



High Performance Epoxy Laminate and Prepreg

Isola's **FR406** sets the industry standard for high performance epoxy materials.

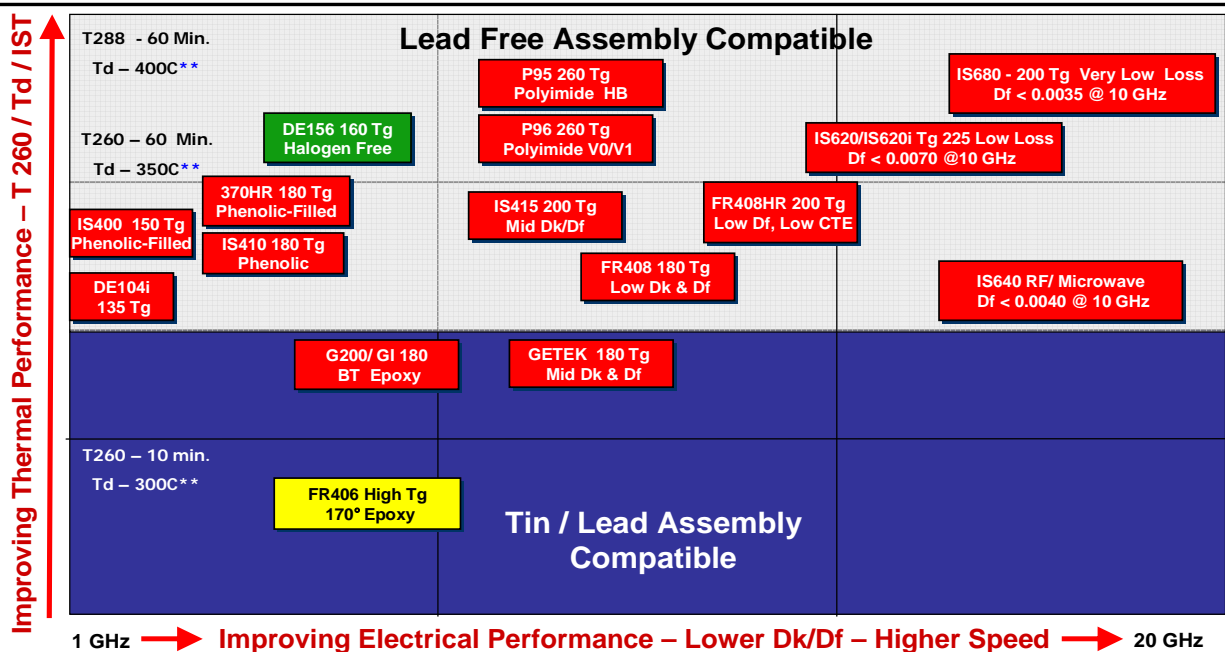
This product is engineered to meet the demands of the multilayer printed circuit board industry, while maintaining standard FR-4 processing. FR406 offers improved dimensional control, superior chemical and thermal performance and product consistency.

IPC-4101C /24, /21, /26 and /28
 UL Recognized – FR-4,
 File Number E41625

- High Tg – 170 °C (DSC)**
 Superior performance through multiple thermal excursions
 Superior chemical and thermal resistance
 Lower CTE from ambient to 288 DegC
- Ultraviolet (UV) Blocking & AOI Compatible**
 UV blocking and enhanced fluorescence
 Laser enhanced reflectance compatible will all AOI equipment
- Standard FR-4 Processing**
 No post bake after pressing.
 Drilling parameters and hole wall prep
- Availability**
Thickness: 0.002" [.05 mm] to 0.125" [3.2 mm]
 Available in sheet or panel form
Copper Foil Cladding: Grade 3 (HTE) , 1/8 to 3 oz.
 Foil Options: Double treat, reverse treat
Prepregs: Available in roll or panel form
Glass Styles: standard offerings



Isola - Product Position Thermal Performance vs Signal Integrity



Speed is a function of design such as line length etc.

