

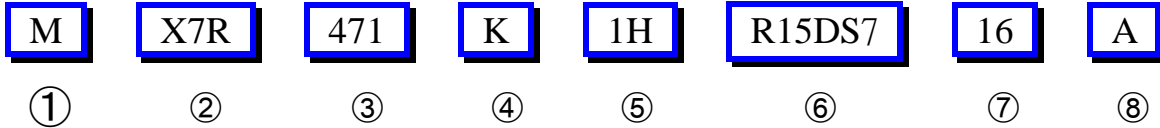


# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## *Dipped Radial Lead Type*

### ● Part Number Description



#### ① Type

Symbol	Type
M	Radial

#### ④ Capacitance Tolerance

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

#### ② Temperature Characteristic

Temp. Charact.	Temperature Range	Capacitance Change
NPO	-55 ~ 125°C	0±30 ppm/°C
X5R	-55 ~ 85°C	±15%
X7R	-55 ~ 125°C	±15%
Y5V	-30 ~ 85°C	+22%, -82%

#### ⑤ Rated Voltage

Symbol	Rated Voltage
0J	DC 6.3V
1A	DC 10V
1C	DC 16V
1E	DC 25V
1H	DC 50V
2A	DC 100V
2E	DC 250V
2H	DC 500V
1K	DC 1000V

#### ③ Capacitance Value

Symbol	Cap. Value
060	6pF
6R8	6.8pF
120	12pF
471	470pF
222	2200pF
104	100000pF



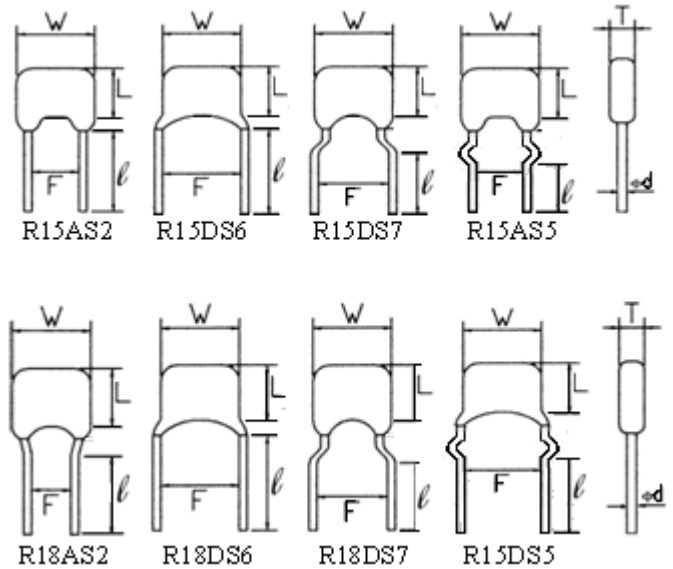
# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## Dipped Radial Lead Type

### ⑥ Style

Symbol	Dimension (unit:mm)				
	W(max)	L(max)	T(max)	F(±0.8)	Φd
R15AS2	4.5	4.8	3	2.5	0.52 ±0.05
R15AS5	4.5	4.8	3		
R18AS2	5.5	5.8	3.8		
R15DS5	4.5	4.8	3	5	
R15DS6	4.5	4.8	3		
R18DS6	5.5	5.8	3.8		
R15DS7	4.5	4.8	3		
R18DS7	5.5	5.8	3.8		

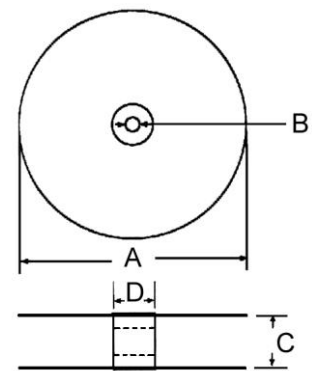
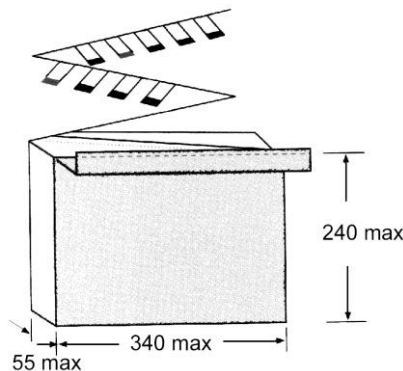


### ⑦ Lead Length (ℓ)

Packing	Bulk				Taping
Symbol	04	06	10	30	16
Length (mm)	4±1	6±1	10±1	30±3	16± <sub>1</sub> <sup>1.5</sup>

### ⑧ Packing

Symbol	Packing
Blank	Bulk
A	AMMO
R	REEL



### Reel Package

Unit:mm

A	B	C	D	
365max.	28±1.5	51.0max.	102max.	



