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FL-170
HIGH PERFORMANCE LAMINATE and PREPREG

High Reliability, High Tg, CAF Resistant, Low CTE
Glass Cloth Based Epoxy Resin
Flame Retardant Copper Cladded Laminate

Product Description

The PIC FL-170 is specially formulated to cope with the increasing stringent demand in high complexity, high layer count, lead-free PCB design and applications. This material is a high performance, high Tg, Low CTE, CAF resistant multi-functional epoxy resin.

Applications

- High-layer count designs
- Backplanes
- High complexity multi-layers
- PC computers
- High-end servers
- Wireless communication infrastructure
- Automotive applications requiring high thermal resistance

Product Features

- High Tg Glass transition temperature: >170°C (measured by DSC)
- High degradation temperature: > 340 °C
- Low water absorbability
- Compatible with lead-free assembly environment - passed the lead-free reflow requirement at peak temperature of 260°C
- Excellent CAF resistance
- Able to withstand high thermal excursion during PCB fabrication and assembly
- Provide high thermal resistance and long term thermal reliability
- Wide operating window for multilayer processing
- Excellent thermal shock reliability
- Withstand stringent requirements of Accelerated Thermal Cycling and IST cycles
- UV blocking for maximum compatibility with automated optical inspection

PIC FL-170 Laminate Specification

Property	Typical Value	IPC-4101B/126 <0.0197"	Typical Value	IPC-4101B/126 ≥0.0197"	Units	Test Method
Peel Strength, minimum Standard profile copper foil 1. After thermal stress 2. At 125°C 3. After process solution	 1.22(7.00) 1.05(6.00) 0.87(5.00)	 0.80(4.57) 0.70(4.00) 0.55(3.14)	 1.22(7.00) 1.05(6.00) 0.87(5.00)	 1.05(6.00) 0.70(4.00) 0.80(4.57)	N/mm (lb/inch)	 2.4.8.2 2.4.8.3
Volume Resistivity, minimum A. C-96/35/90 B. After moisture resistance C. At elevated temperature E-24/125	 1.6×10^{10} - - - 3.0×10^{10}	 10^6 - - - 10^3	 - - - 8.3×10^8 9.0×10^8	 - - - 10^4 10^3	MΩ-cm	2.5.17.1
Surface Resistivity, minimum A. C-96/35/90 B. After moisture resistance C. At elevated temperature E-24/125	 1.2×10^8 - - - 5.0×10^8	 10^4 - - - 10^3	 - - - 8.1×10^7 7.1×10^7	 - - - 10^4 10^3	MΩ	2.5.17.1
Moisture Absorption, maximum	0.45	- - -	0.25	0.5	%	2.6.2.1
Dielectric Breakdown, minimum	- - -	- - -	40	40	kV	2.5.6
Permittivity at Frequency, maximum (Laminate & Prepreg as laminated) 1 MHz 1 GHz 10GHz	 4.5 4.3 - - -	 5.4 5.2 AABUS	 4.7 4.4 - - -	 5.4 5.2 AABUS	- - -	 2.5.5.2/ 2.5.5.3 2.5.5.9 2.5.5.5
Loss Tangent at Frequency, minimum (Laminate & Prepreg as laminated) 1 MHz 1 GHz 10GHz	 0.018 0.020 - - -	 0.035	 0.018 0.020 - - -	 0.035	- - -	 2.5.5.2/ 2.5.5.3 2.5.5.9 2.5.5.5
Flexural Strength, minimum 1. Length direction 2. Cross direction	 - - - - - -	 - - - - - -	 530 450	 415 345	N/mm^2	2.4.4
Arc Resistance, minimum	104	60	104	60	S	2.5.1
Thermal Stress 10s at 288°C ,minimum 1. Unetched 2. Etched	 Pass Pass	 Pass Visual Pass Visual	 Pass Pass	 Pass Visual Pass Visual	rating	2.4.13.1
Electric Strength, minimum (Laminate & Prepreg as laminated)	72	30	- - -	- - -	KV / mm	2.5.6.2
Flammability, (Laminate & Prepreg as laminated)	V-0	V-0 minimum	V-0	V-0 minimum	Rating	UL94
Glass Transition Temperature	- - -	- - -	174	170mininum	°C	2.4.25
Decomposition Temperature	- - -	- - -	350	340minimum	°C	2.4.24.6 (5% wt loss)
Z-Axis CTE A. Alpha 1 B. Alpha 2 C. 50 -260 Degrees C	 - - - - - - - - -	 - - - - - - - - -	 45 250 2.8	 60 maximum 300 maximum 3.0 maximum	 PPM/ °C PPM/ °C %	2.4.24
Thermal Resistance (Copper removed) A. T260 B. T288 C. T300	 - - - - - -	 - - - - - -	 >60 >25 >10	 30minimum 15minimum 2minimum	 Minutes Minutes Minutes	2.4.24.1
CAF Resistance	- - -	- - -	Pass	AABUS	Pass/Fail	2.6.25

*Data shown are nominal value for reference only.

