

# MULTILAYER CERAMIC CAPACITORS

## EPOXY COATED RADIAL TYPE

### 1. Application

電介質材料 Dielectric	NPO COG	X7R	Z5U	Y5V
電介質種類 Dielectric Type	I 類電介質 Stable Class I	II 類電介質 Stable Class II Dielectric		
電氣性能 Electrical Properties	<p>電氣性能最穩定,基本上不隨溫度、電壓和時間的改變而改變。</p> <p>With negligible dependence of electrical properties on temperature, voltage, frequency and time.</p>	<p>電氣性能較穩定,在溫度、電壓與時間改變時性能的變化不明顯,由於X7R是一種強電介質,因而能造出容量比NPO電介質更大的電容器。</p> <p>With predictable change of properties with temperature, voltage, frequency and time, this dielectric is ferroelectric and offers higher capacitance ranges than class I .</p>	<p>具有較高的介電常數,常用於生產比容較大、標稱容量較高的大容量電容器產品,但其容量穩定性能較X7R差,容量損耗對溫度、電壓等測試條件敏感。</p> <p>With higher dielectric constant and greater variation of properties with temperature and test conditions, very high capacitance per unit volume and suited for bypass and coupling application as well as filtering, transient suppression blocking, and charge storage application.</p>	
應用 Application	<p>適用於穩定性要求高的高頻電路,如溫度補償電路、震盪電路等。</p> <p>Used in circuit requiring stable performance, such as temperature compensation circuits and smite circuits.</p>	<p>適用於隔直、偶合、旁路與對電容穩定性要求不太高的鑿頻電路。</p> <p>Used as blocking, coupling, By-passing and frequency discriminating elements.</p>	<p>適用於要求容量較大的電路,如儲能、記憶電路等。</p> <p>Suited for By-passing and coupling application such as store power and memory circuit.</p>	
使用溫度 Operating	-55°C ~ +125 °C	-55 °C ~ +125 °C	+10°C ~85°C	-30 °C ~ +85 °C
溫度係數 Temperature	0 ± 30 ppm/°C	± 15%	+22%~-56%	+22%~-82%

**CINETECH**  
SYMBOL OF QUALITY

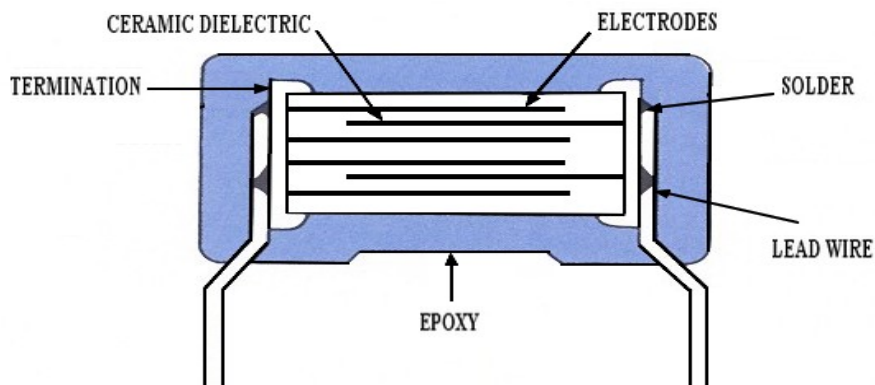
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### 2. How to order

