

Dipped Axial Lead Type

● Part Number Description

A	X7R	103	K	1H	R15	TR
①	②	③	④	⑤	⑥	⑦

① Type

Symbol	Type
A	Axial

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%

③ Capacitance Value

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

④ Capacitance Tolerance

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

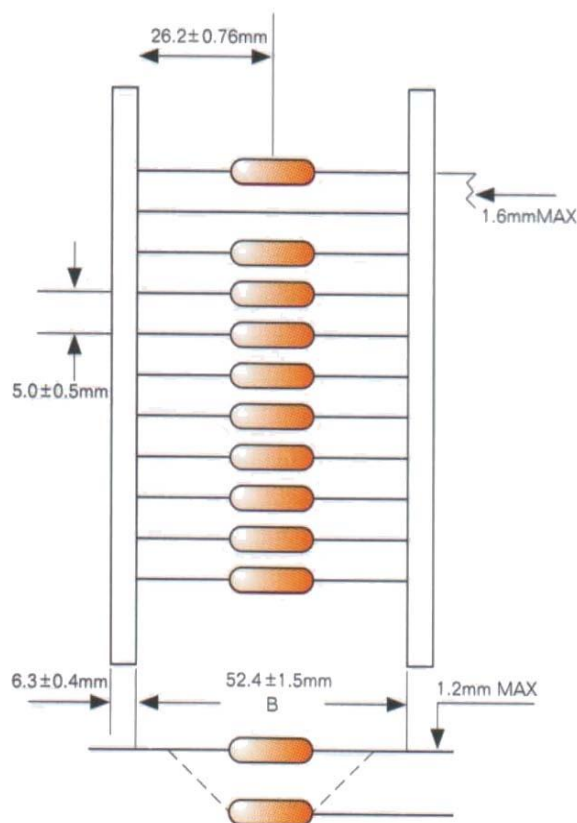
⑤ Rated Voltage

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

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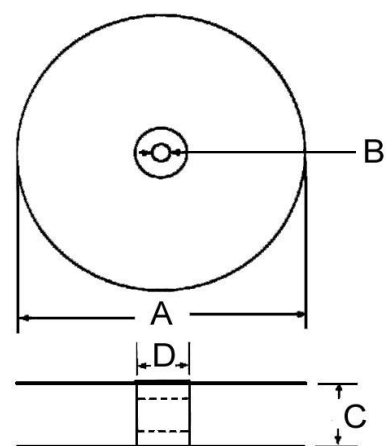
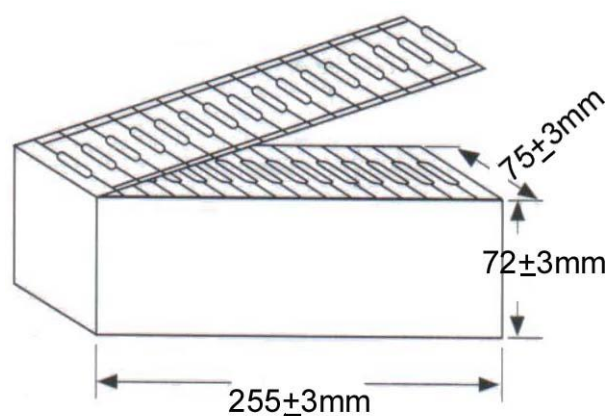
⑥ Size

Symbol	Dimension (unit:mm)			
	T (max)	D (max)	F (±0.8)	Φd
R15	2.8	4.2	5	0.5 ±0.05
			7.52	
			10	



⑦ Packing or Pitch of Bulk

Symbol	Packing
Blank	Bulk
A	AMMO
R	REEL
D	5±0.8
F	7.52±0.8
G	10±0.8



Reel Package

Unit:mm

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



MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

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● Capacitance Range

Style	Rate Voltage	NPO	X7R	X5R	Y5V
R15	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 ~ 103	221 ~ 334		104 ~ 105
	100V	010 ~ 472	221 ~ 104		
	250V	101 ~ 272	102 ~ 333		



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● 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± 0.2Vrms $C > 1000\text{pF}@1\text{KHz} \pm 10\%$, 1± 0.2Vrms
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 500MΩ · μ F , whichever is less 16Vdc product : More than 10GΩ or 100MΩ · μ F , 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

Dipped Axial Lead Type

● Electrical Characteristics

X7R/X5R/Y5V

Item	High Dielectric Constant		Measuring Condition
Operating Temperature Range	X7R = $-55 \sim +125^{\circ}\text{C}$ X5R = $-55 \sim +85^{\circ}\text{C}$ Y5V = $-30 \sim +85^{\circ}\text{C}$		
Temperature Characteristics	X7R/X5R= $\pm 15\%$ Y5V= $+22$ to -82%		
Capacitance	Within the specified tolerance		
Dissipation Factor ($\tan\delta$)	25V min	X7R=0.03max. X7R=0.055max. ($C \geq 1.0\mu\text{F}$) Y5V=0.075max.	Shall be measured at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ at the frequency and voltage X7R/X5R/Y5V @1KHz $\pm 10\%$, $1 \pm 0.2\text{Vrms}$
	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 $\times 2.5$ 100V $\sim$ 500V Rated voltage(over) $\times 1.5$ Duration : 1 to 5 sec. The charge/discharge current is less than 50mA
Insulation Resistance	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.		Apply rated voltage for 1 minute at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 70% R.H. max. . 16Vdc product : Measurement voltage is 25Vdc

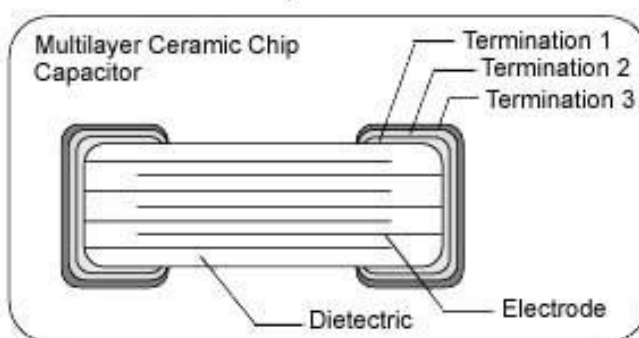
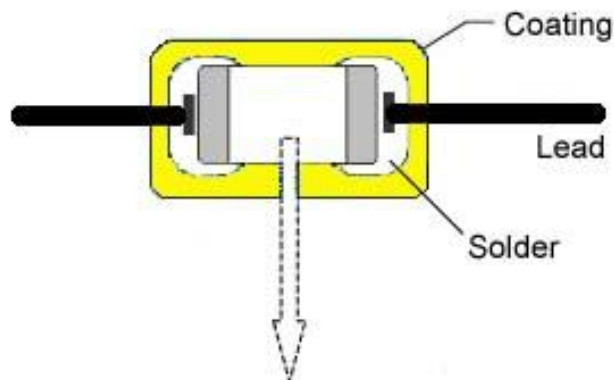


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UNIVERSE CONDENSER CO. LTD

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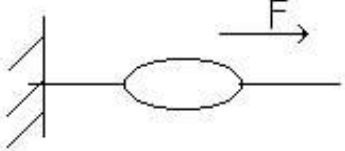
● Material List



● 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 : 5 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 : $235 \pm 5^\circ\text{C}$ Dipping : 2 ± 0.5 sec. (Flux shall be used)

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● Environmental and Test Characteristics

