



GA-LD

GA-LD is an advanced high Tg (200 °C/DSC) . Low Dk/Df multifunctional epoxy laminate . Excellent heat resistance, CAF resistance and Low CTE performance, suitable for through-hole reliability, Lead Free process, and is more suitable for high multilayer PCB process, high density PCB. Superior electrical performance, suitable for high frequency high- speed telecommunications.

Key Features

- **Tg: 200 °C(DSC)**
This material with high performance multi-function resin , crosslink density is high. Material Tg values can reach above 200 °C(DSC).
- **Dk: 3.75 & Df: 0.0070**
Within the scope of the 1 MHz - 20 GHz, material has superior electrical properties, is conducive to the high frequency high-speed transmission, and high density wiring design. The lower signal loss can ensure signal integrity.
- **Z-CTE(50-260):2.4%**
Its remarkable very low expansion coefficient, is more suitable for making high multilayer PCB, ensure the reliability of high temperature welding and assembly process.
- **Td: 355 °C**
Excellent resistance to aging temperature, keep the material performance in high thermal shock or high temperature environment impact.

Laminate:GA-LD

Prepreg: GA-LDB

Applications

- Multilayer PCB
- Servers
- Storage
- Router/Switch
- RF/Wireless Communication
- Line cards

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)	49×37 1244×0940	IPC-4101 Class C/M
To	49×41 1244×1042	
0.125 (3.2)	49×43 1244×1093	

Characteristic GA-LD		Unit	Test Method	Typical data	spec
			IPC-TM-650 (or as noted)		
Volume Resistivity		MΩ-cm	2.5.17.1	7X10 ⁹	≥10 ⁶
Surface Resistivity		MΩ	2.5.17.1	2X10 ⁸	≥10 ⁴
Permittivity (RC50%)	At 1GHz	-	2.5.5.9/2.5.5.13	3.75/3.80	≤5.20
	At 5GHz		2.5.5.13	3.75	/
	At 10GHz		2.5.5.13	3.70	/
	At 15GHz		2.5.5.13	3.70	/
Loss Tangent (RC50%)	At 1GHz	-	2.5.5.9/2.5.5.13	0.0070/0.0080	≤0.035
	At 5GHz		2.5.5.13	0.0080	/
	At 10GHz		2.5.5.13	0.0090	/
	At 15GHz		2.5.5.13	0.0090	/
Arc Resistance		Sec	2.5.1	120	≥60
Dielectric Breakdown		KV	2.5.6	40	≥40
Electric Strength(thickness<0.5mm)		KV/mm	2.5.6.2	40	≥30
CTI		PLC(V)	ASTM D3638	3(175-249)	/
Thermal Stress Test		-	2.4.13.1	Pass	Pass
Td (5% Weight loss)		°C	2.4.24.6	355	≥340
Glass Transition Temperature	DMA	°C	2.4.24.4	215	/
	DSC	°C	2.4.25	200	≥170
Thermal Conductivity		W/mK	ASTM D5470	0.40	/
Most Operation Temperature(MOT)		°C	UL Cert	130	/
T288		Min	2.4.24.1	≥30	≥15
T300		Min	2.4.24.1	18	≥2
X/Y-Axis CTE	Before Tg	PPM/°C	2.4.24	13/15	/
Z-Axis CTE	Before Tg	PPM/°C		45	≤60
	After Tg	PPM/°C		220	≤300
Z-Axis CTE (50~260°C)		%	2.4.24	2.4	≤3.0
Peel Strength (RTF 1OZ)		Lb/in(N/mm)	2.4.8	5.5(0.96)	≥4(0.7)
Flexural Strength	LW	N/mm ²	2.4.4	450	≥415
	CW	N/mm ²		400	≥345
E-modulus	LW/CW	Gpa	---	23/22	/
Flexural Modulus	LW/CW	Gpa	---	26/24	/
Moisture Absorption		%	2.6.2.1	0.10	≤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.