

# Ceramic Substrate for SLCC

## 1、Feature

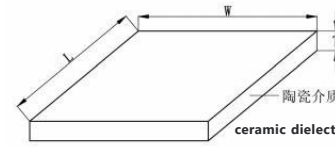
- dielectric constant coverage is wide: 9.9-60000 , include class I 、 class III 、 class IIII, Adapt to different size and capacity requirements.
- The appearance features characteristics such as thin thickness, high flatness, uniform surface and low surface roughness.
- In terms of electrical performance, it features excellent frequency characteristics, stable temperature coefficient, high withstand voltage strength, stability and reliability, as well as a long service life , It is mainly used for manufacturing microwave single-layer ceramic dielectric chip capacitors, resistance-capacitance networks and other products.



## 2、Executive standard

Q/JC XK20001-2025 《 Detailed Specification for Dielectric Ceramic Materials for Microwave Single-layer Chip Ceramic Dielectric capacitors》 .

## 3、Product size

| Size Code | Outline Dimension (mm) |          |                                                       |                                                                                      |
|-----------|------------------------|----------|-------------------------------------------------------|--------------------------------------------------------------------------------------|
|           | L                      | W        | T                                                     | schematic diagram                                                                    |
| SC15      | 38.1±0.5               | 38.1±0.5 | 05: 0.127±0.025<br>06: 0.152±0.025<br>07: 0.178±0.025 |  |
| SC20      | 50.8±0.5               | 50.8±0.5 | 08: 0.203±0.025<br>10: 0.254±0.025                    |                                                                                      |

Note: Other sizes can be customized freely

## 4、Electrical Performance table

| product classification | Dielectric constant | Dielectric loss | Temperature coefficient (-55°C~125°C) | working voltage | Insulation Resistance (MΩ) |
|------------------------|---------------------|-----------------|---------------------------------------|-----------------|----------------------------|
| Class I                | 9.9±0.5             | ≤0.15%          | 90±30                                 | 100V            | ≥10 <sup>6</sup>           |
|                        | 20±2                | ≤0.15%          | 0±30                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 37±2                | ≤0.15%          | 0±30                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 40±3                | ≤0.15%          | N150±50                               | 100V            | ≥10 <sup>6</sup>           |
|                        | 45±5                | ≤0.15%          | 0±30                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 65±5                | ≤0.70%          | 0±30                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 80±5                | ≤0.15%          | 0±60                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 85±5                | ≤0.25%          | N350±50                               | 100V            | ≥10 <sup>6</sup>           |
|                        | 90±5                | ≤0.25%          | 0±60                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 110±12              | ≤0.25%          | 0±60                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 130±10              | ≤0.25%          | 0±60                                  | 100V            | ≥10 <sup>6</sup>           |
|                        | 150±10              | ≤0.25%          | N1500±500                             | 100V            | ≥10 <sup>6</sup>           |
|                        | 300±30              | ≤0.25%          | N1500±500                             | 100V            | ≥10 <sup>6</sup>           |
|                        | 600±60              | ≤1.5%           | N3000±1000                            | 100V            | ≥10 <sup>6</sup>           |
|                        | 900±90              | ≤1.5%           | N3500±1000                            | 100V            | ≥10 <sup>6</sup>           |

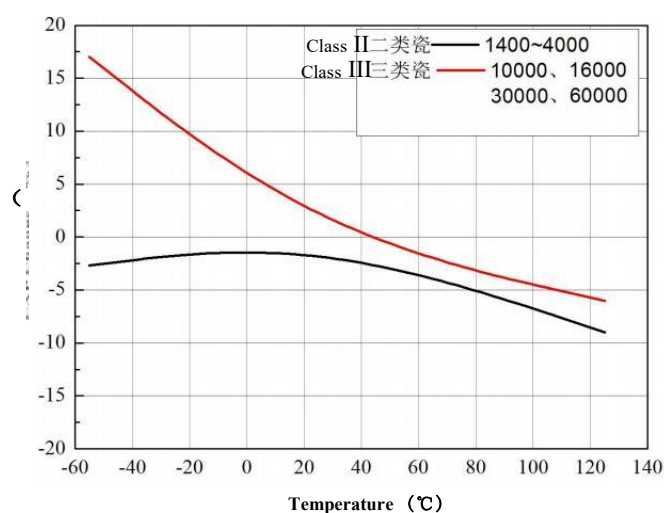
|           |             |       |                         |          |                  |
|-----------|-------------|-------|-------------------------|----------|------------------|
| Class II  | 900±100     | ≤2.5% | ±15%                    | 100V     | ≥10 <sup>5</sup> |
|           | 1400±200    | ≤2.5% | ±15%                    | 100V     | ≥10 <sup>5</sup> |
|           | 2000±500    | ≤3.0% | ±15%                    | 100V     | ≥10 <sup>5</sup> |
|           | 3000±500    | ≤3.0% | ±15%                    | 100V     | ≥10 <sup>5</sup> |
|           | 4000±500    | ≤3.0% | ±15%                    | 100V     | ≥10 <sup>5</sup> |
|           | 8500±2000   | ≤4.0% | +30%~-80%<br>(-55℃~85℃) | 100V     | ≥10 <sup>5</sup> |
|           | 12000±2000  | ≤4.0% | +30%~-80%<br>(-25℃~85℃) | 100V     | ≥10 <sup>5</sup> |
|           | 16000±3000  | ≤4.0% | +22%~-82%<br>(10℃~85℃)  | 100V     | ≥10 <sup>5</sup> |
| Class III | 10000±2000  | ≤2.5% | ±15%                    | 10V~100V | ≥10 <sup>5</sup> |
|           | 16000±3000  | ≤2.5% | ±15%                    | 10V~63V  | ≥10 <sup>4</sup> |
|           | 25000±5000  | ≤2.5% | ±15%                    | 10V~63V  | ≥10 <sup>4</sup> |
|           | 35000±5000  | ≤2.5% | ±15%                    | 10V~63V  | ≥10 <sup>4</sup> |
|           | 60000±10000 | ≤2.5% | ±15%                    | 10V~25V  | ≥10 <sup>3</sup> |

