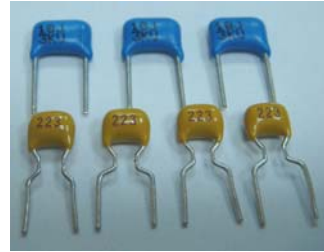


## Radial Dipped Ceramic Capacitors [General Capacitor]

### RDC Series – General Voltage (6.3V-1KV)



Capacitors with voltage ratings or 6.3V to 1KV

#### ◆ Features

- Technological progress in creating thinner layers of ceramic dielectric offers the highest voltage rating
- Provides good frequency
- High reliability
- RoHS compliant

#### ◆ Applications

- Suitable for Car Electronic , Power supplies
- Inverter and Converter
- Fuel pump , Water pump , Hybrid engine , Door lock , Wiper

#### ◆ Summary of Specification

Operation Temperature	NPO,X7R : -55~+125 °C ; X5R : -55~+85 °C ; Y5V : -30~+85 °C
Rated Voltage	6.3Vdc to 1KVdc
Temperature Coefficient	NPO : $\leq \pm 30\text{ppm}/^\circ\text{C}$ , -55~+125 °C (EIA Class I )
	X7R : $\leq \pm 15\%$ , -55~+125 °C (EIA Class II )
	X5R : $\leq \pm 15\%$ , -55~+85 °C (EIA Class II )
	Y5V : $\leq \pm 22\sim 82\%$ , -30~+82 °C (EIA Class II )
Capacitance Range	NPO :10pF to 220nF ; X7R :1000pF to 22uF X5R : 330nF to 100uF ; Y5V :0.1uF to 100uF
Dissipation Factor :	NPO : $Q \geq 1000$ ; X7R,X5R,Y5V : Please see RDC specification data sheet
Insulation Resistance	10GΩ or 500/C Ω whichever is smaller
Aging	NPO:0% ; X7R,X5R: 2.5 % Y5V: 6% per decade of time
Dielectric Strength	$V \leq 50$ : 250% Rated Voltage $V < 500V$ :200% Rated Voltage $500V \leq V < 1000V$ : 150% Rated Voltage $1000 \leq V$ :120% Rated Voltage

#### ◆ How To Order

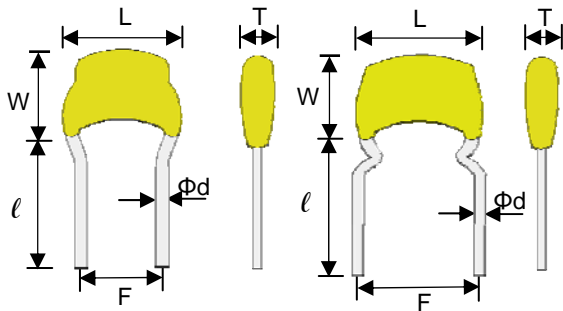


Product Code	Dielectric	Capacitance Unit : pF	Tolerance	Rated Voltage	Leader Space	Leader Style	Packaging
RDC: Radial Ceramic Chip Capacitor	Ex.: N: NPO X: X7R	Ex.: 2R0:2.0pF 100:10×10 <sup>0</sup> 471:47×10 <sup>1</sup> 102:10×10 <sup>2</sup>	Ex.: C: +/-0.25pF D: +/-0.50pF J : +/- 5% K : +/-10% M: +/-20%	Ex.: 251:250Vdc 631:630Vdc 102:1000Vdc	EX: 2 : 2.50mm 5 : 5.00mm	EX: Size DD:4.0x5.5 ED:5.5x7.0 FD:7.5x8.0 DK:4.0x5.5 EK:5.5x7.0 FK:7.5x8.0	T: Taping & Reel B: Bulk

## ◆ Dimension

### D.Type

### K.Type



Unit : mm [inches]

TYPE	L (max)	W (max)	T (max)	F		ℓ		ϕd
				2.5±0.8 [0.098]	5.0±1 [0.196]	5.0 [0.196]	25 [0.982]	
D□	4.0 [0.157]	5.5 [0.216]	2.5 [0.098]	2.5±0.8 [0.098]	5.0±1 [0.196]	5.0 [0.196]	25 [0.982]	0.5±0.1 [0.196]
E□	5.5 [0.216]	7.0 [0.275]	4.0 [0.157]	2.5±0.8 [0.098]	5.0±1 [0.196]	5.0 [0.196]	25 [0.982]	0.5±0.1 [0.196]
F□	7.5 [0.294]	8.0 [0.314]	4.0 [0.157]	-----	5.0±1 [0.196]	5.0 [0.196]	25 [0.982]	0.5±0.1 [0.196]

