

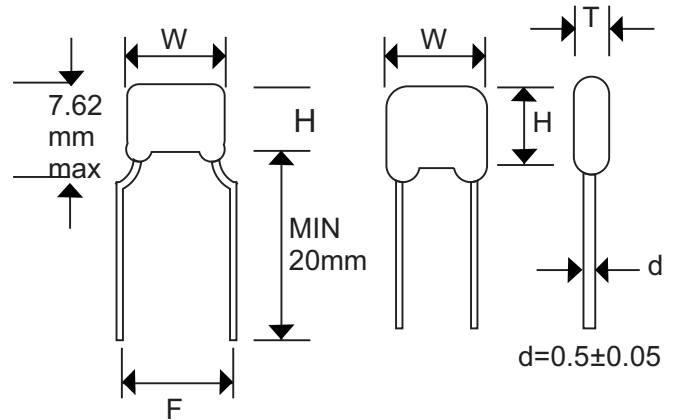
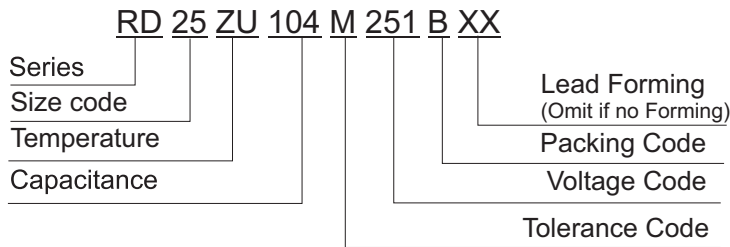
### INTRODUCTION

Radial Leded Multilayer Ceramic Capacitors are made with a superior epoxy coating for moisture and mechanical protection. The small size is suitable for a wide range of applications, including: data processing, telecommunications, instrumentation, and industrial controls.

### FEATURES

- Epoxy Coating
- Minature Size
- Auto Insertable
- Reliable

### PART NUMBER EXAMPLE



### SIZE CODE & CAPACITANCE RANGE

Size Code	Dimensions (mm)			Voltage Vdc	Voltage Code	X7R (µf)	X5R (µf)	Y5V (µf)	Z5U (µf)
	W	H	T						
RD2 *	4.0	4.0	2.5	6.3V	060		1.50 ~ 10.00	4.70 ~ 22.00	
				10V	100		0.33 ~ 4.70	2.20 ~ 10.00	
				16V	160	0.22 ~ 2.20	0.15 ~ 2.2	1.00 ~ 4.70	
				25V	250	0.10 ~ 1.50	0.10 ~ 1.0	0.47 ~ 2.20	0.47 ~ 2.20
				50V	500	0.00022 ~ 0.33	0.10 ~ 1.00	0.1 ~ 1.00	0.1 ~ 1.00
				100V	101	0.00022 ~ 0.10			
				250V	251	0.001 ~ 0.033			
RD3 *	5.0	5.0	3.0	6.3V	060		10.00 ~ 22.00	47 ~ 100.0	
				10V	100		6.80 ~ 10.00	22 ~ 47.0	
				16V	160	0.30 ~ 4.70	1.5 ~ 10.00	10 ~ 22	
				25V	250	0.68 ~ 2.20		4.7 ~ 10	
				50V	500	0.47 ~ 1.00		2.2 ~ 4.7	
				100V	101	0.033 ~ 0.47			
				250V	251	0.015 ~ 0.15			
500V	501	0.001 ~ 0.033							

- \* 2 = 2.5mm ± 1mm Lead Spacing, F Dimension
- \* 5 = 5.0mm ± 1mm Lead Spacing, F Dimension

### CAPACITANCE CODE EXAMPLES

Code	221	102	222	103	473	104	105	106
Capacitance in µF	0.00022µF	0.001µF	0.0022µF	0.01µF	0.047µF	0.1µF	1.0µF	10µF
Capacitance in pF	220pF	1,000pF	2,200pF	10,000pF	47,000pF	100,000pF	1,000,000pF	10,000,000pF

