

# 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 Isolal's patentable high performance multi-functional 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.

The I-Speed® resin system is laser fluorescing and UV blocking for maximum compatibility with Automated Optical Inspection (AOI) systems, optical positioning systems and photo imangible 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

#### 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 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 November 11, 2019  
Revision No: D

### Product Features

- Industry Recognition
  - UL File Number: E41625
  - Qualified to UL's MCIL Program
  - RoHS Compliant
- Performance Attributes
  - Lead-free assembly compatible
- Processing Advantages
  - FR-4 process compatible
  - UV blocking and AOI fluorescence

### Product Availability

- Standard Material Offering: Laminate
  - Available in full size sheet or panel form
- Copper Foil Type
  - HTE Grade 3
  - VLP-2 (2 micron), 1 oz and below
  - 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
  - Mechanically spread glass

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	67.0 62.0	ksi	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	48.3 35.6	ksi	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
Relative Thermal Index (RTI)		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/i-speed/>

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## NOTE

Visit our site <http://www.isola-group.com> for more details.

Revisions:

A: Initial release - 4/17

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

C: Removed Low Dk glass option - 11/18

D: Change MOT to RTI 5/19