PIC FL-170 Prepreg Specification

Property	Typical Value	IPC-4101B/126	Units	Test Method
Volatile Content, maximum	1.2	1.5	%	2.3.19
Shelf Life @ Max. 50% RH, Max. 20°C	Meet Requirement	90 (from delivery)	days	AABUS

FL-170 Laminate Product List

Thin Cores					
Thickness	Construction	Tolerance (IPC-4101B)	Size	Copper Foil	
				Thickness	Type
0.0030"	1×1080	Class C	36"x48" (920x1220mm) 40"x48" (1020x1220mm) 42"x48" (1070x1220mm)	1/3 oz 1/2 oz 1 oz 2 oz 3 oz	Reverse Treated Copper Foil (RTC) HTE Copper Foil
0.0035"	1×1080,1×2113	Class C			
0.0035"	2x106	Class C			
0.0040"	1×2113,1×3313,1×2116	Class C			
0.0040"	2x106	Class C			
0.0045"	1×2116	Class C			
0.0045"	2x1080	Class C			
0.0050"	1×2116	Class C			
0.0050"	2x1080	Class C			
0.0060"	1×1506	Class C			
0.0060"	2x1080	Class C			
0.0070"	1×7628	Class C			
0.0070"	2x1080	Class C			
0.0080"	1×7628	Class C			
0.0080"	2x2116	Class C			
0.0120"	2×1506	Class C			
0.0140"	2×7628	Class C			

* All thickness measured do not include copper
* Laminates of special requirements also available upon request and agreement between users and suppliers

FL-170 Prepreg Product List

Glass style	Product	Resin Content (%)	Gel Time (second)	Volatile (%)
106	PP-FL170 106RC64	64±2	105±20	≤1.2
	PP-FL170 106RC66	66±2	105±20	≤1.2
	PP-FL170 106RC69	69±2	105±20	≤1.2
	PP-FL170 106RC74	74±2	105±20	≤1.2
1080	PP-FL170 1080RC53	53±2	105±20	≤1.2
	PP-FL170 1080RC56	56±2	105±20	≤1.2
	PP-FL170 1080RC60	60±2	105±20	≤1.2
	PP-FL170 1080RC62	62±2	105±20	≤1.2
	PP-FL170 1080RC65	65±2	105±20	≤1.2
3313	PP-FL170 3313RC46	46±2	105±20	≤1.2
	PP-FL170 3313RC49	49±2	105±20	≤1.2
	PP-FL170 3313RC52	52±2	105±20	≤1.2
	PP-FL170 3313RC54	54±2	105±20	≤1.2
	PP-FL170 3313RC57	57±2	105±20	≤1.2
2116	PP-FL170 2116RC47	47±2	105±20	≤1.2
	PP-FL170 2116RC49	49±2	105±20	≤1.2
	PP-FL170 2116RC51	51±2	105±20	≤1.2
1506	PP-FL170 1506RC43	43±2	105±20	≤1.2
	PP-FL170 1506RC44	44±2	105±20	≤1.2
7628	PP-FL170 7628RC40	40±2	105±20	≤1.2
	PP-FL170 7628RC42	42±2	105±20	≤1.2
	PP-FL170 7628RC45	45±2	100±20	≤1.2

*The width and length is 49.5" and 120 meters / roll respectively. For 106 & 1080, the length is 240 meters / roll.

FL-170 Recommended press condition

Heating rate of material between 80℃ and 140℃,1.5-2.5℃/min is better.
Temperature of material keep over 170℃ more than 85min to allow resin to fully cure,and the top temp. keep below 190℃.
Apply full pressure of 300-400Psi on the panels when the temp. of the center book reaches 90-105℃, the pressure should be kept below 150 psi during cooling to ambient temperature.
Cooling rate of material should be kept under 2.5℃/min when the temperature of material is over 100℃ in order to avoid introducing twist.
Keep vacuum under 40torr should be continued until over 140℃ in material.