Ceramic Interference Suppression Safety Certified Capacitors



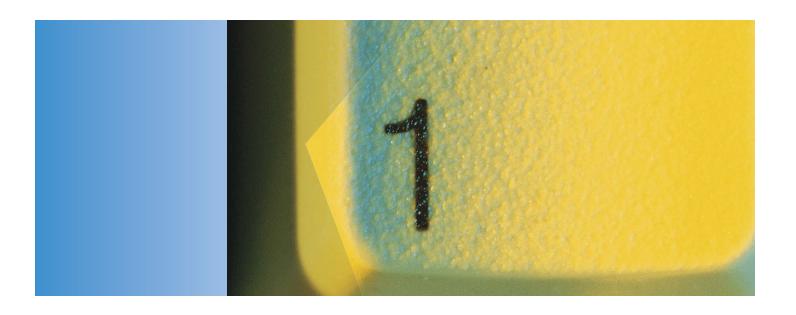
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Ceramic Interference Suppression Safety Certified Capacitors KEVE



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When you partner with KEMET, our entire global organization provides you with the coordinated service you need. No bouncing from supplier to supplier. No endless phone calls and web browsing. We're your single, integrated source for electronic component solutions worldwide.

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About KEMET.

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KEMET Corporation is a leading global supplier of electronic components. We offer our customers the broadest selection of capacitor technologies in the industry across multiple dielectrics, along with an expanding range of electromechanical devices, and electromagnetic compatibility solutions. Our vision is to be the preferred supplier of electronic component solutions for customers demanding the highest standards of quality, delivery and service.

Safety Standard Recognized, 900 Series, Radial Disc, Encapsulated, AC Type, X1 400 VAC/Y2 250 VAC (Industrial Grade)

Electronic Components

Overview

KEMET's 900 series encapsulated radial through-hole ceramic disc capacitors are specifically designed for interferencesuppression AC line filtering applications. Having internationally recognized safety certifications, these capacitors are well-suited for applications that require keeping potentially disruptive or damaging line transients and EMI out of susceptible equipment. They are also an ideal solution when needing to suppress line disturbances at the source.

Safety Certified Capacitors are classified as either X and/or Y capacitors. Class X capacitors are primarily used in line-to line (across-the-line) applications. In this application there is no danger of electric shock to humans should the capacitor fail, but could result in a risk of fire. The class Y capacitor is primarily used in line-to-ground (line by-pass) applications. In this application, failure of the capacitor could lead to danger of electric shock.

With a working voltage of 400 VAC in line-to-line (Class X) and 250 VAC in line-to-ground (Class Y) applications, these safety capacitors meet the impulse test criteria outlined in IEC Standard 60384. Meeting subclass X1 and Y2 requirements, these devices are certified to withstand impulses up to 4 KV (X1) and 5 KV (Y2) respectively. These encapsulated devices also meet the flame test requirements outlined in UL Standard 94V-0.



Ordering Information

C9	8	1	U	103	M	Υ	V	D	Α	Α	7317
Ceramic Series	Body Diameter	Lead Spacing ^{1,2,4}	Spec.	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage	Dielectric/ Temp. Char.	Design	Lead Config. ^{1,3,4}	Failure Rate	Packaging (C-Spec) ^{2,3,4}
C9 = Ceramic 900 Series	0 = 7.0 mm 1 = 8.0 mm 2 = 9.0 mm 3 = 10.0 mm 4 = 11.0 mm 6 = 13.0 mm 8 = 15.0 mm	5 = 5.0 mm 7 = 7.5 mm 1 = 10.0 mm	U = Safety	2 significant digits + number of zeroes Use 9 for 1.0 - 9.9 pF e.g., 2.2 pF = 229	C = $\pm 0.25 \text{ pF}$ D = $\pm 0.5 \text{ pF}$ J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$	Y = X1 400 VAC /Y2 250 VAC	N = CH (NP0) S = SL Y = Y5P W = Y5U V = Y5V	D = Disc	A = Straight B = Vertical Kink C = Outside Kink D = Inside Kink	A = N/A	7317 = Ammo Pack WL30 = Bulk/3.0 mm Lead length WL35 = Bulk/3.5 mm Lead length WL40 = Bulk/4.0 mm Lead length WL45 = Bulk/4.5 mm Lead length WL50 = Bulk/5.0 mm Lead length WL50 = Bulk/5.0 mm Lead length WL20 = Bulk/20 mm Lead length

Due to a high risk of arcing, "Inside Kink" lead configuration cannot be combined with the 5 mm lead spacing option. The "Inside Kink" option is only available on capacitors with lead spacing of 7.5 mm or 10 mm.

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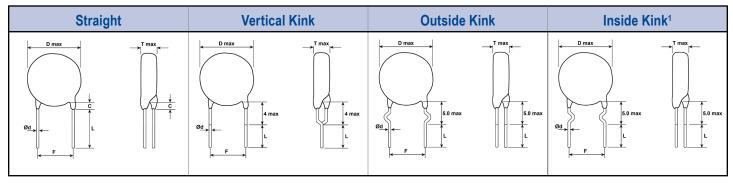
² Capacitor body diameter will limit available lead spacing and packaging options. See "Dimensions" and "Product Ordering Codes and Ratings" sections of this document to determine availability.

³ "Vertical Kink", "Outside Kink" and "Inside Kink" lead configurations cannot be combined with the bulk/20 mm lead length option (WL20). 20 mm lead length is only available on capacitors with straight leads (lead configuration ordering code "A"). For nonstandard lead length inquiries, please contact KEMET.

⁴ Bulk packaging lead length availability is dependent upon "Lead Configuration" and "Lead Spacing." See "Dimensions" section of this document to verify availability of a specific lead length option. For nonstandard lead length inquiries, please contact KEMET.



Lead Configurations



¹ Due to a high risk of arcing, the "Inside Kink" lead configuration option cannot me combined with 5 mm lead spacing ("F" dimension above). The "Inside Kink" option is only available on devices with lead spacing of 7.5 mm or 10 mm.

Dimensions – Millimeters

	Lead	F	Lead		L	Packaging	D	Т	е	Ød
Lead Config.	Config. Ordering Code ¹	Lead Spacing ²	Spacing Tolerance	Packaging Type ²	Lead Length	C-Spec Ordering Code ³	Body Diameter ²	Body Thickness	Lead Meniscus	Lead Dia.
			+0.8/-0.2	Ammo Pack	20.0 +1.5/-1.0	7317				
					3.0 ±1.0	WL30				
		5.0	.00	Bulk	3.5 ±1.0	WL35				
			±0.8	Bulk	4.5 ±1.0	WL45				
					20.0 minimum	WL20				
		7.5	.40	Ammo Pack	20.0 +1.5/-1.0	7317	See Table	1 - "Product	3.0 maximum	0.5 ±0.1
Straight	A				3.0 ±1.0	WL30	Ordering	Codes and		
		7.5	±1.0	Bulk	4.5 ±1.0	WL45	Ratings"		maximum	
					5.0 ±1.0	WL50				
				Ammo Pack	20.0 +1.5/-1.0	7317				
		10.0	.10		3.0 ±1.0	WL30				
		10.0	±1.0	Bulk	4.5 ±1.0	WL45				
					5.0 ±1.0	WL50				

¹ Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² Body diameter of capacitor will limit available lead spacing and packaging options. See "Product Ordering Codes and Ratings" sections of this document for further details.

