

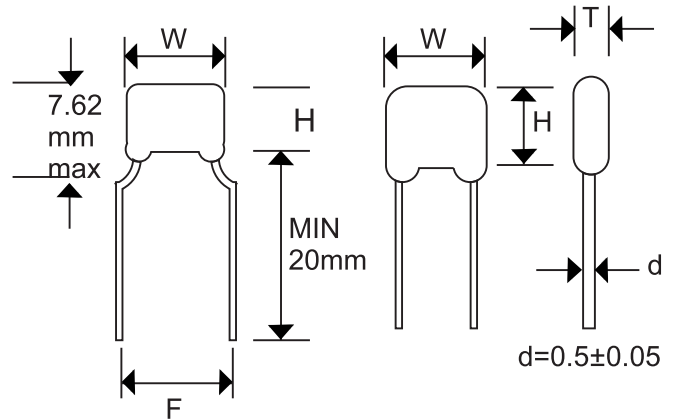
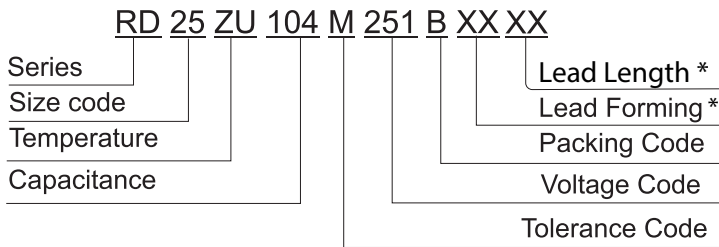
INTRODUCTION

Radial Leaded 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
- Miniature Size
- Auto Insertable
- Reliable

PART NUMBER EXAMPLE



*omit for standard leads and taped product

SIZE CODE & CAPACITANCE RANGE

Size Code	Dimensions (mm)			Voltage Vdc	Voltage Code	COG/NPO (pf)	X7R (µf)	X5R (µf)	Y5V (µf)	Z5U (µf)
	Wmax	Hmax	Tmax							
RD2 *	4.0	4.0	2.5	6.3V	60			1.50~10.00	4.70~22.00	
				10V	100			0.33~4.70	2.20~10.00	
				16V	160	022.~2.20	0.15~2.2	1.00~4.70		
				25V	250	0.10~1.50	0.10~1.0	0.47~2.20	0.47~2.22	
				50V	500	1~10,000	0.00022~0.33	0.10~1.0	0.1~1.00	0.1~1.00
				100V	101	1~4,700	0.00022~0.10			
				250V	251	100~2,700	0.001~0.033			
RD3 *	5.1	5.1	4.0	6.3V	60			10~22.00	47~100.0	
				10V	100			6.80~10.00	22~47.0	
				16V	160	0.30~04.70	1.5~10.00	10~22		
				25V	250	0.68~2.20		4.7~10		
				50V	500	3,900~33,000	0.47~1.00	2.2~4.7		
				100V	101	3,900~10,000	0.033~0.47			
				250V	251	3,000~8,200	0.015~0.15			
				500V	501	100~3,300	0.001~0.033			

Note: Contact RFE for capacitance and voltage combinations not shown above.

CAPACITANCE CODE EXAMPLES

Code	1R0	100	330	221	102	222	103	104	224	105
Capacitance in pF	1.0pF	10pF	33pF	220pF	1,000pF	2,200pF	10,000pF	100,000pF	220,000pF	
Capacitance in µF				0.00022µF	0.001µF	0.0022µF	0.01µF	0.1µF	0.22µF	1.0µF

■ **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	COG/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%

