

## Data Sheet

Customer: \_\_\_\_\_

Product: Multilayer Ceramic Capacitprs Epoxy Coated Radial Type

Size : R15 / R20 / R25

Issued Date: 03-July-2023

Edition: Ver. 2

### Record of change

Date	Ver.	Description	Page
2016-08-28	1		
2023-07-03	2	Revised Test Freq. $C \leq 10\mu F \rightarrow 1\text{KHz}/1\text{V}$ & $C > 10\mu F \rightarrow 120\text{Hz}/0.5\text{V}$	2

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Prepared by	Checked by	Approved by	Accepted by (customer)
03-July-2023	03-July-2023	03-July-2023	
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**Application :**

NPO : Temperature compensation type, have little or no change in capacitance with variation in temperature. Hence, they are used in radio-frequency oscillators, precision timing circuits, ultra stable amplifiers, etc.

X7R/X5R : Temperature stable type for by-pass and decoupling in radio and television receivers, computers servo systems. Audio tone, and coupling, etc., where moderate capacitance variations are permissible and dissipation factor is not critical.

Z5U/Y5V : General type for by-pass and filtering applications.

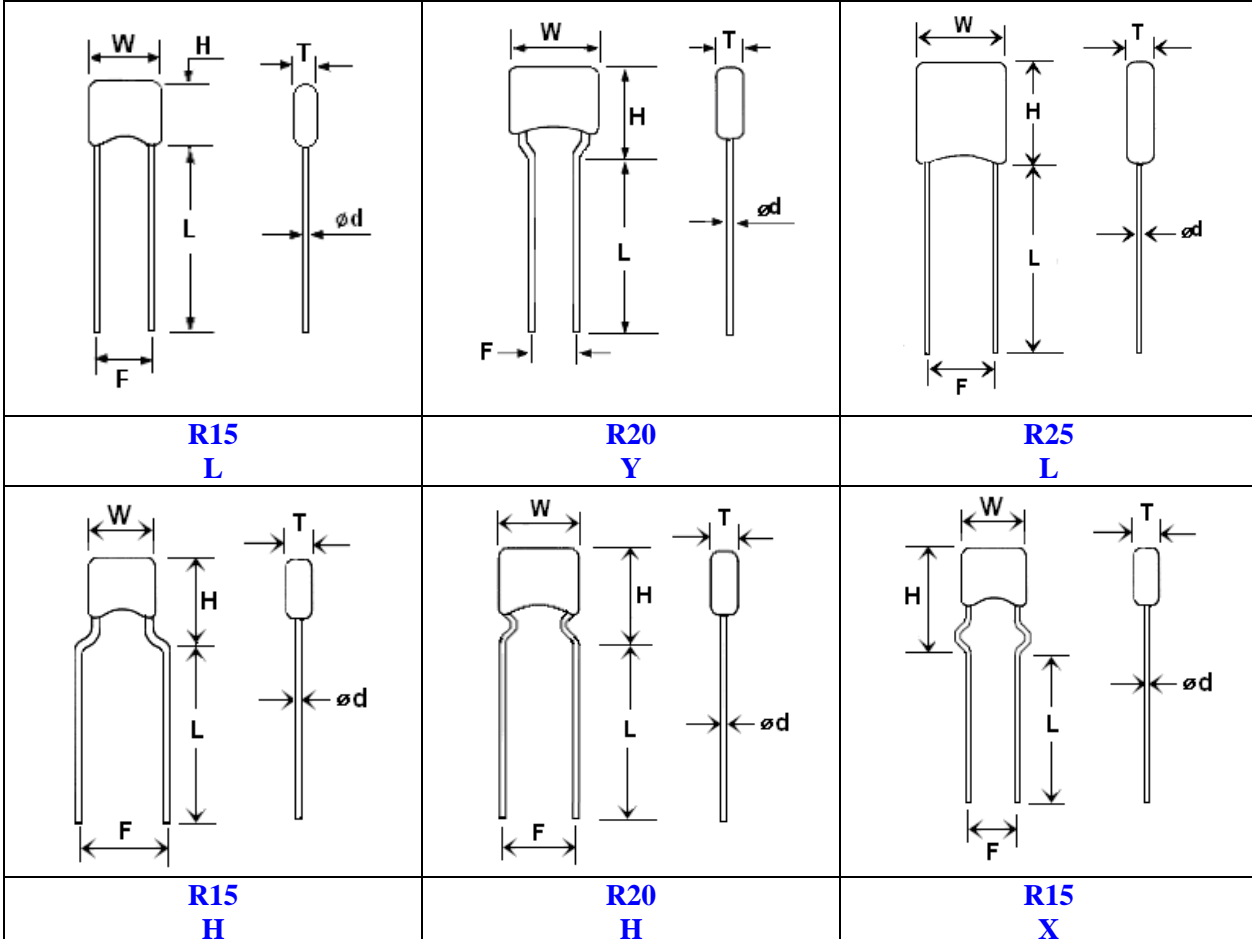
**Construction :**



**Part Number Designation:**

<u>R15</u>	<u>Z</u>	<u>104</u>	<u>M</u>	<u>1H</u>	<u>L</u>	<u>5</u>	<u>L</u>
Size	T.C.	Capacitance-Code	Tolerance	Voltag	Lead shape	Lead space	Package-Lead-length
R15	N=NPO	Two significant	B: ±0.10pF	0J=6.3V	L=Straight	2=2.54±0.8(mm)	R=Tape/Reel
R20	W=X7R	digits + No. of zeros.	C: ±0.25pF	1A=10V	Y=Inside	5=5.08±0.8(mm)	B=Tape/Box
R25	X=X5R	example:	D: ±0.50pF	1C=16V	Crimp		6=6±1mm
	Z=Z5U	102=1000pF	F: ±1%	1E=25V	H=High seated		L=25.4mm (Min.)
	Y=Y5V	223=22000pF	G: ±2%	1H=50V	X=Outside		
		104=100000pF	J: ±5%	1J=63V	Crimp		
			K: ±10%	2A=100V			
			M: ±20%				
			Z: -20%~+80%				

**1.LEAD SHAPE :**



## 2. LEAD SPACE (F)

CODE	LEAD SPACE (mm/inch)	
2	2.54±0.8	0.1±0.032
5	5.08±0.8	0.2±0.032

## 3. LEAD LENGTH (L)

CODE	LEAD LENGTH	REMARK
6	6mm±1mm	Specified lead length upon request.
L	25mm (min)	

## 4. BODY SIZE & DIMENSION

Size code	Lead style available	Capacitance Range					Dimensions (mm)				
		NPO	X7R	Z5U	Y5V	X5R	W max	H max	T max.	d±0.05	F±0.8