³ The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Dimensions - Millimeters cont'd

	Lead	F	Lead		L	Packaging	D	T	е	Ød
Lead Config.	Config. Ordering Code ¹	Lead Spacing ²	Spacing Tolerance	Packaging Type ²	Lead Length	C-Spec Ordering Code ³	Body Diameter ²	Body Thickness	Lead Meniscus	Lead Dia.
			+0.8/-0.2	Ammo Pack	18.0 +2.0/-0	7317				
		5.0			3.0 ±1.0	WL30				
		5.0	±0.8	Bulk	3.5 ±1.0	WL35				
					4.0 ±1.0	WL40				
Vertical Kink	В			Ammo Pack	18.0 +2.0/-0	7317		1 - "Product	3.0	05.01
(Preformed)	В	7.5	±1.0	Bulk	3.5 ±1.0	WL35		Codes and ings"	maximum	0.5 ±0.1
				DUIK	4.0 ±1.0	WL40				
				Ammo Pack	18.0 +2.0/-0	7317				
		10.0	±1.0	Dulls	3.5 ±1.0	WL35				
				Bulk	4.0 ±1.0	WL40				
			+0.8/-0.2	Ammo Pack	18.0 +2.0/-0	7317				
		5.0	±0.8	Bulk	3.0 ±1.0	WL30				
					3.5 ±1.0	WL35				
					4.0 ±1.0	WL40				
				Ammo Pack	18.0 +2.0/-0	7317				
Outside Kink		7.5	4.0		3.5 ±1.0	WL35		1 - "Product	3.0	
(Preformed)	С	7.5	±1.0	Bulk	4.0 ±1.0	WL40		Codes and ings"	maximum	0.5 ±0.1
					5.0 ±1.0	WL50				
				Ammo Pack	18.0 +2.0/-0	7317				
		40.0	4.0		3.5 ±1.0	WL35				
		10.0	±1.0	Bulk	4.0 ±1.0	WL40				
					5.0 ±1.0	WL50				
		7.5		Ammo Pack	18.0 +2.0/-0	7317				
Inside Kink	D	7.5	±1.0	Bulk	3.5 ±1.0	WL35	13.0 maximum	7.0 m maximum	3.0	0.5 ±0.1
(Preformed)	D	40		Ammo Pack	18.0 +2.0/-0	7317				
		10		Bulk	3.5 ±1.0	WL35				

¹ Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² Body diameter of capacitor will limit available lead spacing and packaging options. See "Product Ordering Codes and Ratings" sections of this document for further details.

³ The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Benefits

- Safety Standard Recognized (IEC 60384-14)
- Reliable operation up to 125°C
- Class X1/Y2
- 5.0 mm, 7.5 mm, and 10 mm lead spacing
- · Lead (Pb)-free and RoHS Compliant
- Halogen Free
- Capacitance offerings ranging from 2.0 pF up to 10,000 pF
- Available capacitance tolerances of ±0.25 pF, ±0.5 pF, ±5%, ±10%, and ±20%
- · High reliability
- · Preformed (crimped) or straight lead configurations
- · Non-polar device, minimizing installation concerns
- Encapsulation meets flammability standard UL 94V–0

Applications

Typical applications include:

- · Line-to-line (Class X) filtering
- · Line-to-ground (Class Y) filtering
- Antenna coupling
- Primary and secondary coupling (switching power supplies)
- Line disturbances suppression (motors and motor controls, relays, switching power supplies, and inverters)

Approval Standard and Certification No.

Safety Standard	Standard No.	Subclass	Working Voltage	Certificate No.
VDE	IEC 60384-14	X1	400 VAC	40036415
(ENEC)	IEC 00304-14	Y2	250 VAC	40030413

These devices are VDE/ENEC recognized for antenna coupling and AC line-to-line (Class X) and line-to-ground (Class Y) applications per IEC60384-14.

Environmental Compliance

These devices are Halogen Free and RoHS Compliant. They meet all requirements set forth by both EU and China RoHS directives.





General Specifications/Performance Characteristics

Dielectric/Temperature Characteristic:	CH(NP0)	SL	Y5P	Y5U	Y5V	
Operating Temperature Range	-40°C to +125°C					
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC)	±60 ppm/°C	-1,000 ~ +350 ppm/°C	±10%	+20%/-55%	~ +30%/-80%	
Dielectric Withstanding Voltage (7.5 mm and 10 mm Lead Spacing) ¹	2,600 VAC (60 ±5 seconds at 25°C)					
Dielectric Withstanding Voltage (5 mm Lead Spacing) ¹		(60	2,000 VAC ±5 seconds at 2	5°C)		
Quality Factor (Q)	30 pF% and a Below 30 pF: ≥	bove: ≥ 1,000 : 400 +(20 x C)*	See	See "Dissipation Factor"		
Dissipation Factor (tanδ) at +25°C²	See "Quality Factor" 2.50%			2.50%	5.0%	
Insulation Resistance (IR) Limit at +25°C	+25°C 10,000 MΩ Minimum (500 VDC applied for 60 ±5 seconds @ 25°C)					

^{*}C = Nominal capacitance

CH(NP0) & SL: 1 MHz ± 100 kHz and 1.0 ±0.2 Vrms

X5P, Y5U and Y5V: 1 kHz \pm 50 Hz and 1.0 \pm 0.2 Vrms

Note: When measuring capacitance, it is important to ensure the set voltage level is held constant. The HP4284 & Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

¹ The distance between the adjacent leads of the component (also referred to as "lead spacing") governs Dielectric Withstanding Voltage (DWV) limit.

² Capacitance and Dissipation Factor (DF) measured under the following conditions:



Table 1 - Product Ordering Codes and Ratings

Dielectrie				Din	nensions (mm	1)	Lead S	pacing
Dielectric/ Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging
	C90(1)U209CYND(2)A(3)	2.0 pF						
	C90(1)U309CYND(2)A(3)	3.0 pF	±0.25 pF					
	C90(1)U409CYND(2)A(3)	4.0 pF	_0.20 p.					
	C90(1)U509CYND(2)A(3)	5.0 pF						
	C90(1)U609DYND(2)A(3)	6.0 pF						
	C90(1)U709DYND(2)A(3)	7.0 pF		7.0				
	C90(1)U809DYND(2)A(3)	8.0 pF	±0.5 pF					
	C90(1)U909DYND(2)A(3)	9.0 pF					5 mm,	
	C90(1)U100DYND(2)A(3)	10 pF						,
СН	C90(1)U120JYND(2)A(3)	12 pF					7.5 ı	
(NP0)	C90(1)U150JYND(2)A(3)	15 pF			5.0	0.5 ±0.1		r
(5)	C91(1)U180JYND(2)A(3)	18 pF					10 mm	mm
	C91(1)U200JYND(2)A(3)	20 pF		8.0				
	C91(1)U220JYND(2)A(3)	22 pF		0.0				
	C91(1)U240JYND(2)A(3) C92(1)U270JYND(2)A(3) C92(1)U300JYND(2)A(3)	24 pF	±5%					
		27 pF	10/0					
		30 pF		9.0				
	C92(1)U330JYND(2)A(3)	33 pF						
	C93(1)U360JYND(2)A(3)	36 pF		10.0				
	C93(1)U390JYND(2)A(3)	39 pF						
	C94(1)U470JYND(2)A(3)	47 pF		11.0			7.5 mm c	or 10 mm
						Y		
	C90(1)U100JYSD(2)A(3)	10 pF						
	C90(1)U120JYSD(2)A(3)	12 pF						
	C90(1)U150JYSD(2)A(3)	15 pF						
	C90(1)U180JYSD(2)A(3)	18 pF						
	C90(1)U200JYSD(2)A(3)	20 pF						
	C90(1)U220JYSD(2)A(3)	22 pF						
	C90(1)U240JYSD(2)A(3)	24 pF						
	C90(1)U270JYSD(2)A(3)	27 pF		7.0				
	C90(1)U300JYSD(2)A(3)	30 pF					5 m	nm
	C90(1)U330JYSD(2)A(3)	33 pF					7.5 i	
SL	C90(1)U360JYSD(2)A(3)	36 pF	±5%		5.0	0.5 ±0.1		r
	C90(1)U390JYSD(2)A(3)	39 pF					-	mm
	C90(1)U470JYSD(2)A(3)	47 pF						
	C90(1)U500JYSD(2)A(3)	50 pF						
	C90(1)U510JYSD(2)A(3)	51 pF						
	C91(1)U560JYSD(2)A(3)	56 pF						
	C91(1)U620JYSD(2)A(3)	62 pF		8.0				
	C91(1)U680JYSD(2)A(3)	68 pF						
	C91(1)U750JYSD(2)A(3)	75 pF						
	C92(1)U820JYSD(2)A(3)	82 pF		9.0				
	C93(1)U101JYSD(2)A(3)			1				
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing

⁽¹⁾ To properly complete ordering code, insert the one-digit numeric code to reflect required lead spacing: (Note that select capacitance values and packaging options may limit lead spacing availability. See table above to verify availability.)