NPO

Item	Temperature Compensating	Measuring Condition
Resistance to Soldering heat		
ΔC	± 2.5% 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℃ for 10 ± 0.5sec. Let sit at room temperature for 24 ± 2 hrs. then measure. Perform the initial measurement.
Q	C ≥ 30pF : Q ≥ 1000 C < 30pF : Q ≥ 400 + 20 × C (C is nominal capacitance)	
I.R.	More than 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	
Thermal shock		
ΔC	± 2.5% or ± 0.25pF (Whichever is greater)	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 24 ± 2 hrs., then measure.
Q	C ≥ 30pF : Q ≥ 1000 C < 30pF : Q ≥ 400 + 20 × C (C is nominal capacitance)	
I.R.	More than 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	

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

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● Environmental and Test Characteristics

NPO

Item	Temperature Compensating	Measuring Condition
Moisture resistance (Steady state)		
ΔC	± 5% or ± 0.5pF (Whichever is greater)	Apply the rated DC voltage at 40 ± 2℃ and 90 to 95% R.H. for 500 ⁺²⁴ ₋₀ hrs. Remove and let sit at room temperature for 24 ± 2 hrs., then measure. Perform the initial measurement.
Q	C ≥ 30pF : Q ≥ 350 10pF > C < 30pF : Q ≥ 275 + $\frac{5}{2} \times C$ C ≤ 10pF : Q ≥ 200 + 10 × C (C is nominal capacitance)	
I.R.	More than 1000MΩ or 50MΩ · μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	
High temperature loading		
ΔC	± 3% or ± 0.3pF (Whichever is greater)	Apply 200% of the rated DC voltage for 1000 ⁺⁴⁸ ₋₀ hrs. at the maximum operating temperature ± 2℃ . Remove and let sit at room temperature for 24 ± 2 hrs., then measure. The charge/discharge current is less than 50mA. Perform initial measurement. * 100% for 100V ~ 500V over.
Q	C ≥ 30pF : Q ≥ 350 10pF > C < 30pF : Q ≥ 275 + $\frac{5}{2} \times C$ C ≤ 10pF : Q ≥ 200 + 10 × C (C is nominal capacitance)	
I.R.	More than 1000MΩ or 50MΩ · μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	

Dipped Axial Lead Type

● Environmental and Test Characteristics

X7R/X5R/Y5V

Item	Temperature Compensating		Measuring Condition																			
Resistance to Soldering heat																						
ΔC	X7R/X5R= ± 7.5% Y5V= ± 20%		The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at 260 ± 5℃ for 10 ± 0.5sec. Let sit at room temperature for 48 ± 4 hrs. , then measure. • Initial measurement for Perform a heat treatment at 150⁺⁰₋₁₀℃ for 1 hour. Remove and let sit for 48 ± 4 hours at room temperature. Perform the initial measurement.																			
D.F.	25V min	X7R=0.03max. X7R=0.055max. (C≥1.0uF) Y5V=0.075max																				
	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 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.																					
Withstanding voltage	No defects																					
Exterior	No abnormalities																					
Thermal shock																						
ΔC	X7R/X5R= ± 7.5% Y5V= ± 20%		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 48 ± 4 hrs. , then measure. <table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Temp. (℃)</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>30±3</td><td>15</td><td>30±3</td><td>15</td></tr></table> • Initial measurement for Perform a heat treatment at 150⁺⁰₋₁₀℃ for 1 hour. Remove and let sit for 48 ± 4 hrs. At room temperature. Perform the initial measurement.					Step	1	2	3	4	Temp. (℃)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	Time	30±3	15	30±3	15
Step	1	2						3	4													
Temp. (℃)	Min. Operating Temp.	Room Temp.						Max. Operating Temp.	Room Temp.													
Time	30±3	15						30±3	15													
D.F.	25V min	X7R=0.03max. X7R=0.055max. (C≥1.0uF) Y5V=0.075max																				
	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 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.																					
Withstanding voltage	No defects																					
Exterior	No abnormalities.																					

Dipped Axial Lead Type

● Environmental and Test Characteristics

X7R/X5R/Y5V

Item	Temperature Compensating		Measuring Condition
Moisture resistance (Steady state)			
ΔC	X7R/X5R= ± 12.5% Y5V= ± 30%		Apply the rated DC voltage at 40 ± 2℃ and 90 to 95% R.H. for 500 ⁺²⁴ ₋₀ hrs. Remove and let sit at room temperature for 48 ± 4 hrs. , then measure. • Initial measurement for Perform a heat treatment at 150 ⁺⁰ ₋₁₀ °℃ for 1 hour. Remove and let sit for 48 ± 4 hrs. At room temperature. Perform the initial measurement.
D.F.	25V min	X7R=0.06max. X7R=0.11max. (C≥1.0uF) Y5V=0.1125max	
	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 1000MΩ or 50MΩ · μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ · μ F , whichever is less.		
Withstanding voltage	No defects		
Exterior	No abnormalities		
High temperature loading			
ΔC	X7R/X5R= ± 15% Y5V= ± 30%		Apply 200% of the rated DC voltage for 1000 ⁺⁴⁸ ₋₀ hrs. at the maximum operating temperature ± 2℃. Remove and let sit at room temperature for 48 ± 4 hrs. , 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℃. Remove and let sit at room temperature for 48 ± 4 hrs. Perform initial measurement. * 100% for 100V~500V
D.F.	25V min	X7R=0.06max. X7R=0.11max. (C≥1.0uF) Y5V=0.1125max	
	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 1000MΩ or 50MΩ · μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ · μ F , whichever is less.		
Withstanding voltage	No defects		
Exterior	No abnormalities		



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

1.0 Part Number Description

C	Y5P	102	K	1H	05	D	S1	16	A
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① Type

Symbol	Type
C	Resin Ceracoat
D	Epoxy Coated

② Temperature Characteristic

Temp. Charact.	Temperature Range	Capacitance Change
NPO	-25 ~ 85°C	0±60 ppm/°C
SL	-25 ~ 85°C	350 ~ -1000 ppm/°C
Y5E	-25 ~ 85°C	± 4.7%
Y5P	-25 ~ 85°C	± 10%
Y5U	-25 ~ 85°C	+22%, -56%
Y5V	-25 ~ 85°C	+22%, -82%
Z5U	+10 ~ 85°C	+22%, -56%
Z5V	+10 ~ 85°C	+22%, -82%

③ Capacitance Value

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

④ Capacitance Tolerance

Symbol	Capacitance Tolerance
C	±0.25pF
D	±0.5pF
F	±1%
G	±2%
J	±5%
K	±10%
M	±20%
Z	+80%, -20%

⑤ Rated Voltage

Symbol	Rated Voltage
1C	DC 16V
1E	DC 25V
1H	DC 50V
2A	DC 100V
2E	DC 250V
2H	DC 500V
2F	DC 630V
1K	DC 1000V
2K	DC 2000V
3K	DC 3000V
6K	DC 6000V
A1	AC 1000V
A2	AC 2000V



DISC CERAMIC CAPACITORS

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⑥ External Dimensions (D) (mm)

Symbol	05	07	10	12
Φ	5 Φ	7 Φ	10 Φ	12 Φ

⑦ Lead Spacing (F) (mm)

Symbol	A	D	E	F	G
Spacing	2.5	5	6.35	7.52	10
Tol.	± 0.8				

⑧ Lead Style

Symbol	S1 & S4 style	S2 style
d	0.55 ± 0.05	0.45 ± 0.05
F	Lead Spacing $\rightarrow$ Refer 1.0	
L	Lead Length $\rightarrow$ Refer 1.0	
D	Refer to Capacitance Range Chart	
T		
G		

