

PTFE Glass Fiber Cloth Copper Clad Laminate F4BM、F4BME

Product introduction

This product is made of glass fiber cloth, polytetrafluoroethylene resin and polytetrafluoroethylene film through scientific preparation and strict process. Its electrical performance is improved to a certain extent than F4B, mainly due to the wider range of dielectric constant, low dielectric loss, increased insulation resistance, and more stable performance, which can replace foreign products of the same type. F4BM and F4BME have the same dielectric layer, but the copper foil used together is different: F4BM and ED copper foil are suitable for applications without PIM indicators; F4BME with reverse RTF copper foil has excellent PIM index, more accurate line control and lower conductor loss.

F4BM and F4BME precisely adjust the dielectric constant by adjusting the ratio between polytetrafluoroethylene and glass fiber cloth, which not only achieves low loss, but also enhances the dimensional stability of the material; The higher the dielectric constant is, the higher the proportion of glass fiber is, so the dimensional stability is better, the coefficient of thermal expansion is lower, the temperature fluctuation is better, and the dielectric loss is increased.

Product features

- \bullet DK2.17 \sim 3.0 is optional, and DK can be customized
- ◆ F4BME with RTF copper foil has excellent PIM indicators
- Diversified size and cost saving
- ◆ Irradiation resistant, low exhaust
- Commercialization, mass production and high cost performance

Classic case

- ♦ Microwave, RF, radar
- Phase shifter, passive device
- Power divider, coupler, combiner
- Feed network, phased array antenna
- ♦ Satellite communication, base station antenna









Р	roduct ted	chnical paramete	ers	Product model/data					
Product				F4BM217	F4BM220	F4BM233	F4BM245		
characte		Test conditions	Unit	F4BME217	F4BME220	F4BME233	F4BME245		
Dielectric constant (typical value)		10GHz	/	2.17	2.2	2.33	2.45		
Permittivity	tolerance	/	/	±0.04	±0.04	±0.04	±0.05		
Loss factor		10GHz	/	0.001	0.001	0.0011	0.0012		
(typical	value)	20GHz	/	0.0014	0.0014	0.0015	0.0017		
Temperature of dielectric	coefficient constant	-55°C~150°C	PPM/°C	-150	-142	-130	-120		
Doolings	trongth	1 OZ F4BM	N/mm	>1.8	>1.8	>1.8	>1.8		
Peeling s	trength	1 OZ F4BME	N/mm	>1.6	>1.6	>1.6	>1.6		
Volume resistivity		normal behavior	MΩ.cm	≥6×10 ⁶	≥6×10 ⁶	≥6×10 ⁶	≥6×10 ⁶		
Surface resistance		normal behavior	МΩ	≥1×10 ⁶	≥1×10 ⁶	≥1×10 ⁶	≥1×10 ⁶		
Electrical :		5KW,500V/s	KV/mm	>23	>23	>23	>25		
Breakdowi (XY dire		5KW,500V/s	KV	>30	>30	>32	>32		
thermal	X Y direction	-55 °∼288°C	ppm/°C	25,34	25,34	22,30	20,25		
expansion- coefficient	Z direction	-55 °∼288°C	ppm/°C	240	240	205	187		
Therma	l stress	260°C,10s,	3 times	Non layered	Non layered	Non layered	Non layered		
Water abs	sorption	20±2°C 24hours	%	≤0.08	≤0.08	≤0.08	≤0.08		
Dens	sity	normal temperature	g/cm³	2.17	2.18	2.20	2.22		
Long-term service temperature		High and low temperature box	°C	-55~+260	-55~+260	-55~+260	-55~+260		
Thermal co	nductivity	Z direction	W/(M.K)	0.24	0.24	0.28	0.30		
PIM		Only applicable to F4BME	dBc	≤-159	≤-159	≤-159	≤-159		
Fire resistance		/	UL-94	V-0	V-0	V-0	V-0		
Material composition		/	/	PTFE, Glass fiber cloth F4BM with ED copper foil, F4BME with reverse RTF copper foil					

^{1.} The dielectric constant (typical value) is measured in the Z direction of the material, using the strip line method of GB/T 12636-1990 or IPC-TM650 2.5.5.5;

^{2.} Other performance tests shall adopt or refer to the test methods specified in IPC-TM-650 or GBT4722-2017;

^{3.} All test data are typical measurement data and are intended to help customers select materials. They are not intended and do not constitute any express or implied warranty, nor do they ensure that customers can achieve all the performance in the data sheet in specific occasions. Customers are responsible for verifying and determining the adaptability of Wangling materials in each application.