- $5 = 5.0 \, mm$
- $7 = 7.5 \, mm$
- $1 = 10.0 \, \text{mm}$

- A = Straight
- B = Vertical Kink
- C = Outside Kink
- D = Inside Kink (not available with 5 mm lead spacing option)

⁽²⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

⁽³⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Table 1 - Product Ordering Codes and Ratings cont'd

Dielectric/				Din	nensions (mm	1)	Lead S	pacing		
Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging		
	C90(1)U101KYYD(2)A(3)	100 pF								
	C90(1)U151KYYD(2)A(3)	150 pF								
	C90(1)U221KYYD(2)A(3)	220 pF		7.0		0.5 ±0.1	r	nm.		
	C90(1)U331KYYD(2)A(3)	330 pF						mm,		
Y5P	C90(1)U471KYYD(2)A(3)	470 pF	±10%		5.0			,		
	C91(1)U561KYYD(2)A(3)	560 pF		8.0			or 10 mm			
	C91(1)U681KYYD(2)A(3)	680 pF		0.0						
	C92(1)U821KYYD(2)A(3)	820 pF		9.0						
	C92(1)U102KYYD(2)A(3)	1,000 pF		0.0						
	000//////0010//////////////////////////	1000 5	·	7.0						
	C90(1)U102MYWD(2)A(3)	1,000 pF		7.0				40		
	C92(1)U152MYWD(2)A(3)	1,500 pF		9.0		0.5 ±0.1	5 mm, 7.5 mm, or 10 mm			
Y5U	C92(1)U222MYWD(2)A(3)	2,200 pF	±20%	11.0	5.0		75 mm or 10			
	C94(1)U332MYWD(2)A(3)	3,300 pF		11.0			7.5 mm or 10 mm	7.5 mm or 10 mm		
	C96(1)U392MYWD(2)A(3)	3,900 pF 4,700 pF		13.0			7.5 mm or 10 mm	10 mm only		
	C96(1)U472MYWD(2)A(3)	4,700 pr								
	C90(1)U102MYVD(2)A(3)	1,000 pF								
	C90(1)U152MYVD(2)A(3)	1,500 pF		7.0						
	C90(1)U222MYVD(2)A(3)	2,200 pF		7.0			5 mm, 7.5 m	m, or 10 mm		
	C92(1)U332MYVD(2)A(3)	3,300 pF		9.0						
Y5V	C94(1)U392MYVD(2)A(3)	3,900 pF	±20%		5.0	0.5 ±0.1				
	C94(1)U472MYVD(2)A(3)	4.700 pF		11.0				7.5 mm or 10 mm		
	C96(1)U682MYVD(2)A(3)	6,800 pF	1 -	13.0			7.5 mm or 10 mm	40 1		
	C98(1)U103MYVD(2)A(3)	10,000 pF		15.0				10 mm only		
		-7 F								
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing		

⁽¹⁾ To properly complete ordering code, insert the one-digit numeric code to reflect required lead spacing: (Note that select capacitance values and packaging options may limit lead spacing availability. See table above to verify availability.)

- $5 = 5.0 \, mm$
- $7 = 7.5 \, mm$
- $1 = 10.0 \, mm$
- (2) To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)
 - A = Straight
 - B = Vertical Kink
 - C = Outside Kink
 - D = Inside Kink (not available with 5 mm lead spacing option)
- (3) To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Ite	em	Specif	ication			Test Meth	nod	
Operating Temp	perature Range				-40°C to +125°C			
	Between lead wires	No fa	illures	tł 2	ne lead wires for 60 ,000 VAC(rms) - 5.	not be damaged who of seconds. of mm lead spacing of mm and 10 mm lea	en voltage is applied between ad spacing	
Dielectric Strength	Body Insulation	No failures			The terminals (leads) of the capacitor shall be connected together. A metal foil is tightly wrapped around the body of the capacitor at a distance of about 3 to 4 mm from each terminal. The capacitor is then inserted into a container filled with metal balls approximately 1 mm in diameter. 2,600 VAC(rms) is applied for 60 seconds between the capacitor lead wires and metal balls.			
Insulation Re	esistance (IR)	10,000 MΩ	Ω minimum		he insulation resister 60 ±5 seconds		ured with 500 ±50 VDC applied	
Capac	citance	Within specif	fied tolerance					
		Temperature Characteristics	Specification	-				
		Y5P, Y5U	DF ≤ 2.5%	Y5P, Y5U and Y5V: Capacitance is measured at 1 kHz ±20% and 5 Vrms or less. (20 ±2°C) NP0 and SL: Capacitance is measured at 1 MHz ±20% and 1.0 ±0.2 Vrms (25°C)				
Dissipation Fa	ictor (DF) or Q	Y5V	DF ≤ 5.0%					
	3.00 (2.75. 2	NP0,SL	≥ 30 pF: Q ≥ 1000 < 30 pF: Q ≥ 400 +(20 x C) C = Nominal capacitance					
					capacitance meas	surement is made at	each step specified:	
		Temperature Characteristics	Capacitance Change		Step 1	Temperature +20 ±2°C		
		Y5P	Within ±10%		2	-25 ±2°C		
Temperature (Characteristics	Y5U	Within +20%/-55%		3	+20 ±2°C		
'		Y5V	Within ~+30%/-80%		4	+85 ±2°C		
		CH	0 ±60 ppm/°C		5	+20 ±2°C		
		SL	-1,000 ~+350 ppm°C (+20°C ~+85°C)	C	Pre-treatment: Capacitor is stored ondition ¹ for 24 ±2	at 85 ±2°C for 1 hou hours before measu	r and then placed at room rement.	
	Tensile	Lead wire or capacito	r body shall not break.	With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a tensile force of 10 N is applied to the termination in the direction of its axis and acting in a direction away from the body of the specimen.				
Terminal Strength	Bending	Lead wire or capacito	r body shall not break.	With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a mass force of 5 N is then suspended from the end of the termination. The body of the specimen is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then resumed to its initial position over the same period of time; this operation constitutes one bend. One bend immediately followed by a second bend in the opposite direction.				
Solder	rability	solder in the axial direct	re a uniform coating of ction and over 3/4 of its ference.	The lead wire of the capacitor is dipped into molten solder for 2 ±0.5				

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specif	ication	Test N	Method			
	Appearance	No visua	al defect	As shown in the figure below, the le solder up to 1.5 mm (+5/-0 mm) fror	ad wires are immersed in molten			
	IR	1,000) ΜΩ	(root of lead wire). Duration/Solder Temperature: 3.5 ±	:0.5 seconds/350°C ±10°C or 10 ±1			
	Dielectric Strength	Per it	em 1	seconds/260°C ±5°C Thermal Capacitor				
Soldering Effect (Non-Preheat)	Capacitance	Y5P, Y5U and Y5V: Within ±10% SL, CH (NP0): Within ±2.5% or ±0.25 pF, whichever is larger.		Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
	Appearance	No visua	al defect	Capacitor is stored at 120°C +0/-5°				
	IR	1,000) ΜΩ	up to 1.5 mm (+5/-0mm) from the er	wires are immersed in molten solder and of the epoxy meniscus (root of			
	Dielectric Strength	Per it	em 1	lead wire). Duration/Solder Temperature: 7.5 +0/-1 seconds/260°C ±5°C				
Soldering Effect (Preheat)	Capacitance	Y5P, Y5U and Y SL, CH (NP0): Withir whicheve	n ±2.5% or ±0.25 pF,	Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
	Appearance	No visua	al defect	Steady State Humidity:	Load Humidity:			
		Temperature Characteristics	Capacitance Change					
		Y5P	Within ±10%					
	Capacitance	Y5U	Within ±20%					
		Y5V	Within ±30%					
Biased Humidity		SL CH (NP0)	Within ±2.5% or ±0.25 pF, whichever is larger.	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours. Post Treatment:	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours with full rated voltage applied.			
	DF	Y5P and Y5U: Y5V: 7.5%		Capacitor is stored for 1 to 2 hours at room condition ¹ .	Post Treatment: Capacitor is stored for 1 to 2 hours at room condition ¹ .			
	Q	SL and CH(NP0): Q ≥ 100 + More than 30 C = Nominal	Less than 30 pF: - 10 × C/3 pF: Q ≥ 200 capacitance		nours at room condition'.			
	IR	Y5P, Y5V and Y5U:						
	Dielectric Strength	No fa						

