



IS415HR High Thermal Performance Epoxy Material

IS415HR is a proprietary high-performance 180°C glass transition temperature (Tg) FR-4 system for multilayer Printed Wiring Board (PWB) applications where maximum thermal performance and reliability are required. This product is also ideally suited for designs requiring high signal integrity. IS415HR has a lower Z-axis CTE and provides superior moisture resistance at reflow, resulting in a product that bridges the gap from both a thermal and electrical perspective.

www.isola-group.com/products/IS415HR

ORDERING INFORMATION:

Contact your local sales representative or visit www.isola-group.com for further information.

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High Performance

IS415HR Data Sheet

Tg 180, Td 360
Dk 3.80, Df 0.0123
/98 /99/ 101 /126

Features

- High Thermal Performance
 - ▶ High Tg: 180°C (DSC)
 - ▶ High Td: 360°C (TGA @ 5% wt loss)
 - ▶ Low CTE in the Z-axis – 2.5% (50-260°C)
- T260: 60 minutes
- T288: >30 minutes
- Lead-free Compatible and RoHS Compliant
- UV Blocking and AOI Compatible
 - ▶ High throughput and accuracy during PCB fabrication and assembly
- Superior Processing
 - ▶ Closest to conventional FR-4 processing of all high-speed materials
- Core Material Standard Availability
 - ▶ Thickness: 0.002 (0.05 mm) to 0.028 (0.71 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
 - ▶ Spread glass fabric available
- Industry Approvals
 - ▶ IPC-4101D WAM1 /98 /99/ 101 /126 (IPC-4101C /21 /24 /26 /121 /124 /129)
 - ▶ UL - File Number E41625
 - ▶ Qualified to UL's MCIL Program

IS415HR 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	170-180	°C	2.4.25	
Decomposition Temperature (Td) by TGA @ 5% weight loss	360	–	°C	ASTM D3850	
T260	60	–	Minutes	ASTM D3850	
T288	>30	–	Minutes	ASTM D3850	
CTE, Z-axis	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.24	
CTE, X-, Y-axes	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.24	
Z-axis Expansion (50-260°C)	2.5	–	%	2.4.24	
Thermal Conductivity	0.4	–	W/mK	ASTM D5930	
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched B. Etched	Pass	Pass Visual	Rating	2.4.13.1
Dk, Permittivity (Laminate & prepreg as laminated) Tested at 56% resin	A. @ 1 GHz (HP4291A) B. @ 2 GHz (Bereskin Stripline) C. @ 5 GHz (Bereskin Stripline) D. @ 10 GHz (Bereskin Stripline)	3.85 3.80 3.79 3.77	– – – –	–	2.5.5.9 2.5.5.5 2.5.5.5 2.5.5.5
Df, Loss Tangent (Laminate & prepreg as laminated) Tested at 56% resin	A. @ 1 GHz (HP4291A) B. @ 2 GHz (Bereskin Stripline) C. @ 5 GHz (Bereskin Stripline) D. @ 10 GHz (Bereskin Stripline)	0.0121 0.0123 0.0122 0.0125	– – – –	–	2.5.5.9 2.5.5.5 2.5.5.5 2.5.5.5
Volume Resistivity	A. 96/35/90 B. After moisture resistance C. At elevated temperature	– 4.70x10 ⁷ 9.80x10 ⁷	1.0x10 ⁶ – 1.0x10 ³	MΩ-cm	2.5.17.1
Surface Resistivity	A. 96/35/90 B. After moisture resistance C. At elevated temperature	– 2.70x10 ⁸ 2.40x10 ⁶	1.0x10 ⁴ – 1.0x10 ³	MΩ	2.5.17.1
Dielectric Breakdown	>60	–	kV	2.5.6	
Arc Resistance	120	60	Seconds	2.5.1	
Electric Strength (Laminate & prepreg as laminated)	40 (1100)	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. Standard profile copper 1. After thermal stress 2. At 125°C (257°F) 3. After process solutions	0.82 (4.6) 0.77 (4.3) 0.64 (3.6)	0.80 (4.5) 0.70 (4.0) 0.55 (3.0)	N/mm (lb/inch)	2.4.8.2 2.4.8.3 –
Flexural Strength	A. Lengthwise direction B. Crosswise direction	74,200 51,600	–	lb/inch ²	2.4.4
Tensile Strength	A. Lengthwise direction B. Crosswise direction	43,750 31,520	–	lb/inch ²	–
Young's Modulus	A. Grain direction B. Fill direction	3530 3200	–	ksi	ww
Poisson's Ratio	A. Grain direction B. Fill direction	0.158 0.138	–	–	xx
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.

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