Product technical parameters				Product model/data					
Product characteristics				F4BM255	F4BM265	F4BM275	F4BM294	F4BM300	
		Test conditions	Unit	F4BME255	F4BME265	F4BME275	F4BME294	F4BME300	
Dielectric constant (typical value)		10GHz	/	2.55	2.65	2.75	2.94	3.0	
Permittivity	Permittivity tolerance		/	±0.05	±0.05	±0.05	±0.06	±0.06	
Loss factor		10GHz	/	0.0013	0.0013	0.0015	0.0016	0.0017	
(typica	(typical value)		/	0.0018	0.0019	0.0021	0.0023	0.0025	
Temperature of dielectri	e coefficient ic constant	-55 °∼150°C	PPM/°C	-110	-100	-92	-85	-80	
Dooling	Peeling strength		N/mm	>1.8	>1.8	>1.8	>1.8	>1.8	
Peelings			N/mm	>1.6	>1.6	>1.6	>1.6	>1.6	
Volume r	Volume resistivity		MΩ.cm	≥6×10 ⁶	≥6×10 ⁶	≥6×10 ⁶	≥6×10 ⁶	≥6×10 ⁶	
Surface re	Surface resistance		МΩ	≥1×10 ⁶	≥1×10 ⁶	≥1×10 ⁶	≥1×10 ⁶	≥1×10 ⁶	
Electrical (Z dire		5KW,500V/s	МΩ	>25	>25	>28	>30	>30	
	Breakdown voltage (XY direction)		KV	>34	>34	>35	>36	>36	
thermal expansion	X Y direction	-55 °∼288°C	ppm/°C	16,21	14,17	14,16	12,15	12,15	
coefficient	Z direction	-55 °∼288°C	ppm/°C	173	142	112	98	95	
Therma	al stress	260°C, 10s, 3times		Non layered	Non layered	Non layered	Non layered	Non layered	
Water ab	sorption	20±2°C 24hours	%	≤0.08	≤0.08	≤0.08	≤0.08	≤0.08	
Den	sity	normal temperature	g/cm³	2.25	2.25	2.28	2.29	2.29	
Long-te tempe	erm use erature	High and low temperature box	°C	-55~+260	-55~+260	-55~+260	-55~+260	-55~+260	
Thermal co	onductivity	Z direction	W/(M.K)	0.33	0.36	0.38	0.41	0.42	
PIM		Applicable only to F4BME	dBc	≤-159	≤-159	≤-159	≤-159	≤-159	
Fire res	Fire resistance		UL-94	V-0	V-0	V-0	V-0	V-0	
Material composition		/	/	PTFE, glass fiber cloth F4BM with ED copper foil, F4BMEwith reverse RTF copper foil					



Optional copper foil:

F4BM pair with ED copper foil, optional thickness: 0.5OZ (0.018mm), 1OZ (0.035mm) 1.5OZ (0.05mm), 2OZ (0.07mm) F4BME pair with RTF copper foil, optional thickness: 0.5OZ (0.018mm), 1OZ (0.035mm)

Available in regular sizes:

460×610mm 500×600mm 850×1200mm 914×1220mm 1000×1200mm

Unconventional dimensions can be specified (please contact us for special dimensions):

300×250mm 350×380mm 500×500mm 840×840mm 1000×1500mm

Note: When the thickness is \geq 4.0mm or \leq 0.2mm, the size cannot exceed 500 \times 610mm

Thickness and tolerance can be provided (the following are conventional thicknesses, and unconventional thicknesses can be customized by contacting our company

The following thicknesses are the total thickness of copper or the thickness of the medium, which can be produced. Please indicate whether it is "the total thickness of copper" or "the thickness of the medium" when placing an order.

Thickness (mm)	0.1 (Mesophyll thickness)	0.127 (Mesophyll thickness)	0.2	0.25	0.5	0.508	0.762
Public errand (mm)	±0.01	±0.01	±0.02	±0.02	±0.04	±0.04	±0.05
Thickness (mm)	0.8	1.0	1.5	1.524	1.575	2.0	2.5
Public errand (mm)	±0.05	±0.05	±0.06	±0.06	±0.06	±0.08	±0.08
Thickness (mm)	3.0	4.0	5.0	6.0	8.0	10.0	12.0
Public errand (mm)	±0.09	±0.1	±0.1	0.12	±0.15	±0.18	±0.2

When the dielectric constant is \leq 2.65, the thinnest available medium thickness is 0.1mm, and when the dielectric constant is 2.7-3.0, the thinnest available medium thickness is 0.2mm.

F4BM and F4BME series aluminum/copper substrates:

This series of products can be provided with aluminum based or copper based materials, that is, one side of the dielectric layer is covered with copper foil, and the other side of the dielectric layer is covered with copper based or aluminum based materials which plays a shielding or heat dissipation role, the model is F4BM***—AL、F4BME***—CU、F4BME***—CU。

Model	Metal base	Proportion	Thermal conductivity	Copper or aluminum based Available thickness (mm)	Metal base thickness tolerance (mm)	Available in sizes (mm)
F4BM***—CU	Dedesses	8.9	380	0.48, 0.98, 1.48 1.98, 2.98, 3.98 Other thickness connections formulate	+0.02, -0.05	460×610 460×305 Other dimensions Contact us
F4BME***—CU	Red copperbrass					
F4BM***-AL	- Aluminum base	2.7	180			
F4BME***—AL						

Model example:

F4BM220—AL Aluminum clad base plate representing F4BM220 F4BME255—CU Copper clad base plate representing F4BME255