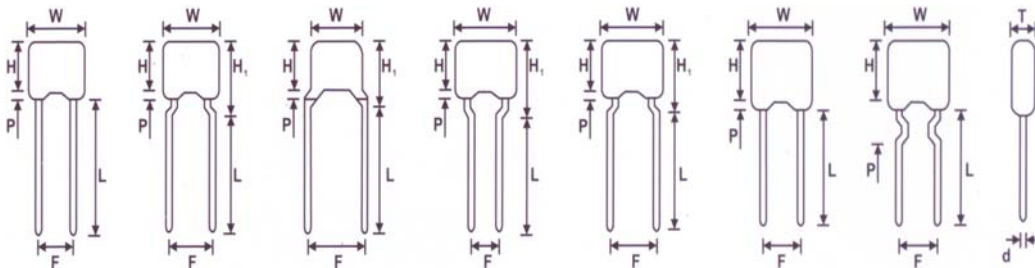
RD15	Z	104	M	1H	A	5	R
SIZE	T.C.	CAPACITANCE	TOLERANCE	VOLTAGE	LEAD SHAPE	LEAD SPACE	PACKAGE
RD15	N=NPO	1PF = 1R0	J=±5%	1E=25V	L=STRAIGHT	2=2.54±0.8	R=TAPE/REEL
RD20	B=X7R	1.5PF = 1R5	K=±10%	1H=50V	A=SLOPE 45° LEAD	5=5.08±0.8	B=TAPE/BOX
RD30	Z=Z5U	2.2PF = 2R2	M=±20%	2A=100V	Y=INSIDE CRIMP	(mm)	K=BULK
	Y=Y5V	100PF=101	Z=+80 ~ -20%	2D=200V	H=HIGHT SEATED 90		L=25.4mm Min.
	X=X5R	120PF=121		2H=500V	K=OUTWARD KINK		
		10nF=103		2I=630V			
		100nF= 104		3A=1KV			
				3D=2KV			
				3F=3KV			

### 3. Construction



### 4. Lead Shape

R15-2.5(L) R15-5.0(H) R15-5.0-(A) R20-2.5(L) R20-5.0(H) R30-5.0(L) R30-5.0(H)



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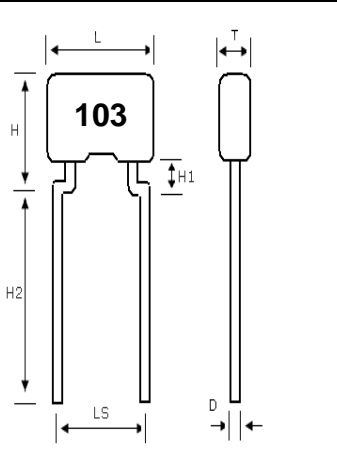
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## 5. Size Code and Dimensions (mm)

Size	Chip size	W.	T	H	H1	F	L
RD15-2.5	0603	3.0-3.8	1.8-2.8	2.6-3.8	--	2.5±0.25	5.0±0.5
RD15-5.0	0603	3.0-3.8	1.8-2.8	2.6-3.8	5.6-7.6	5.0±0.5	6.0±0.5
RD15-5.0-A (45°)	0603	3.0-3.8	1.8-2.8	2.6-3.8	5.6-7.6	5.0±0.5	10.0±0.5 16.0±1.0
RD15-2.5	0805	3.0-3.8	1.8-2.8	2.6-3.8	--	2.5±0.25	30.0±1.0
RD15-5.0	0805	3.0-3.8	1.8-2.8	2.6-3.8	5.6-7.6	5.0±0.5	
RD15-5.0-A (45°)	0805	3.0-3.8	1.8-2.8	2.6-3.8	5.6-7.6	5.0±0.5	
RD20-2.5	1206/1210	5	3.0/3.8	5	7.6	2.5±0.25	
RD20-5.0	1206/1210	5	3.0/3.8	5	7.6	5.0±0.5	
RD30-5.0	1812	7.6	3.8	7.6	--	5.0±0.5	

## 6. Marking

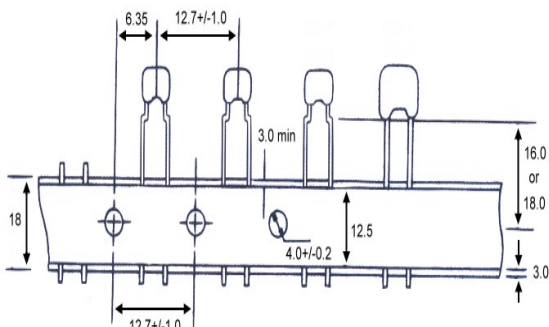
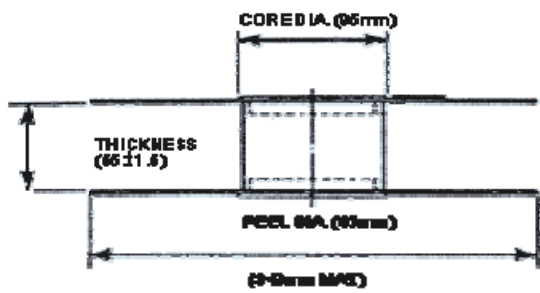
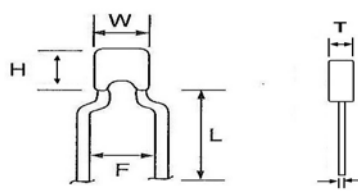
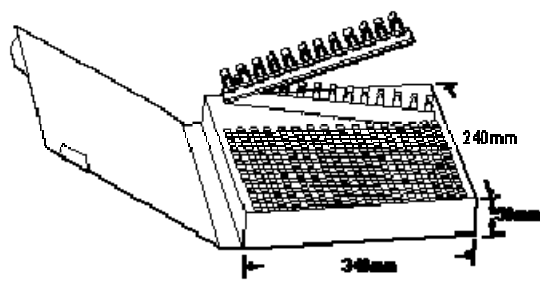
顏色 Color	黑色 Black	
電容量 Capacitance	Tolerance	印字 Marking
100	J	10
220	J	22
470	J	47
101	J	101
471	J/K	471
102	J/K	102
103	J/K/M	103
104	K/M/Z	104
105	K/M/Z	105