■ TOLERANCE CODE

Code	Cap. Tol.
C	±0.25pF
D	±0.5pF
F	±1%
G	±2%
J	±5%
K	±10%
M	±20%
Z	±80%, -20%

■ TEMPERATURE COEFFICIENT

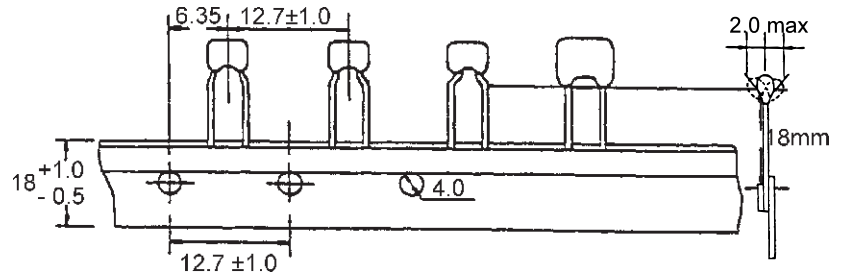
Code	Temp. Charact.	Temperature Range	Capacitance Change
CG	C0G/NPO	-55 ~ 125°C	0±30 ppm/°C
X5R	X5R	-55 ~ 85°C	±15%
XR	X7R	-55 ~ 125°C	±15%
YV	Y5V	-30 ~ 85°C	+22%, -82%
ZU	Z5U	+10 ~ 85°C	+22%, -56%

\* See other RD Series for COG/NPO

■ TAPING & PACKAGING

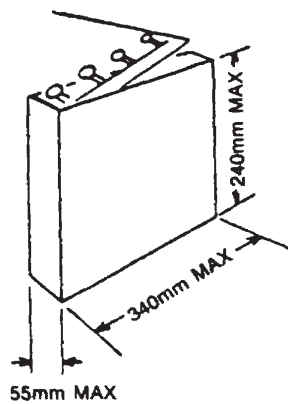
■ PACKAGING CODE

Code	Style	Quantity
B	BULK	1000
A	AMMO	3000
R	REEL	3000

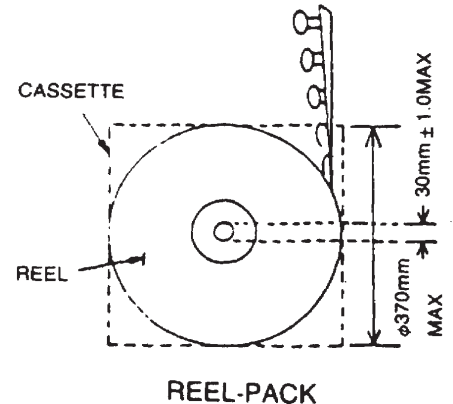


■ Lead Forming

Code	Stand off forming
KO	Kink Out
KI	Kink In



AMMO BOX



REEL-PACK

■ LEAD LENGTH EXAMPLE (Bulk Only)

Code	20	04	10	16	30
Length (mm)	standard	4±1	10±1	16± <sup>1.5</sup> <sub>1</sub>	30±3

■ **ELECTRICAL CHARACTERISTICS**

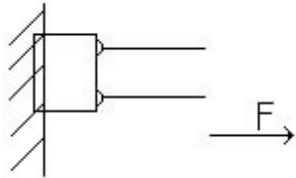
X7R/X5R/Y5V/Z5U

Parameter	Specification	Measuring Condition
Capacitance	With the specified tolerance	
Dissipation Factor (tanδ)	25V min X7R= 0.03max X7R= 0.055max.(C ≥ 1.0uF) Y5V= 0.075max	Shall be measured at 25°C ± 2°C at the frequency and voltage
	16V Z5U= 0.09max X7R/X5R=0.05max.	
	10V max Y5V= 0.10max X7R/X5R=0.05max. Y5V= 0.125max	Z5U @ 1Hz ± 10%, 0.5±0.2Vrms
	6.3V X5R= 0.075max	
Withstanding Voltage	No defects	Applied voltage: Rated voltage X 2.5 100V~500V Rated voltage (over) X 1.5 Duration: 1 to 5 sec. The charge/discharge current is less than 50mA
Insulation Resistance	More than 10GΩ or 500MΩ · μF whichever is less 16Vdc product : More than 10GΩ or 100MΩ · μF whichever is less	Apply rated voltage for 1 minute at 25°C ± 2°C and 70% R.H. max 16Vdc product : Measurement voltage is 25Vdc

■ **STORAGE**

1. The storage conditions < 40°C, < 70% R.H.
2. After opening the package, please store in desiccators.

■ **ENVIRONMENTAL AND TEST CHARACTERISTICS**

Parameter	Specification	Measuring Condition
Strength of termination	Termination not to be broken or loosened Force : 2 LB min. Keep time : 10±1 sec.	
Solderability of leads	Lead wire to be soldered vertically up to the coating end point. At least 75% of lead surface is covered	Solder temperature: 260 ± 5°C Dipping: 2 ± 0.5 sec. (Containing Ag 2~5%) (Flux shall be used)