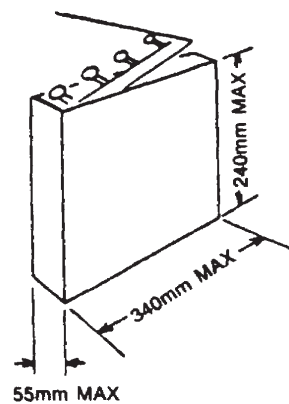
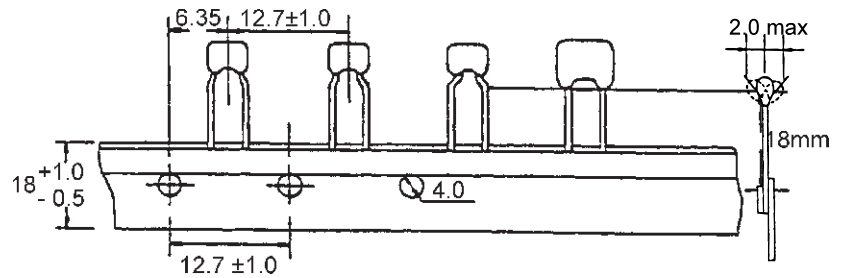
* See other RD Series for COG/NPO

■ **PACKAGING CODE**

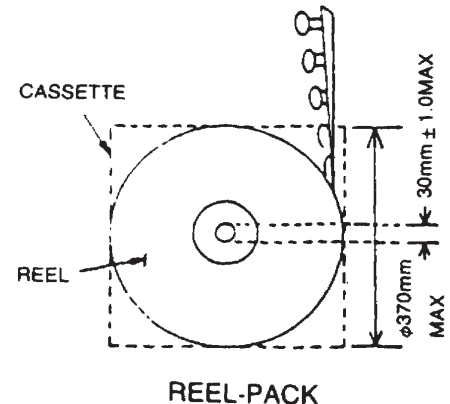
Code	Style	Quantity
B	BULK	1000
A	AMMO	3000
R	REEL	3000

■ **LEAD FORMING**

Code	Stand off forming
KO	Kink Out
KI	Kink In



AMMO BOX



REEL-PACK

■ **LEAD LENGTH EXAMPLE (BULK ONLY)**

Code	20	4.0	4.5	5.0	5.5
Length (mm)	standard	4±1	4.5±1	5±1	5.5±1

■ ELECTRICAL CHARACTERISTICS COG/NPO

Parameter	Specification	Measuring Condition	
Capacitance	with the specified tolerance	Shall be measured at 25°C ± 2°C at the frequency and voltage C ≤ 1000pF @ 1MHz ± 20%, 1 ± 0.2Vrms, C > 1000pF @ 1KHz ± 10%, 1 ± 0.2Vrms	
Q	C ≥ 30pF: Q < 30pF: Q ≥ 1000 C < 30pF: Q ≥ 400 + 20 × C (C is nominal capacitance)		
Withstanding Voltage	no defects	Applied Voltage: Rated Voltage × 2.5 100V~500V Rated voltage (over) × 1.5 Duration: 1 to 5 sec. The charge/discharge current is less than 50mA	
Insulation Resistance	More than 10GΩ or 50MΩ0μF (whichever is less) 16Vdc product: More than 10GΩ or 100MΩ0μF (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	
		Resistance to Soldering Heat	Thermal Shock
ΔC	±2% or ±0.25pF (whichever is greater)	The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at 260 ± 5°C for 10 ± 0.5 sec.	
Q	C ≥ 30pF: Q ≥ 1000 C < 30pF: Q ≥ 400 + 20 × C (C is nominal capacitance)	Let sit at room temperature for 24 ± 2 hours, then measure	Perform the five cycles according to the four heat treatments listed in the following table. Remove and let sit at room temperature for 24 ± 2 hours, then measure. [See Table A, below] Perform the initial measurement.
I.R.	More than 1000MΩ or 50MΩ0μF (whichever is less) 16Vdc product: More than 1000GΩ or 10MΩ0μF (whichever is less)	Perform the initial measurement	
		Moisture Resistance (steady state)	High Temperature Loading
ΔC	±2% or ±0.25pF (whichever is greater)	The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at 260 ± 5°C for 10 ± 0.5 sec.	
Q	C ≥ 30pF: Q ≥ 1000 C < 30pF: Q ≥ 400 + 20 × C (C is nominal capacitance)	Let sit at room temperature for 24 ± 2 hours, then measure	Perform the five cycles according to the four heat treatments listed in the following table. Remove and let sit at room temperature for 24 ± 2 hours, then measure. [See Table A, below] Perform the initial measurement.
I.R.	More than 1000MΩ or 50MΩ0μF (whichever is less) 16Vdc product: More than 1000GΩ or 10MΩ0μF (whichever is less)	Perform the initial measurement	