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## 7. Packing Specification

<p><b>Tape :</b></p> 	<p><b>Reel :</b></p> 
<p><b>Box Pack :</b></p>  <p>STYLE H HIGH SEATED</p>	<p><b>Bulk :</b></p> 

## 8. Packing Quantity

項目 Item	立式電容器 Radial Leded Type	臥式電容器 Axial Leded Type
編帶/捲裝 Tape & Reel	4000 pcs/Reel	7500 pcs/Reel(Standard)
編帶/盒裝 Tape & Box	2000 pcs/Box	5000 pcs/Box
散裝 Bulk Pack	1000 pcs/Bag(STD)	1000 pcs/Bag



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## 9. Inspection Norm

檢驗項目 Item	檢驗標準 Inspection Norm			
	NPO/COG	X7R	Z5U	Y5V
電容量 Capacitance	測試頻率： Test Frequency： ≤1000PF=1Mhz >1000PF=1Khz	測試頻率： Test Frequency： 1Khz	測試頻率： Test Frequency： 1Khz	測試頻率： Test Frequency： 1Khz
	測試電壓： Test Voltage: 1 ± 0.2 Vrms	測試電壓： Test Voltage: 1 ± 0.2 Vrms	測試電壓： Test Voltage: 0.5 ± 0.1 Vrms	測試電壓： Test Voltage: 1 ± 0.2 Vrms
	在允差範圍內： In the tolerance： C=±0.25pf D=±0.50pf J=±5%	在允差範圍內： In the tolerance： J=±5%pF K=±10% M=±20%	在允差範圍內： In the tolerance： M=±20% Z=+80%/-20%	在允差範圍內： In the tolerance： M=±20% Z=+80%/-20%
消散係數(DF) Dissipation Factor	測試頻率： Test Frequency： ≤1000PF=1Mhz >1000PF=1Khz	測試頻率： Test Frequency： 1Khz	測試頻率： Test Frequency： 1Khz	測試頻率： Test Frequency： 1Khz
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	< 0.1 %	< 2.5%-100/50V < 3.5%-25/16V	< 4.0 %	< 5.0%-100/50V < 7.0%-25/16V
絕緣組抗(IR) Insulation Resistance 500Ω =C*R 500Ω =0.47UF 1064M Ω	測試電壓：Test Voltage 額定電壓：Rated Voltage	測試電壓：Test Voltage 額定電壓：Rated Voltage	測試電壓：Test Voltage 額定電壓：Rated Voltage	測試電壓：Test Voltage 額定電壓：Rated Voltage
	兩個中的最小值： Whichever is less ≥ 10 Gohmas or ≥ 1000 MΩ	兩個中的最小值： Whichever is less ≥ 10 Gohmas or ≥ 1000 MΩ	兩個中的最小值： Whichever is less ≥ 10 Gohmas or ≥ 1000 MΩ	兩個中的最小值： Whichever is less ≥ 10 Gohmas or ≥ 1000 MΩ
耐電壓 50V	2倍額定電壓 2 x rated Voltage	2倍額定電壓 2 x rated Voltage	2倍額定電壓 2 x rated Voltage	2倍額定電壓 2 x rated Voltage



