GA-170-LL/ GA-170B-LL

Low Z-CTE Multi-functional epoxy resin CCL and prepreg
Phenolic cured epoxy with fillers

Features

- Low Z-CTE and excellent through hole reliability
- High Tg 170℃ (DSC)
- Outstanding thermal resistance and suitable for Lead Free process
- Low water absorption and CAF resistance

Designation Introduction

GA-170-LL	Single or double side PCB and thin core for multi-layer PCB	ANSI grade: FR-4
GA-170B-LL	Prepreg for multi-layer PCB	

Certification UL (File No: E186152)

Model	Min. Thickness (Inch)	Clad cond. Thickness		Max. Area Diameter (mm)	Solder Lts.		UL 94 Flame Class	MOT (℃)
		Min. (μm)	Max. (μm)		Temp. (℃)	Time (sec)		
GA-170-LL/ GA-170B-LL	0.002	4.3	204	50.8	300	20	94V-0	130
	0.015	4.3	204	50.8	300	20	94V-0	130

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Performance List for Laminate
(Specification sheet IPC-4101/98/99/101/126)

Characteristic		Unit	Condition	Typical Values	SPEC.
Volume Resistivity		MΩ-cm	C-96/35/90	7.6×10^{8}	≧ 10^{6}
Surface Resistivity		MΩ	C-96/35/90	2.5×10^{7}	≧ 10^{4}
Permittivity (RC50%)	At 1MHz		C-24/23/50	4.67	≦ 5.4
	At 1GHz		C-24/23/50	4.17	≦ 5.2
Loss Tangent (RC50%)	At 1MHz		C-24/23/50	0.0126	≦ 0.035
	At 1GHz		C-24/23/50	0.0167	
Moisture Absorption		%	D-24/23	0.1	≦ 0.5
Arc Resistance		Sec	D-48/50+D-0.5/23	120	≧ 60
Dielectric Breakdown		KV	D-48/50	40	≧ 40
Flammability		-	C-24/23/50+E-24/125	94 V-0	94 V-0
Peel Strength (HTE 1OZ)		Lb/in (N/mm)	After thermal stress 288℃×10Sec solder floating	8(1.40)	≧6(1.05)
Thermal Stress Test		-	288℃×10Sec× 6cycle floating	Pass	Pass
Flexural Strength	LW	N/mm^2	A	445	≧ 415
	CW	N/mm^2	A	404	≧ 345
CTE-X(50~260℃)		PPM/℃	TMA	14	-
CTE-Y(50~260℃)		PPM/℃		16	-
Z-Axis CTE	Alpha 1	PPM/℃	TMA	43	≦ 60
	Alpha 2	PPM/℃		240	≦ 300
Z-Axis CTE (50~260℃)		%		2.7	≦ 3.0
Time to Delaminate (Copper removed)	T260	Min	TMA	≧ 60	≧ 30
	T288	Min	TMA	≧ 15	≧ 15
	T300	Min	TMA	≧ 2	≧ 2
Td (5% Weight loss)		℃	TGA	340	≧ 340
Glass Transition Temperature		℃	DSC	171	≧ 170

Note: For specification ≧0.50 mm , test sample is 1.6mm 1/1; For specification <0.50 mm , test sample is 0.20 mm 1/1.

Normal Size & Thickness

Thickness Inch (mm)	Copper Cladding OZ (μm)	Size Inch mm	Thickness Tolerance
0.002 (0.051) To 0.125 (3.2)	1/3(12) 0.5(17) 1.0(35) 2.0(70) 3.0(105) 4.0(140)	49×36.8 1244×0935 49×40.7 1244×1035 49×42.7 1244×1085	IPC-4101 Class C/M

Note:

1. The effective area of laminate is 36” (Grain) ×48”, 40” (Grain) ×48”, 42” (Grain) ×48”.
2. Copper cladding type can be selected from HTE, super HTE, double treated, reversed, very low profile or ultra thin copper foil, depended on customer needs.
3. Keeping the core and prepreg in the same grain direction is critical to ensure flatness of the multilayer boards. Grain direction is shown on the “Certificate of Conformance”.

Construction

Thickness		Normal Construction		Thickness		Normal Construction	
mm	mil			mm	mil		
1.00	39	7628	5 ply	0.35	14	7628	2 ply
0.90	36	7628	5 ply	0.30	12	1506	2 ply
0.77	31	7628	4 ply	0.25	10	2116	2 ply
0.74	29	7628	4 ply	0.20	8	7628	1 ply
0.71	28	7628	4 ply	0.15	6	1506	1 ply
0.53	21	7628	3 ply	0.13	5	2116	1 ply
0.50	20	7628	3 ply	0.10	4	2116	1 ply
0.40	16	7628	2 ply	0.08	3	1080	1 ply
0.38	15	7628	2 ply	0.05	2	106	1 ply

Note: 1.00, 0.90, 0.77, 0.74 mm thickness include cladding, all others exclude cladding. Other thickness and constructions are available to special order.

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Performance List for prepreg

Nominal thickness (mm)	Glass Style	Resin Content (%)	Resin Flow (%)	Gel Time (sec)	Volatile Content (%)	Scaled Flow Thickness (per ply)	
						mm	mil
0.20	7628	50±3	28±5	120±20	≦ 1.5	0.179±0.010	7.0±0.4
0.20	7628	45±3	22±5			0.175±0.010	6.9±0.4
0.15	1506	50±3	28±5			0.148±0.010	5.8±0.4
0.10	2116	53±3	28±5			0.102±0.010	4.0±0.4
0.08	2113	56±3	26±5			0.087±0.0075	3.4±0.3
0.06	1080	65±3	35±5			0.062±0.0075	2.4±0.3
0.03	106	75±3	42±5			0.047±0.0075	1.9±0.3

Note: Grace can provide special specifications to meet customers' requirement.

Prepreg Storage Requirement

IPC-4101 3.17

Condition 1: Six months when stored at <5°C

Condition 2: Three months when stored at <23°C and <50 % RH

Note:

1. Prepreg should be stored in the absence of a catalytic environment such as UV light or excessive radiation.
2. Prepreg exceeding the shelf life requirements prior to shipment to the user must be retested and recertified to agree upon specifications.

Recommended Press Cycle

1. Heating rate suggestions when material temperature range is 90~130℃
   Heating rate: 1.2~2.5℃/min for 350~400psi pressure (24.1~27.6 Bar)
   Heating rate: 3.2~5.5℃/min for 250~300psi pressure (17.2~20.7 Bar)
2. Temperature of material reach 180℃ must is held for at least 70min to allow epoxy resin to cure fully.
3. In order to avoid warpage and twist issue, cooling rate of material suggest to be kept under 1.5℃/min, when the temperature of material is still above 160℃

Note: All values mentioned above are just for reference, clients can modify relative parameters according to the machines and designs.