Teflon woven glass fabric copper-clad laminates with high permittivity F4BMX-1/2

F4BMX-1/2 is laminated by laying up of imported varnished glass cloth with Teflon resin and Polytrtrafluoroethylene film， according to the scientific formulation and strict technology process. This product takes some advantages over F4B series in the electrical performance（wider range of dielectric constant、lower dielectric loss angle tangent、increased resistance、and more stability of performance）.Compared with the F4BM，the consistency of the laminate various properties can be insured through using the imported woven glass fabric.

Technical Specifications：

Appearance	Meet the specification requirements for the laminate of microwave PCB by National and Military Standards.					
Types	F4BMX217	F4BMX220	F4BMX245	F4BMX255	F4BMX265	F4BMX275
Dielectric Constant	2.17	2.20	2.45	2.55	2.65	2.75
Types	F4BMX285	F4BMX294	F4BMX300			
Dielectric Constant	2.85	2.94	3.0			

Dimension （mm）	300×250 380×350 440×550 500×500 460×610 600×500 840×840 840×1200 1500×1000 1800×1000					
	For special dimension，customized laminates is available.					
Thickness and Tolerance（mm）	Laminate thickness	0.25	0.5	0.8	1.0	
	Tolerance	±0.025	±0.05	±0.05	±0.05	
	Laminate thickness	1.5	2.0	3.0	4.0	5.0
	Tolerance	±0.05	±0.075	±0.09	±0.10	±0.10
	Laminate thickness	6.0	8.0	10.0	12.0	（Thickness ≥ 5.0mm，dimension ≤ 600x500）
	Tolerance	±0.12	±0.15	±0.18	±0.2	
	The laminate thickness includes the copper thickness. For special dimension，customized laminates is available.					
Mechanical	Warp	Thickness（mm）	Maximum Warp			

Strength			Original board	Single side	Double side
		0.25～0.5	0.030	0.050	0.025
		0.8～1.0	0.025	0.030	0.020
		1.5～2.0	0.020	0.025	0.015
		3.0～5.0	0.015	0.020	0.010
	Cutting/punching Strength	Thickness□1mm，no burrs after cutting，minimum space between two punching holes is 0.55mm，no delamination.			
		Thickness□1mm，no burrs after cutting，minimum space between two punching holes is 1.10mm，no delamination.			
	Peel strength（1oz copper）	Normal state：≥18N/cm；No bubble、delamination、peel strength≥15N/cm（in the constant humidity and temperature、and keep in the melting solder of 260℃±2℃ for 20 seconds）.			
Chemical Property	According to the properties of laminate，the chemical etching method for PCB can be used. The dielectric properties of laminate are not changed. The plating through hole can be done，but the sodium treatment or the plasma treatment must be used. The Hot Air Level temperature can not be higher than 253℃，and can not be repeated.				

	Name	Test condition	Unit	Value
Electrical Property	Density	Normal state	g/ cm3	2.1 ~ 2.35
	Moisture Absorption	Dip in the distilled water of 20±2℃ for24 hours	%	≤0.08
	Operating Temperature	High-low temperature chamber	℃	-50℃ ~ +260℃
	Thermal Conductivity		W/m/k	0.3~0.5
	CTE （typical）	0 ~ 100℃ （εr ：2.1~2.3）	ppm/℃	24（x）
				34（y）
				235（z）
	CTE （typical）	0 ~ 100℃ （εr ：2.3~2.9）	ppm/℃	16（x）
				20（y）
				168（z）

	CTE （typical）	0～100℃ （εr ：2.9~3.38）		ppm/℃	12（x）
					15（y）
					92（z）
	Shrinkage Factor	2 hours in boiling water		%	□ 0.0002
	Surface Resistivity	500V DC	Normal state	M·Ω	≥2×105
			Constant humidity and temperature		≥8×104
	Volume Resistivity	Normal state		MΩ.cm	≥8×106
		Constant humidity and temperature			≥2×105
	Surface dielectric strength	Normal state		d=1mm（Kv/mm）	≥1.2
		Constant humidity and temperature			≥1.1
	Dielectric Constant	10GHZ		εr	2.17，2.20，2.45，2.55，2.65，2.75，2.85，2.95，3.0。 （±2%）

	Dissipation Factor	10GHZ	tgδ	2.17□2.2	≤1×10-3
				2.45□3.0	≤1.4×10-3

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