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### 10. Reliability

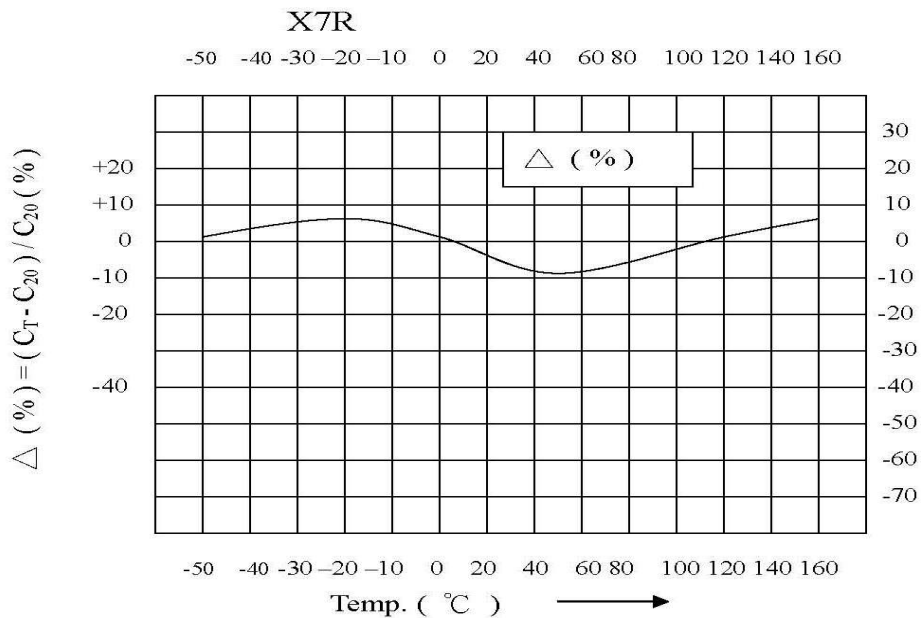
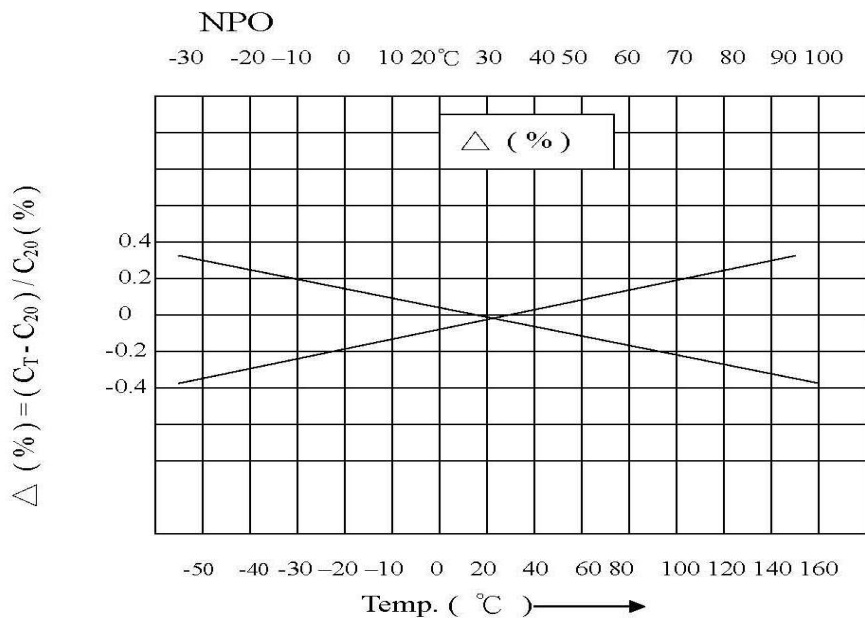
項目 (Item)	檢驗方法 (Test Methods)	檢驗標準 (Test Specifications)																																													
焊錫性 Solderability	將電容器導線浸入松香溶液後浸入焊錫槽溫度為 $235\pm 5^{\circ}\text{C}$ 的焊錫中5秒,浸入深度距離電容本體 2.5~3mm.  The lead wire of a capacitor shall be dipped into a rosin and then into molten solder of $235\pm 5^{\circ}\text{C}$ for 5 seconds , in both cases the depth of dipping is up to about 2.5 to 3.0 mm from the root of lead wires.	導線表面均勻沾錫,上錫面積不小於總面積的75%.  Lead wire shall be soldered with uniformly coated on the Axial or Radial direction over 75% of the circumferential direction.																																													
耐焊性 Resistance to Soldering heat	焊錫溫度 $265\pm 5^{\circ}\text{C}$ ,時間 $5\pm 0.5$ 秒,插入深度距離電容本體2.5~3mm,試驗後 $24\pm 2$ 小時測量.  The lead wire shall be immersed into the melted solder of $265\pm 5^{\circ}\text{C}$ , up to about 2.5 to 3.0 mm from the main body and the specified items shall be measured after leaving for $24\pm 2$ hours.	1.外觀：無損傷 Appearance：No marked defect 2.電容值變化( $\Delta C/C$ ): Capacitance change : <table border="1"> <thead> <tr> <th></th> <th>COG</th> <th>X7R</th> <th>Z5U</th> <th>Y5V</th> </tr> </thead> <tbody> <tr> <td><math>\Delta C/C</math></td> <td><math>\leq \pm 0.5\%</math>, or <math>\pm 0.5\text{pf}</math></td> <td><math>\leq \pm 7.5\%</math></td> <td><math>\leq \pm 20\%</math></td> <td><math>\leq \pm 20\%</math></td> </tr> </tbody> </table>		COG	X7R	Z5U	Y5V	$\Delta C/C$	$\leq \pm 0.5\%$ , or $\pm 0.5\text{pf}$	$\leq \pm 7.5\%$	$\leq \pm 20\%$	$\leq \pm 20\%$																																			
