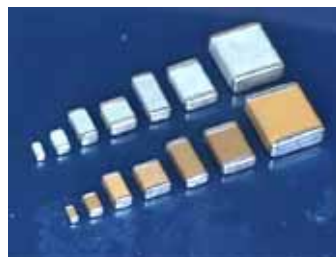


CCT Series-High Voltage Capacitors

Multilayer Ceramic Chip Capacitors [High Voltage Capacitor]

CCT Series – Middle Voltage (100V-1KV)



Voltage ratings from 100V to 1KV and sizes from 0603 to 2225.

◆ Features

- Special internal electrode design offers the highest voltage rating
- Surface mount suited for wave and reflow soldering
- High reliability
- RoHS compliant

◆ Applications

- Suitable for LAN/WLAN interface, Back-Lighting Inverter, DC-DC Converters, Ballast, Modems & Power Supplies.

◆ Summary of Specification

Operation Temperature	-55~+125
Rated Voltage	100Vdc to 1000Vdc
Temperature Coefficient	NPO : $\leq \pm 30\text{ppm/}$, -55~+125 (EIA Class)
	X7R : $\leq \pm 15\%$, -55~+125 (EIA Class)
Capacitance Range	NPO :2pF to 100nF ; X7R :150pF to 2.2uF
Dissipation Factor :	NPO : Q 1000 ; X7R : D.F. 2.5%
Insulation Resistance	10G Ω or 500/C Ω whichever is smaller
Aging	NPO:0% ; X7R: 2.5 % per decade of time
Dielectric Strength	200V V < 500V : 200% Rated Voltage
	500V V < 1000V : 150% Rated Voltage
	1000V V : 120% Rated Voltage

◆ How To Order

C

2225

X

334

K

501

T

X

Product Code	Chip Size	Dielectric	Capacitance Unit : pF	Tolerance	Rated Voltage	Packaging	Special Requirement
C: MLCC (Multilayer Ceramic Chip of Capacitor)	Ex.: 1206 : 3.2×1.6mm 1808 : 4.6×2.0mm 1812: 4.6×3.2mm	Ex.: N: NPO X: X7R	Ex.: 2R0:2.0pF 100:10×10 ⁰ 471:47×10 ¹ 102:10×10 ²	Ex.: C: +/-0.25pF D: +/-0.50pF J : +/- 5% K : +/-10% M: +/-20%	Ex.: 251:250Vdc 631:630Vdc 102:1000Vdc	T: Taping & Reel B: Bulk	Ex.: O: Arc Prevention Coating X: Cushion Termination (Super Term)

HVC Series-High Voltage Capacitors

Multilayer Ceramic Chip Capacitors [High Voltage Capacitor]

HVC Series – High Voltage Capacitors (2KV)



This series is offered in C0G(NPO) and X7R temperature characteristic in sizes from 1206 to 2220.

◆ Features

- Standard for telecommunication devices (IEEE802.3) in LAN interface.
- Available with proprietary coating to prevent arcing and pass Hi-Pot test
- Surface mount suited for wave and reflow soldering
- Special internal electrode design offers the highest voltage rating
- RoHS compliant

◆ Applications

- Suitable for telecommunication devices in LAN interface
- Ballast capacitor for back light inverter applications

◆ Summary of Specification

Operation Temperature	-55~+125
Rated Voltage	2KVdc
Temperature Coefficient	NPO : $\leq \pm 30\text{ppm/}$, -55~+125 (EIA Class) X7R : $\leq \pm 15\%$, -55~+125 (EIA Class)
Capacitance Range	NPO : 2pF to 470pF ; X7R : 150pF to 10nF
Dissipation Factor :	NPO : Q 1000 ; X7R : D.F. 2.5%
Insulation Resistance	10G Ω or 500/C Ω whichever is smaller
Aging	NPO:0% ; X7R: 2.5 % per decade of time
Dielectric Strength	120% Rated Voltage