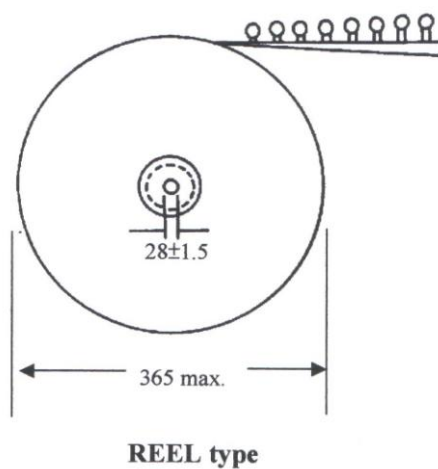
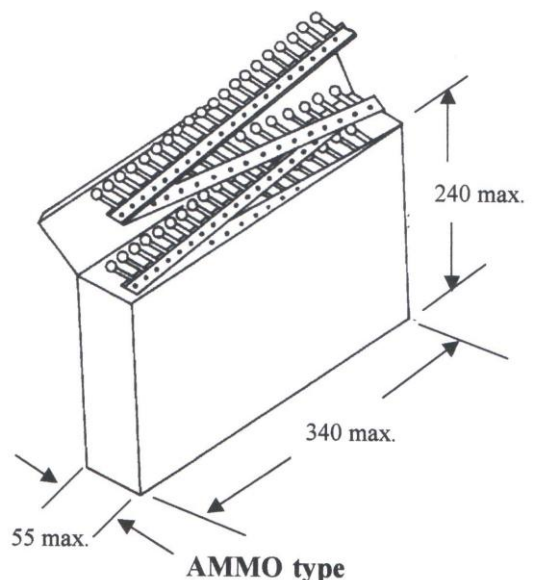
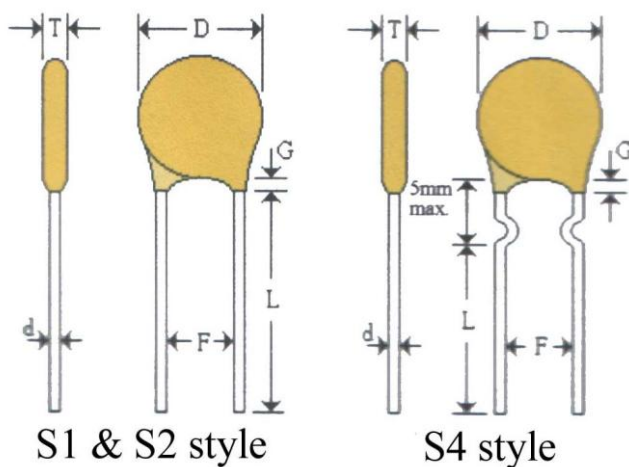
Unit:mm

⑨ Lead Length (L) (mm)

Packing	Bulk				Taping	
Symbol	04	06	10	25	16	20
Length	4	6	10	25	16	20
Tol.	± 1	± 1	± 1	Min.	$+1.5$ -1	$+1.5$ -1

⑩ Packing

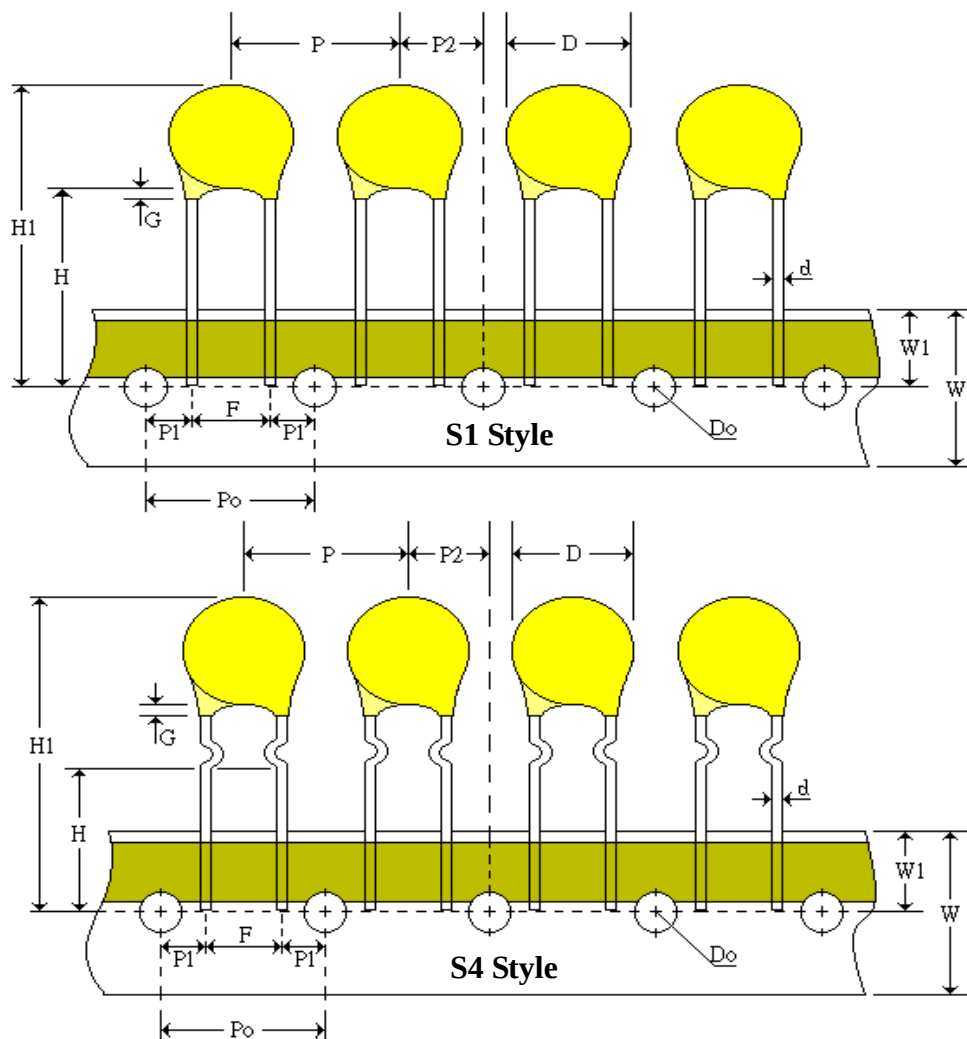
Symbol	Quantity	
A	2000pcs Per AMMO	Taping type
R	2500pcs Per REEL	
No Code	1000pcs , 500pcs Per BAG	Bulk type





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Description	Symbol	S1 style	S4 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	Po	12.7±0.3		
Length from Hole Center to Lead	P1	5.1±0.7	3.85±0.7	P1=3.18±0.7 refer to F=6.35±0.8
		3.85±0.7		
		3.18±0.7		
Length from Hole Center to Component Center	P2	6.35 Ref.		
Diameter of Sprocket Hole	Do	4±0.3		
Diameter of Body	D			Refer Capacitance Range Chart
Diameter of Lead Wire	D	0.55±0.05		
Lead Spacing	F	2.5±0.8	5±0.8	
		5±0.8		
		6.35±0.8		
Lead Crimped Height	H	16	16	Tolerance ^{+1.5} ₋₁
		20		
Top of Component Height	H1	32.25max.		
Coating extension on Lead	G			Refer Capacitance Range Chart
Thickness of Body	T			Refer Capacitance Range Chart



DISC CERAMIC CAPACITORS

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2.0 Capacitance Range Chart (Class I 、II)

(Max. Capacitance in pF)