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壽命實驗 Life Test	<table border="1"> <thead> <tr> <th>條件 Condition</th> <th>NPO</th> <th>X7R</th> <th>Z5U</th> <th>Y5V</th> </tr> </thead> <tbody> <tr> <td>溫度 Temperature</td> <td><math>+125^{\circ}\text{C}</math></td> <td></td> <td><math>+85^{\circ}\text{C}</math></td> <td></td> </tr> <tr> <td>時間 Time</td> <td colspan="4">1000 小時(hours)</td> </tr> <tr> <td>電壓 Voltage</td> <td colspan="4">1.5×額定電壓 (rated voltage applied)</td> </tr> <tr> <td>恢復時間 Recovery time</td> <td colspan="4"><math>24\pm 2</math> 小時(hours)</td> </tr> </tbody> </table>	條件 Condition	NPO	X7R	Z5U	Y5V	溫度 Temperature	$+125^{\circ}\text{C}$		$+85^{\circ}\text{C}$		時間 Time	1000 小時(hours)				電壓 Voltage	1.5×額定電壓 (rated voltage applied)				恢復時間 Recovery time	$24\pm 2$ 小時(hours)				1.外觀：無損傷 Appearance：No marked defect 2.變化值 (Change value): <table border="1"> <thead> <tr> <th></th> <th>COG</th> <th>X7R</th> <th>Z5U</th> <th>Y5V</th> </tr> </thead> <tbody> <tr> <td><math>\Delta C/C</math></td> <td><math>\leq \pm 2\%</math>, or <math>\pm 2\text{pf}</math></td> <td><math>\leq \pm 10\%</math></td> <td><math>\leq \pm 20\%</math></td> <td><math>\leq \pm 30\%</math></td> </tr> <tr> <td>DF</td> <td colspan="4"><math>\leq 1.5 \times \text{initial requirement}</math></td> </tr> <tr> <td>IR</td> <td colspan="4"><math>\geq 0.25 \times \text{initial requirement}</math></td> </tr> </tbody> </table>		COG	X7R	Z5U	Y5V	$\Delta C/C$	$\leq \pm 2\%$ , or $\pm 2\text{pf}$	$\leq \pm 10\%$	$\leq \pm 20\%$	$\leq \pm 30\%$	DF	$\leq 1.5 \times \text{initial requirement}$				IR	$\geq 0.25 \times \text{initial requirement}$			
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引出端強度 Strength of lead	固定電容器並在兩端導線加力.  Fix the body of capacitor, apply a tensile weight gradually to each lead.	拉力：臥式電容器： $> 4\text{ kg}$ 立式電容器： $> 1\text{ kg}$ Pull：Axial： $> 4\text{ kg}$ Radial： $> 1\text{ kg}$																																													



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## 11. Temperature Characteristics



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