

Surface-mount Ceramic Multilayer Capacitors - Soft Termination Series

CS0805KKX7RYBB104 (0805 ,X7R, 100nF, 250V, ±10%)

Spec Sheet

Scope

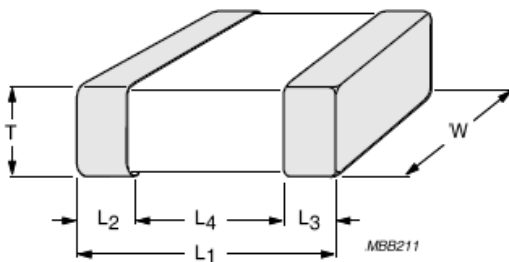
This product specification is applied to Multi-layer Ceramic Capacitor with soft termination.

Yageo Part Number

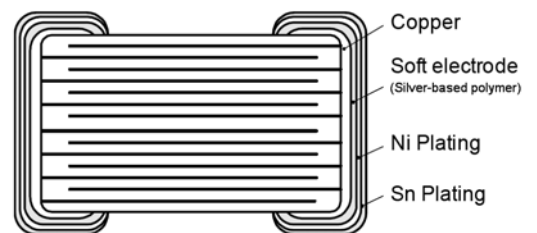
CS	0805	K	K	X7R	Y	BB	104
(1) Dimension	(2) Cap Tol.	(3) Packaging	(4) TC	(5) Rated Volt.	(6) Capacitance		

(1) External Dimensions

(Unit: mm)



L1	2.0±0.3
W	1.25±0.25
T	1.25±0.25
L2/L3	0.25 to 0.75
L4	1.5 (min)

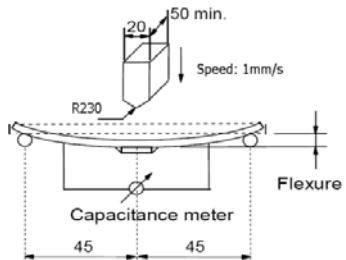


(2) Capacitance Tolerance:	±10%
(4) Temperature Characteristics:	X7R
Temperature Range:	-55 to 125 °C
Cap Change:	±15%
(5) Rated Voltage:	250V
(6) Capacitance:	100nF
(3) Package:	Embossed Plastic Tape Reel 7"
Packaging Unit:	3,000 pcs
Insulation Resistance:	R x C > 500Ω.F
Dielectric Loss Tangent:	2.5%
RoHS Compliance:	Yes
Halogen Free:	Yes
Soldering Method:	Reflow/Wave

IEC-60384 Standard Specification and Test methods

Test Item	Procedure	Requirements												
Mounting	The capacitors may be mounted on printed-circuit boards or ceramic substrates.	No visible damage												
Visual inspection and dimension check	Any applicable method using x10 magnification	In accordance with specification												
Capacitance Dielectric loss tangent	Class1 : C ≤ 1nF, f = 1 MHz; C > 1nF, f = 1 KHz; NPO: measuring voltage 1 V at room temp. Class 2 (X5R, X7R) : Precondition: 150 +0/-10 °C/1 hr , then keep for 24±1 hrs at room temp. f = 1 kHz; measuring voltage 1 V at 20°C	Within specified tolerance												
Insulation resistance	At Ur (DC) for 1 minute Ur(DC) > 500V: At 500V for 1 minute	In accordance with specification												
Temperature coefficient	<p>Capacitance shall be measured by the steps shown in the following table.</p> <p>The capacitance change should be measured after 5 min at each specified temperature stage.</p> <table border="1" data-bbox="443 1205 756 1435"> <thead> <tr> <th>Step</th> <th>Temperature</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>25±2</td> </tr> <tr> <td>b</td> <td>Lower Temperature ±3</td> </tr> <tr> <td>c</td> <td>25±2</td> </tr> <tr> <td>d</td> <td>Upper Temperature ±2</td> </tr> <tr> <td>e</td> <td>25±2</td> </tr> </tbody> </table> <p>(1) Class I Temperature Coefficient shall be calculated from the formula as below: $\text{Temp. Coefficient} = \frac{C2 - C1}{C1 \times \Delta T} \times 10^6 \text{ [ppm/°C]}$ C1: Capacitance at step c C2: Capacitance at 125°C ΔT: 100°C (=125°C -25°C)</p> <p>(2) Class II Capacitance Change shall be calculated from the formula as below. $\Delta C = \frac{C2 - C1}{C1} \times 100(\%)$ C1: Capacitance at step c C2: Capacitance at step b or d</p>	Step	Temperature	a	25±2	b	Lower Temperature ±3	c	25±2	d	Upper Temperature ±2	e	25±2	<p>Class I: Δ C/C: ±30ppm</p> <p>Class II: X7R/ X5R: Δ C/C: ±15% Y5V: Δ C/C: +22~-82%</p>
Step	Temperature													
a	25±2													
b	Lower Temperature ±3													
c	25±2													
d	Upper Temperature ±2													
e	25±2													