## ◆ Capacitance Range

Dielectric Characteristic	Type	Rated Voltage	Capacitance Range (pF)																																									
			100	120	150	180	220	270	330	390	470	560	680	820	101	121	151	181	221	271	331	391	471	561	681	821	102	122	152	182	222	272	332	392	472	562	682	822	103	153	223	333	473	683
NPO	D□	50V	[Blue bar]																																									
		100V	[Blue bar]																																									
		250V	[Blue bar]																																									
		500V	[Blue bar]																																									
	E□	50V	[Blue bar]																																									
		100V	[Blue bar]																																									
		250V	[Blue bar]																																									
		500V	[Blue bar]																																									
		630V	[Blue bar]																																									
	F□	50V	[Blue bar]																																									
		100V	[Blue bar]																																									
		250V	[Blue bar]																																									
500V		[Blue bar]																																										
		630V	[Blue bar]																																									

Dielectric Characteristic	Type	Rated Voltage	Capacitance Range (pF)																							
			102	152	222	332	472	682	103	153	223	333	473	683	104	154	224	334	474	684	105	155	225	335	475	685
X7R	D□	16V	[Blue bar]																							
		25V	[Blue bar]																							
		50V	[Blue bar]																							
		100V	[Blue bar]																							
		250V	[Blue bar]																							
		500V	[Blue bar]																							
	E□	16V	[Blue bar]																							
		25V	[Blue bar]																							
		50V	[Blue bar]																							
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		500V	[Blue bar]																							
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		50V	[Blue bar]																							
		100V	[Blue bar]																							
		250V	[Blue bar]																							
		500V	[Blue bar]																							
		630V	[Blue bar]																							
		1KV	[Blue bar]																							

## RDC Series Specification & Test Condition

Item	Specification	Test Condition		
<b>Operation Temperature</b>	Please see RDC specification data sheet			
<b>Visual</b>	No abnormal exterior appearance	Visual Inspection		
<b>Capacitance</b>	Within The Specified Tolerance	Class      Frequency      Voltage		
<b>Quality Factor</b>	ClassI(NPO): More Than 30pF : $Q \geq 1000$ 30pF & Below: $Q \geq 400 + 20C$ (C:Cap., pF)	NPO C $\leq$ 100pF    1MHz $\pm$ 10%      1.0 $\pm$ 0.2Vrms C $>$ 100pF      1KHz $\pm$ 10%		
		X7R,X5R,Y5V C $\leq$ 10uF    1KHz $\pm$ 10%      1.0 $\pm$ 0.2Vrms C $>$ 10uF    120Hz $\pm$ 20%      0.5 $\pm$ 0.2Vrms		
<b>Dissipation Factor</b>	ClassII(X7R,X5R,Y5V): Please see RDC specification data sheet	Perform a heat temperature at 150 $\pm$ 5 $^{\circ}$ C for 30min. then place room temp. for 24 $\pm$ 2hr.		
<b>Insulation Resistance</b>	10,000M $\Omega$ or 500/C $\Omega$ whichever is smaller for rated voltage $>$ 10V and greater 100/C $\Omega$ for rated voltage $\leq$ 10V	Applied Voltage: Rated Voltage Charge Time : 60 $\pm$ 5 sec. Charge-Discharge current shall be less than 50mA current..		
<b>Withstanding Voltage</b>	No dielectric breakdown or mechanical breakdown	V $\leq$ 50 : 250% Rated Voltage V < 500V : 200% Rated Voltage 500V $\leq$ V < 1000V: 150% Rated Voltage 1000 $\leq$ V :120% Rated Voltage for 1~5 sec. Current is limited to less than 50mA.		
<b>Temperature Capacitance Coefficient</b>	Char.	Temp. Range	Cap. Change	ClassI: [C2-C1/C1(T2-T1)] $\times$ 100% ClassII: (C2-C1)/C1 $\times$ 100% T1:Standard Temperature(25 $^{\circ}$ C) T2:Test Temperature C1:Capacitance At Standard Temperature C2:Capacitance At Test Temperature
	NPO (N)	-55 $^{\circ}$ C~ +125 $^{\circ}$ C	$\pm$ 30ppm/ $^{\circ}$ C	
	X7R (X)	-55 $^{\circ}$ C~ +125 $^{\circ}$ C	$\pm$ 15%	
	X5R (B)	-55 $^{\circ}$ C~+85 $^{\circ}$ C	$\pm$ 15%	
	Y5V (Y)	-30 $^{\circ}$ C~+85 $^{\circ}$ C	+22% ~-82%	
<b>Lead Strength</b>	Tensile Strength	No mechanical damage such as lead breakage and loosing.	With holding the parts, apply pulling force to lead drawing direction gradually. Pulling strength: 5N Holding time: 10 $\pm$ 1s	
	Bending Strength	No mechanical damage such as lead breakage and loosing.	With holding the capacitors to keep the axis vertical, bend it 90 degrees with weighting and put it back to the original position. This operation shall be done for 2~3s. and repeat the following times. Bending forth: 5N(weight :0.51kg) Testing time : 2 times	
<b>Solderability</b>	Leads shall be covered by new solder more than 75% of its surface	Completely soak both terminations in solder at 235 $\pm$ 5 $^{\circ}$ C for 2 $\pm$ 0.5s Solder : H63A Flux :Rosin Dipping :By 1.5~2.0mm form the root of lead		
<b>Resistance to Soldering Heat</b>	Appearance	No mechanical damage shall occur	Completely soak both terminations in solder at 250 $\pm$ 5 $^{\circ}$ C for 5 $\pm$ 1s	
	Capacitance	ClassI(NPO): Within 2.5% or $\pm$ 0.25pF whichever is larger of initial value ClassII X7R,X5R : $\leq \pm$ 10% of initial value Y5V : $\leq \pm$ 20% of initial value	Solder : H63A Flux :Rosin Dipping :By 1.5~2.0mm form the root of lead	
	Q / Tan $\delta$	To satisfy the specified initial value		
	Insulation Resistance	To satisfy the specified initial value		

