



## Radial Leaded, Epoxy Dipped Multilayer Ceramic Capacitors

**Capacitance Range:** 10PF to 100,000PF

**Capacitance Test:** @25°C

NP0, X7R: 1.0±0.25VRMS and 1KHz, 1MHz

for values below 100PF.

### Capacitance Tolerance:

NP0: C=±0.25PF (10PF and below)

D=±0.5PF (10PF and below)

J=±5% (10PF and below)

K=±10% (5.6PF and below)

X7R: K=±10%

M=±20%

Y5V: M=±20%

Z=+80% -20%

Y5V: 0.5VRMS maximum and 1KHz

### Dissipation Factor:

NP0: 0.1% max @25°C, 1.0±0.25VRMS and 1KHz. 1MHz for values below 100PF.

X7R: 2.5% max @25°C, 1.0±0.25VRMS and 1KHz.

Y5V: 5.0% max @25°C, 0.5VRMS max and 1KHz.

**Working Voltage:** 25V, 50V and 100Vdc

### Temperature Characteristics:

NP0: 0±30ppm°C, -55°C to +125°C

X7R: ±15%ΔC, -55°C to +125°C

Y5V: +22-82% ΔC, -25°C to +85°C

### Dielectric Strength:

NP0, X7R: 250% rated voltage with 50mA maximum charging current

Y5V: 200% rated voltage with 50mA maximum charging current

### Insulation Resistance:

NP0, X7R: 100,000 Megohms min. or 1000 ohm-farads min., whichever is less at 25°C.

Y5V: 10,000 Megohms min. or 1000 ohm-farads min., Whichever is less at 25°C.

### Life Test: [ 1,000 hrs ]

NP0, X7R: 200% rated voltage at +125°C.

Y5V: 150% rated voltage at +85°C.

### Humidity Resistance: [MIL-STD-202 Method 106]

NP0, X7R, Y5V: 96hrs at 40°C related humidity 90~95%.

### Mechanical Specification:

Cast: Conformal coating (epoxy)

Lead Material: Solder coated, copper

Package Method: Bulk, Tape & Ammo

Solderability: [MIL-STD-202, Method 208]

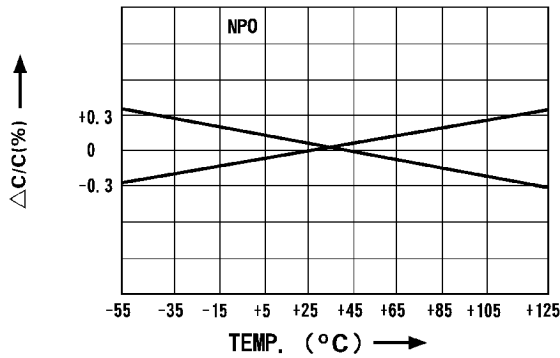
Leach Resistance: Temp 230°C, 20 seconds immersion in SN62

### Thermal Shock: [MIL-STD-202 Method 107, condition A]

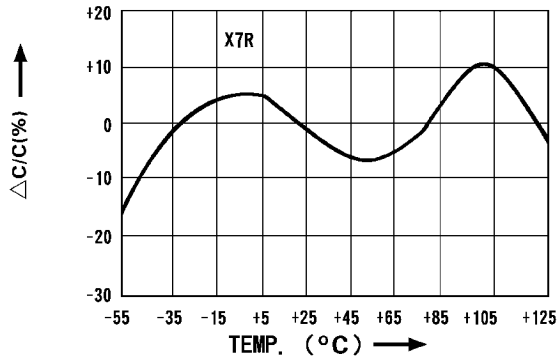
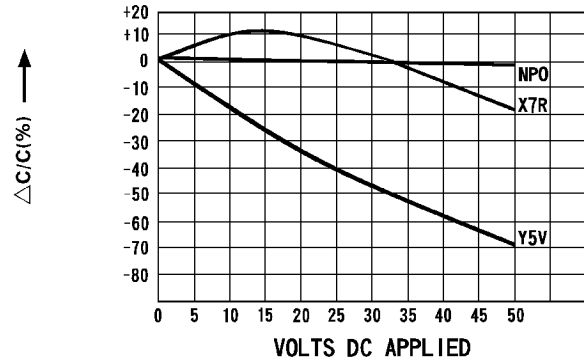


