F_4BM-1/2 Technical Specifications

F_4BM-1/2 is laminated by laying up of woven glass fabric、bond film、with Teflon resin and Polytrtrafluoroethylene film，according to the scientific formulation and strict technology process. This product takes some advantages over F_4B series in the electrical performance（wider range of dielectric constant、lower dielectric loss angle tangent、increased resistance、and more stability of performance）.

Technical Specifications：

Appearance	Meet the specification requirements for the laminate of microwave PCB by National and Military Standards.					
Types	F_4BM220	F_4BM255	F_4BM265	F_4BM300		
Dielectric Constant	2.20	2.55	2.65	3.0		
Dimension（mm）	300×250 380×350 440×550 500×500 460×610 600×500 840×840 840×1200 1500×1000					
	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	6.0	8.0	10.0	12.0	

	thickness					
	Tolerance	±0.12	±0.15	±0.18	±0.20	
	The laminate thickness includes the copper thickness. For special dimension，customized laminates is available.					

Mechanical Strength	Warp	Thickness（mm）	Maximum Warp		
			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.			
		Thickness³1mm，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.				

Electrical	Name	Test condition	Unit	Value
	Density	Normal state	g/ cm^3	2.1～2.35
	Moisture	Dip in the distilled water of 20	%	≤0.09

Property	Absorption	±2℃ for24 hours			
	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/℃	25 (x)
					34 (y)
					240 (z)
	CTE (typical)	0 ~ 100℃ (εr : 2.3~2.9)		ppm/℃	16 (x)
					21 (y)
					173 (z)
	CTE (typical)	0 ~ 100℃ (εr : 2.9~3.5)		ppm/℃	12 (x)
					15 (y)
					95 (z)
	Shrinkage Factor	2 hours in boiling water		%	< 0.0002
	Surface Resistivity	500V DC	Normal state	M·Ω	$\geq 1\times10^5$
			Constant humidity and temperature		$\geq 1\times10^4$
	Volume Resistivity	Normal state		MΩ.cm	$\geq 6\times10^6$
		Constant humidity and temperature			$\geq 1\times10^5$
	Pin Resistance	500V DC	Normal state	MΩ	$\geq 1\times10^5$
			Constant humidity		$\geq 1\times10^3$

		and temperature			
	Surface dielectric strength	Normal state	d=1mm (Kv/mm)	≥1.2	
		Constant humidity and temperature		≥1.1	
	Dielectric Constant	10GHz	εr	2.20 , 2.55 , 2.65 , 3.0 (±2%)	
	Dissipation Factor	10GHz	tgδ	2.2	≤1×10^{-3}
				2.55~3.0	≤1.5×10^{-3}

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