

Microwave dielectric ceramic substrates

1、Introduction

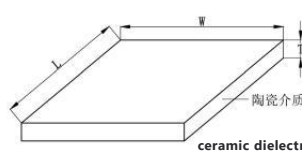
- High Q value, A resonant frequency temperature coefficient close to 0 Can make the make the circuit work stably.
- High K Value, effectively reduce the geometry size of circuit.
- It can be used to prepare products in the microwave and millimeter-wave frequency bands, such as microwave single-layer chip capacitors, thin-film circuits, microwave dielectric antennas, etc.



2、Executive standard

Q/JCXX20005-2025 《Detailed specifications for microwave Dielectric Ceramic substrates》

3、Product size

Typical external dimensions (mm)					
Lenth (L)	Width (W)	Thickness (T)			Schematic diagram
		As-Fired	Machined	Polished	
50.8±0.5	50.8±0.5	0.127±0.025	0.127±0.005	0.127±0.005	
		0.254±0.025	0.254±0.005	0.254±0.005	
		0.381±0.025	0.381±0.005	0.381±0.005	
60.0±0.5	48.0±0.5	0.508±0.025	0.508±0.010	0.508±0.010	
		0.635±0.025	0.635±0.010	0.635±0.010	
		1.0±0.025	1.0±0.010	1.0±0.010	

Note: Other sizes can be customized freely

4、Main technical parameters

parameters	unit	Material code							
		M15A	M20A	M40A	M45A	M80A	M93A	M100A	M130A
dielectric constant	—	15±0.5	19.8±0.5	40±1.5	45±2.0	80±2.0	93±2.0	100±3.0	130±5.0
Quality factor (Q)	—	≥2000 @12GHz	≥6000 @8GHz	≥6000 @5GHz	≥6000 @5GHz	≥2000 @3GHz	≥2000 @3GHz	≥1000 @3GHz	≥1000 @3GHz
Temperature frequency coefficient (-55~85℃)	ppm/℃	-30±5	0±30	6±3	0±30	0±10	0±10	0±30	0±30
Temperature coefficient (-55~125℃)	ppm/℃	50±10	0±60	-30±10	0±60	0±30	0±30	0±60	0±60
Thermal expansivity (25~200℃)	ppm/℃	9.5	9.8	8.3	9.6	8.5	8.7	9.5	9.9
Thermal conductivity	W/(m·K)	4.5	4.8	4.5	3.7	4.8	4.8	3.8	3.9
Volume resistivity	Ω·cm	≥10 ¹²	≥10 ¹²	≥10 ¹²	≥10 ¹²	≥10 ¹²	≥10 ¹²	≥10 ¹²	≥10 ¹²
Flexural Strength	MPa	≥100	≥100	≥50	≥50	≥120	≥120	≥120	≥100
Bulk density	g/cm ³	3.3±0.2	3.8±0.2	4.5±0.3	5.2±0.3	5.3±0.3	5.5±0.3	5.7±0.3	6.0±0.3
Water absorption	—	<0.08%	<0.08%	<0.08%	<0.08%	<0.08%	<0.08%	<0.08%	<0.08%

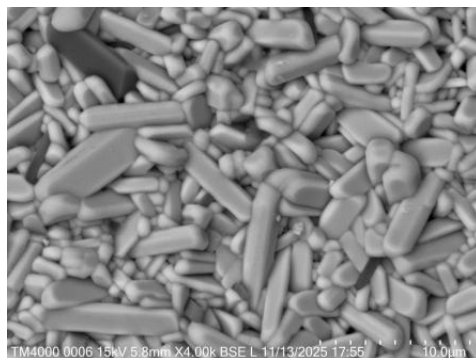
Note: Other dielectric constants can be customized

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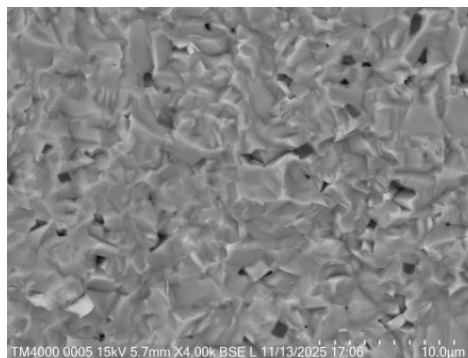
5、Substrate type

Substrate type	Surface roughness	Camber
As-Fired	$\leq 0.5 \mu m$	$< 0.3\%$
Machined	As per the user requirements	$< 0.3\%$
Polished	$\leq 0.03 \mu m$	$< 0.2\%$

6、Representative products microstructure



SEM of surface (K100)



SEM of fracture surface (K100)

7、How to order

S - 5050 - M15A - 10 - Z2

① ② ③ ④ ⑤

- ① S indicates substrate.
- ② 5050 indicates size of substrate, see the size table.
- ③ M15A indicates material code.
- ④ 10 indicates thickness, see the thickness table.
- ⑤ Apparent condition: X indicates As-Fired, Y indicates Machined, Z1 indicates single side polished, Z2 indicates both sides polished, S indicates special customization.

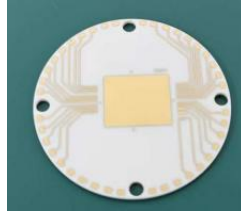
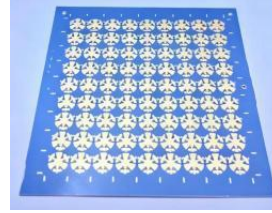
Size code	Length × width (mm)
5050	50.8×50.8
6048	60×48
6070	60×70

Thickness code	T (mm)
05	0.127
10	0.254
15	0.381
20	0.508
25	0.635
40	1.016

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8、 Applications

It is mainly applied in fields such as mobile communication, satellite TV, broadcasting communication, radar, and satellite positioning systems. It is used in modern communication as dielectric resonators, filters, circulators, isolators, thin-film circuits, etc.



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