W.Vdc	NPO (CH)	SL	B (Y5E) (Y5P)	E (Z5U)	F (Z5V)	Dimensions (mm)		
						D	T	G
50V 100V	0.5~47	33~150	100~2200	1000~5000	3300~10000	5±1	<3.5	<1.5
	50~68	180~220	3300	5600~6800		6±1	<3.5	<1.5
	75~100	250~330	3900	7500~10000	12000~22000	7±1	<3.5	<1.5
	120~150	390	4700~6800			8±1	<3.5	<1.5
	180~200	470~560				9±1	<3.5	<1.5
	220~270	680~820	7500~10000			10±1	<3.5	<1.5
	300~330					12±1	<3.5	<1.5

耐壓 100Vdc 以下，均需符合 Coating 之可漏底不漏銀電極的製作規範。

(Max. Capacitance in pF)

W.Vdc	NPO (CH)	SL	B (Y5E) (Y5P)	E (Z5U)	F (Z5V)	Dimensions (mm)		
						D	T	G
500V 630V	0.5~15	22~68	100~1000	1000~1200		5±1	<3.8	<2.0
	18~33	82~120	1200~1500	1500~2200	3300~5000	6±1	<3.8	<2.0
	39~56	150~220	1800~2200	2700~4700	5600~6800	7±1	<3.8	<2.0
	68~82	270~330	2700~3000	5600~6800	8200~10000	8±1	<3.8	<2.0
	100~120	390~470	3300~3900	8200~10000		9±1	<3.8	<2.0
	150~180		4700~5000			10±1	<3.8	<2.0
	200~220		5600~6800	12000~15000	15000~22000	12±1	<3.8	<2.0
			8200~10000	18000~22000	27000~47000	14±1	<3.8	<2.0
					100000	16±1	<3.8	<2.0

3.0 Semi-Conductive Capacitance Range Chart (Class III)

(Max. Capacitance in pF)

W.Vdc	F (Y5V)	Dimensions (mm)		
		D	T	G
25V	22000	4.5±1	<3	<1.5
	33000~50000	5±1	<3	<1.5
	100000	6±1	<3	<1.5
		7±1	<3	<1.5
50V	22000	4.5±1	<3	<1.5
	33000~50000	5±1	<3	<1.5
	100000	6±1	<3	<1.5
		6±1	<3	<1.5
		7±1	<3	<1.5

耐壓 100Vdc 以下，均需符合 Coating 之可漏底不漏銀電極的製作規範。



DISC CERAMIC CAPACITORS

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4.0 Medium-High Voltage Capacitance Range Chart (Class I 、 II)

耐壓 1KVdc 以上，均需符合 Coating 之不可漏底的製作規範。

(Max. Capacitance in pF)

W.Vdc	NPO (CH)	SL	B (Y5E) (Y5P)	E (Z5U)	F (Z5V)	Dimensions (mm)		
						D	T	G
1KV	1~10		100~470	1000~1200		5±1	<3.8	<2.0
	12~33	30~100	500~680	1500~2200		6±1	<3.8	<2.0
	39~51	120~150	820~1000	2700~3300		7±1	<3.8	<2.0
	56~68	1800~220	1500~1800	3900	4700~6800	8±1	<3.8	<2.0
	75~91	270~330	2000~2200	4700~5600	8200~10000	9±1	<3.8	<2.0
	100~120	390	2700~3300	6800,10000	12000	10±1	<3.8	<2.0
				8200~10000	15000	11±1	<3.8	<2.0
	150~180	470~560	3900~4700	10000~12000		12±1	<3.8	<2.0
	200~220	680~820	5000~6800	15000	18000~22000	14±1	<3.8	<2.0

W.Vdc	NPO (CH)	SL	B (Y5E) (Y5P)	E (Z5U)	F (Z5V)	Dimensions (mm)		
						D	T	G
2KV	1~20	15~56	100~470	1000~1200		5±1.5	<4.5	<2.0
	22~30	68~100	560~820	1500~2200	3300~3900	6±1.5	<4.5	<2.0
	33~39	120~150	1000~1200	2700~3300	4700~5100	7±1.5	<4.5	<2.0
	47~51	180	1500	3900	5600~6800	8±1.5	<4.5	<2.0
	56~68	200~220	1800~2000		8200	9±1.5	<4.5	<2.0
	75~82	270~300	2200~2700	4700~5600	10000	10±1.5	<4.5	<2.0
	90~100	330	3000~3300		12000	11±1.5	<4.5	<2.0
	110~120		3900	6800		12±1.5	<4.5	<2.0
	150	390				13±1.5	<4.5	<2.0
			4700~5600	8200~10000		14±1.5	<4.5	<2.0

W.Vdc	NPO (CH)	SL	B (Y5E) (Y5P)	E (Z5U)	F (Z5V)	Dimensions (mm)		
						D	T	G
3KV	1~18	15~47	100~470	1000~1200	1800~2200	7±1.5	<4.5	<3.0
	20~30	50~680	680~820	1500	2700~3300	8±1.5	<4.5	<3.0
	33~39	82~100	1000	1800~2000	3900	9±1.5	<4.5	<3.0
	47~56	120	1200	2200~2700	4700~5600	10±1.5	<4.5	<3.0
	62~68	150~180	1500	3000~3300		11±1.5	<4.5	<3.0
	72~82	200~220	1800		6800~8200	12±1.5	<4.5	<3.0
		270	2000~2200	3900~4700		13±1.5	<5	<3.0
		300~330			10000	14±1.5	<5	<3.0
			2700~3300	5000~6800		15±1.5	<5	<3.0