◆ How To Order

C

1808

X

102

K

202

T

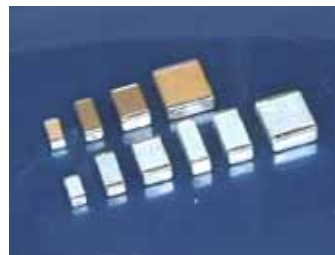
O

Product Code	Chip Size	Dielectric	Capacitance Unit : pF	Tolerance	Rated Voltage	Packaging	Special Requirement
C: MLCC (Multilayer Ceramic Chip of Capacitor)	Ex.: 1206 : 3.2×1.6mm 1808 : 4.6×2.0mm 1812: 4.6×3.2mm	Ex.: N: NPO X: X7R	Ex.: 2R0:2.0pF 100:10×10 ⁰ 471:47×10 ¹ 102:10×10 ²	Ex.: C: +/-0.25pF D: +/-0.50pF J : +/- 5% K : +/-10% M: +/-20%	Ex.: 202:2000Vdc	T: Taping & Reel B: Bulk	Ex.: O: Arc Prevention Coating X: Cushion Termination (Super Term)

HVC Series-High Voltage Capacitors

Multilayer Ceramic Chip Capacitors [High Voltage Capacitor]

HVC Series – Ultra High Voltage (3KV-5KV)



Capacitors with voltage ratings or 3KV to 5KV are ideally suited for LCD back light inverter circuits.

◆ Features

- Super term termination prevents cracking solution mechanical stress
- Special internal electrode design offers the highest voltage rating
- Surface mount suited for wave and reflow soldering
- High reliability
- RoHS compliant

◆ Applications

- Suitable for back-lighting inverter ,DC-DC converters, modems and power supplies

◆ Summary of Specification

Operation Temperature	-55~+125
Rated Voltage	3KVdc to 5KVdc
Temperature Coefficient	NPO : $\leq \pm 30\text{ppm/}$, -55~+125 (EIA Class)
	X7R : $\leq \pm 15\%$, -55~+125 (EIA Class)
Capacitance Range	NPO :2pF to 1.0nF ; X7R :150pF to 2.7nF
Dissipation Factor :	NPO : Q 1000 ; X7R : D.F. 2.5%
Insulation Resistance	10G Ω or 500/C Ω whichever is smaller
Aging	NPO:0% ; X7R: 2.5 % per decade of time
Dielectric Strength	120% Rated Voltage

◆ How To Order

C

1808

N

270

K

302

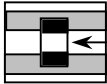
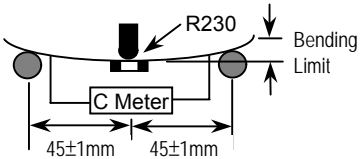
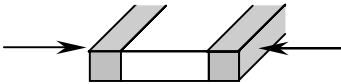
T

X

Product Code	Chip Size	Dielectric	Capacitance Unit : pF	Tolerance	Rated Voltage	Packaging	Special Requirement
C: MLCC (Multilayer Ceramic Chip of Capacitor)	Ex.: 1206 : 3.2×1.6mm 1808 : 4.6×2.0mm 1812: 4.6×3.2mm	Ex.: N: NPO X: X7R	Ex.: 2R0:2.0pF 100:10×10 ⁰ 471:47×10 ¹ 102:10×10 ²	Ex.: C: +/-0.25pF D: +/-0.50pF J : +/- 5% K : +/-10% M: +/-20%	Ex.: 302:3000Vdc 502:5000Vdc	T: Taping & Reel B: Bulk	Ex.: O: Arc Prevention Coating X: Cushion Termination (Super Term)