# TYPICAL CHARACTERISTICS

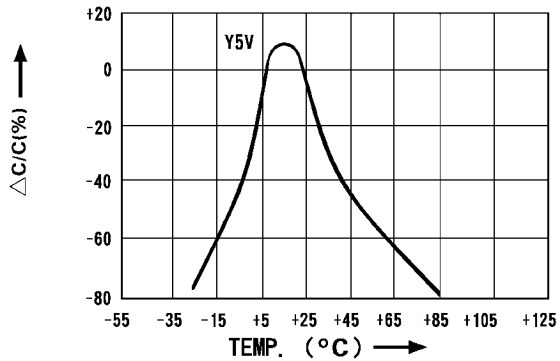
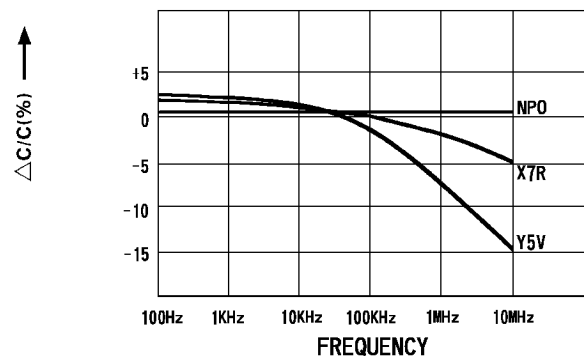
### TEMPERATURE COEFFICIENT



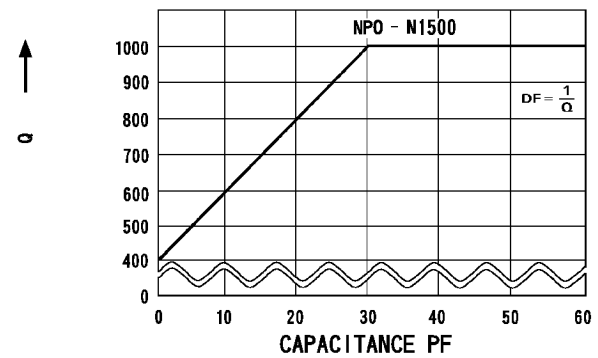
### DC VOLTAGE COEFFICIENT



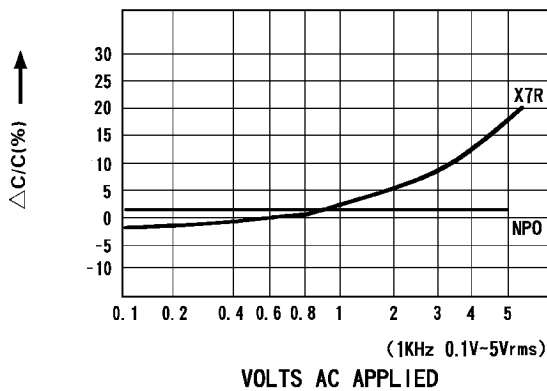
### $\Delta$ CAPACITANCE VS FREQUENCY



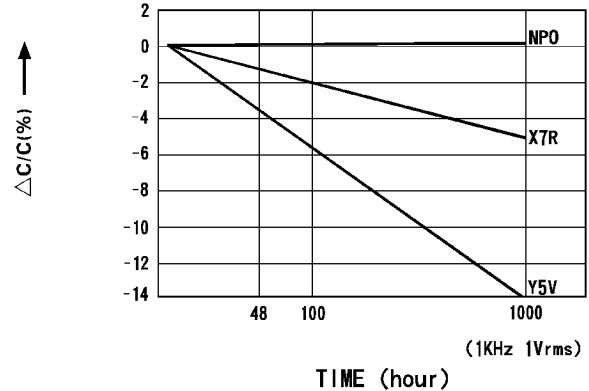
### DF AND Q



### AC VOLTAGE COEFFICIENT



### AGING RATE





## Radial Leaded, Epoxy Dipped Multilayer Ceramic Capacitors

Parts Number System									
R	20	X7R	104	K	5	H	5	05	Y
1)	2)	3)	4)	5)	6)	7)	8)	9)	10)

**1) Product Type:**

R: Mono Radial  
(Radial Lead)

**7) Lead Style:**

L= Straight leads  
H= High seated & right angle

**2) Size Code:**

See sizechart for available size by capacitance and voltage

**8)Lead length:**

3= 3mm  
4= 4mm  
S= 5mm  
6= 6mm  
7= 7mm  
8= 8mm  
9= 9mm  
M= 10mm  
L= 25mm  
T= Tape & Reel  
A= Ammo Box