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

5.0 Specification

No	Item	Class I	Class II	Class III	Measuring Condition															
1	Visual and mechanical examination	To be within the specifications shows in			Capacitors shall be visually inspected for visible evidence of defect. Dimensions shall be measured with calipers or micrometers. Marking shall be legibility.															
2	Operating Temperature Range	- 25℃ to +85℃	Y5E 、Y5P : - 25℃ to +85℃ Z5U 、Z5V : +10℃ to +85℃	Y5V & Y5U& Y5P : - 25℃ to +85℃	Class III is semi-conductor material															
3	Temperature Characteristics	NPO(CH) : 0 ± 60ppm/℃ PH : - 150 ± 60ppm/℃ RH : - 220 ± 60ppm/℃ SH : - 330 ± 60ppm/℃ TH : - 470 ± 60ppm/℃ UJ : - 750 ± 120ppm/℃ SL : +350 to- 1000ppm/℃	Y5E : ± 4.7% Y5P : ± 10% Z5U : +22 -56 % Z5V : +22 -82 %	Y5U : +22 -56 % Y5V : +22 -82 % Y5P : ±10 %	Retain the sample for 30 minutes at the temperature specified below in the sequence listed in the table. Then measure the capacitance in each step after thermal equilibrium at each temperature is reached. <table><tr><td>Step 1</td><td>Step 2</td><td>Step 3</td><td>Step 4</td><td>Step 5</td></tr><tr><td>Room Temp.</td><td>Min. Operating Temp.</td><td>Room Temp.</td><td>Max. Operating Temp.</td><td>Room Temp.</td></tr><tr><td>25±2℃</td><td>-25±3℃ 10±2℃</td><td>25±2℃</td><td>85±2℃</td><td>25±2℃</td></tr></table> Note that step 1 and 2 do not apply for the SL characteristics.	Step 1	Step 2	Step 3	Step 4	Step 5	Room Temp.	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	25±2℃	-25±3℃ 10±2℃	25±2℃	85±2℃	25±2℃
Step 1	Step 2	Step 3	Step 4	Step 5																
Room Temp.	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.																
25±2℃	-25±3℃ 10±2℃	25±2℃	85±2℃	25±2℃																
4	Capacitance	To be within the specified tolerance			Shall be measured at 25℃± 2℃ normal temperature at the frequency and voltage															
5	Q or Dissipation Factor (tanδ)	C≥30pF : Q≥1000 C<30pF : Q≥400 + 20 × C (C is nominal capacitance)	Y5E &Y5P &Z5U : tanδ ≤0.025 Z5V : tanδ ≤0.05	Y5U & Y5V & Y5P : tanδ ≤0.05	Class I : 1MHz ± 20% , 1 ± 0.2Vrms Class II : 1KHz ± 10% , 1 ± 0.2Vrms Class III : 1KHz ± 10% , 0.5 ± 0.05Vrms															
6	Withstanding Voltage	No defects			Applied voltage : Rated voltage ×3 (Class I) Rated voltage ×2.5 (Class II) Rated voltage ×2 (Class III) Duration : 1 to 5 sec. The charge/discharge current is less than 50mA															
7	Insulation Resistance	More than 10GΩ	More than 10GΩ or 200MΩ • F,whichever is less.	More than 1GΩ or 20MΩ • F,whichever is less.	Apply rated voltage for 1 minute at 25℃± 2℃ and 70% R.H. max. 16Vdc product : Measurement voltage is 25Vdc															
8	Strength of Lead	Termination not to be broken or loosened			Fix the capacitor, apply the tensile stress listed below in the terminal extraction direction until the designated value is reached, then retain the capacitor for 10 ± 1 seconds as is. <table><tr><td>Nominal wire diameter</td><td>0.5mm</td><td>0.6mm</td></tr><tr><td>Tensile stress</td><td>1kg</td><td>1.5kg</td></tr></table>	Nominal wire diameter	0.5mm	0.6mm	Tensile stress	1kg	1.5kg									
Nominal wire diameter	0.5mm	0.6mm																		
Tensile stress	1kg	1.5kg																		
9	Solderability of leads	At least 75% of the immersed surface in the circumference direction is covered with new solder.			Solder temperature : Class I : 260 ± 5℃ Class II、 III : 250 ± 5℃ Dipping : 2 ± 0.5 sec. (Flux shall be used)															



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

5.0 Specification

No	Item		Class I	Class II	Class III	Measuring Condition															
10	Resistance to Soldering heat	ΔC	± 2.5% or ± 0.25pF (Whichever is greater)	Y5E ∙ Y5P : ± 5% Z5U : ± 15% Z5V : ± 20%	Y5U & Y5V : ± 30% Y5P : ± 7.5%	The lead wire is immersed in the melted solder 1.5mm to 2mm from the capacitor body (Class I, II) Solder temperature : 350 ± 10℃ Duration : 3 ± 0.5sec. (Class III) Solder temperature : 260 ± 5℃ Duration : 5 ± 0.5sec. The measurements after testing must be taken after leaving the sample for 12 to 24 hours under normal temperature and humidity conditions.															
		Withstanding voltage	No defects																		
		Exterior	No abnormalities																		
11	Temperature and Immersion cycling	ΔC	± 5% or ± 0.5pF (Whichever is greater)	Y5E ∙ Y5P : ± 10% Z5U : ± 20% Z5V : ± 30%	Y5U & Y5V : ± 30% Y5P : ± 15 %	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10). Perform the 5 cycles according to the four heat treatments listed in the following table. <table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Temp. (℃)</td><td>Min. Operating Temp.</td><td>Room Temp.</td><td>Max. Operating Temp.</td><td>Room Temp.</td></tr><tr><td>Time (min.)</td><td>30±3</td><td>15</td><td>30±3</td><td>15</td></tr></table> The measurements after testing must be taken after leaving the sample for 12 to 24 hours under normal temperature and humidity conditions.	Step	1	2	3	4	Temp. (℃)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	Time (min.)	30±3	15	30±3	15
		Step	1	2	3		4														
		Temp. (℃)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.		Room Temp.														
		Time (min.)	30±3	15	30±3		15														
		Q／D.F.	C≥30pF : Q≥350 10pF>C<30pF : $Q \geq 275 + \frac{5}{2} \times C$ C≤10pF : Q≥200 + 10 × C (C is nominal capacitance)	Y5E & Y5P & Z5U : $\tan \delta \leq 0.05$ Z5V : $\tan \delta \leq 0.075$	Y5U & Y5P : $\tan \delta \leq 0.05$ Y5V : $\tan \delta \leq 0.075$																
		I.R.	More than 1GΩ	More than 1GΩ or 20MΩ ∙ F, whichever is less.	More than 500MΩ or 10MΩ ∙ F, whichever is less.																
Withstanding voltage	No defects																				
Exterior	No abnormalities																				
12	Humidity Loading	ΔC	± 7.5% or ± 0.75pF (Whichever is greater)	Y5E ∙ Y5P : ± 10% Z5U : ± 20% Z5V : ± 30%	Y5U & Y5V : ± 30% Y5P : ± 15 %	Temperature : 40 ± 2℃ Humidity : 90 to 95% R.H. Duration : 500 ⁺²⁴ ₋₀ hrs. The rated voltage continuously applied. The charge/discharge current is less than 10mA. The measurements after testing must be taken after leaving the sample for 1 to 2 hours under normal temperature and humidity conditions. • Perform a heat treatment at 40 ± 2℃ for 1 hour. Remove and let sit for 1 to 2 hours at normal temperature and humidity conditions. Perform the initial measurement.															
		Q／D.F.	C≥30pF : Q≥200 C<30pF : $Q \geq 100 + \frac{10}{3} \times C$ (C is nominal capacitance)	Y5E & Y5P & Z5U : $\tan \delta \leq 0.05$ Z5V : $\tan \delta \leq 0.075$	Y5U & Y5V & Y5P : $\tan \delta \leq 0.075$																
		I.R.	More than 1GΩ	More than 1GΩ or 20MΩ ∙ F, whichever is less.	More than 500MΩ or 10MΩ ∙ F, whichever is less.																
		Withstanding voltage	No defects																		
		Exterior	No abnormalities																		



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

5.0 Specification

No	Item		Class I	Class II	Class III	Measuring Condition	
13	Life	ΔC	± 5% or ± 0.5pF (Whichever is greater)	Y5E、Y5P : ± 10% Z5U : ± 20% Z5V : ± 30%	Y5U & Y5V : ± 30% Y5P : ± 15 %	Applied voltage : Rated voltage ×2(Class I, II) Rated voltage ×1.25(Class III) Temperature : 85± 2℃	
		Q／D.F.	C≥30pF : Q≥350 10pF>C<30pF : $Q \geq 275 + \frac{5}{2} \times C$ C≤10pF : Q≥200 + 10 × C (C is nominal capacitance)	Y5E & Y5P & Z5U : $\tan\delta \leq 0.05$ Z5V : $\tan\delta \leq 0.075$	Y5U & Y5V & Y5P : $\tan\delta \leq 0.075$	Duration : 1000 ⁺⁴⁸ ₋₀ hrs. The charge/discharge current is less than 10mA. The measurements after testing must be taken after leaving the sample for 12 to 24 hours under normal temperature and humidity conditions.	
		I.R.	More than 1GΩ	More than 1GΩ or 20MΩ • F,whichever is less.	More than 500MΩ or 10MΩ • F,whichever is less.	• Perform a heat treatment at 85± 2℃ for 1 hour. Remove and let sit for 12 to 24 hours at normal temperature and humidity conditions. Perform the initial measurement.	
		Withstanding voltage	No defects				
		Exterior	No abnormalities				

* Note on standard condition : “standard condition” referred to herein is defined as follows :

5 to 35℃ of temperature, 45 to 85% relative humidity, and 860 to 1060 mbar of air pressure.