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specification	Test Method					
High Temperature Life	Appearance Capacitance Change IR Dielectric Strength	No visual defect Y5P, Y5V and Y5U: Within ±20% SL and CH (NP0): Within ±3 or ±0.3 pF, whichever is larger. 3,000 MΩ minimum SL and CH (NPO): 1,000 MΩ minimum No failures	Capacitors are placed in a circulating air oven for a period of 1,000 hours. The air in the oven is maintained at a temperature of 125°C ±2 throughout the test. The capacitors are subjected to AC 425 Vrms. Each hour the voltage is increased to AC 1,000 Vrms for 0.1 seconds.					
Flame	· Test	The capacitor flame extinguishes as follows: Cycle Time 1 ~ 4 30 seconds maximum 5 60 seconds maximum	The capacitor is exposed to a flame for 15 seconds and then removed for 15 seconds. This test is repeated for 5 cycles. Capacitor Flame Gas Burner (Unit:mm)					
Active Flar	mmability	The cheesecloth should not ignite.	The capacitors are individually wrapped in at least one, but not more than two, complete layers of cheesecloth. They are then subjected to 20 discharges. The interval between successive discharges is 5 seconds. The VAC is maintained for 2 minutes after the last discharge.					
Active Flammability			R 100 ±2% V_{AC} VR ±5% Ct 3 μ F ±5% 10 kV V_{R} Rated Voltage F Fuse, Rated 10A Vt Voltage applied to Ct					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	em	Specifi	ication			Test Method			
Passive Fl	lammability	The burning time sh seco The tissue paper	The capacitor under test is held into a flame and in a position which best promotes burning. Each specimen is exposed to the flame one time. Test Specimen Tissue About 10mm Thick Board Time of exposure to flame: Length of flame: 12 ±1 mm Gas burner length: Inside diameter: Outside diameter: Outside diameter: Outside diameter: Gas butane gas purity: 95% minimum						
	Appearance	No visua	al defect						
	Capacitance	Temperature Characteristics SL, CH (NP0)	Capacitance Change Within ±5%	The capacitor is subjected to 5 temperature cycles. (Temperature Cycle)					
		Y5P Y5U, Y5V	Within ±10% Within ±20%		Step	Temperature (°C)	Time (minutes)		
					1	-40 +0/-3	30]	
Temperature		SL, CH (NP0)	≥ 30 pF: Q ≥ 350 < 30 pF: Q ≥ 275		2	Room temperature	3		
Cycle			+5/2C		3	125 +3/-0	30		
	DF/Q		C = Nominal capacitance		4	Room temperature	3]	
		Y5P	DF ≤ 5%	Dro-troo	tment: Con	acitor shall be stored at 85	5 +2 for 1 hour th	nen	
		Y5U, Y5V	DF ≤ 7.5%	placed a	t room cond	lition ¹ for 24 ±2 hours. pacitor is stored for 1 to 2			
	IR	3,000 ΜΩ	minimum	1 031-116	amont. Oa	pasitor is stored for 1 to 2	nours at room of	mullion .	
	Dielectric Strength	No fa	ilures						

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Soldering and Mounting Information

Soldering:

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could reflow the solder joint between the lead and ceramic element and/or may result in thermal shocks that can crack the ceramic element.

When soldering these capacitors with a soldering iron, it should be performed under the following conditions:

- Temperature of iron-tip: 400°C maximum
- · Soldering iron wattage: 50 W maximum
- · Soldering time: 3.5 seconds maximum

Cleaning (ultrasonic cleaning):

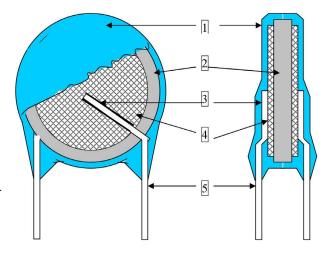
To perform ultrasonic cleaning, observe the following conditions:

- · Rinse bath capacity: Output of 20 watts per liter or less
- · Rinsing time: 5 minute maximum
- Do not vibrate the PCB/PWB directly
- Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires

Construction

Reference	Item	Material
1	Encapsulation ¹	Epoxy resin, Pigment (Blue/UL 94 V-0)
2	Dielectric Material	BaTiO ₃
3	Solder	Sn 96.5, Ag 3, Cu 0.5
4	Electrodes	Ag (Glass frit)
5	Lead Wires	Tinned copper clad steel wire (Sn Plating 100% 3-7 μm)

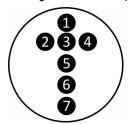
¹ The minimum thickness of the insulation coating (encapsulation) is 0.4 mm Note: Image is exaggerated in order to clearly identify all components of construction.





Capacitor Marking

These capacitors shall be stamped or laser marked with KEMET's trademark, type designation, capacitor class, rated voltage, rated capacitance, and capacitance tolerance codes. In addition, all devices are marked with the recognized approval mark and a date/lot code for traceability. Marking will be supplied either on one side or both sides of the encapsulated capacitor body. All marking shall be legible to allow for clear identification of the component. Marking appears in legible contrast. Illustrated below is an example of the marking format and content. (Two sided marking is limited to capacitors with body diameters ≤ 8.0 mm.)





Location #	Description			Detail				
0	KEMET Trademark	<u>K</u>						
2	Type Designation (2 characters)			AC				
3	Rated Capacitance (3 numeric characters)	First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, 4,700 pF is identified as 472. (For values below 10 pF an "R" is used in place of the decimal point, e.g., 2R0 = 2.0 pF.)						
4	Capacitance Tolerance Code (1 character)	C =	0.25 pF, D = 0.5 pF, .	J = ±5%, K = ±10%, M = ±2	0%			
6	VDE & ENEC approval mark IEC 60384–14 3rd (2005)	10 DYE						
6	Capacitor Class and Rated Voltage		X1: 400 \	/ ~ Y2: 250 V ~				
			Date/Lot Co	de, e.g., 3 <u>C</u> 12345				
		3	<u>C</u>	1	2345			
•	Date/Lot Code	Last digit of year, e.g., 3 = 2013	Manufacturing Location Code	Manufacturing Month: 1-9 = Jan - Sept A = October N = November D = December	Last 4 digits of lot no.			

Packaging Quantities

Dooksaina Tyna	Loose (Bulk Bag)	Carrier Tape Quantity					
Packaging Type		(12.7 mm Pitch¹)	(15 mm Pitch1)	(25.4 mm Pitch¹)			
Ammo Pack	N/A	1,000 pi	eces/box	500 pieces/box			
Bulk	500 pieces/bag	N/A					

¹ For details regarding component pitch on carrier tape, see "Ammo Pack Taping Format" and "Ammo Pack Taping Specifications" sections of this document.

Safety Standard Recognized, 900 Series, Radial Disc, Encapsulated, AC Type, X1 440 VAC/Y2 300 VAC (Industrial Grade)

Electronic Components

Overview

KEMET's 900 Series encapsulated radial through-hole ceramic disc capacitors are specifically designed for interferencesuppression AC line filtering applications. Having internationally recognized safety certifications, these capacitors are well-suited for applications that require keeping potentially disruptive or damaging line transients and EMI out of susceptible equipment. They are also an ideal solution in situations where there is a need to suppress line disturbances at the source.

Safety Certified Capacitors are classified as either X and/or Y capacitors. Class X capacitors are primarily used in line-to-line (across-the-line) applications. In this application there is no danger of electric shock to humans should the capacitor fail, but could result in a risk of fire. The class Y capacitor is primarily used in line-to-ground (line by-pass) applications. In this application, failure of the capacitor could lead to danger of electric shock.

With a working voltage of 440 VAC in line-to-line (Class X) and 300 VAC in line-to-ground (Class Y) applications, these safety capacitors meet the impulse test criteria outlined in IEC Standard 60384. Meeting subclass X1 and Y2 requirements, these devices are certified to withstand impulses up to 4 KV (X1) and 5 KV (Y2) respectively. These encapsulated devices also meet the flame test requirements outlined in UL Standard 94V-0.