## 5、Physical performance parameters

| Product classification | Dielectric constant                       | Lenth×Width (mm)                                   | Typical thickness(mm)                     | Surface roughness (μm) | Camber |
|------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|------------------------|--------|
| Class I                | 9.9~900                                   | (38.1±0.5) × (38.1±0.5)<br>(50.8±0.5) × (50.8±0.5) | 0.127<br>0.152<br>0.178<br>0.203<br>0.254 | 0.07 ~ 0.20            | ≤0.3%  |
| Class II               | 900~16000                                 | (38.1±0.5) × (38.1±0.5)                            |                                           | 0.07 ~ 0.20            |        |
| Cl ass III             | 10000<br>16000<br>25000<br>30000<br>60000 |                                                    |                                           | 0.10~ 0.40             |        |
|                        |                                           |                                                    |                                           |                        |        |

## 6、Temperature characteristics

Represent the curve of the product's capacitance varying with temperature, the temperature variation range is -55℃~125℃.



## 7、How to order

JCI - K151 - SC15 - 06

①                      ②                      ③                      ④

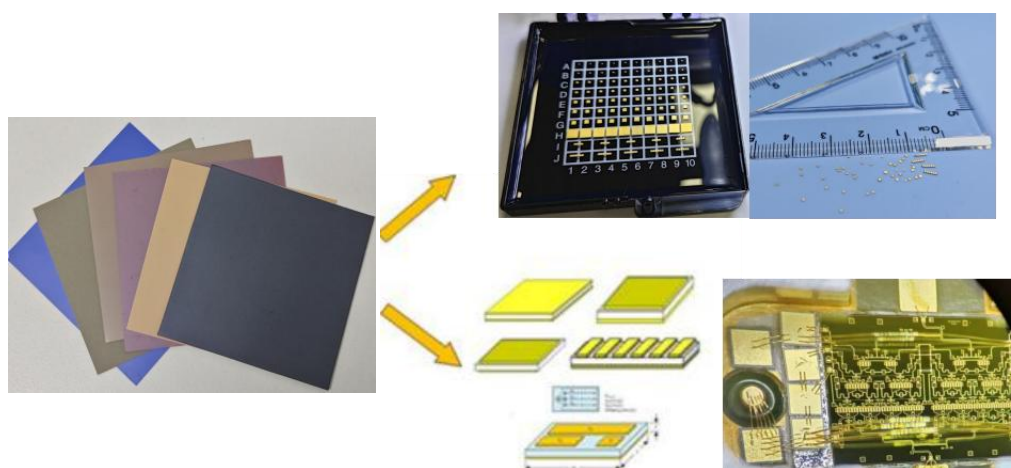
- ① JC indicates the enterprise identification code , I indicates class I 、 II indicates class II 、 III indicates class III.
- ② K151 indicates the dielectric constant is 150, see Electrical Performance table. For dielectric constants below 100, the direct marking method is adopted , For dielectric constants above 100, The last digit represents the number of zeros, such as 253 , indicates the dielectric constant is 25000.
- ③ SC15 indicates length and width of substrate, see the size code table.
- ④ indicates thickness, see the thickness code table.

| size code | Lenth、 Width<br>(mm) |
|-----------|----------------------|
| 15        | $38.1 \pm 1.0$       |
| 20        | $50.8 \pm 1.0$       |

| Thicknes scode | T (mm)            |
|----------------|-------------------|
| 05             | $0.127 \pm 0.025$ |
| 06             | $0.152 \pm 0.025$ |
| 07             | $0.178 \pm 0.025$ |
| 08             | $0.203 \pm 0.025$ |
| 10             | $0.254 \pm 0.025$ |

## 8、Applications

Dielectric ceramic substrates are used to fabricate various surface mount components such as microwave single-layer chip ceramic capacitors and resistance-capacitance networks. In circuits, they mainly play roles such as blocking direct current, bypassing, tuning, filtering, and decoupling. They are highly suitable for engineering fields such as microwave and millimeter-wave phased array T/R components, wideband receivers, frequency sources, and communication RF channels, and possess excellent temperature stability. It is suitable for environments with high requirements for surface flatness and miniaturization of external dimensions. Typical applications are as follows.



Note: This figure shows the manufacturing and application fields of dielectric ceramic substrates for microwave single-layer chip ceramic capacitor.