Legacy Materials

Data Sheet

Tg 170°C
Td 300°C
Dk 3.93
Df 0.0167

IPC-4101 - / 21 / 24 / 26

UL - File Number E41625

Last Updated May 17, 2019
Revision No: C

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.

Product Attributes

Legacy Materials

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

Product Features

- Industry Recognition
  - UL File Number: E41625
  - RoHS Compliant
- Performance Attributes
- 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)
  - 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

FR406 Typical Values

Last Updated May 17, 2019

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/mK	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	93.7 78.2	ksi	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	63.0 47.7	ksi	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

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.

https://www.isola-group.com/products/all-printed-circuit-materials/fr406/

NOTE

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