



FR406 High Performance Epoxy Laminate and Prepreg

FR406 sets the industry standard for high performance epoxy materials. This product is engineered to meet the demands of the multilayer printed circuit board industry, while maintaining standard FR-4 processing. FR406 offers improved dimensional control, superior chemical and thermal performance and product consistency.

www.isola-group.com/products/FR406

ORDERING INFORMATION:

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

Isola Group
3100 West Ray Road
Suite 301
Chandler, AZ 85226
Phone: 480-893-6527
Fax: 480-893-1409
info@isola-group.com

Isola Asia Pacific (Hong Kong) Ltd.
Unit 3512 - 3522, 35/F
No. 1 Hung To Road, Kwun Tong,
Kowloon, Hong Kong
Phone: 852-2418-1318
Fax: 852-2418-1533
info.hkg@isola-group.com

Isola GmbH
Isola Strasse 2
D-52348 Düren, Germany
Phone: 49-2421-8080
Fax: 49-2421-808164
info-dur@isola-group.com

High Performance

FR406 Data Sheet

T_g 170, T_d 300
D_k 3.93, D_f 0.0167
/21 /24 /26

Features

- High Thermal Performance
 - ▶ T_g: 170°C (DSC)
 - ▶ T_d: 300°C (TGA @ 5% wt loss)
 - ▶ Superior chemical and thermal resistance
 - ▶ Lower CTE from ambient to 288°C
- T260: 10 minutes
- T288: >2 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)
- 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
- Industry Approvals
 - ▶ IPC-4101D WAM1 /21 /24 /26
 - ▶ UL - File Number E41625

FR406 Typical Values

Property		Typical Values		
		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC		170	°C	2.4.25
Decomposition Temperature (Td) by TGA @ 5% weight loss		300	°C	ASTM D3850
T260		10	Minutes	2.4.25
T288		>2	Minutes	2.4.25
CTE, Z-axis	A. Pre-Tg	60	ppm/°C	2.4.24
	B. Post-Tg	250		
CTE, X-, Y-axes	A. Pre-Tg	13	ppm/°C	2.4.24
	B. Post-Tg	14		
Z-axis Expansion (50-260°C)		3.5	%	2.4.24
Thermal Conductivity		0.3-0.4	W/mK	ASTM D5930
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched	Pass	Rating	2.4.13.1
	B. Etched			
Dk, Permittivity (Laminate & prepreg as laminated) Tested at 50% resin	A. @ 100 MHz (HP4285A)	4.00	-	2.5.5.3
	B. @ 1 GHz (HP4291A)	3.95		2.5.5.9
	C. @ 2 GHz (Bereskin Stripline)	3.93		2.5.5.5
	D. @ 5 GHz (Bereskin Stripline)	3.92		2.5.5.5
	E. @ 10 GHz (Bereskin Stripline)	3.92		2.5.5.5
Df, Loss Tangent (Laminate & prepreg as laminated) Tested at 50% resin	A. @ 100 MHz (HP4285A)	0.0130	-	2.5.5.3
	B. @ 1 GHz (HP4291A)	0.0161		2.5.5.9
	C. @ 2 GHz (Bereskin Stripline)	0.0167		2.5.5.5
	D. @ 5 GHz (Bereskin Stripline)	0.0172		2.5.5.5
	E. @ 10 GHz (Bereskin Stripline)	0.0172		2.5.5.5
Volume Resistivity	A. 96/35/90	9.0x10 ⁷	MΩ-cm	2.5.17.1
	B. After moisture resistance	-		
	C. At elevated temperature	3.0x10 ⁷		
Surface Resistivity	A. 96/35/90	3.0x10 ⁸	MΩ	2.5.17.1
	B. After moisture resistance	-		
	C. At elevated temperature	8.0x10 ⁸		
Dielectric Breakdown		>50	kV	2.5.6
Arc Resistance		90	Seconds	2.5.1
Electric Strength (Laminate & prepreg as laminated)		44 (1100)	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 – all copper weights >17 microns	1.19 (7.0)	N/mm (lb/inch)	2.4.8
	B. Standard profile copper	1.60 (9.0)		2.4.8.2
	1. After thermal stress	1.19 (7.0)		2.4.8.3
	2. At 125°C (257°F)	1.19 (7.0)		-
	3. After process solutions	1.60 (9.0)		-
Flexural Strength	A. Lengthwise direction	93,700	lb/inch ²	2.4.4
	B. Crosswise direction	78,200		
Tensile Strength	A. Lengthwise direction	62,950	lb/inch ²	ASTM D3039-95a
	B. Crosswise direction	47,680		
Young's Modulus	A. Grain direction	3684	ksi	ASTM D790-15e2
	B. Fill direction	3116		
Poisson's Ratio	A. Grain direction	0.191	-	ASTM D3039-95a
	B. Fill direction	0.154		
Moisture Absorption		0.2	%	2.6.2.1
Flammability (Laminate & prepreg as laminated)		V-0	Rating	UL 94
Max Operating Temperature		130	°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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