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

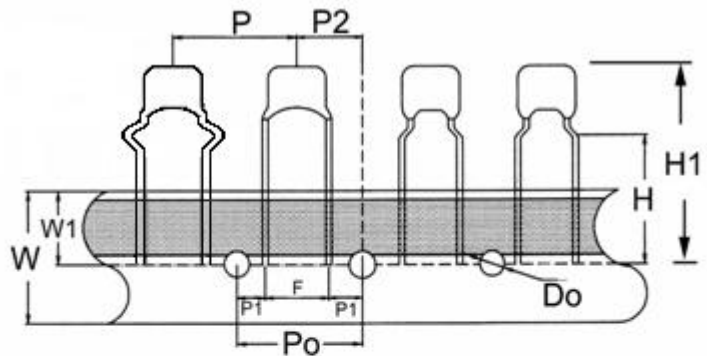
UNIVERSE CONDENSER CO. LTD

## Dipped Radial Lead Type

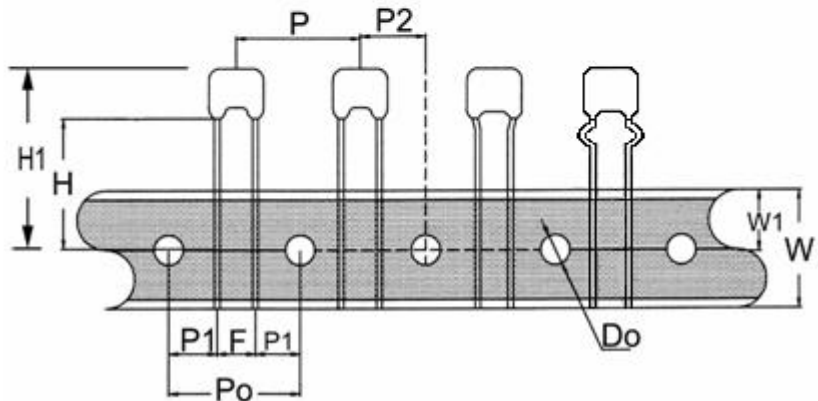
- Taping

(Refer to ⑥ Style)

R□□DS□  
Style



R□□AS□  
Style



Unit:mm

Description		R□□AS□ Style	R□□DS□ Style	Remark
Carrier tape width	W	18±0.5		
Position of sprocket hole	W1	9±0.5		
Pitch of component	P	12.7 Ref.		
Pitch of sprocket hole	P0	12.7±0.3		
Length from hole center to Lead	P1	5.1±0.7	3.85±0.7	
Length from hole center to component center	P2	6.35 Ref.		
Diameter of sprocket hole	Do	4±0.3		
Lead crimp height	H	18 <sup>+1.5</sup> <sub>-1</sub>	16 <sup>+1.5</sup> <sub>-1</sub>	
Lead spacing	F	2.5±0.8	5±0.8	
Top of component height	H1	26.5Max		



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## *Dipped Radial Lead Type*

### ● Capacitance Range

Style	Rate Voltage	NPO	X7R	X5R	Y5V
R15AS2 R15AS5 R15DS5 R15DS6 R15DS7	6.3V			155 ~ 106	475 ~ 106
	10V			334 ~ 475	225 ~ 106
	16V		224 ~ 225	105	105 ~ 475
	25V		104 ~ 155	224	474 ~ 225
	50V	010 ~ 223	101 ~ 105		104 ~ 105
	100V	010 ~ 682	101 ~ 224		
	200V	010~222	101~104		
	250V				
	500V 630V	010~102	101~223		
1000V		151~822			
R18AS2 R18DS6 R18DS7	6.3V			106	
	10V			685 ~ 106	
	16V		335 ~ 475	106	106
	25V		684 ~ 225	335	475
	50V	010 ~ 103	181 ~ 475		225
	100V	1R2 ~ 223	101 ~ 225		
	200V	1R5 ~ 472	151 ~ 104		
	250V				
	500V 630V	1R5 ~ 222	151 ~ 563		
1000V	1R5 ~ 102	151 ~ 153			



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## *Dipped Radial Lead Type*