Ordering Information

C9	7	1	U	472	M	Z	W	D	Α	Α	7317
Ceramic Series	Body Diameter	Lead Spacing ^{1,3}	Spec.	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage	Dielectric/ Temp. Char.	Design	Lead Config. ^{2,3}	Failure Rate	Packaging (C-Spec) ^{2,3}
C9 = Ceramic 900 Series	0 = 7.0 mm 1 = 8.0 mm 2 = 9.0 mm 3 = 10.0 mm 4 = 11.0 mm 6 = 13.0 mm 8 = 15.0 mm	7 = 7.5 mm 1 = 10.0 mm	U = Safety	2 significant digits + number of zeroes Use 9 for 1.0 - 9.9 pF e.g., 2.2 pF = 229	C = ±0.25 pF D = ±0.5 pF J = ±5% K = ±10% M = ±20%	Z = X1 440 VAC /Y2 300 VAC	N = CH (NP0) S = SL Y = Y5P W = Y5U V = Y5V	D = Disc	A = Straight B = Vertical Kink C = Outside Kink D = Inside Kink	A = N/A	7317 = Ammo Pack WL30 = Bulk/3.0 mm Lead length WL35 = Bulk/3.5 mm Lead length WL40 = Bulk/4.0 mm Lead length WL45 = Bulk/4.5 mm Lead length WL50 = Bulk/5.0 mm Lead length WL50 = Bulk/20 mm Lead length WL20 = Bulk/20 mm Lead length

¹ Capacitor body diameter will limit available lead spacing and packaging options. See "Dimensions" and "Product Ordering Codes and Ratings" sections of this document to determine availability.

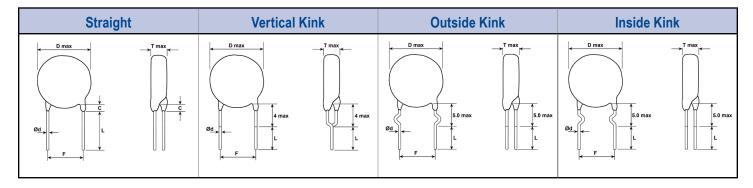
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² "Vertical Kink", "Outside Kink" and "Inside Kink" lead configurations cannot be combined with the bulk/20 mm lead length option (WL20). 20 mm lead length is only available on capacitors with straight leads (lead configuration ordering code "A"). For nonstandard lead length inquiries, please contact KEMET.

³ Bulk packaging lead length availability is dependent upon "Lead Configuration" and "Lead Spacing." See "Dimensions" section of this document to verify availability of a specific lead length option. For nonstandard lead length inquiries, please contact KEMET.



Lead Configurations



Dimensions - Millimeters

	Lead	F	Lead		L	Packaging	D	Т	е	Ød
Lead Config.	Config. Ordering Code ¹	Lead Spacing ²	Spacing Tolerance	Type ² Lead O		C-Spec Ordering Code ³	Body Diameter ²	Body Thickness	Lead Meniscus	Lead Dia.
				Ammo Pack	20.0 +1.5/-1.0	7317				
		7.5	±1.0		3.0 ±1.0	WL30			3.0	
		7.5	±1.0	Bulk	4.5 ±1.0	WL45				0.5 ±0.1
Otro-in-ht	A				5.0 ±1.0	WL50		1 - "Product		
Straight	A			Ammo Pack	20.0 +1.5/-1.0	7317	Ordering Codes and Ratings"		maximum	0.5 ±0.1
		10.0	±1.0	Bulk	3.0 ±1.0	WL30				
					4.5 ±1.0	WL45				
					5.0 ±1.0	WL50				
				Ammo Pack	18.0 +2.0/-0	7317				
		7.5	±1.0	Bulk	3.5 ±1.0	WL35				
Vertical Kink	Vertical Kink (Preformed)			Duik	4.0 ±1.0	WL40		1 - "Product Codes and	3.0	0.5 ±0.1
(Preformed)		10.0	±1.0	Ammo Pack	18.0 +2.0/-0	7317		ings"	maximum	0.5 ±0.1
				Bulk	3.5 ±1.0	WL35				
				Duik	4.0 ±1.0	WL40				

¹ Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² Body diameter of capacitor will limit available lead spacing and packaging options. See "Product Ordering Codes and Ratings" sections of this document for further details.

³ The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Dimensions – Millimeters cont'd

	Lead	F	Lead		L	Packaging	D	T	е	Ød
Lead Config.	Config. Ordering Code ¹	Lead Spacing ²	Spacing Tolerance	Packaging Type ²	Lead Length	C-Spec Ordering Code ³	Body Diameter ²	Body Thickness	Lead Meniscus	Lead Dia.
				Ammo Pack	18.0 +2.0/-0	7317				
		7.5	.10		3.5 ±1.0	WL35			3.0 maximum	
		7.5	±1.0	Bulk	4.0 ±1.0	WL40				
Outside Kink	С				5.0 ±1.0	WL50		1 - "Product		0.5 ±0.1
(Preformed)	C		.10	Ammo Pack	18.0 +2.0/-0	7317		Codes and ings"		
		10.0			3.5 ±1.0	WL35				
		10.0	±1.0	Bulk	4.0 ±1.0	WL40				
					5.0 ±1.0	WL50				
		7.5		Ammo Pack	18.0 +2.0/-0	7317				
Inside Kink		7.5		Bulk	3.5 ±1.0	WL35	13.0	7.0	3.0	05.04
(Preformed)		10.0	±1.0	Ammo Pack	18.0 +2.0/-0	7317	maximum	maximum	maximum	0.5 ±0.1
				Bulk	3.5 ±1.0	WL35				

Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² Body diameter of capacitor will limit available lead spacing and packaging options. See "Product Ordering Codes and Ratings" sections of this document for further details.

³ The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Benefits

- Safety Standard Recognized (IEC 60384-14)
- Reliable operation up to 125°C
- · Class X1/Y2
- 7.5 mm and 10 mm lead spacing
- · Lead (Pb)-free and RoHS Compliant
- · Halogen Free
- Capacitance offerings ranging from 2.0 pF up to 10,000 pF
- Available capacitance tolerances of ±0.25 pF, ±0.5 pF, ±5%, ±10%, and ±20%
- · High reliability
- · Preformed (crimped) or straight lead configurations
- · Non-polar device, minimizing installation concerns
- Encapsulation meets flammability standard UL 94V–0

Applications

Typical applications include:

- Line-to-line (Class X) filtering
- · Line-to-ground (Class Y) filtering
- · Antenna coupling
- Primary and secondary coupling (switching power supplies)
- · Line disturbances suppression (motors and motor controls, relays, switching power supplies, and inverters)

Approval Standard and Certification No.

Safety Standard	Standard No.	Subclass	Working Voltage	Certificate No.
VDE	IEC 60384-14	X1	440 VAC	40036415
(ENEC)	IEC 00304-14	Y2	300 VAC	40030413

These devices are VDE/ENEC recognized for antenna coupling and AC line-to-line (Class X) and line-to-ground (Class Y) applications per IEC60384-14.

Environmental Compliance

These devices are Halogen Free and RoHS Compliant. They meet all requirements set forth by both EU and China RoHS directives.





General Specifications/Performance Characteristics

Dielectric/Temperature Characteristic:	CH(NP0)	SL	Y5P	Y5U	Y5V
Operating Temperature Range			-40°C to +125°C		
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC)	±60 ppm/°C	-1,000 ~ +350 ppm/°C	±10%	+20%/-55%	~ +30%/-80%
Dielectric Withstanding Voltage (7.5 mm and 10 mm Lead Spacing)	2,600 VAC (60 ±5 seconds at 25°C)				
Quality Factor (Q)	30 pF% and a Below 30 pF: ≥	above: ≥ 1,000 : 400 +(20 x C)*	See	"Dissipation Fac	ctor"
Dissipation Factor (tanδ) at +25°C¹	See "Quality Factor"		2.50%	2.50%	5.0%
Insulation Resistance (IR) Limit at +25°C	°C 10,000 MΩ Minimum (500 VDC applied for 60 ±5 seconds @ 25°C)				

^{*}C = Nominal capacitance

CH(NP0) & SL: 1 MHz \pm 100 kHz and 1.0 \pm 0.2 Vrms

X5P, Y5U and Y5V: 1 kHz \pm 50 Hz and 1.0 \pm 0.2 Vrms

Note: When measuring capacitance, it is important to ensure the set voltage level is held constant. The HP4284 & Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

² Capacitance and Dissipation Factor (DF) measured under the following conditions:



