by TGA @ 5% weight loss	360	°C	2.4.24.6	
Time to Delaminate by TMA (Copper removed)	A. T260 B. T288	>60	Minutes	2.4.24.1
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	60 230 2.7	ppm/°C ppm/°C %	2.4.24C
X/Y-Axis CTE	Pre-Tg	16	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. @ 1 GHz B. @ 2 GHz C. @ 5 GHz D. @ 10 GHz	3.65 3.64 3.63 3.63	—	2.5.5.9 Bereskin Stripline Bereskin Stripline Bereskin Stripline
Df, Loss Tangent	A. @ 1 GHz B. @ 2 GHz C. @ 5 GHz D. @ 10 GHz	0.0058 0.0060 0.0067 0.0071	—	2.5.5.9 Bereskin Stripline Bereskin Stripline Bereskin Stripline
Volume Resistivity	A. After moisture resistance B. At elevated temperature	4.4 x 10 <sup>7</sup> 9.4 x 10 <sup>7</sup>	MΩ-cm	2.5.17.1
Surface Resistivity	A. After moisture resistance B. At elevated temperature	2.6 x 10 <sup>6</sup> 2.1 x 10 <sup>8</sup>	MΩ	2.5.17.1
Dielectric Breakdown		>50	kV	2.5.6B
Arc Resistance		137	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		70 (1741)	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. After process solutions	1.14 (6.5) 0.96 (5.5) 0.90 (5.1)	N/mm (lb/inch)	2.4.8C 2.4.8.2A 2.4.8.3
Flexural Strength	A. Length direction B. Cross direction	67,000 62,000		2.4.4B
Tensile Strength	A. Length direction B. Cross direction	48,348 35,598		ASTM D3039
Young's Modulus	A. Length direction B. Cross direction	2868 2730	ksi	ASTM D790-15e2
Poisson's Ratio	A. Length direction B. Cross direction	0.173 0.152	—	ASTM D3039
Moisture Absorption		0.061	%	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.