**RDC Series Specification & Test Condition**

Item	Specification	Test Condition																
<b>Temperature Cycle</b>	Appearance	No mechanical damage shall occur																
	Capacitance	ClassI(NPO): Within 2.5% or $\pm 0.25\text{pF}$ whichever is larger of initial value ClassII(X7R,X5R): Within $\pm 7.5\%$ of initial value ClassII(Y5V): Within $\pm 20\%$ of initial value	ClassII capacitor shall be set for $48 \pm 4$ hours at room temperature after one hour heat treatment at $150 \pm 0/-10$ °C before initial measure. Capacitor shall be subjected to five cycles of the temperature cycle as following:															
	Q / Tan $\delta$	see RDC specification data sheet	<table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°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.(°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.(°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																
Insulation Resistance	To satisfy the specified initial value	Measure at room temperature after cooling for ClassI: $24 \pm 2$ Hours ClassII: $48 \pm 4$ Hours																
<b>Humidity</b>	Appearance	No mechanical damage shall occur																
	Capacitance	ClassI(NPO): Within 5% or $\pm 0.5\text{pF}$ whichever is larger of initial value ClassII(X7R,X5R): Within $\pm 15\%$ of initial value ClassII(Y5V): Within $\pm 30\%$ of initial value	ClassII capacitor shall be set for $48 \pm 4$ hours at room temperature after one hour heat treatment at $150 \pm 0/-10$ °C before initial measure.  Temperature : $40 \pm 2$ °C Relative Humidity : 90 ~95%RH Test Time : $500 \pm 12/-0$ hr Measure at room temperature after cooling for ClassI: $24 \pm 2$ Hours ClassII: $48 \pm 4$ Hours															
	Q / Tan $\delta$	ClassI(NPO): 30pF & Over : $Q \geq 350$ 10 to 30pF : $Q \geq 275 + 2.5C$ 30pF & Below: $Q \geq 200 + 10C$ ClassII(X7R,X5R,Y5V): see RDC specification data sheet																
	Insulation Resistance	1,000M $\Omega$ or 50/C $\Omega$ whichever is smaller for rated voltage >10V and greater 10/C $\Omega$ for rated voltage $\leq 10V$																
	<b>High Temperature Load (Life Test)</b>	Appearance	No mechanical damage shall occur															
Capacitance		ClassI(NPO): Within 5% or $\pm 0.5\text{pF}$ whichever is larger of initial value ClassII(X7R,X5R): Within $\pm 15\%$ of initial value ClassII(Y5V): Within $\pm 30\%$ of initial value	ClassII capacitors applied DC testing voltage is applied for one hour at maximum operation temperature $\pm 3$ °C then shall be set for $48 \pm 4$ hours at room temperature and the initial measurement shall be conducted. Applied Voltage: $V \leq 50\text{Vdc}$ 200% Rated Voltage $V \leq 250\text{Vdc}$ 150% Rated Voltage $V < 1\text{KVdc}$ 120% Rated Voltage $V \geq 1\text{KV}$ 100% Rated Voltage															
Q / Tan $\delta$		ClassI(NPO): More Than 30pF : $Q \geq 350$ 30pF & Below: $Q \geq 275 + 2.5C$ ClassII(X7R,X5R,Y5V): see RDC specification data sheet	However: The rated voltage is 6.3V/10V, applied voltage of 100% Rated voltage. 150% Rated Voltage for $C \geq 1.0\mu\text{F}$ and 200% Rated Voltage for $C < 1.0\mu\text{F}$ . Temperature: max. operation temperature Test Time : $1000 \pm 48/-0$ Hr Current Applied : 50mA Max Measure at room temperature after cooling for ClassI: $24 \pm 2$ Hours ClassII: $48 \pm 4$ Hours															
Insulation Resistance		1,000M $\Omega$ or 50/C $\Omega$ whichever is smaller for rated voltage >10V and greater 10/C $\Omega$ for rated voltage $\leq 10V$																
<b>Vibration</b>		Appearance	No mechanical damage shall occur															
	Capacitance	Within the specified tolerance																
	Q / Tan $\delta$	To satisfy the specified initial value	Solder the capacitor on P.C. Board Vibrate the capacitor with amplitude of 1.5mm P-P changing the frequencies from 10Hz to 55Hz and back to 10Hz in about 1min. Repeat this for 2 hours each in 3perpendicular directions.															