**3)Temp. Char.:**

NPO (COG)  
X7R  
Y5V

**4)Capacitance:**

101=10x10=100PF  
222=22x100=2,200PF  
103=10x1000  
=10,000PF

**5)Tolerance:**

C=  $\pm 0.25$ PF  
D=  $\pm 0.5$ PF  
J=  $\pm 5\%$   
K=  $\pm 10\%$   
M=  $\pm 20\%$   
Z= +80%-20%

**9)Rated Voltage:**

02= 25V dc  
05= 50V dc  
10= 100V dc  
20= 200V dc

**6) Lead Space:**

2= 2.54mm (0.10")  
5= 5.08mm (0.20")

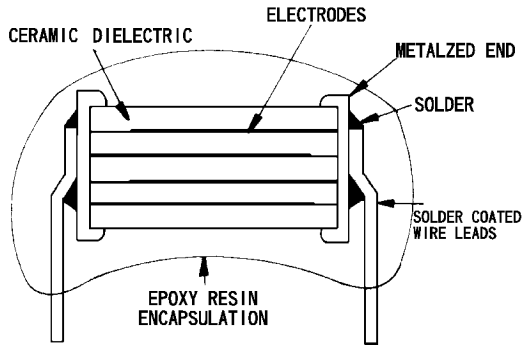
**10)Color:**

Y= Yellow

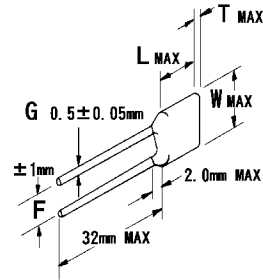


# STYLE OF RADIAL LEADED

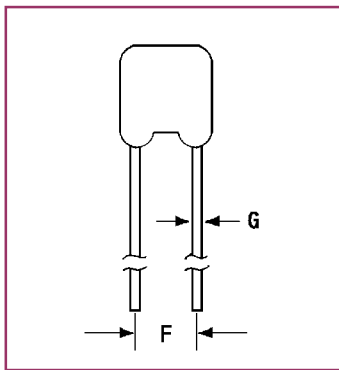
## MONOLITHIC CONSTRUCTION



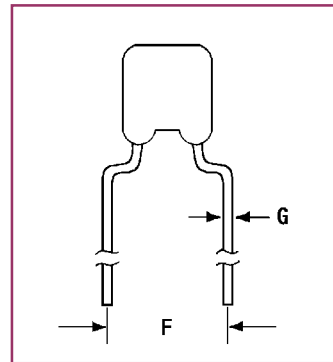
## CASE SIZE



## LEAD STYLES:



STYLE L  
STRAIGHT LEAD



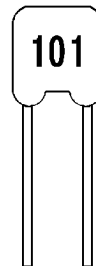
STYLE H  
HIGH SEATED ASSEMBLY

## SIZE CODE and DIMENSIONS: Units in millimeter

SIZE CODE	L	W	T	LEAD DIAMETER(G)	LEAD LENGTH(L)	LEAD SPACE (F)	LEAD STYLES
R15	3.8mm	3.8mm	2.8mm	0.5±0.05mm	3.0 ~ 32mm	2.54mm	L
R15	3.8mm	3.8mm	2.8mm	0.5±0.05mm	3.0 ~ 32mm	5.08mm	H
R20	5.1mm	5.1mm	3.2mm	0.5±0.05mm	3.0 ~ 32mm	2.54mm	L
R20	5.1mm	5.1mm	3.2mm	0.5±0.05mm	3.0 ~ 32mm	5.08mm	H

## MARKING

The mark of capacitance value.





**Radial Leaded, Epoxy Dipped Multilayer Ceramic Capacitors**

T. C.		NP0		X7R		Y5V	
SIZE		R15	R20	R15	R20	R15	R20
WVDC CAP		50	50	50	50	50	50
1PF	1R0						
to	To						
100	101						
120	121						
150	151						
180	181						
220	221						
270	271						
330	331						
390	391						
470	471						
560	561						
680	681						
820	821						
1,000	102						
1,200	122						
1,500	152						
1,800	182						
2,200	222						
2,700	272						
3,300	332						
3,900	392						
4,700	472						
5,600	562						
6,800	682						
8,200	822						
.01uF	103						
.015	153						
.022	223						
.033	333						
.047	473						
.068	683						
.100	104						
.12	124						
.15	154						
.22	224						
.33	334						
.47	474						
.68	684						
1.0	105						