When there are questions concerning measurement results :

In order to provide correlation data, the test shall be conducted under condition of 23℃± 2℃ of temperature, 60 to 70% relative humidity, and 860 to 1060 mbar of air

Pressure, Unless otherwise specified, all the tests are conducted under the “standard condition” .

6.0 Storage

1. The storage conditions should be:

Temperature = Lower than 40℃

Humidity = Lower than 70% R.H.

2. After opening the package, please store in desiccators.



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

Medium-High Voltage Capacitor

7.0 Specification

No	Item	Class I	Class II	Measuring Condition															
1	Visual and mechanical examination	To be within the specifications shows in		Capacitors shall be visually inspected for visible evidence of defect. Dimensions shall be measured with calipers or micrometers. Marking shall be legibility.															
2	Operating Temperature Range	NPO、SL : - 25℃ to +85℃	Y5E、Y5P、Y5U、Y5V : - 25℃ to +85℃ Z5U、Z5V : +10℃ to +85℃	Class III is semi-conductor material															
3	Temperature Characteristics	NPO(CH) : 0 ± 60ppm/℃ UJ : - 750 ± 120ppm/℃ SL : +350 to- 1000ppm/℃	Y5E : ± 4.7% Y5P : ± 10% Y5U : $\begin{matrix} +22 \\ -56 \end{matrix} \%$ Z5U : $\begin{matrix} +22 \\ -56 \end{matrix} \%$ Z5V、Y5V : $\begin{matrix} +22 \\ -82 \end{matrix} \%$	Retain the sample for 30 minutes at the temperature specified below in the sequence listed in the table. Then measure the capacitance in each step after thermal equilibrium at each temperature is reached. <table border="1"><thead><tr><th>Step 1</th><th>Step 2</th><th>Step 3</th><th>Step 4</th><th>Step 5</th></tr><tr><td>Room Temp.</td><td>Min. Operating Temp.</td><td>Room Temp.</td><td>Max. Operating Temp.</td><td>Room Temp.</td></tr></thead><tbody><tr><td>25±2℃</td><td>-25±3℃ 10±2℃</td><td>25±2℃</td><td>85±2℃</td><td>25±2℃</td></tr></tbody></table> Note that step 1 and 2 do not apply for the SL characteristics.	Step 1	Step 2	Step 3	Step 4	Step 5	Room Temp.	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	25±2℃	-25±3℃ 10±2℃	25±2℃	85±2℃	25±2℃
Step 1	Step 2	Step 3	Step 4	Step 5															
Room Temp.	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.															
25±2℃	-25±3℃ 10±2℃	25±2℃	85±2℃	25±2℃															
4	Capacitance	To be within the specified tolerance		Shall be measured at 25℃ ± 2℃ normal temperature at the frequency and voltage															
5	Q or Dissipation Factor (tanδ)	C ≥ 30pF : Q ≥ 1000 C < 30pF : Q ≥ 400 + 20 × C (C is nominal capacitance)	Y5E & Y5P & Y5U & Z5U : tanδ ≤ 0.025 Z5V、Y5V : tanδ ≤ 0.05	Class I : 1MHz ± 20% , 1 ± 0.2Vrms Class II : 1KHz ± 10% , 1 ± 0.2Vrms															
6	Withstanding Voltage	No defects between terminals No defects between terminal and body		Applied voltage : Rated voltage × 2 (Class I) Rated voltage × 1.5 (Class II、III) 5KV~7999V × 1.5 8KV~12KV × 1.2 Duration : 1 to 5 sec. The charge/discharge current is less than 50mA Applied voltage : 1.3kVdc Duration : 1 to 5 sec.															
7	Insulation Resistance	More than 10GΩ or 200MΩ • F, whichever is less. Y5V : More than 1GΩ or 20MΩ • F, whichever is less.		Apply 500Vdc for 1 minute at 25℃ ± 2℃ and 70% R.H. max.															
8	Strength of Lead	Termination not to be broken or loosened		Fix the capacitor, apply the tensile stress listed below in the terminal extraction direction until the designated value is reached, then retain the capacitor for 10 ± 1 seconds as is. Tensile stress ≥ 1.5kg															
9	Solderability of leads	At least three-fourths of the immersed surface in the circumference direction is covered with new solder.		Solder temperature : Class I : 260 ± 5℃ Class II、III : 250 ± 5℃ Dipping : 2 ± 0.5 sec. (Flux shall be used)															



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

Medium-High Voltage Capacitor

7.0 Specification

No	Item		Class I	Class II	Measuring Condition															
10	Resistance to Soldering heat	ΔC	± 2.5% or ± 0.25pF (Whichever is greater)	Y5E & Y5P : ± 5% Y5U & Z5U : ± 15% Z5V : ± 20% Y5V : ± 30%	The lead wire is immersed in the melted solder 1.5mm to 2mm from the capacitor body (Class I, II, III) Solder temperature : 260 ± 5℃ Duration : 5 ± 0.5sec. The measurements after testing must be taken after leaving the sample for 12 to 24 hours under normal temperature and humidity conditions.															
		Withstanding voltage	No defects																	
		Exterior	No abnormalities																	
11	Temperature and Immersion cycling	ΔC	± 5% or ± 0.5pF (Whichever is greater)	Y5E & Y5P : ± 10% Y5U & Z5U : ± 20% Z5V : ± 30% Y5V : ± 30%	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10). Perform the five cycles according to the four heat treatments listed in the following table. <table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Temp. (℃)</td><td>Min. Operating Temp.</td><td>Room Temp.</td><td>Max. Operating Temp.</td><td>Room Temp.</td></tr><tr><td>Time (min.)</td><td>30±3</td><td>15</td><td>30±3</td><td>15</td></tr></table> The measurements after testing must be taken after leaving the sample for 12 to 24 hours under normal temperature and humidity conditions.	Step	1	2	3	4	Temp. (℃)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	Time (min.)	30±3	15	30±3	15
		Step	1	2		3	4													
		Temp. (℃)	Min. Operating Temp.	Room Temp.		Max. Operating Temp.	Room Temp.													
		Time (min.)	30±3	15		30±3	15													
		Q／D.F.	C≥30pF : Q≥350 10pF>C<30pF : $Q \geq 275 + \frac{5}{2} \times C$ C≤10pF : Q≥200 + 10 × C (C is nominal capacitance)	Y5E & Y5P & Z5U & Y5U : tanδ ≤0.05 Z5V、 Y5V : tanδ ≤0.075																
I.R.	More than 1GΩ	More than 1GΩ or 20MΩ • F,whichever is less. Y5V : More than 500MΩ or 10MΩ • F,whichever is less.																		
Withstanding voltage	No defects																			
Exterior	No abnormalities																			
12	Humidity Loading	ΔC	± 7.5% or ± 0.75pF (Whichever is greater)	Y5E、Y5P : ± 10% Y5U & Z5U : ± 20% Z5V、Y5V : ± 30%	Temperature : 40 ± 2℃ Humidity : 90 to 95% R.H. Duration : 500 ⁺²⁴ ₋₀ hrs. The rated voltage continuously applied. The charge/discharge current is less than 10mA. The measurements after testing must be taken after leaving the sample for 1 to 2 hours under normal temperature and humidity conditions. • Perform a heat treatment at 40 ± 2℃ for 1 hour. Remove and let sit for 1 to 2 hours at normal temperature and humidity conditions. Perform the initial measurement.															
		Q／D.F.	C≥30pF : Q≥200 C<30pF : $Q \geq 100 + \frac{10}{3} \times C$ (C is nominal capacitance)	Y5E & Y5P & Y5U & Z5U : tanδ ≤0.05 Z5V、Y5V : tanδ ≤0.075																
		I.R.	More than 500MΩ Y5V : More than 500MΩ or 10MΩ • F,whichever is less.																	
		Withstanding voltage	No defects																	
		Exterior	No abnormalities																	



