FR406

Standard Loss, High Tg Epoxy Laminate and Prepreg

Tg 170°C Td 300°C Dk 3.93 Df 0.0167

IPC-4101 /21 /24 /26 UL - File Number E41625

FR406 sets the industry standard for high performance epoxy materials.

PRODUCT FEATURES

Industry Recognition

- UL File Number: E41625
- RoHS Compliant

Processing Advantages

- FR-4 process compatible
- UV blocking and AOI fluorescence
- No post bake after pressing

PRODUCT AVAILABILITY

Standard Material Offering: Laminate

- 2 to 125 mil (0.05 to 3.2 mm)

Copper Foil Type

- HTE Grade 3
- RTF (Reverse Treat Foil)

Copper Weight

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

Standard Material Offering: Prepreg

- Tooling of prepreg panels

Glass Fabric Availability

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

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.

PRODUCT ATTRIBUTES

LEGACY

ORDERING INFORMATION:

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

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Typical Values Table

Property		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC		170	°C	2.4.25C
Decomposition Temperature (Td) by TGA @ 5% weight loss		300	°C	2.4.24.6
Time to Delaminate by TMA (Copper removed)	A. T260 B. T288	10 >2	Minutes	2.4.24.1
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	60 250 3.5	ppm/°C ppm/°C %	2.4.24C
X/Y-Axis CTE	Pre-Tg	13	ppm/°C	2.4.24C
Thermal Conductivity		0.3-0.4	W/m·K	ASTM E1952
Thermal Stress 10 sec @ 288ºC (550.4ºF)	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	4.00 3.95 3.93 3.92 3.92	—	2.5.5.3 2.5.5.9 2.5.5.5 2.5.5.5 2.5.5.5
Df, Loss Tangent	A. @ 100 MHz B. @ 1 GHz C. @ 2 GHz D. @ 5 GHz E. @ 10 GHz	0.0130 0.0161 0.0167 0.0172 0.0172	—	2.5.5.3 2.5.5.9 2.5.5.5 2.5.5.5 2.5.5.5
Volume Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	9.0×10^7 — 3.0×10^7	MΩ-cm	2.5.17.1
Surface Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	3.0×10^8 — 8.0×10^8	MΩ	2.5.17.1
Dielectric Breakdown		>50	kV	2.5.6B
Arc Resistance		90	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		44 (1100)	kV/mm (V/mil)	2.5.6.2A
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] B. Standard profile copper 1. After thermal stress 2. At 125ºC (257ºF) 3. After process solutions	1.19 (7.0) 1.60 (9.0) 1.19 (7.0) 1.60 (9.0)	N/mm (lb/inch)	2.4.8C 2.4.8.2A 2.4.8.3 2.4.8.3
Flexural Strength	A. Length direction B. Cross direction	646 (93.7) 539 (78.2)	MPa (kpsi)	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	434 (63.0) 329 (47.7)	MPa (kpsi)	ASTM D3039
Young's Modulus	A. Length direction B. Cross direction	3684 3116	ksi	ASTM D790-15e2
Poisson's Ratio	A. Length direction B. Cross direction	0.191 0.154	—	ASTM D3039
Moisture Absorption		0.2	%	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: Change MOT to RTI 5/19