

IPC-4101 /98 /99 /101 /126 UL - File Number E41625

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

## 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
- Multiple lamination cycles
- HDI technology compatible

## PRODUCT AVAILABILITY

### Standard Material Offering: Laminate

- Available in full size sheet or panel form

### Copper Foil Type

- HTE Grade 3
- HVLP (VLP2) 2.5 micron Rz JIS, 1 oz and below is standard
- 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

I-Speed® laminate and prepreg products are manufactured with Isolas' 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 imagable solder mask imaging.

## PRODUCT ATTRIBUTES



HIGH DENSITY  
INTERCONNECT



HIGH SPEED  
DIGITAL



HIGH THERMAL  
RELIABILITY

## TYPICAL MARKET APPLICATIONS



NETWORKING &  
COMMUNICATIONS



AEROSPACE  
& DEFENSE



COMPUTING, STORAGE  
& PERIPHERALS



MEDICAL, INDUSTRIAL  
& INSTRUMENTATION

## ORDERING INFORMATION:

Contact your local sales representative or contact [info@isola-group.com](mailto:info@isola-group.com) for further information.

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# Typical Values Table

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/m-K	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	$4.4 \times 10^7$ $9.4 \times 10^7$	MΩ-cm	2.5.17.1
Surface Resistivity	A. After moisture resistance B. At elevated temperature	$2.6 \times 10^6$ $2.1 \times 10^8$	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)		2 (250-399)	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
Test data generated from rigid laminate	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

## NOTES

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 - 10/18

D: Change MOT to RTI - 5/19

E: Revised CTI to 2 - 1/21

F: Changed VLP2 to HVLP to align with common industry terms 4/21

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