Table 1 – Product Ordering Codes and Ratings

Dielectric/				Din	nensions (mm	1)	Lead S	pacing			
Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging			
	C90(1)U209CZND(2)A(3)	2.0 pF									
	C90(1)U309CZND(2)A(3)	3.0 pF	±0.25 pF								
	C90(1)U409CZND(2)A(3)	4.0 pF	_0.20 p.								
	C90(1)U509CZND(2)A(3)	5.0 pF									
	C90(1)U609DZND(2)A(3)	6.0 pF		7.0							
	C90(1)U709DZND(2)A(3)	7.0 pF	05.5	7.0							
	C90(1)U809DZND(2)A(3)	8.0 pF	±0.5 pF								
	C90(1)U909DZND(2)A(3)	9.0 pF									
	C90(1)U100DZND(2)A(3)	10 pF					7.5				
CH	C90(1)U120JZND(2)A(3)	12 pF			5.0	0.5 ±0.1	7.5	mm or			
(NP0)	C90(1)U150JZND(2)A(3)	15 pF			5.0	0.5 ±0.1	10 1				
	C91(1)U180JZND(2)A(3)	18 pF					101	111111			
	C91(1)U200JZND(2)A(3)	20 pF		8.0							
	C91(1)U220JZND(2)A(3) C91(1)U240JZND(2)A(3)	22 pF 24 pF									
	C92(1)U270JZND(2)A(3)	24 pF 27 pF	±5%								
	C92(1)U300JZND(2)A(3)	30 pF		9.0							
	C92(1)U330JZND(2)A(3)	33 pF		9.0							
	C93(1)U360JZND(2)A(3)	36 pF									
	C93(1)U390JZND(2)A(3)	39 pF		10.0							
	C94(1)U470JZND(2)A(3)	47 pF		11.0							
	00 1(1)0 11 002.12(2).1(0)										
	C90(1)U100JZSD(2)A(3)	10 pF									
	C90(1)U120JZSD(2)A(3)	12 pF									
	C90(1)U150JZSD(2)A(3)	15 pF									
	C90(1)U180JZSD(2)A(3)	18 pF									
	C90(1)U200JZSD(2)A(3)	20 pF									
	C90(1)U220JZSD(2)A(3)	22 pF									
	C90(1)U240JZSD(2)A(3)	24 pF									
	C90(1)U270JZSD(2)A(3)	27 pF		7.0							
	C90(1)U300JZSD(2)A(3)	30 pF									
	C90(1)U330JZSD(2)A(3)	33 pF	50/			0.5.04	7.5				
SL	C90(1)U360JZSD(2)A(3)	36 pF	±5%		5.0	0.5 ±0.1)r			
	C90(1)U390JZSD(2)A(3)	39 pF					10 ו	IIIII			
	C90(1)U470JZSD(2)A(3)	47 pF									
	C90(1)U500JZSD(2)A(3)	50 pF									
	C90(1)U510JZSD(2)A(3)	51 pF									
	C91(1)U560JZSD(2)A(3) C91(1)U620JZSD(2)A(3)	56 pF 62 pF									
	C91(1)U620JZSD(2)A(3)	62 pF		8.0							
	C91(1)U750JZSD(2)A(3)	75 pF									
	C92(1)U820JZSD(2)A(3)	82 pF		9.0							
	C93(1)U101JZSD(2)A(3)	100 pF		10.0							
	300(1)0101020D(2)A(0)	100 βι		10.0							
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing			

⁽¹⁾ To properly complete ordering code, insert the one-digit numeric code to reflect required lead spacing: (Note that select capacitance values and packaging options may limit lead spacing availability. See table above to verify availability.)

- $7 = 7.5 \, mm$
- $1 = 10.0 \, mm$

- A = Straight
- B = Vertical Kink
- C = Outside Kink
- D = Inside Kink

⁽²⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

⁽³⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Table 1 – Product Ordering Codes and Ratings cont'd

Dielectric/				Din	nensions (mm	1)	Lead S	pacing
Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging
	C90(1)U101KZYD(2)A(3)	100 pF						
	C90(1)U151KZYD(2)A(3)	150 pF						
	C90(1)U221KZYD(2)A(3)	220 pF		7.0		0.5 ±0.1		
	C90(1)U331KZYD(2)A(3)	330 pF					7.5	mm
Y5P	C90(1)U471KZYD(2)A(3)	470 pF	±10%		5.0		C	
	C91(1)U561KZYD(2)A(3)	560 pF		8.0			10	mm
	C91(1)U681KZYD(2)A(3)	680 pF						
	C92(1)U821KZYD(2)A(3)	820 pF		9.0				
	C92(1)U102KZYD(2)A(3)	1,000 pF		0.0				
	000(4)1140014714(5(0) 4(0)	4000 5		7.0				
	C90(1)U102MZWD(2)A(3)	1,000 pF		7.0		0.5 ±0.1 7.5 mm		7.5 mm or 10 mm
	C92(1)U152MZWD(2)A(3)	1,500 pF 2,200 pF		9.0				
Y5U	C92(1)U222MZWD(2)A(3) C94(1)U332MZWD(2)A(3)	3,300 pF	±20%	11.0	5.0		7.5 mm or 10 mm	
	C96(1)U392MZWD(2)A(3)	3,900 pF						
	C96(1)U472MZWD(2)A(3)	4,700 pF		13.0				10 mm only
	030(1)0412INI2VVD(2)/1(0)	ч,100 рі						
	C90(1)U102MZVD(2)A(3)	1,000 pF						
	C90(1)U152MZVD(2)A(3)	1,500 pF		7.0				
	C90(1)U222MZVD(2)A(3)	2,200 pF						7.5 40
V5V	C92(1)U332MZVD(2)A(3)	3,300 pF	000/	9.0	5.0	05.04	7.5 40	7.5 mm or 10 mm
Y5V	C94(1)U392MZVD(2)A(3)	3,900 pF	±20%	44.0	5.0	0.5 ±0.1	7.5 mm or 10 mm	
	C94(1)U472MZVD(2)A(3)	4,700 pF		11.0				
	C96(1)U682MZVD(2)A(3)	6,800 pF		13.0				10 mm only
	C98(1)U103MZVD(2)A(3)	10,000 pF		15.0				10 min only
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing

⁽¹⁾ To properly complete ordering code, insert the one-digit numeric code to reflect required lead spacing: (Note that select capacitance values and packaging options may limit lead spacing availability. See table above to verify availability.)

- A = Straight
- B = Vertical Kink
- C = Outside Kink
- D = Inside Kink

 $^{7 = 7.5 \,} mm$

 $^{1 = 10.0 \,} mm$

⁽²⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

⁽³⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Ite	em	Specif	ication		Test Meth	nod		
Operating Tem	perature Range			-40°C to +125°C				
	Between lead wires	No fa	ilures	The capacitor shall between the lead w	not be damaged whires for 60 seconds.	en 2,600 V	AC(rms) is applied	
Dielectric Strength	Body Insulation	No fa	iilures	The terminals (leads) of the capacitor shall be connected together. A metal foil is tightly wrapped around the body of the capacitor at a distance of about 3 to 4 mm from each terminal. The capacitor is then inserted into a container filled with metal balls approximately 1 mm in diameter. 2,600 VAC(rms) is applied for 60 seconds between the capacitor lead wires and metal balls.			Metal about Foil 3 to 4mm	
Insulation Re	esistance (IR)	10,000 MΩ	Ω minimum	The insulation resis after 60 ±5 seconds		ured with 5	00 ±50 VDC applied	
Capac	citance	Within specif	fied tolerance					
		Temperature Characteristics	Specification					
		Y5P, Y5U	DF ≤ 2.5%	Y5P, Y5U and Y5V: Capacitance is measured at 1 kHz ±20% and 5 Vrms or less. (20 ±2°C) NP0 and SL: Capacitance is measured at 1 MHz ±20% and 1.0 ±0.2 Vrms (25°C)				
Dissination Fa	actor (DF) or Q	Y5V	DF ≤ 5.0%					
Dissipation (otor (BT) or Q	NP0,SL	\geq 30 pF: Q \geq 1000 < 30 pF: Q \geq 400 +(20 x C) C = Nominal capacitance					
				A capacitance measurement is made at each step specified:				
		Temperature Characteristics	Capacitance Change	Step	Temperature			
		VED)A/;4b-; 400/	1	+20 ±2°C			
Taman a natuuna (Ob a na ata ni ati a a	Y5P	Within ±10%	2	-25 ±2°C			
remperature (Characteristics	Y5U	Within +20%/-55%	3	+20 ±2°C			
		Y5V	Within ~+30%/-80%	4	+85 ±2°C			
		CH SL	0 ±60 ppm/°C -1,000 ~+350 ppm°C (+20°C ~+85°C)		+20 ±2°C at 85 ±2°C for 1 hou hours before measu		placed at room	
	Tensile	Lead wire or capacito	r body shall not break.	With the termination body in such a man tensile force of 10 N	n in its normal position ner that the axis of the termination in the t	on, the spec he terminat mination in	ion is vertical; a the direction of its	
Terminal Strength	Bending	Lead wire or capacito	r body shall not break.	axis and acting in a direction away from the body of the specimen. With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a mass force of 5 N is then suspended from the end of the termination. The body of the specimen is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then resumed to its initial position over the same period of time; this operation constitutes one bend. One bend immediately followed by a second bend in the opposite direction.				
Solde	rability	solder in the axial direct	e a uniform coating of ction and over 3/4 of its ference.	The lead wire of the capacitor is dipped into molten solder for 2 ±0.5 seconds. The depth of immersion is up to 1.5 mm (+5/-0 mm) from the root of lead wires. Solder Temperature: Lead free solder (Sn-3Ag – 0.5Cu) 245°C ±5°C.				