DISC CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

Medium-High Voltage Capacitor

7.0 Specification

No	Item		Class I	Class II	Measuring Condition
13	Life	ΔC	± 5% or ± 0.5pF (Whichever is greater)	Y5E 、 Y5P : ± 10% Y5U & Z5U : ± 20% Z5V 、 Y5V : ± 30%	Applied voltage : Rated voltage ×1.5(Class I) Rated voltage ×1.25(Class II , III) 8KV~12KV × 1 Temperature : 85± 2℃ Duration : 1000 ⁺⁴⁸ ₋₀ hrs. The charge/discharge current is less than 10mA. The measurements after testing must be taken after leaving the sample for 12 to 24 hours under normal temperature and humidity conditions. • Perform a heat treatment at 85± 2℃ for 1 hour. Remove and let sit for 12 to 24 hours at normal temperature and humidity conditions. Perform the initial measurement.
		Q／D.F.	C≥30pF : Q≥350 10pF >C< 30pF : $Q \geq 275 + \frac{5}{2} \times C$ C≤10pF : Q≥200 + 10 × C (C is nominal capacitance)	Y5E 、 Y5P 、 Z5U 、 Y5U : tanδ ≤0.05 Z5V 、 Y5V : tanδ ≤0.075	
		I.R.	More than 1GΩ	More than 1GΩ or 20MΩ • F,whichever is less. Y5V : More than 500MΩ or 10MΩ • F,whichever is less.	
		Withstanding voltage	No defects		
		Exterior	No abnormalities		



MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

Dipped Radial Lead Type

● Part Number Description

M	X7R	471	K	1H	R15DS7	16	A
①	②	③	④	⑤	⑥	⑦	⑧

① Type

Symbol	Type
M	Radial

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%

③ Capacitance Value

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

④ Capacitance Tolerance

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

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



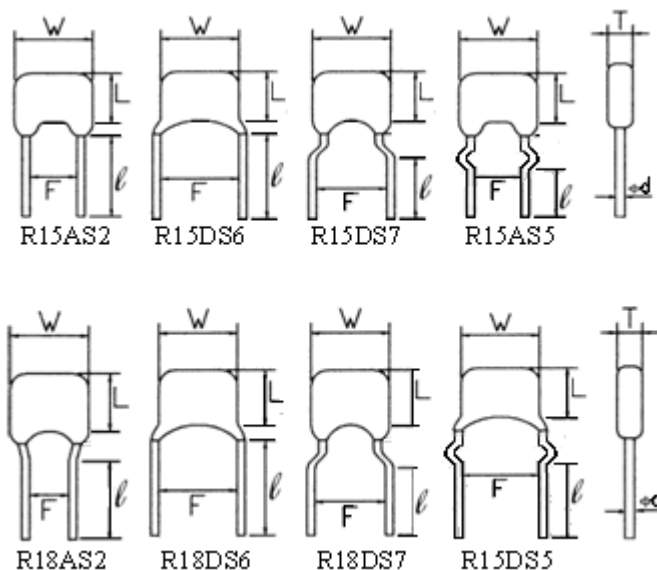
MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

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		

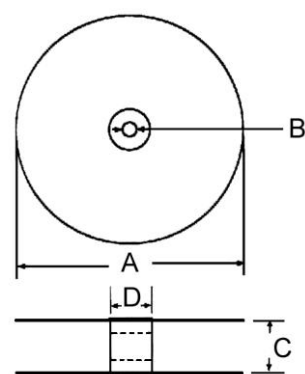
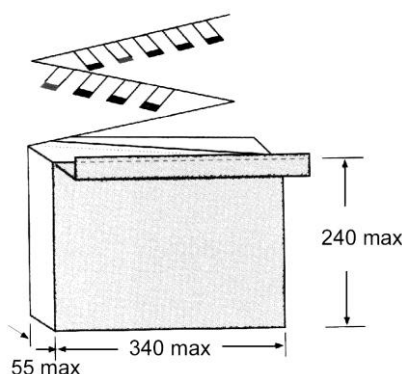


⑦ Lead Length (ℓ)

Packing	Bulk				Taping
Symbol	04	06	10	30	16
Length (mm)	4±1	6±1	10±1	30±3	16± ^{1.5} ₁

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

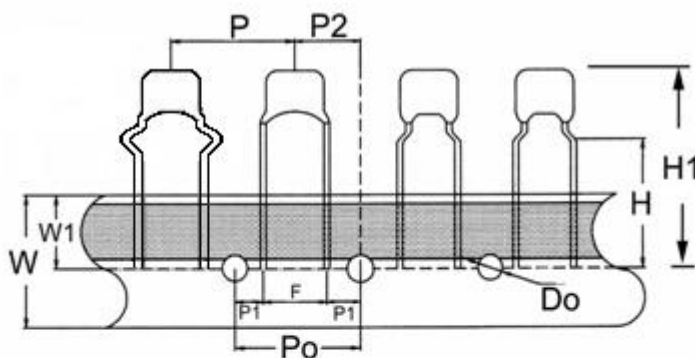
UNIVERSE CONDENSER CO. LTD

Dipped Radial Lead Type

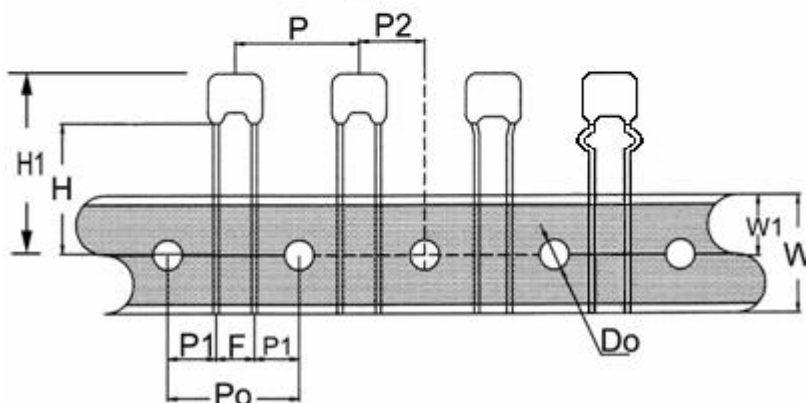
• Taping

(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 ^{+1.5} ₋₁	16 ^{+1.5} ₋₁	
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	$0 \pm 30 \text{ ppm/}^\circ\text{C}$	
Capacitance	Within the specified tolerance	Shall be measured at $25^\circ\text{C} \pm 2^\circ\text{C}$ 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)	
Withstanding Voltage	No defects	Applied voltage : Rated voltage $\times 2.5$ 100V ~ 999V Rated voltage $\times 1.5$ 1000 ~ 3000V Rated voltage $\times 1.2$ Duration : 1 to 5 sec. The charge/discharge current is less than 50mA
Insulation Resistance	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	Apply rated voltage for 1 minute at $25^\circ\text{C} \pm 2^\circ\text{C}$ 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