IEC-60384 Standard Specification and Test methods

Test Item	Procedure	Requirements
Adhesion	A force applied for 10 sec to the line joining the terminations and in a plane parallel to the substrate.	Force: size \geq 0603: \geq 5N, size=0402: \geq 2.5N, size \leq 0201: \geq 1N
Bending Strength	Mounting in accordance with IEC 60384-22 paragraph 4.3 Conditions: Bending 5mm at a rate of 1 mm/s, radius jig 230 mm, holding time 5 \pm 1 sec. NPO: 5 mm, X7R/0402 to 0603: 5 mm, 0805 to 1812: 3mm 	No visible damage Δ C/C: Class I, within \pm 1% or 0.5 pF, whichever is greater Class II: X7R, X5R: \pm 10%,
Resistance to soldering heat	Precondition: 150 \pm 0/-10 $^{\circ}$ C/1 hr, then keep for 24 \pm 1 hrs at room temp Preheating: for size >1206:100 to 120 $^{\circ}$ C for 1 minute and 170 to 200 $^{\circ}$ C for 1 minute. Solder bath temperature: 260 \pm 5 $^{\circ}$ C Dipping time 10 \pm 0.5 s Recovery time 24 \pm 2 Hours.	Dissolution of the end face plating shall not exceed 25% of the length of the edge concerned. Δ C/C: Class I, within \pm 0.5% or 0.5 pF, whichever is greater Class II: X7R: \pm 12.5%, DF: within initial specified value IR: within initial specified value
Solderability	The specimen shall be preheated to a temperature of 80 to 140 $^{\circ}$ C and maintained for 30s to 60s. 1. Temperature: 235 \pm 5 $^{\circ}$ C / Dipping time: 2 \pm 0.5 s 2. Temperature: 245 \pm 5 $^{\circ}$ C / Dipping time: 3 \pm 0.5 s (lead free) Depth of immersion: 10mm	The solder should cover over 95% of the critical area of each termination.
Rapid change of temperature	Precondition: 150 \pm 0/-10 $^{\circ}$ C/1 hr, then keep for 24 \pm 1 hrs at room temp 5 cycles with following detail: 30 minutes at Lower Category Temperature; 30 minutes at Upper Category Temperature; Recovery time 24 \pm 2 Hours.	No visual damage Δ C/C: Class I, within \pm 1% or 1 pF, whichever is greater Class II: X7R, X5R: \pm 15%, DF: within initial specified value IR: within initial specified value

