

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

FR408HR is a high-performance FR-4 resin system with a 230°C (DMA) Tg for multilayer PCB applications where maximum thermal performance and reliability are required.

PRODUCT FEATURES

Industry Recognition

- RoHS Compliant

Performance Attributes

- CAF resistant
- Lead-free assembly compatible
- 6x 260°C reflow capable
- 6x 288°C solder float capable

Processing Advantages

- FR-4 process compatible
- Via filling capability
- Multiple lamination cycles

PRODUCT AVAILABILITY

Standard Material Offering: Laminate

- 2 to 30 mil (0,05 to 0.75 mm)

Copper Foil Type

- HTE Grade 3
- RTF (Reverse Treat Foil)
- Embedded resistor foil

Copper Weight

- ½, 1 and 2 oz (18, 35 and 70 µm) available
- Heavier copper foil available
- Thinner copper foil available

Standard Material Offering: Prepreg

- Tooling of prepreg panels

Glass Fabric Availability

- E-glass
- Square weave glass
- Mechanically spread glass

FR408HR laminate and prepreg products are manufactured with Isola’s patented high performance multifunctional resin system, reinforced with electrical grade (E-glass) glass fabric. This system delivers a 30% 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 FR408HR system is also 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



TYPICAL MARKET APPLICATIONS



ORDERING INFORMATION:

Contact your local sales representative or contact info@isola-group.com for further information.

Isola Group
6565 West Frye Road Chandler,
AZ 85226 Phone: 480-893-6527
Fax: 480-893-1409

Isola Asia Pacific
(Hong Kong) Ltd. 12/F,
Kin Sang Commercial Centre,
49 King Yip Street, Kwun Tong,
Kowloon,
Hong Kong Phone: 852-2418-1318
Fax: 852-2418-1533

Isola GmbH
Isola Strasse 2 D-52348 Düren,
Germany Phone: 49-2421-8080
Fax: 49-2421-808164

Typical Values Table

Property	Typical Value	Units		Test Method
		Metric (English)	IPC-TM-650 (or as noted)	
Glass Transition Temperature (Tg) by DSC	190	°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 >30	Minutes 2.4.24.1	
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	55 230 2.8	ppm/°C ppm/°C %	
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. @ 100 MHz B. @ 1 GHz C. @ 2 GHz D. @ 5 GHz E. @ 10 GHz	3.72 3.69 3.68 3.64 3.65	— 2.5.5.3 2.5.5.9 Bereskin Stripline Bereskin Stripline Bereskin Stripline	
Df, Loss Tangent	A. @ 100 MHz B. @ 1 GHz C. @ 2 GHz D. @ 5 GHz E. @ 10 GHz	0.0072 0.0091 0.0092 0.0098 0.0095	— 2.5.5.3 2.5.5.9 Bereskin Stripline Bereskin Stripline Bereskin Stripline	
Volume Resistivity	A. After moisture resistance B. At elevated temperature	4.4×10^7 9.4×10^7	MΩ-cm 2.5.17.1	
Surface Resistivity	A. After moisture resistance B. At elevated temperature	2.6×10^6 2.1×10^8	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	500 (72.5) 400 (58.0)	MPa (kpsi) 2.4.4B	
Tensile Strength	A. Length direction B. Cross direction	376 (54.5) 267 (38.7)	MPa (kpsi) ASTM D3039	
Young's Modulus	A. Length direction B. Cross direction	3695 3315	ksi ASTM D790-15e2	
Poisson's Ratio	A. Length direction B. Cross direction	0.137 0.133	— 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

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