



GA-688Q1

GA-686Q1 is an advanced halogen-free high Tg 210°C (DMA) ultra low-loss multifunctional epoxy laminate. Superiorelectrical performance are suitable for high frequency highspeed telecommunications. The characteristics of lowtransmission loss and low degree of distortion can be mainly suitable for base station platform, cloud computing, storage and advanced servers.

Key Features

- **Tg: 210°C(DMA)**
This material with high performance multi-function resin , crosslink density is high. Material Tg values can reach 210°C(DMA).
- **Dk: 3.10 & Df: 0.0008**
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):2.2%**
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-688Q1

Prepreg: GA-688Q1B

Applications

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

Industrial Approvals

- Flammability Rating : 94V-0

Normal Size & Thickness

Thickness Inch (mm)	Size Inch mm	Thickness Tolerance
0.002 (0.05)	49x37 1244x0940	IPC-4101 Class C/M
To	49x41 1244x1042	
0.125 (3.2)	49x43 1244x1093	

Characteristic GA-688Q1 (Q-glass)		Unit	Test Method	Typical data	spec
			IPC-TM-650 (or as noted)		
Volume Resistivity		MΩ-cm	2.5.17.1	2X10 ⁹	≥ 10 ⁶
Surface Resistivity		MΩ	2.5.17.1	1X10 ⁸	≥ 10 ⁵
Permittivity (RC70%)	At 1GHz	-	2.5.5.15	3.10	/
	At 5GHz		2.5.5.15	3.00	/
	At 10GHz		2.5.5.15	3.00	/
	At 15GHz		2.5.5.15	2.95	/
Loss Tangent (RC70%)	At 1GHz	-	2.5.5.15	0.0008	/
	At 5GHz		2.5.5.15	0.0010	/
	At 10GHz		2.5.5.15	0.0012	/
	At 15GHz		2.5.5.15	0.0013	/
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
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	210	≥ 205
	DSC	°C	2.4.25	190	≥ 185
T288		Min	2.4.24.1	≥ 60	≥ 15
T300		Min	2.4.24.1	≥ 60	≥ 2
Z-Axis CTE	Before Tg	PPM/°C	2.4.24	45	≤ 60
	After Tg	PPM/°C		250	≤ 300
Z-Axis CTE (50~260°C)		%	2.4.24	2.0	≤ 2.5
Peel Strength (10Z HVLP3)		Lb/in(N/mm)	2.4.8	3.5(0.61)	≥ 3(0.52)
Flexural Strength	LW	N/mm ²	2.4.4	410	≥ 345
	CW	N/mm ²		350	≥ 345
Moisture Absorption		%	2.6.2.1	0.07	≤ 0.2
Flammability		-	UL94	V-0	V-0

Note: 1. Test sample is 30mil 1/1(1078*10ply).

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