IEC-60384 Standard Specification and Test methods

Test Item	Procedure	Requirements															
Damp heat with Ur load	1. Precondition (Class II only): 150 +0/-10°C/1 hr, then keep for 24±1 hrs at room temp 2. Initial measure Spec: refer Initial spec (Cap, DF, IR) 3. Damp heat test: 500±12 hours at 40±2°C; 90 to 95% R.H.; 1.0Ur applied 4. Recovery: Class 1 : 6 to 24 hours, Class 2 : 24±2 hours 5. Final measure: Cap, DF, IR	No visual damage after recovery Δ C/C: Class I, within ±2% or 1 pF, whichever is greater Class II: X7R:±15%, DF: 2 x Specified value IR: Class I: ≥ 2,500MΩ or RxC ≥ 25Ω.F whichever is less Class II: ≥ 500MΩ or RxC ≥ 25Ω.F whichever is less															
	X7R/0805/4.7μF/16V ; X7R/1206/10μF/16V to 25V ; X7R/1210/2.2μF to 10μF/16V to 50V; X7R/1210/2.2μF/100V;	ΔC/C : ±20% D.F.: ≤ 2 x specified value IR: R x C ≥ 5 Ω.F															
Endurance	1. Precondition (Class II only): 150 +0/-10°C/1 hr, then keep for 24±1 hrs at room temp 2. Initial measure Spec: refer Initial spec (Cap, DF, IR) 3. Endurance test: Temperature:NPO/X7R: 125°C , X5R: 85°C Apply below Specified voltage applied for 1000 hrs <table border="1" data-bbox="448 1328 788 1476"> <thead> <tr> <th>Voltage</th> <th>NPO</th> <th>X7R</th> </tr> </thead> <tbody> <tr> <td>≤ 100V</td> <td>2.0 x Ur</td> <td>2.0 x Ur</td> </tr> <tr> <td>200/250V</td> <td>1.5 x Ur</td> <td>1.5 x Ur</td> </tr> <tr> <td>500/630V</td> <td>1.3 x Ur</td> <td>1.2 x Ur</td> </tr> <tr> <td>≥ 1KV</td> <td>1.2 x Ur</td> <td>1.1 x Ur</td> </tr> </tbody> </table> Recovery time: 24±2 hours 5. Final measure: Cap, DF, IR	Voltage	NPO	X7R	≤ 100V	2.0 x Ur	2.0 x Ur	200/250V	1.5 x Ur	1.5 x Ur	500/630V	1.3 x Ur	1.2 x Ur	≥ 1KV	1.2 x Ur	1.1 x Ur	No visual damage after recovery Δ C/C: Class I, within ±2% or 1 pF, whichever is greater Class II: X7R:±15%, DF: 2 x Specified value IR: Class I: ≥ 4,000MΩ or RxC ≥ 40Ω.F whichever is less Class II: ≥ 1000MΩ or RxC ≥ 50Ω.F whichever is less
	Voltage	NPO	X7R														
≤ 100V	2.0 x Ur	2.0 x Ur															
200/250V	1.5 x Ur	1.5 x Ur															
500/630V	1.3 x Ur	1.2 x Ur															
≥ 1KV	1.2 x Ur	1.1 x Ur															
	* Apply 1.5 x Ur for below items X7R/0805/4.7μF/16V ; X7R/1206/10μF/16V to 25V ; X7R/1210/2.2μF to 10μF/16V to 50V; X7R/1210/2.2μF/100V;	ΔC/C : ±20% D.F.: ≤ 2 x specified value IR: R x C ≥ 10 Ω.F															
Voltage Proof	Specified stress voltage applied for 1 ~5 sec. Ur ≤ 100 V: series applied 2.5 Ur 100 V < Ur ≤ 200 V series applied (1.5 Ur + 100) 200 V < Ur ≤ 500 V series applied (1.3 Ur + 100) Ur = 630 V: 1.3 Ur Ur ≥ 1000 V: 1.2 Ur Charge / Discharge current less than 50mA.	No breakdown or flashover															