HVC Series-High Voltage Capacitors

HVC Series Specification & Test Condition

Item	Specification	Test Condition		
Operation Temperature	-55 to +125°C			
Visual	No abnormal exterior appearance	Visual Inspection		
Capacitance	Within The Specified Tolerance	Class Frequency Voltage		
Quality Factor	Class I (NPO): More Than 30pF : $Q \geq 1000$ 30pF & Below: $Q \geq 400 + 20C$ (C:Cap., pF)	NPO $C \leq 100\text{pF}$ 1MHz±10% 1.0±0.2Vrms $C > 100\text{pF}$ 1KHz±10%		
		X7R 1KHz±10% 1.0±0.2Vrms		
Dissipation Factor	Class (X7R): Maximum 0.025	Perform a heat temperature at 150±5 for 30min. then place room temp. for 24±2hr.		
Insulation Resistance	10,000MΩ or 500/C Ω whichever is smaller. (C in Farad)	$V \leq 500\text{V}$, Rated Voltage $V > 500\text{V}$, Applied 500Vdc Charge Time : 60sec. Is applied less than 50mA current.		
Withstanding Voltage	No dielectric breakdown or mechanical breakdown	$V < 500\text{V}$: 200% Rated Voltage $500\text{V} \leq V < 1000\text{V}$: 150% Rated Voltage $1000 \leq V$:120% Rated Voltage for 1~5 sec. Current is limited to less than 50mA. Withstanding voltage testing requires immersion of the element in a isolation fluid prevent arcing on the chip surface, at voltage over 1000Vdc.		
Temperature Capacitance Coefficient	Char.	Temp. Range	Cap. Change	Class :
	NPO(N)	-55 ~ +125	± 30ppm/°C	$[C2-C1/C1(T2-T1)] \times 100\%$
	X7R (X)	-55 ~ +125	± 15%	Class : $(C2-C1)/C1 \times 100\%$ T1:Standard Temperature(25°C) T2:Test Temperature C1:Capacitance At Standard Temperature C2:Capacitance At Test Temperature
Adhesive Strength of Termination	No indication of peeling shall occur on the terminal electrode.		A 5N-f(≈0.5Kg-f) pull force shall be applied for 10±1 sec.	
Resistance to Flexure of Substrate	No mechanical damage or capacitance change more than the following table.	The board shall be bend 1.0mm with a rate of 1.0 mm/sec.		
	Char.	Capacitance Change		
	NPO(N)	≤ ± 5.0% of initial value		
	X7R (X)	≤ ± 12.5% of initial value		
Solderability	More than 90% of the terminal surface is to be soldered newly, so metal part does not come out or dissolve . 	Solder Temperature : 245±5°C Dip Time : 5 ± 0.5 sec. Immersing Speed : 25±10% mm/s Solder : H63A Flux : Rosin Preheat : At 80~120 °C For 10~30sec.		

HVC Series-High Voltage Capacitors

HVC Series Specification & Test Condition

Item	Specification	Test Condition															
Resistance to Soldering Heat	Appearance	No mechanical damage shall occur															
	Capacitance	Class I (NPO): Within 2.5% or $\pm 0.25\text{pF}$ whichever is larger of initial value Class (X7R): Within $\pm 10\%$ of initial value															
	Q / Tan δ	To satisfy the specified initial value															
	Insulation Resistance	To satisfy the specified initial value															
		Class II capacitor shall be set for 48 ± 4 hours at room temperature after one hour heat treatment at $150 +0/-10^\circ\text{C}$ before initial measure. Preheat : at $150 \pm 10^\circ\text{C}$ for 60~120sec. Dip : solder temperature of $260 \pm 5^\circ\text{C}$ Dip Time : $10 \pm 1\text{sec}$. Immersing Speed : $25 \pm 10\%$ mm/s Solder : H63A Flux : Rosin															
		Measure at room temperature after cooling for Class I : 24 ± 2 Hours Class : 48 ± 4 Hours															
Temperature Cycle	Appearance	No mechanical damage shall occur															
	Capacitance	Class I (NPO): Within 2.5% or $\pm 0.25\text{pF}$ whichever is larger of initial value Class (X7R): Within $\pm 7.5\%$ of initial value															
	Q / Tan δ	To satisfy the specified initial value															
	Insulation Resistance	To satisfy the specified initial value															
		Class capacitor shall be set for 48 ± 4 hours at room temperature after one hour heat treatment at $150 +0/-10^\circ\text{C}$ before initial measure. Capacitor shall be subjected to five cycles of the temperature cycle as following:															
		<table border="1"> <thead> <tr> <th>Step</th> <th>Temp.($^\circ\text{C}$)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min Rated Temp.+0/-3 (-55)</td> <td>30</td> </tr> <tr> <td>2</td> <td>25</td> <td>3</td> </tr> <tr> <td>3</td> <td>Max Rated Temp.+3/-0 (125)</td> <td>30</td> </tr> <tr> <td>4</td> <td>25</td> <td>3</td> </tr> </tbody> </table>	Step	Temp.($^\circ\text{C}$)	Time(min)	1	Min Rated Temp.+0/-3 (-55)	30	2	25	3	3	Max Rated Temp.+3/-0 (125)	30	4	25	3
Step	Temp.($^\circ\text{C}$)	Time(min)															
1	Min Rated Temp.+0/-3 (-55)	30															
2	25	3															
3	Max Rated Temp.+3/-0 (125)	30															
4	25	3															
		Measure at room temperature after cooling for Class I : 24 ± 2 Hours Class : 48 ± 4 Hours															
Humidity	Appearance	No mechanical damage shall occur															
	Capacitance	Class I (NPO): Within 5% or $\pm 0.5\text{pF}$ whichever is larger of initial value Class (X7R): Within $\pm 15\%$ of initial value															
	Q / Tan δ	Class I (NPO): More Than 30pF : $Q \geq 350$ 30pF & Below: $Q \geq 275 + 2.5C$ Class (X7R): Maximum $\pm 5.0\%$															
	Insulation Resistance	1,000M Ω or 50/C Ω whichever is smaller. (C in Farad)															
		Class capacitor shall be set for 48 ± 4 hours at room temperature after one hour heat treatment at $150 +0/-10^\circ\text{C}$ before initial measure. Temperature : 40 ± 2 Relative Humidity : 90 ~95%RH Test Time : 500 +12/-0 hr															
		Measure at room temperature after cooling for Class I : 24 ± 2 Hours Class : 48 ± 4 Hours															