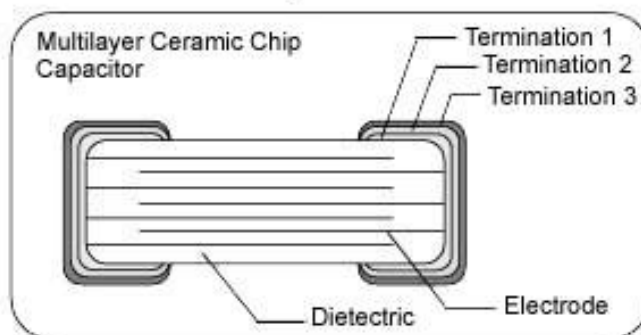
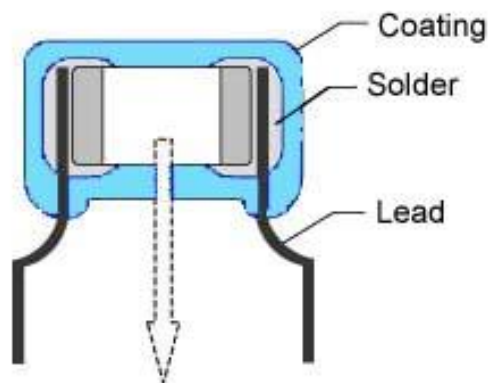


MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

Dipped Radial Lead Type

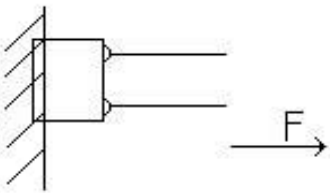
● Material List



● 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 : $260 \pm 5^\circ\text{C}$ 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
Resistance to Soldering heat		
ΔC	± 2.5% 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℃ for 10 ± 0.5sec. Let sit at room temperature for 24 ± 2 hrs. then measure. Perform the initial measurement.
Q	C ≥ 30pF : Q ≥ 1000 C < 30pF : Q ≥ 400 + 20 × C (C is nominal capacitance)	
I.R.	More than 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	
Thermal shock		
ΔC	± 2.5% or ± 0.25pF (Whichever is greater)	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 24 ± 2 hrs., then measure.
Q	C ≥ 30pF : Q ≥ 1000 C < 30pF : Q ≥ 400 + 20 × C (C is nominal capacitance)	
I.R.	More than 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	

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



MONOLITHIC (MULTILAYER) CERAMIC CAPACITORS

UNIVERSE CONDENSER CO. LTD

Dipped Radial Lead Type

● Environmental and Test Characteristics

NPO

Item	Temperature Compensating	Measuring Condition
Moisture resistance (Steady state)		
ΔC	± 5% or ± 0.5pF (Whichever is greater)	Apply the rated DC voltage at 40 ± 2℃ and 90 to 95% R.H. for 500 ⁺²⁴ ₋₀ hrs. Remove and let sit at room temperature for 24 ± 2 hrs., then measure. Perform the initial measurement.
Q	C ≥ 30pF : Q ≥ 350 10pF > C < 30pF : Q ≥ 275 + $\frac{5}{2} \times C$ C ≤ 10pF : Q ≥ 200 + 10 × C (C is nominal capacitance)	
I.R.	More than 1000MΩ or 50MΩ · μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ · μ F , whichever is less.	
Withstanding voltage	No defects	
Exterior	No abnormalities	
High temperature loading		
ΔC	± 3% or ± 0.3pF (Whichever is greater)	Apply 200% of the rated DC voltage for 1000 ⁺⁴⁸ ₋₀ hrs. at the maximum operating temperature ± 2℃ . Remove and let sit at room temperature for 24 ± 2 hrs., then measure. The charge/discharge current is less than 50mA. Perform initial measurement. ● 100V ≤ V < 1000V: 150% of rated voltage. ● V ≤ 1000V: 120% of rated voltage (max.3600V)
Q	C ≥ 30pF : Q ≥ 350 10pF > C < 30pF : Q ≥ 275 + $\frac{5}{2} \times C$ C ≤ 10pF : Q ≥ 200 + 10 × C (C is nominal capacitance)	
I.R.	More than 1000MΩ or 50MΩ · μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ · μ 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																			
Resistance to Soldering heat																						
ΔC	X7R/X5R= ± 7.5% Y5V= ± 20%		The lead wire is immersed in the melted solder 1.5mm to 2mm from the main body at 260 ± 5℃ for 10 ± 0.5sec. Let sit at room temperature for 48 ± 4 hrs. , then measure. • Initial measurement for Perform a heat treatment at 150 ⁺⁰₋₁₀ °C for 1 hour. Remove and let sit for 48 ± 4 hours at room temperature. Perform the initial measurement.																			
D.F.	25V min	X7R=0.03max. X7R=0.055max. (C≥1.0uF) Y5V=0.075max																				
		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 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ F , whichever is less.																					
Withstanding voltage	No defects																					
Exterior	No abnormalities																					
Thermal shock																						
ΔC	X7R/X5R= ± 7.5% Y5V= ± 20%		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 48 ± 4 hrs. , then measure. <table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Temp. (℃)</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>30±3</td><td>15</td><td>30±3</td><td>15</td></tr></table> • Initial measurement for Perform a heat treatment at 150 ⁺⁰₋₁₀ °C for 1 hour. Remove and let sit for 48 ± 4 hrs. At room temperature. Perform the initial measurement.					Step	1	2	3	4	Temp. (℃)	Min. Operating Temp.	Room Temp.	Max. Operating Temp.	Room Temp.	Time	30±3	15	30±3	15
Step	1	2						3	4													
Temp. (℃)	Min. Operating Temp.	Room Temp.						Max. Operating Temp.	Room Temp.													
Time	30±3	15						30±3	15													
D.F.	25V min	X7R=0.03max. X7R=0.055max. (C≥1.0uF) Y5V=0.075max.																				
		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 10GΩ or 500MΩ · μ F , whichever is less. 16Vdc product : More than 10GΩ or 100MΩ · μ 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
Moisture resistance (Steady state)			
ΔC	X7R/X5R= ± 12.5% Y5V= ± 30%		Apply the rated DC voltage at 40 ± 2℃ and 90 to 95% R.H. for 500 ⁺²⁴ ₋₀ hrs. Remove and let sit at room temperature for 48 ± 4 hrs. , then measure. • Initial measurement for Perform a heat treatment at 150 ⁺⁰ ₋₁₀ ℃ for 1 hour. Remove and let sit for 48 ± 4 hrs. At room temperature. Perform the initial measurement.
D.F.	25V min	X7R=0.06max. X7R=0.11max. (C≥1.0uF) Y5V=0.1125max.	
	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 1000MΩ or 50MΩ • μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ • μ F , whichever is less.		
Withstanding voltage	No defects		
Exterior	No abnormalities		
High temperature loading			
ΔC	X7R/X5R= ± 15% Y5V= ± 30%		To Apply voltage: 1. V < 100V: 200% of rated voltage. 2. 100V ≤ V < 1000V: 150% of rated voltage. 3. V ≤ 1000V: 120% of rated voltage. (max.3600V) Test time :1000 ⁺⁴⁸ ₋₀ hrs. at the maximum operating temperature ± 2℃ . Remove and let sit at room temperature for 48 ± 4 hrs. , then measure. The charge/discharge current is less than 50mA.
D.F.	25V min	X7R=0.06max. X7R=0.11max. (C≥1.0uF) Y5V=0.1125max.	
	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 1000MΩ or 50MΩ • μ F , whichever is less. 16Vdc product : More than 1000MΩ or 10MΩ • μ F , whichever is less.		
Withstanding voltage	No defects		Perform initial measurement.
Exterior	No abnormalities		