Table A

Step	1	2	3	4
Temp. (°C)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.
Time	30 ± 3	15	30 ± 3	15

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≥ 1.0μF) Y5V=0.075max	Shall be measured at 25°C± 2°C at the frequency and voltage X7R/X5R/Y5V @ 1Hz ± 10%, 1 ± 0.2Vrms Z5U @ 1Hz ± 10%, 0.5 ± 0.2Vrms	
	16V	Z5U=0.09max X7R/X5R=0.05max		
	10V max	Y5V=0.10max X7R/X5R=0.05max Y5V=0.125max		
	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 500MΩ0μF (whichever is less) 16Vdc product: More than 10GΩ or 100MΩ0μF (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	
	Specification		Resistance to Soldering Heat	Thermal Shock
ΔC	X7R/X5R= ±7.5% Y5V=±20% Z5U=±20%		The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at 260 ± 5°C for 10±0.5 sec.	
D.F.	25V min	X7R=0.03max X7R=0.055max (C≥ 1.0μF) Y5V=0.075max	Let sit at room temperature for 48 ±4 hours then measure. *Initial measurement perform a heat treatment at 150°C± 10°C for 1 hours Remove and let sit for 48 ±4 hours at room temperature. Perform the initial measurement.	Perform the five cycles according to the four heat treatments listed in the Table B (below). Remove and let sit at room temperature for 48 ±4 hours, then measure.
	16V	Z5U=0.05max X7R/X5R=0.10max		
	10V max	X7R/X5R=0.05max Y5V=0.125max		
	6.3V	X5R=0.075max		
I.R.	More than 10GΩ or 500MΩ0μF (whichever is less) 16Vdc product: More than 10GΩ or 100MΩ0μF (whichever is less)			
	Specification		Moisture Resistance (steady state)	High Temperature Loading
ΔC	X7R/X5R= ±15% Y5V= ±30% Z5U= ±30%		Apply the rated DC voltage at 40°C ±2°C and 90 to 95% R.H. for 500 +24 -0 hrs. Remove and let sit at room temperature for 48 +4 hrs. *Initial measurement perform a heat treatment at 150°C± 10°C for 1 hour. Remove and let sit for 48 ±4 hours at room temperature Perform the initial measurement	Apply the 200% of rated DC voltage for 1000± 48 hours at the maximum operating temperature at ±2°C. Remove and let sit for 48±4 hours then measure. 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 ± 2°C. Remove let sit at room temperature for 48 ± 4 hours. Perform the initial measurement. *100% for 100V~500V
D.F.	25V min	X7R=0.03max X7R=0.055max (C≥ 1.0μF)		
	16V	Z5U=0.09max X7R/X5R=0.05max		
	10V max	Y5V=0.10max X7R/X5R=0.05max Y5V=0.125max		
6.3V	X5R=0.075max			
I.R.	More than 10GΩ or 50MΩ0μF (whichever is less) 16Vdc product: More than 1000GΩ or 10MΩ0μF (whichever is less)			

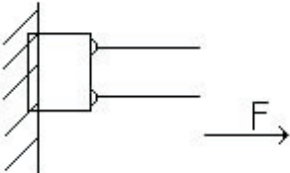
Table B

Step	1	2	3	4
Temp. (°C)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.
Time	30±3	15	30±3	15

■ **STORAGE**

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

■ **ENVIRONMENTAL & 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)