### ● Electrical Characteristics

NPO

Item	Temperature Compensating	Measuring Condition
Operating Temperature Range	-55 ~ +125°C	
Temperature Characteristics	0 ± 30 ppm/°C	
Capacitance	Within the specified tolerance	Shall be measured at 25°C± 2°C at the frequency and voltage
Q	$C \geq 30\text{pF} : Q \geq 1000$ $C < 30\text{pF} : Q \geq 400 + 20 \times C$ (C is nominal capacitance)	$C \leq 1000\text{pF}@1\text{MHz} \pm 20\%$ , $1 \pm 0.2\text{Vrms}$ $C > 1000\text{pF}@1\text{KHz} \pm 10\%$ , $1 \pm 0.2\text{Vrms}$
Withstanding Voltage	No defects	Applied voltage : Rated voltage × 2.5 100V ~ 999V Rated voltage × 1.5 1000 ~ 3000V Rated voltage × 1.2 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



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## *Dipped Radial Lead Type*

- Electrical Characteristics

X7R/X5R/Y5V

Item	High Dielectric Constant		Measuring Condition
Operating Temperature Range	X7R = - 55 ~ +125°C X5R = - 55 ~ +85°C Y5V = - 30 ~ +85°C		
Temperature Characteristics	X7R/X5R= ± 15% Y5V= +22 to - 82%		
Capacitance	Within 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  X7R/X5R/Y5V @1KHz ± 10%, 1± 0.2Vrms
	16V	X7R/X5R=0.05max. Y5V=0.10max.	
	10V max.	X7R/X5R=0.05max. Y5V=0.125max.	
	6.3V	X5R=0.075max.	
Withstanding Voltage	No defects		Applied voltage : Rated voltage ×2.5 100V ~ 999V Rated voltage(over) ×1.5 1000~3000V Rated voltage × 1.2 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

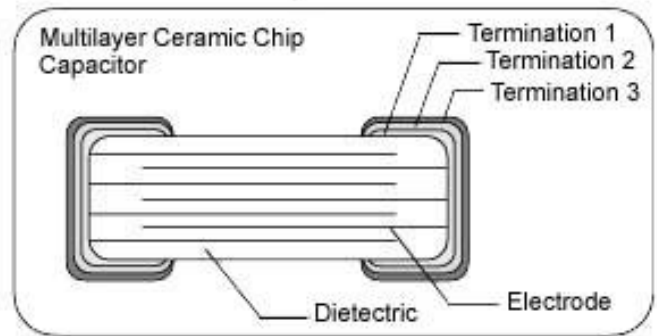
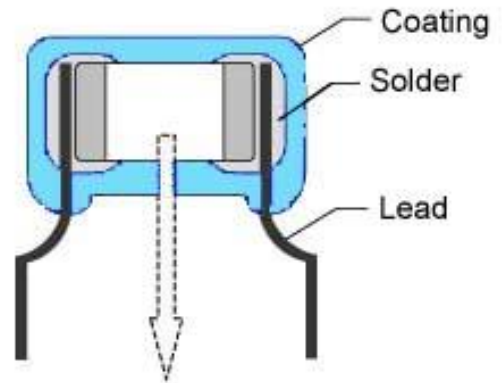


# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## *Dipped Radial Lead Type*

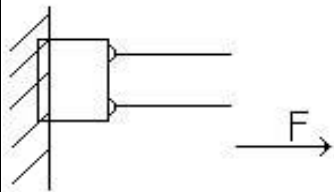
- Material List



- Storage

1. The storage conditions should be:  
 Temperature = Lower than 40°C  
 Humidity = Lower than 70% R.H.
2. After opening the package, please store in desiccators.

- Environmental and Test Characteristics

Item	Temperature Compensating	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. (Flux shall be used)



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## Dipped Radial Lead Type

### ● Environmental and Test Characteristics

#### NPO

Item	Temperature Compensating	Measuring Condition															
<i>Resistance to Soldering heat</i>																	
$\Delta C$	$\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is greater)	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 $10 \pm 0.5\text{sec}$ . Let sit at room temperature for $24 \pm 2$ hrs. then measure. Perform the initial measurement.															
Q	$C \geq 30\text{pF} : Q \geq 1000$ $C < 30\text{pF} : Q \geq 400 + 20 \times C$ (C is nominal capacitance)																
I.R.	More than $10\text{G}\Omega$ or $500\text{M}\Omega \cdot \mu\text{F}$ , whichever is less. 16Vdc product : More than $10\text{G}\Omega$ or $100\text{M}\Omega \cdot \mu\text{F}$ , whichever is less.																
Withstanding voltage	No defects																
Exterior	No abnormalities																
<i>Thermal shock</i>																	
$\Delta C$	$\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is greater)	Fix the capacitor to the supporting jig in the same manner and under the same conditions as ( <i>Resistance to Soldering heat</i> ). Perform the five cycles according to the four heat treatments listed in the following table. Remove and let sit at room temperature for $24 \pm 2$ hrs., then measure.															
Q	$C \geq 30\text{pF} : Q \geq 1000$ $C < 30\text{pF} : Q \geq 400 + 20 \times C$ (C is nominal capacitance)																
I.R.	More than $10\text{G}\Omega$ or $500\text{M}\Omega \cdot \mu\text{F}$ , whichever is less. 16Vdc product : More than $10\text{G}\Omega$ or $100\text{M}\Omega \cdot \mu\text{F}$ , whichever is less.																
Withstanding voltage	No defects																
Exterior	No abnormalities																
		<table border="1"> <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>	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													
		Perform the initial measurement.															





# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## *Dipped Radial Lead Type*

### ● Environmental and Test Characteristics

#### NPO

Item	Temperature Compensating	Measuring Condition
<i>Moisture resistance (Steady state)</i>		
$\Delta C$	$\pm 5\%$ or $\pm 0.5\text{pF}$ (Whichever is greater)	Apply the rated DC voltage at $40 \pm 2^\circ\text{C}$ and 90 to 95% R.H. for $500_{-0}^{+24}$ hrs.  Remove and let sit at room temperature for $24 \pm 2$ hrs., then measure.  Perform the initial measurement.
Q	$C \geq 30\text{pF} : Q \geq 350$ $10\text{pF} > C < 30\text{pF} : Q \geq 275 + \frac{5}{2} \times C$ $C \leq 10\text{pF} : Q \geq 200 + 10 \times C$ (C is nominal capacitance)	
I.R.	More than $1000\text{M}\Omega$ or $50\text{M}\Omega \cdot \mu\text{F}$ whichever is less. 16Vdc product : More than $1000\text{M}\Omega$ or $10\text{M}\Omega \cdot \mu\text{F}$ whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	
<i>High temperature loading</i>		
$\Delta C$	$\pm 3\%$ or $\pm 0.3\text{pF}$ (Whichever is greater)	Apply 200% of the rated DC voltage for $1000_{-0}^{+48}$ hrs. at the maximum operating temperature $\pm 2^\circ\text{C}$ . Remove and let sit at room temperature for $24 \pm 2$ hrs., then measure.  The charge/discharge current is less than 50mA.  Perform initial measurement. ● $100\text{V} \leq V < 1000\text{V}$ : 150% of rated voltage. ● $V \leq 1000\text{V}$ : 120% of rated voltage (max.3600V)
Q	$C \geq 30\text{pF} : Q \geq 350$ $10\text{pF} > C < 30\text{pF} : Q \geq 275 + \frac{5}{2} \times C$ $C \leq 10\text{pF} : Q \geq 200 + 10 \times C$ (C is nominal capacitance)	
I.R.	More than $1000\text{M}\Omega$ or $50\text{M}\Omega \cdot \mu\text{F}$ whichever is less. 16Vdc product : More than $1000\text{M}\Omega$ or $10\text{M}\Omega \cdot \mu\text{F}$ whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## Dipped Radial Lead Type

