GA-170-LE

High Tg170 Phenolic Curing Laminate and Prepreg

GA-170-LE is an advanced High Tg (170℃/DSC) multifunctional epoxy laminate . Excellent heat resistance, CAF resistance and Low CTE performance, suitable for through-hole reliability, Lead Free process and high multilayer PCB process, high density PCB.

Laminate:GA-170-LE
Prepreg: GA-170B-LE

Key Features

- **Tg: 176℃(DSC)**
  This material with high performance, multi-function resin，crosslink density is high. Material Tg values can reach above 170 ℃(DSC).
- **Z-CTE(50-260):2.4%**
  Its remarkable very low expansion coefficient, is more suitable for making high multilayer PCB. Combined with the excellence of CAF resistance, can be widely used in automotive circuit board. Ensure the reliability of high temperature welding and assembly process.
- **Td: 345℃**
  Excellent resistance to aging temperature, keep the material performance in high thermal shock or high temperature environment impact.
- **T288: 30min**
  Suitable for Lead-free process. Subjected to thermal shock for many times, still can maintain good material performance. And excellent dimensional stability and low expansion coefficient, apply to high order HDI.

Applications

- High Multilayer PCB
- Servers
- LCD Panels
- Telecommunications
- Memory Module
- Heavy Copper Application
- Automotive circuit board

Industrial Approvals

- IPC-4101E/98/99/101/126
- UL File Number：e186152
- UL Type Designation：FR-4.0
- Flammability Rating：94V-0
- Maximum Operating Temperature： 130°C

Normal Size & Thickness

Thickness Inch (mm)	Size Inch mm	Thickness Tolerance
0.002 (0.05) To 0.125 (3.2)	49×37 1244×0940 49×41 1244×1042 49×43 1244×1093	IPC-4101 Class C/M

Characteristic GA-170-LE		Unit	Test Method IPC-TM-650 （or as noted）	Typical Values	SPEC.
Volume Resistivity		MΩ-cm	2.5.17.1	7X10^{9}	≧10^{6}
Surface Resistivity		MΩ	2.5.17.1	2X10^{8}	≧10^{4}
Permittivity (RC 50%)	At 1MHz	-	2.5.5.9	4.99	≦5.40
	At 1GHz		2.5.5.9/2.5.5.13	4.63/4.82	≦5.20
Loss Tangent (RC 50%)	At 1MHz	-	2.5.5.9	0.0112	/
	At 1GHz		2.5.5.9/2.5.5.13	0.0163/0.0183	≦0.035
Arc Resistance		Sec	2.5.1	120	≧60
Dielectric Breakdown		KV	2.5.6	40	≧40
Dielectric Strength(thickness<0.5mm)		KV/mm	2.5.6.2	40	≧30
CTI		PLC(V)	ASTM D3638	2(250-399)	/
Thermal Stress Test		-	2.4.13.1	Pass	Pass
Td (5% Weight loss)		℃	2.4.24.6	345	≧340
Glass Transition Temperature	DMA	℃	2.4.24.2	190	/
	DSC	℃	2.4.25	176	≧170
	TMA	℃	2.4.24	165	/
Thermal Conductivity		W/mK	ASTM D5470	0.42	/
Most Operation Temperature(MOT)		℃	UL Cert	130	130
T288		Min	2.4.24.1	30	≧15
T300		Min	2.4.24.1	15	≧2
X/Y-Axis CTE	Before Tg	PPM/℃	2.4.24	13/15	/
Z-Axis CTE	Before Tg	PPM/℃	2.4.24	40	≦60
	After Tg	PPM/℃		220	≦300
Z-Axis CTE (50~260℃)		%	2.4.24	2.4	≦3.0
Peel Strength (HTE 1OZ)		Lb/in(N/mm)	2.4.8	8.5(1.49)	≧6(1.05)
Flexural Strength	LW	N/mm^2	2.4.4	460	≧415
	CW	N/mm^2		420	≧345
E-modulus	LW/CW	Gpa	---	23/21	/
Flexural Modulus	LW/CW	Gpa	---	23/20	/
Moisture Absorption		%	2.6.2.1	0.09	≦0.5
Flammability		-	UL94	V-0	V-0

Note: 1.Test sample is 62mil 1/1(without special remark).

2. The data above is only for reference, and the actual data will have deviation, according to varieties of test equipment and method.