



FR408

FR408 is a high-performance FR-4 epoxy laminate and prepreg system designed for advanced circuitry applications.

Its low dielectric constant (Dk) and low dissipation factor (Df) make it an ideal candidate for broadband circuit designs requiring faster signal speeds or improved signal integrity. FR408 is compatible with most FR-4 processes. This feature allows the use of FR408 without adding complexity to current fabrication techniques.

ORDERING INFORMATION:

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

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Performance

Tg 180°C

Td 360°C

Dk 3.67

Df 0.0120

zIPC- 4101C /21 /24 /26 /98 /101 /126

UL - File Number E41625

Qualified to UL's MCIL Program

Product Features

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

Product Availability

- Standard Material Offering: Laminate
 - 2 to 125 mil (0.05 to 3.2 mm)
 - Available in full size sheet or panel form
- Copper Foil Type
 - HTE Grade 3
 - 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

FR408 Specifications

Property		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC		180	°C	2.4.25
Decomposition Temperature (Td) by TGA @ 5% weight loss		360	°C	2.4.24.2
Time to Delaminate by TMA (Copper removed)	A. T260	60	Minutes	2.4.24.1
	B. T288	15		
Z-Axis CTE	A. Pre-Tg	60	ppm/°C	2.4.24
	B. Post-Tg	228	ppm/°C	
	C. 50 to 260°C, (Total Expansion)	3.5	%	
X/Y-Axis CTE	Pre-Tg	13	ppm/°C	2.4.24.1
Thermal Conductivity		0.4	W/mK	ASTM E1952
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched	Pass	Pass Visual	2.4.13.1
	B. Etched			
Dk, Permittivity	A. @ 100 MHz	3.69	—	2.5.5.3
	B. @ 1 GHz	3.66		2.5.5.9
	C. @ 2 GHz	3.67		Bereskin Stripline
	D. @ 5 GHz	3.66		Bereskin Stripline
	E. @ 10 GHz	3.65		Bereskin Stripline
Df, Loss Tangent	A. @ 100 MHz	0.0094	—	2.5.5.3
	B. @ 1 GHz	0.0117		2.5.5.9
	C. @ 2 GHz	0.0120		Bereskin Stripline
	D. @ 5 GHz	0.0127		Bereskin Stripline
	E. @ 10 GHz	0.0125		Bereskin Stripline
Volume Resistivity	A. After moisture resistance	4.6×10^7	MΩ-cm	2.5.17.1
	B. At elevated temperature	2.8×10^8		
Surface Resistivity	A. After moisture resistance	2.81×10^6	MΩ	2.5.17.1
	B. At elevated temperature	2.64×10^8		
Dielectric Breakdown		>50	kV	2.5.6
Arc Resistance		120	Seconds	2.5.1
Electric Strength (Laminate & laminated prepreg)		55 (1400)	kV/mm (V/mil)	2.5.6.2
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]	1.14 (6.5)	N/mm (lb/inch)	2.4.8
	B. Standard profile copper	1.225 (7.0)		2.4.8.2
	1. After thermal stress	1.14 (6.5)		2.4.8.3
	2. At 125°C (257°F)	0.90 (5.1)		2.4.8.3
Flexural Strength	A. Length direction	81,400	lb/inch ²	2.4.4
	B. Cross direction	64,100		
Tensile Strength	A. Length direction	59,260	lb/inch ²	ASTM D3039
	B. Cross direction	42,040		
Poisson's Ratio	A. Length direction	0.162	—	ASTM D3039
	B. Cross direction	0.138		
Moisture Absorption		0.15	%	2.6.2.1
Flammability (Laminate & laminated prepreg)		V-0	Rating	UL 94
Max Operating Temperature		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.

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