** Laminate Data - IST performance is a function of Hole diameter, board thickness, plating parameters and laminate attributes.

FR406

Property		Typical Values			
		Typical Value	Specification	Units	Test Method
				Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC, spec minimum		170	170-200	°C	2.4.25
Decomposition Temperature (Td)		300	—	°C	ASTM D3850
CTE, Z-axis	A. Pre-Tg	60	AABUS	ppm/°C	2.4.24
	B. Post-Tg	250	—		
CTE, X-, Y-axes	A. Pre-Tg	13	AABUS	ppm/°C	2.4.24
	B. Post-Tg	14	—		
% Z-Axis Expansion (50-260C)		3.5	—	%	2.4.24
Thermal Conductivity		0.3-0.4	—	W/mK	ASTM D5930
Thermal Stress 10 Sec @ 288°C (550.4°F), spec min		A. Unetched Pass	Pass Visual	Rating	2.4.13.1
		B. Etched Pass	Pass Visual		
Permittivity, spec maximum (Laminate & prepreg as laminated)	A. @ 100 MHz HP4285A	4.00	5.4	—	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
Loss Tangent, spec maximum (Laminate & prepreg as laminated)	A. @ 100 MHz HP4285A	0.0130	0.035	—	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, spec minimum	A. 96/35/90	9X10 ⁷	10 ⁶	MΩ -cm	2.5.17.1
	B. After moisture resistance	—	—		
	C. At elevated temperature	3x10 ⁷	10 ³		
Surface Resistivity, spec minimum	A. 96/35/90	3x10 ⁸	10 ⁴	MΩ	2.5.17.1
	B. After moisture resistance	—	—		
	C. At elevated temperature	8x10 ⁸	10 ³		
Dielectric Breakdown, spec minimum		>50	40	kV	2.5.6
Arc Resistance, spec minimum		90	60	Seconds	2.5.1
Electric Strength, spec minimum (Laminate & prepreg as laminated)		44	30	kV/mm	2.5.6.2
		1100	(750)	(V/mil)	
Comparative Tracking Index (CTI)		3 (175-249)	—	Class volts	UL-746A ASTM D3638
Peel Strength, Spec Minimum	A. Low profile copper foil and very low profile – all copper weights >17 microns	122 (1.19) (7)	70 (0.70) (4.0)	N/mm (lb/inch)	2.4.8
	B. Standard profile copper	160 (1.60) (9)	—		2.4.8.2
	1. After thermal stress	122 (1.19) (7)	80 (0.80) (4.5)	N/mm (lb/inch)	2.4.8.3
	2. At 125°C (257°F)	122 (1.19) (7)	70 (0.70) (4.0)		—
	3. After process solutions	160 (1.60) (9)	55 (0.55) (3.0)		—
Flexural Strength, minimum	A. Lengthwise direction	91	—	Mpa (lb/inch ²)	2.4.4
	B. Crosswise direction	73	—		
Moisture Absorption, spec maximum		0.2	—	%	2.6.2.1
Flammability (Laminate & prepreg as laminated), spec min		V-0	V-0	Rating	UL-94
Tensile Strength		55/40	Grain/Fill	Ksi	
Poisson's Ratio		0.15 / .012	Grain/Fill		
Youngs Modulus		3.5 / 3.0	Grain/Fill	Million PSI	
Taylors Modulus		3.2 / 3.0	Grain/Fill	Million PSI	
HWI		0			
Max Operating Temperature		130 (130)	UL Cert (tested)	Deg C	
DSR		yes			

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.

ORDERING INFORMATION:

Contact your local sales representative or the Customer Service Department in Chandler, AZ
 Isola Group 3100 W Ray Road, Chandler, AZ 85226
 Phone: 480-893-6527
 For further information visit www.isola-group.com



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