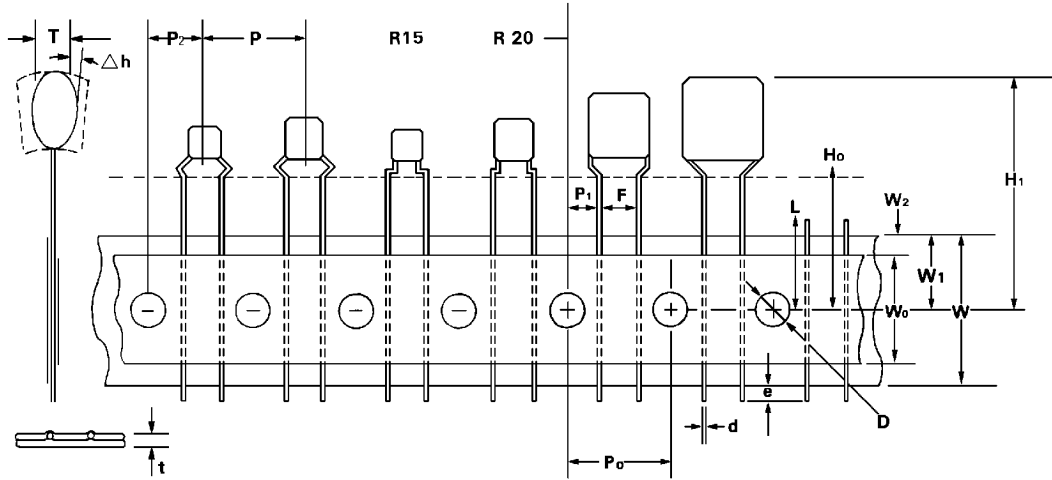


# TAPING DIMENSIONS OF RADIAL LEADED

## Radial TAPE AND REEL

Suitable for the auto insertion machine.

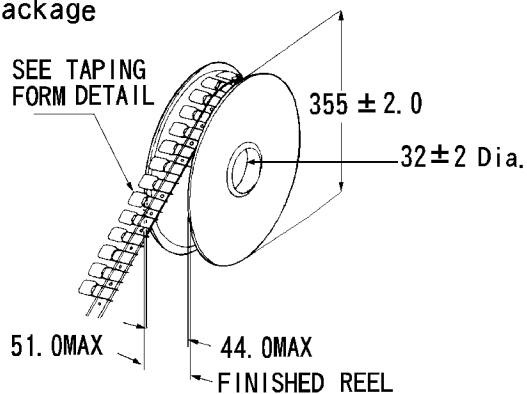
**DIMENSION:** Units in millimeter



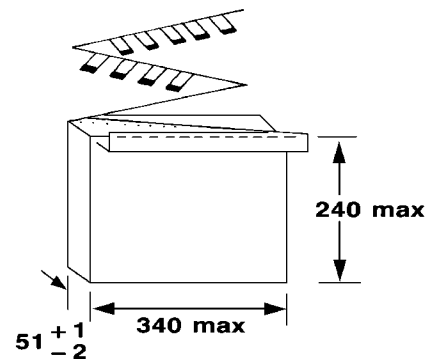
Description	Symbol	Dimensions	Description	Symbol	Dimension
Body		10.16X10.16mm	Feed hole pitch	P0	±1.05mm
Wire lead Diameter	d	0.5±0.05mm	Overall tape thickness	t	1.00mm Max
Feed Hole Diameter	D	4±0.5mm	Body thickness	T	4.5mm Max
Lead end Protrusion		+0.5-3.5mm	Lead crimp height	H0	16±0.5 to 18±0.5mm
Lead Spacing	F	5.08±1mm	Carrier tape width	W	18.05±0.55mm
Body inclination	△h	0±1.02mm	Adhesive tape width	W0	13.00 Ref.
Top height	H1	32.25mm Max	Feed hole height	W1	9.0±0.50mm
Rejected Component	L	11.0mm Max	Feed hole off alignment	P1	3.81±0.50mm
Out height				P2	6.35±1.05mm
Taping Pitch	P	12.7±1.0mm	Adhesive tape margin	W2	3.10 Ref.

## REEL AND BOX DIMENSIONS(mm)

### Reel Package



### Box Package



## PACKAGING QUANTITY

Size Code	Taping Type		Bulk Type
	Quantity per reel	Quantity per box	Quantity per bag
R15	2,500	2,000	1,000
R20	2,500	2,000	1,000