^{1 &}quot;Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specif	ication	Test N	lethod			
	Appearance	No visua	al defect	As shown in the figure below, the le solder up to 1.5 mm (+5/-0 mm) from	ad wires are immersed in molten nthe end of the epoxy meniscus			
	IR	1,000	Ο ΜΩ		0.5 seconds/350°C ±10°C or 10 ±1			
	Dielectric Strength	Per it	tem 1	seconds/260°C ±5°C Thermal Capacitor				
Soldering Effect (Non-Preheat)	Capacitance	Y5P, Y5U and Y5V: Within ±10% SL, CH (NP0): Within ±2.5% or ±0.25 pF, whichever is larger.		Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
	Appearance	No visua	al defect	Capacitor is stored at 120°C +0/-5°	C for 60 +0/-5 seconds. Then, as wires are immersed in molten solder			
	IR) ΜΩ	up to 1.5 mm (+5/-0mm) from the er				
	Dielectric Strength	Per it	tem 1	lead wire). Duration/Solder Temperature: 7.5 +0/-1 seconds/260°C ±5°C				
Soldering Effect (Preheat)	Capacitance		5V: Within ±10% n ±2.5% or ±0.25 pF, r is larger.	Pre-treatment: Capacitor stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
	Appearance	No visua	al defect	Steady State Humidity:	Load Humidity:			
		Temperature Characteristics	Capacitance Change Within ±10%					
	0 "	Y5U	Within ±20%					
	Capacitance	Y5V	Within ±30%					
Biased Humidity		SL CH (NP0)	Within ±2.5% or ±0.25 pF, whichever is larger.	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours. Post Treatment:	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours with full rated voltage applied.			
	DF		5.0% maximum maximum	Capacitor is stored for 1 to 2 hours at room condition ¹ .	Post Treatment: Capacitor is stored for 1 to 2 hours at room condition ¹ .			
	Q	SL and CH(NP0): Q ≥ 100 +	Less than 30 pF: + 10 × C/3) pF: Q ≥ 200		nours at room condition'.			
	IR	Y5P, Y5V and Y5U:	$3,000~\text{M}\Omega$ minimum $1,000~\text{M}\Omega$ minimum					
-	Dielectric Strength	1	ilures					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specification	Test Method					
	Appearance	No visual defect	Impulse Voltage: Each individual capacitor is subjected to three 5 kv impulses prior to life testing.					
	Capacitance Change	Y5P, Y5V and Y5U: Within ±20% SL and CH (NP0): Within ±3 or ±0.3 pF, whichever is larger.	Vp Cx tr td					
	IR	$3{,}000~M\Omega$ minimum SL and CH (NPO): $1{,}000~M\Omega$ minimum	0.5Vp (45) (45) (45) (45) (45) (47) (47) (47) (47) (48) (48) (48) (48) (48) (48) (48) (48					
High Temperature Life	Dielectric Strength	No failures	Capacitors are placed in a circulating air oven for a period of 1,000 hours. The air in the oven is maintained at a temperature of 125°C ±2 throughout the test. The capacitors are subjected to AC 510 Vrms. Each hour the voltage is increased to 1,000 Vrms for 0.1 seconds. The capacitor is exposed to a flame for 15 seconds and then removed					
Flame	- Test	The capacitor flame extinguishes as follows: Cycle Time 1 ~ 4 30 seconds maximum 5 60 seconds maximum	for 15 seconds. This test is repeated for 5 cycles. Capacitor Flame Gas Burner (Unit:mm)					
			The capacitors are individually wrapped in at least one, but not more than two, complete layers of cheesecloth. They are then subjected to 20 discharges. The interval between successive discharges is 5 seconds. The VAC is maintained for 2 minutes after the last discharge.					
			C _{1,2} 1 μF ±10% C ₃ 0.033 μF ±5% 10 kV					
Active Fla	mmability	The cheesecloth should not ignite.	L _{1.4} 1.5 Mh ±20% 16A Rod core choke Cx Test capacitor					
			R 100 ±2% V _{AC} VR ±5%					
			Ct 3 µF ±5% 10 kV V _R Rated Voltage					
			F Fuse, Rated 10A Vt Voltage applied to Ct					

^{1 &}quot;Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	em	Specif	cation			Test Method		
Passive Flammability		The burning time sh seco The tissue paper	The capacitor under test is held into a flame and in a position which best promotes burning. Each specimen is exposed to the flame one time. Test Specimen Time of exposure to flame: Length of flame: Gas burner length: Inside diameter: Outside diameter: Gas butane gas purity: 95% minimum					
	Appearance No visual defect							
	Capacitance	Temperature Characteristics SL, CH (NP0)	Capacitance Change Within ±5%	The capa	acitor is sub	jected to 5 temperature cyc		1
		Y5P Y5U, Y5V	Within ±10% Within ±20%		Step	Temperature (°C)	Time (minutes)	
_ ,		CL CH (NDO)	≥ 30 pF: Q ≥ 350		1	-40 +0/-3	30]
Temperature Cycle		SL, CH (NP0)	≥ 30 pr. Q ≥ 350 < 30 pF: Q ≥ 275		2	Room temperature	3	
			+5/2C		3	125 +3/-0	30	
	DF/Q		C = Nominal capacitance		4	Room temperature	3	
		Y5P	DF ≤ 5%					
		Y5U, Y5V	DF ≤ 7.5%	placed a	t room cond	acitor shall be stored at 85 lition for 24 ±2 hours.		
	IR	3,000 ΜΩ	minimum	Post-tre	atment : Ca	pacitor is stored for 1 to 2	hours at room co	ondition ¹ .
	Dielectric Strength	No fa	ilures					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Soldering and Mounting Information

Soldering:

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could reflow the solder joint between the lead and ceramic element and/or may result in thermal shocks that can crack the ceramic element.

When soldering these capacitors with a soldering iron, it should be performed under the following conditions:

- Temperature of iron-tip: 400°C maximum
- · Soldering iron wattage: 50 W maximum
- · Soldering time: 3.5 seconds maximum

Cleaning (ultrasonic cleaning):

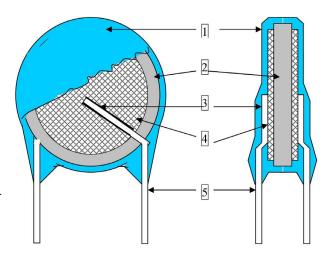
To perform ultrasonic cleaning, observe the following conditions:

- · Rinse bath capacity: Output of 20 watts per liter or less
- Rinsing time: 5 minute maximum
- Do not vibrate the PCB/PWB directly
- Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires

Construction

Reference	Item	Material			
1	Encapsulation ¹	Epoxy resin, Pigment (Blue/UL 94 V-0)			
2	Dielectric Material	BaTiO ₃			
3	Solder	Sn 96.5, Ag 3, Cu 0.5			
4	Electrodes	Ag (Glass frit)			
5	Lead Wires	Tinned copper clad steel wire (Sn Plating 100% 3-7 μm)			

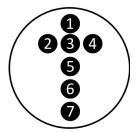
¹ The minimum thickness of the insulation coating (encapsulation) is 0.4 mm Note: Image is exaggerated in order to clearly identify all components of construction.





