



GA-680

GA-680 is an advanced halogen-free high Tg 180 °C (DSC) low loss multifunctional epoxy laminate . Superior electrical performance are suitable for high frequency high speed telecommunications. The characteristics of low transmission loss and low degree of distortion can be mainly suitable for base station platform, cloud computing, storage and advanced servers.

Key Features

- **Tg: 180 °C(DSC)**
This material with high performance multi-function resin , crosslink density is high. Material Tg values can reach above 180 °C(DSC).
- **Dk: 3.80 & Df: 0.0050**
Within the scope of the 1 MHz - 40 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):2.5%**
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: 380 °C**
Excellent resistance to aging temperature, keep the material performance in high thermal shock or high temperature environment impact.

Laminate:GA-680

Prepreg: GA-680B

Applications

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

Industrial Approvals

- IPC-4101E/127/128/130
- UL File Number : e186152
- UL Type Designation : FR-4.1
(In the authentication)
- Flammability Rating : 94V-0
- Maximum Operating Temperature : 130 °C(In the authentication)

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-680		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	3.80/3.90	/
	At 5GHz		2.5.5.13	3.85	/
	At 10GHz		2.5.5.13	3.80	/
	At 15GHz		2.5.5.13	3.80	/
Loss Tangent (RC50%)	At 1GHz	-	2.5.5.9/2.5.5.13	0.0050/0.0060	/
	At 5GHz		2.5.5.13	0.0060	/
	At 10GHz		2.5.5.13	0.0070	/
	At 15GHz		2.5.5.13	0.0070	/
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	380	≥340
Glass Transition Temperature	DMA	°C	2.4.24.4	190	/
	DSC	°C	2.4.25	180	≥170
Thermal Conductivity		W/mK	ASTM D5470	0.40	/
T288		Min	2.4.24.1	≥60	≥15
X/Y-Axis CTE	Before Tg	PPM/°C	2.4.24	13/15	/
Z-Axis CTE	Before Tg	PPM/°C	2.4.24	40	≤60
	After Tg	PPM/°C		240	≤300
Z-Axis CTE (50~260°C)		%	2.4.24	2.5	≤3.0
Peel Strength (1OZ)		Lb/in(N/mm)	2.4.8	8.5(1.53)	≥4(0.7)
Flexural Strength	LW	N/mm ²	2.4.4	420	≥415
	CW	N/mm ²		380	≥345
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.