

F₄BTM-2 Technical Specifications

F₄BTM-2 is laminated by laying up of the imported varnished glass cloth with Teflon resin and filler with the Nano-ceramic , according to the scientific formulation and strict technology process. This product takes advantages over F₄BM series in the electrical performance、 improved the heat dissipation and have the small thermal expansion coefficient.

Technical Specifications :

Appearance	Meet the specification requirements for the laminate of microwave PCB by National and Military Standards.					
Types	F ₄ BTM-1/2 (255)	F ₄ BTM-1/2 (265)	F ₄ BTM-1/2 (285)	F ₄ BTM-1/2 (294)	F ₄ BTM-1/2 (300)	F ₄ BTM-1/2 (320)
	F ₄ BTM-1/2 (338)	F ₄ BTM-1/2 (350)	F ₄ BTM-1/2 (400)	F ₄ BTM-1/2 (440)	F ₄ BTM-1/2 (615)	F ₄ BTM-1/2 (1020)
Dimension (mm)	610×460	600×500	1220×914	1220×1000	1500×1000	
	For special dimension , customized laminates is available.					
Thickness and Tolerance (mm)	Laminate thickness	0.254	0.508	0.762	0.787	1.016
	Tolerance	±0.025	±0.05	±0.05	±0.05	±0.05
	Laminate thickness	1.27	1.524	2.0	3.0	4.0
	Tolerance	±0.05	±0.05	±0.075	±0.09	±0.1
	Laminate thickness	5.0	6.0	9.0	10.0	12.0

	Tolerance	±0.1	±0.12	±0.18	±0.18	±0.2	
Mechanical Strength	Cutting/punching	Thickness<1mm , no burrs after cutting , minimum space between two punching holes is 0.55mm , no delamination.					
	Strength	Thickness ³ 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 265°C ±2°C for 20 seconds) .					
Thermal stress	After solder float , 260°C , 10s , ≥3 times , no delamination and blister.						
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.						
Electrical Property	Name	Test condition	Unit	Value			
	Density	Normal state	g/ cm ³	2.1 ~ 3.0			
	Moisture Absorption	Dip in the distilled water of 20±2°C for 24 hours	%	≤0.05			
	Operating Temperature	High-low temperature chamber	°C	-50°C ~ +260°C			
	Thermal Conductivity		W/m/k	0.6~0.9			
	(typical)	CTE	-55 ~ 288°C (ε _r : 2.55~3.0)	ppm/°C	15 (x)		
					15 (y)		
65 (z)							

CTE (typical)	-55 ~ 288°C (ϵ_r : 3.2~3.5)		ppm/°C	15 (x)
				15 (y)
				55 (z)
CTE (typical)	-55 ~ 288°C (ϵ_r : 4.0~10.2)		ppm/°C	12 (x)
				14 (y)
				50 (z)
Shrinkage Factor	2 hours in boiling water		%	< 0.0002
Surface Resistivity	500 V DC	Normal state	M·Ω	$\geq 1 \times 10^6$
		Constant humidity and temperature		$\geq 1 \times 10^5$
Volume Resistivity	Normal state		MΩ.cm	$\geq 1 \times 10^7$
	Constant humidity and temperature			$\geq 1 \times 10^6$
Surface dielectric strength	Normal state		d=1mm (Kv/mm)	≥ 1.2
	Constant humidity and temperature			≥ 1.1
Dielectric Constant	10GHz		ϵ_r	2.85±0.05、2.94±0.05
				3.00±0.05、3.20±0.05
				3.38±0.05、3.50±0.05
				4.00±0.08、4.40±0.1
				6.15±0.15、10.2±0.25

		ϵ_r	Value		
Thermal Coefficient of ϵ_r (PPM/°C) -50~150°C		2.85 , 2.94	-85		
		3.0 , 3.2	-75		
		3.38	-65		
		3.5	-60		
		4.0	-60		
		4.4	-60		
		6.15	-55		
		10.2	-50		
	Dissipation Factor	10GHz	$tg\delta$	2.55~3.0	$\leq 1.5 \times 10^{-3}$
$tg\delta$			3.0~3.5	$\leq 2.0 \times 10^{-3}$	
$tg\delta$			4.0~10.20	$\leq 2.5 \times 10^{-3}$	
UL Flammability Rating	94 V-0				



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