### ELECTRICAL CHARACTERISTICS

#### X7R/X5R/Y5V/Z5U

Item	Temperature Compensating	Measuring Condition	Measuring Condition															
		<b>Resistance to Soldering heat</b>	<b>Thermal shock</b>															
$\Delta C$	X7R/X5R= $\pm 7.5\%$ Y5V= $\pm 20\%$ Z5U= $\pm 20\%$	The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at $260 \pm 5^\circ\text{C}$ for $10 \pm 0.5\text{sec}$																
D.F.	25V min X7R= 0.03max X7R= 0.055max.( $C \geq 1.0\mu\text{F}$ ) Y5V= 0.075max Z5U= 0.09max	Let sit at room temperature for $48 \pm 4\text{hrs.}$ then measure.  • Initial measurement for perform a heat treatment at $150^{+0}_{-10}^\circ\text{C}$ for 1 hours. Remove and let sit for $48 \pm 4\text{hrs.}$ At room temperature.  Perform the initial measurement.	Perform the five cycles according to the four heat treatments listed in the following table. Remove and let sit at room temperature for $48 \pm 4\text{hrs.}$ , then measure. <table border="1" data-bbox="1083 797 1562 927"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp. (<math>^\circ\text{C}</math>)</td> <td>Min. Operating Temp.</td> <td>Room Temp.</td> <td>Max. Operating Temp.</td> <td>Room Temp.</td> </tr> <tr> <td>Time</td> <td><math>30 \pm 3</math></td> <td>15</td> <td><math>30 \pm 3</math></td> <td>15</td> </tr> </tbody> </table> • Initial measurement for perform a heat treatment at $150^{+0}_{-10}^\circ\text{C}$ for 1 hours. Remove and let sit for $48 \pm 4\text{hrs.}$ At room temperature.  Perform the initial measurement.	Step	1	2	3	4	Temp. ( $^\circ\text{C}$ )	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	Time	$30 \pm 3$	15	$30 \pm 3$	15
	Step			1	2	3	4											
	Temp. ( $^\circ\text{C}$ )			Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.											
	Time			$30 \pm 3$	15	$30 \pm 3$	15											
16V X7R/X5R=0.05max. Y5V= 0.10max																		
10V max X7R/X5R=0.05max. Y5V= 0.125max																		
6.3V X5R= 0.075max																		
I.R.	More than $10\text{G}\Omega$ or $500\text{M}\Omega \cdot \mu\text{F}$ , whichever is less. 16V dc product: More than $10\text{G}\Omega$ or $100\text{M}\Omega \cdot \mu\text{F}$ , whichever is less.																	

Item	Temperature Compensating	Measuring Condition	Measuring Condition
		<b>Moisture resistance (Steady state)</b>	<b>High temperature loading</b>
$\Delta C$	X7R/X5R= $\pm 15\%$ Y5V= $\pm 30\%$ Z5U= $\pm 30\%$	Apply the rated DC voltage at $40 \pm 2^\circ\text{C}$ and 90 to 95% R.H. for $500^{+24}_{-0}$ hrs.	Apply the 200% of rated DC voltage for $1000^{+48}_{-0}$ hrs. at the maximum operating temperature $\pm 2^\circ\text{C}$ . Remove and let sit at room temperature for $48 \pm 4\text{hrs.}$ , then measure.
D.F.	25V min X7R= 0.06max X7R= 0.11max.( $C \geq 1.0\mu\text{F}$ ) Y5V= 0.1125max Z5U= 0.135max	Remove and let sit at room temperature for $48 \pm 4\text{hrs.}$ then measure.  • Initial measurement for perform a heat treatment at $150^{+0}_{-10}^\circ\text{C}$ for 1 hours. Remove and let sit for $48 \pm 4\text{hrs.}$ At room temperature.  Perform the initial measurement.	The charge/discharge current is less than 50mA.  • Initial measurement for Apply 200% of the rated DC voltage for 1 hour at the maximum operating temperature $\pm 2^\circ\text{C}$ . Remove let sit at room temperature for $48 \pm 4\text{hrs.}$  Perform the initial measurement. * 100% for 100V~500V
	16V X7R/X5R=0.10max. Y5V= 0.15max		
	10V max X7R/X5R=0.10max. Y5V= 0.1875max		
	6.3V X5R= 0.15max		
I.R.	More than $1000\text{G}\Omega$ or $50\text{M}\Omega \cdot \mu\text{F}$ , whichever is less. 16V dc product: More than $1000\text{G}\Omega$ or $10\text{M}\Omega \cdot \mu\text{F}$ , whichever is less.		