Shelf Life & Storage Condition

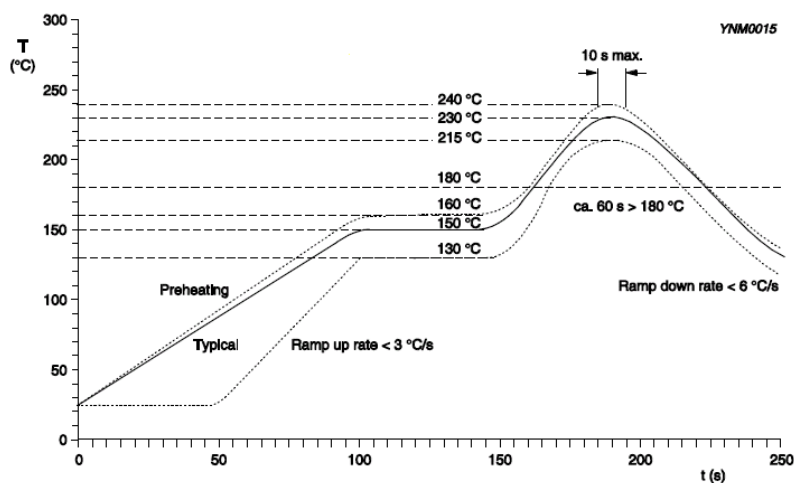
According with international specification JIS 1997.

- (1) Storage Conditions: Temperature -5 to 40°C
Relative humidity 40~60%
- (2) Shelf Life: 2 years from date of manufacture

We recommend that the products are stored in their original packing (e.g. tape, reel). They should never be touched by hand.

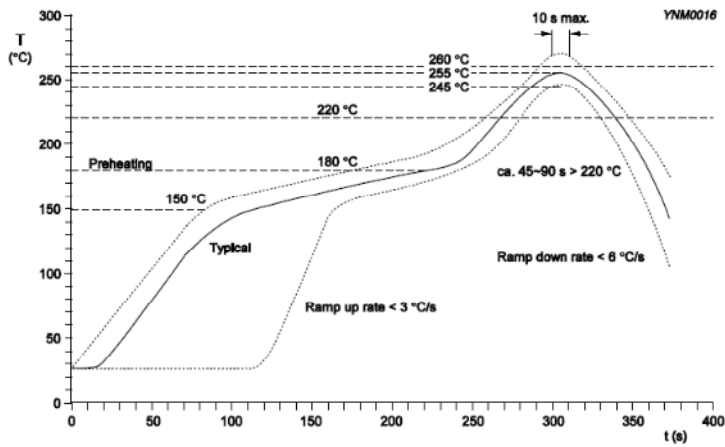
Soldering Condition

For normal use the capacitors may be mounted on printed-circuit boards or ceramic substrates by applying wave soldering, reflow soldering or conductive adhesive in accordance with "IEC 61760-1" (Standard method for the specification of surface mounting components).



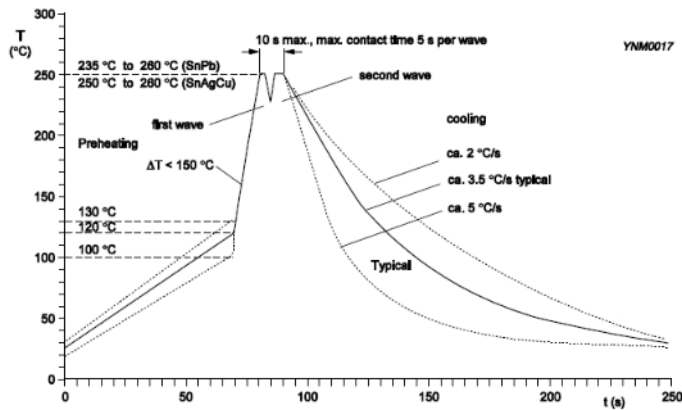
Solid line: Typical process (terminal temperature)
Dotted lines: Process limits - bottom process limit (terminal temperature) & upper process limit (top surface temperature).

Infrared soldering, forced gas convection reflow soldering - Temperature/time profile for SnPb solders



Solid line: Typical process (terminal temperature)
Dotted lines: Process limits - bottom process limit (terminal temperature) & upper process limit (top surface temperature).

Infrared soldering, forced gas convection reflow soldering - Temperature/time profile for lead-free SnAgCu solders



Solid line: Typical process
Dotted lines: Process limits

Double wave soldering for SnPb and lead-free SnAgCu solder - Temperature/time profile (terminal temperature)