HVC Series-High Voltage Capacitors

HVC Series Specification & Test Condition

Item	Specification	Test Condition								
High Temperature Load (Life Test)	Appearance	No mechanical damage shall occur								
	Capacitance	<p>Class I (NPO): Within 3% or $\pm 0.3\text{pF}$ whichever is larger of initial value</p> <p>Class (X7R): Within $\pm 15\%$ of initial value</p>								
	Q / Tan δ	<p>Class I (NPO): More Than 30pF : $Q \geq 350$ 30pF & Below: $Q \geq 275 + 2.5C$</p> <p>Class (X7R): Maximum $\pm 5\%$</p>								
	Insulation Resistance	1,000M Ω or 50/C Ω whichever is smaller. (C in Farad)								
		<p>Class capacitors applied DC voltage (following table) is applied for one hour at maximum operation temperature $\pm 3^\circ\text{C}$ then shall be set for 48 ± 4 hours at room temperature and the initial measurement shall be conducted.</p> <p>Applied Voltage :</p> <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Applied Voltage</th> </tr> </thead> <tbody> <tr> <td>$V \leq 250\text{Vdc}$</td> <td>150% Rated Voltage</td> </tr> <tr> <td>$250\text{Vdc} < V < 1\text{KVdc}$</td> <td>120% Rated Voltage</td> </tr> <tr> <td>More Than 1KVdc(include 1KV)</td> <td>100% Rated Voltage</td> </tr> </tbody> </table> <p>Temperature : max. operation temperature Test Time : 1000 +12/-0Hr Current Applied : 50 mA Max. Measure at room temperature after cooling for Class I : 24 ± 2 Hours Class : 48 ± 4 Hours</p>	Rated Voltage	Applied Voltage	$V \leq 250\text{Vdc}$	150% Rated Voltage	$250\text{Vdc} < V < 1\text{KVdc}$	120% Rated Voltage	More Than 1KVdc(include 1KV)	100% Rated Voltage
Rated Voltage	Applied Voltage									
$V \leq 250\text{Vdc}$	150% Rated Voltage									
$250\text{Vdc} < V < 1\text{KVdc}$	120% Rated Voltage									
More Than 1KVdc(include 1KV)	100% Rated Voltage									
Vibration	Appearance	No mechanical damage shall occur								
	Capacitance	Within the specified tolerance								
	Q / Tan δ	To satisfy the specified initial value								
		<p>Solder the capacitor on P.C. board.</p> <p>Vibrate the capacitor with amplitude of 1.5mm P-P changing the frequencies from 10Hz to 55Hz and back to 10Hz in about 1 min.</p> <p>Repeat this for 2 hours each in 3 perpendicular directions.</p>								