



## IS415 High Thermal Performance Epoxy Material

**IS415** sets the industry standard for high thermal performance epoxy materials and is ideally suited for designs requiring high signal integrity. This product is engineered to meet the demands of Lead (Pb) free multilayer printed circuit assembly, deliver CAF resistance with strong IST results and maintain FR-4 processing. IS415 offers good electrical performance, superior chemical and thermal performance and product consistency.

[www.isola-group.com/products/IS415](http://www.isola-group.com/products/IS415)

### 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 Performance

# IS415 Data Sheet

Tg 200, Td 370  
Dk 3.72, Df 0.0120  
/21 /24 /26 /28 /121  
/124 /129

## Features

- High Thermal Performance
  - ▶ High Tg: 200°C (DSC)
  - ▶ High Td: 370°C (TGA @ 5% wt loss)
  - ▶ Superior performance through multiple thermal excursions
  - ▶ Superior chemical and thermal resistance
- T260: 60 minutes
- T288: >20 minutes
- RoHS Compliant
- UV Blocking and AOI Compatible
  - ▶ UV blocking and enhanced fluorescence
  - ▶ Compatible with all AOI equipment, including laser-enhanced reflectance systems
- Standard FR-4 Processing
  - ▶ No post bake after pressing
  - ▶ Drilling parameters and hole wall preparation are standard
- Core Material Standard Availability
  - ▶ Thickness: 0.002" (0.05 mm) to 0.125" (3.2 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)
  - ▶ VLP-2 (2 micron)
- 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-4101C /21 /24 /26 /28 /121 /124 /129
  - ▶ UL - File Number E41625
  - ▶ Qualified to UL's MCIL Program

# IS415 Specifications

Property		Typical Values			
				Units	Test Method
		Typical Value	Specification	Metric (English)	IPC-TM-650 (or as noted)
<b>Glass Transition Temperature (Tg) by DSC</b>		200	170-200	°C	2.4.25
<b>Decomposition Temperature (Td) by TGA @ 5% weight loss</b>		370	–	°C	ASTM D3850
<b>T260</b>		60	–	Minutes	ASTM D3850
<b>T288</b>		>20	–	Minutes	ASTM D3850
<b>CTE, Z-axis</b>	A. Pre-Tg	45	AABUS	ppm/°C	2.4.24
	B. Post-Tg	240	–		
<b>CTE, X-, Y-axes</b>	A. Pre-Tg	13	AABUS	ppm/°C	2.4.24
	B. Post-Tg	14	–		
<b>Z-axis Expansion (50-260°C)</b>		2.8	–	%	2.4.24
<b>Thermal Conductivity</b>		0.4	–	W/mK	ASTM D5930
<b>Thermal Stress 10 sec @ 288°C (550.4°F)</b>	A. Unetched	Pass	Pass Visual	Rating	2.4.13.1
	B. Etched				
<b>Dk, Permittivity (Laminate &amp; prepreg as laminated) Tested at 56% resin</b>	A. @ 100 MHz (HP4285A)	3.75	5.4	–	2.5.5.3
	B. @ 1 GHz (HP4291A)	3.71	–		2.5.5.9
	C. @ 2 GHz (Bereskin Stripline)	3.72	–		2.5.5.5
	D. @ 5 GHz (Bereskin Stripline)	3.71	–		2.5.5.5
	E. @ 10 GHz (Bereskin Stripline)	3.71	–		2.5.5.5
<b>Df, Loss Tangent (Laminate &amp; prepreg as laminated) Tested at 56% resin</b>	A. @ 100 MHz (HP4285A)	0.0107	0.035	–	2.5.5.3
	B. @ 1 GHz (HP4291A)	0.0131	–		2.5.5.9
	C. @ 2 GHz (Bereskin Stripline)	0.0120	–		2.5.5.5
	D. @ 5 GHz (Bereskin Stripline)	0.0127	–		2.5.5.5
	E. @ 10 GHz (Bereskin Stripline)	0.0125	–		2.5.5.5
<b>Volume Resistivity</b>	A. 96/35/90	–	1.0x10 <sup>6</sup>	MΩ-cm	2.5.17.1
	B. After moisture resistance	3.81x10 <sup>8</sup>	–		
	C. At elevated temperature	3.90x10 <sup>8</sup>	1.0x10 <sup>3</sup>		
<b>Surface Resistivity</b>	A. 96/35/90	–	1.0x10 <sup>4</sup>	MΩ	2.5.17.1
	B. After moisture resistance	2.81x10 <sup>6</sup>	–		
	C. At elevated temperature	2.64x10 <sup>8</sup>	1.0x10 <sup>3</sup>		
<b>Dielectric Breakdown</b>		>50	–	kV	2.5.6
<b>Arc Resistance</b>		120	60	Seconds	2.5.1
<b>Electric Strength (Laminate &amp; prepreg as laminated)</b>		40 (1100)	30 (750)	kV/mm (V/mil)	2.5.6.2
<b>Comparative Tracking Index (CTI)</b>		3 (175-249)	–	Class (Volts)	UL-746A ASTM D3638
<b>Peel Strength</b>	A. Low profile copper foil and very low profile – all copper weights >17 microns	1.14 (6.5)	0.70 (4.0)	N/mm (lb/inch)	2.4.8
	B. Standard profile copper	–	–		2.4.8.2
	1. After thermal stress	1.225 (7.0)	0.80 (4.5)		2.4.8.3
	2. At 125°C (257°F)	1.14 (6.5)	0.70 (4.0)		–
	3. After process solutions	0.90 (5.1)	0.55 (3.0)	–	–
<b>Flexural Strength</b>	A. Lengthwise direction	74,200	–	lb/inch <sup>2</sup>	2.4.4
	B. Crosswise direction	51,600			
<b>Tensile Strength</b>	A. Lengthwise direction	43,750	–	lb/inch <sup>2</sup>	–
	B. Crosswise direction	31,520			
<b>Young's Modulus</b>	A. Grain direction	3530	–	ksi	ww
	B. Fill direction	3200			
<b>Poisson's Ratio</b>	A. Grain direction	0.158	–	–	xx
	B. Fill direction	0.138			
<b>Moisture Absorption</b>		0.15	–	%	2.6.2.1
<b>Flammability (Laminate &amp; prepreg as laminated)</b>		V-0	–	Rating	UL 94
<b>Max Operating Temperature</b>		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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