R15	L	50V: 1.0pF -10nF	50V: 220pF-0.33uF	50V: 1.0nF-0.22uF	50V: 1.0nF-0.22uF	16V 1.0uF-10.0uF	4.5	5.5	3.0	0.5	2.54
	X	100V: 0.47-3900pF	100V: 220pF-0.1uF			25V 1.0uF-4.7uF	4.5	7.0	3.0	0.5	2.54
	H					4.5	7.0	3.0	0.5	5.08	
R20	Y	25V: 22nF -100nF	25V: 1.0uF -10.0uF	50V: 0.22uF-1.0uF	50V: 0.22uF-2.2uF	6.3V 22.0uF-100uF	5.5	7.0	4.0	0.5	2.54
		50V: 10nF -100nF	50V: 0.1uF -4.7uF			16V 3.3uF-47.0uF					
	H	100V: 1.0nF -10nF	100V: 0.1uF -1.0uF			25V 3.3uF-22.0uF	5.5	7.0	4.0	0.5	5.08
		50V: 1.0uF-10uF	50V: 1.0uF-10uF			50V 1.0uF-10.0uF					
R25	L	50V: 150nF -220nF	50V: 6.8uF -22uF	50V: 1.0uF-4.7uF	50V: 1.0uF-4.7uF	6.3V 47.0uF-100uF	7.5	8.0	4.5	0.5	5.08
		100V: 12nF - 27nF	100V: 1.2uF - 2.2uF			16V 10.0uF-22.0uF					

## 5. SPECIFICATIONS AND TEST METHODS :

### Test Method :

(Capacitance & D.F. shall be measured at 25°C)

Type	NPO	NPO/X7R/X5R	NPO/X7R/X5R
Item	C ≤ 1000pF	Z5U/Y5V C ≤ 10uF	Z5U/Y5V C > 10uF
Frequency	1.0 MHz	1.0 KHz	120 Hz
Voltage	1.0 Vrms	1.0 Vrms	0.5 Vrms

### Dielectric strength 25°C (Flash Test)

- NPO, X7R, X5R: 300% rated voltage for 5 seconds with 50 mA. max charging current.
- Z5U and Y5V: 250% rated voltage for 5 seconds with 50 mA. max charging current

### Temperature coefficient

- NPO: ± 30PPM/°C, -55°C to +125°C
- X7R: ± 15%, -55°C to +125°C
- X5R: ± 15%, -55°C to +85°C
- Z5U: +22%, -56%, +10°C to +85°C
- Y5V: +22%, -82%, -30°C to +85°C

### Life Test :

(1000 hrs at max temp. applied with Flash test voltage Recovery for 24± 2 hrs )

- NPO: ≤ ± 3% at 200% rated voltage, 125°C
- X7R: ≤ ± 3% at 200% rated voltage, 125°C
- X5R: ≤ ± 3% at 200% rated voltage, 125°C
- Z5U: ≤ ± 3% at 200% rated voltage, 85°C
- Y5V: ≤ ± 3% at 200% rated voltage, 85°C

### Dissipation Factor 25°C

NPO: 0.15% Max.

Z5U: 5% Max.

X7R/X5R:

Rated voltage	Max.
≥50V	2.5%
25V & 16V	3.5%
10V & 6.3V	5.0%

Y5V:

Rated voltage	Max.
≥50V	5%
25V & 16V	7%
10V & 6.3V	10%

### Insulation Resistance after 60 sec., charging at rated voltage, 25°C, 55% R.H. max

- NPO: 100GΩ or 1000MΩ-uF whichever is less
- X7R : 10GΩ or 100MΩ-uF whichever is less
- X5R : 10GΩ or 100MΩ-uF whichever is less
- Z5U : 10GΩ or 100MΩ-uF whichever is less
- Y5V : 10GΩ or 1000MΩ-uF whichever is less