### ● Environmental and Test Characteristics

X7R/X5R/Y5V

Item	Temperature Compensating	Measuring Condition															
<i>Resistance to Soldering heat</i>																	
$\Delta C$	X7R/X5R= $\pm 7.5\%$ Y5V= $\pm 20\%$	<p>The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at <math>260 \pm 5^\circ\text{C}</math> for <math>10 \pm 0.5\text{sec}</math>.</p> <p>Let sit at room temperature for <math>48 \pm 4</math> hrs. , then measure.</p> <p>• Initial measurement for Perform a heat treatment at <math>150^{+0}_{-10}^\circ\text{C}</math> for 1 hour. Remove and let sit for <math>48 \pm 4</math> hours at room temperature. Perform the initial measurement.</p>															
D.F.	<b>25V min</b>		X7R=0.03max. X7R=0.055max. ( $C \geq 1.0\mu\text{F}$ ) Y5V=0.075max.														
	<b>16V</b>		X7R/X5R=0.05max. Y5V=0.10max.														
	<b>10V max.</b>		X7R/X5R=0.05max. Y5V=0.125max.														
	<b>6.3V</b>		X5R=0.075max.														
I.R.	More than $10\text{G}\Omega$ or $500\text{M}\Omega \cdot \mu\text{F}$ , whichever is less. 16Vdc product : More than $10\text{G}\Omega$ or $100\text{M}\Omega \cdot \mu\text{F}$ , whichever is less.																
Withstanding voltage	No defects																
Exterior	No abnormalities																
<i>Thermal shock</i>																	
$\Delta C$	X7R/X5R= $\pm 7.5\%$ Y5V= $\pm 20\%$	<p>Fix the capacitor to the supporting jig in the same manner and under the same conditions as (Resistance to Soldering heat). Perform the five cycles according to the four heat treatments listed in the following table. Remove and let sit at room temperature for <math>48 \pm 4</math> hrs. , then measure.</p> <table border="1"> <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> <p>• Initial measurement for Perform a heat treatment at <math>150^{+0}_{-10}^\circ\text{C}</math> for 1 hour. Remove and let sit for <math>48 \pm 4</math> hrs. At room temperature. Perform the initial measurement.</p>	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												
D.F.	<b>25V min</b>		X7R=0.03max. X7R=0.055max. ( $C \geq 1.0\mu\text{F}$ ) Y5V=0.075max.														
	<b>16V</b>	X7R/X5R=0.05max. Y5V=0.10max.															
	<b>10V max.</b>	X7R/X5R=0.05max. Y5V=0.125max.															
	<b>6.3V</b>	X5R=0.075max.															
I.R.	More than $10\text{G}\Omega$ or $500\text{M}\Omega \cdot \mu\text{F}$ , whichever is less. 16Vdc product : More than $10\text{G}\Omega$ or $100\text{M}\Omega \cdot \mu\text{F}$ , whichever is less.																
Withstanding voltage	No defects																
Exterior	No abnormalities.																



# MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

## Dipped Radial Lead Type

### ● Environmental and Test Characteristics

X7R/X5R/Y5V

Item	Temperature Compensating	Measuring Condition
<i>Moisture resistance (Steady state)</i>		
$\Delta C$	X7R/X5R= $\pm 12.5\%$ Y5V= $\pm 30\%$	
D.F.	<b>25V min</b> X7R=0.06max. X7R=0.11max. ( $C \geq 1.0\mu F$ ) Y5V=0.1125max.	Apply the rated DC voltage at $40 \pm 2^\circ C$ and 90 to 95% R.H. for $500_{-0}^{+24}$ hrs. Remove and let sit at room temperature for $48 \pm 4$ hrs. , then measure.  • Initial measurement for Perform a heat treatment at $150_{-10}^{+0} \text{ }^\circ C$ for 1 hour.
	<b>16V</b> X7R/X5R=0.10max. Y5V=0.15max.	
	<b>10V max.</b> X7R/X5R=0.10max. Y5V=0.1875max.	
	<b>6.3V</b> X5R=0.15max.	
I.R.	More than $1000M\Omega$ or $50M\Omega \cdot \mu F$ , whichever is less. 16Vdc product : More than $1000M\Omega$ or $10M\Omega \cdot \mu F$ , whichever is less.	Remove and let sit for $48 \pm 4$ hrs. At room temperature.  Perform the initial measurement.
Withstanding voltage	No defects	
Exterior	No abnormalities	
<i>High temperature loading</i>		
$\Delta C$	X7R/X5R= $\pm 15\%$ Y5V= $\pm 30\%$	
D.F.	<b>25V min</b> X7R=0.06max. X7R=0.11max. ( $C \geq 1.0\mu F$ ) Y5V=0.1125max.	To Apply voltage: 1. $V < 100V$ : 200% of rated voltage. 2. $100V \leq V < 1000V$ : 150% of rated voltage. 3. $V \leq 1000V$ : 120% of rated voltage. (max.3600V) Test time : $1000_{-0}^{+48}$ hrs. at the maximum operating temperature $\pm 2^\circ C$ . Remove and let sit at room temperature for $48 \pm 4$ hrs. , then measure. The charge/discharge current is less than 50mA.
	<b>16V</b> X7R/X5R=0.10max. Y5V=0.15max.	
	<b>10V max.</b> X7R/X5R=0.10max. Y5V=0.1875max.	
	<b>6.3V</b> X5R=0.15max.	
I.R.	More than $1000M\Omega$ or $50M\Omega \cdot \mu F$ , whichever is less. 16Vdc product : More than $1000M\Omega$ or $10M\Omega \cdot \mu F$ , whichever is less.	• Initial measurement for Apply 200% of the rated DC voltage for 1 hour at the maximum operating temperature $\pm 2^\circ C$ . Remove and let sit at room temperature for $48 \pm 4$ hrs.
Withstanding voltage	No defects	Perform initial measurement.
Exterior	No abnormalities	