Capacitor Marking

These capacitors shall be stamped or laser marked with KEMET's trademark, type designation, capacitor class, rated voltage, rated capacitance, and capacitance tolerance codes. In addition, all devices are marked with the recognized approval mark and a date/lot code for traceability. Marking will be supplied either on one side or both sides of the encapsulated capacitor body. All marking shall be legible to allow for clear identification of the component. Marking appears in legible contrast. Illustrated below is an example of the marking format and content. (Two sided marking is limited to capacitors with body diameters ≤ 8.0 mm.)





Location #	Description	Detail							
0	KEMET Trademark	<u>K</u>							
2	Type Designation (2 characters)	AC							
3	Rated Capacitance (3 numeric characters)	First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, 4,700 pF is identified as 472. (For values below 10 pF an "R" is used in place of the decimal point, e.g., 2R0 = 2.0 pF.)							
4	Capacitance Tolerance Code (1 character)	C = 0.25 pF, D = 0.5 pF, J = ±5%, K = ±10%, M = ±20%							
6	VDE & ENEC approval mark IEC 60384–14 3rd (2005)	10 DE							
6	Capacitor Class and Rated Voltage		X1: 440 \	/ ~ Y2: 300 V ~					
			Date/Lot Co	ode, e.g., 3 <u>C</u> 12345					
		3	<u>C</u>	1	2345				
•	Date/Lot Code	Last digit of year, e.g., 3 = 2013	Manufacturing Location Code	Manufacturing Month: 1-9 = Jan - Sept A = October N = November D = December	Last 4 digits of lot no.				

Packaging Quantities

Declarios Torre	Lacas (Dulla Bas)	Carrier Tape Quantity						
Packaging Type	Loose (Bulk Bag)	(12.7 mm Pitch¹)	(15 mm Pitch¹)	(25.4 mm Pitch¹)				
Ammo Pack	N/A	1,000 pi	500 pieces/box					
Bulk	500 pieces/bag	N/A						

For details regarding component pitch on carrier tape, see "Ammo Pack Taping Format" and "Ammo Pack Taping Specifications" sections of this document.

Safety Standard Recognized, 900 Series, Radial Disc, **Encapsulated, AS Type, X1 760 VAC/Y1 500 VAC (Industrial Grade)**

Overview

KEMET's 900 series encapsulated radial through-hole ceramic disc capacitors are specifically designed for interferencesuppression AC line filtering applications. Having internationally recognized safety certifications, these capacitors are well-suited for applications that require keeping potentially disruptive or damaging line transients and EMI out of susceptible equipment. They are also an ideal solution when needing to suppress line disturbances at the source.

Safety Certified Capacitors are classified as either X and/or Y capacitors. Class X capacitors are primarily used in line-to line (across-the-line) applications. In this application there is no danger of electric shock to humans should the capacitor fail, but could result in a risk of fire. The class Y capacitor is primarily used in line-to-ground (line by-pass) applications. In this application, failure of the capacitor could lead to danger of electric shock.

With a working voltage of 760 VAC in line-to-line (Class X) and 500 VAC in line-to-ground (Class Y) applications, these safety capacitors meet the impulse test criteria outlined in IEC Standard 60384. Meeting subclass X1 and Y1 requirements, these devices are certified to withstand impulses up to 4 KV (X1) and 8 KV (Y1) respectively. These encapsulated devices also meet the flame test requirements outlined in UL Standard 94V-0.

Electronic Components



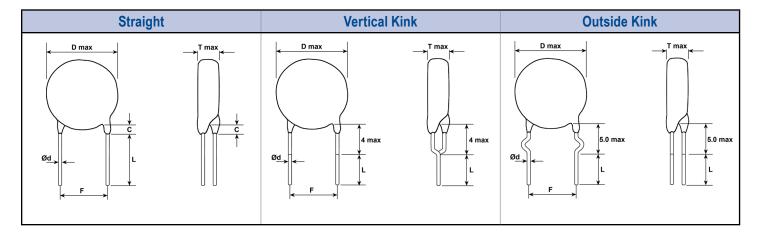
Ordering Information

C9	6	1	U	222	M	W	W	D	Α	A	7317
Ceramic Series	Body Diameter	Lead Spacing ¹	Spec.	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage	Dielectric/ Temp. Char.	Design	Lead Config.1	Failure Rate	Packaging (C-Spec) ¹
C9 = Ceramic 900 Series	6 = 13.0 mm	1 = 10.0 mm	U = Safety	2 significant digits + number of zeroes	M = ±20%	W = X1 760 VAC /Y1 500 VAC	W = Y5U	D = Disc	A = Straight B = Vertical Kink C = Outside Kink	A = N/A	7317 = Ammo Pack WL35 = Bulk/3.5 mm Lead length WL40 = Bulk/4.0 mm Lead length WL45 = Bulk/4.5 mm Lead length WL20 = Bulk/20 mm Lead length

^{1 &}quot;Vertical Kink" and "Outside Kink" lead configurations cannot be combined with the bulk/20 mm lead length option (WL20). 20 mm lead length is only available on capacitors ordered with straight leads (lead configuration ordering code "A"). For nonstandard lead length inquiries, please contact KEMET.



Lead Configurations



Dimensions - Millimeters

	Lead	F	Lead		L	Packaging	D	Т	е	Ød
Lead Config.	Config. Ordering Code ¹	Lead Spacing	Spacing Tolerance	Packaging Lead C-Spec Ordering Length Code ²		Body Diameter	Body Thickness	Lead Meniscus	Lead Dia.	
				Ammo Pack	20.0 +1.5/-1.0	7317				0.5 ±0.1
					3.5 ±1.0	WL35		7.0 maximum	3.0 maximum	
Straight	A	10.0	±1.0	Dulk	4.0 ±1.0	WL40				
				Bulk	4.5 ±1.0	WL45				
					20.0 minimum	WL20				
		40.0	4.0	Ammo Pack	18.0 +2.0/-0	7317				
Vertical Kink	В			Bulk	3.5 ±1.0	WL35	13.0 maximum			
(Preformed)	В	10.0	±1.0		4.0 ±1.0	WL40	maximam			
					4.5 ±1.0	WL45				
				Ammo Pack	18.0 +2.0/-0	7317				
Outside Kink	С	10.0	.10		3.5 ±1.0	WL35				
(Preformed)	C	10.0	±1.0	Bulk	4.0 ±1.0	WL40				
					4.5 ±1.0	WL45				

¹ Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Benefits

- Safety Standard Recognized (IEC 60384–14)
- Reliable operation up to 125°C
- · Class X1/Y1
- · 10 mm lead spacing
- · Lead (Pb)-free and RoHS Compliant
- · Halogen Free
- Available capacitance tolerances of ±0.25 pF, ±0.5 pF, ±5%, ±10%, and ±20%
- High reliability
- Preformed (crimped) or straight lead configurations
- Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated lead finish allowing for excellent solderability
- Encapsulation meets flammability standard UL 94V–0

Applications

Typical applications include:

- Line-to-line (Class X) filtering
- · Line-to-ground (Class Y) filtering
- · Antenna coupling
- Primary and secondary coupling (switching power supplies)
- Line disturbances suppression (motors and motor controls, relays, switching power supplies, and inverters)

Approval Standard and Certification No.

Safety Standard	Standard No.	Subclass	Working Voltage	Certificate No.
VDE	IEC 60384-14	X1	760 VAC	40034867
(ENEC)	IEC 00304-14	Y1	500 VAC	40054007

These devices are VDE/ENEC recognized for antenna coupling and AC line-to-line (Class X) and line-to-ground (Class Y) applications per IEC60384-14.

Environmental Compliance

These devices are Halogen Free and RoHS Compliant. They meet all requirements set forth by both EU and China RoHS directives.





General Specifications/Performance Characteristics

Dielectric/Temperature Characteristic:	Y5U				
Operating Temperature Range:	-25°C to +125°C				
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC):	+20%/-55%				
Dielectric Withstanding Voltage	4,000 VAC (60 ±5 seconds at 25°C)				
Quality Factor (Q)	See "Dissipation Factor"				
Dissipation Factor (tanδ) at +25°C¹	2.50%				
Insulation Resistance (IR) Limit at +25°C	10,000 MΩ minimum (500 VDC applied for 60 ±5 seconds @ 25°C)				

¹ Capacitance and Dissipation Factor (DF) measured under the following conditions:

Note: When measuring capacitance, it is important to ensure the set voltage level is held constant. The HP4284 & Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

Table 1 – Product Ordering Codes and Ratings

Bistorial				Din	nensions (mm	Lead Spacing		
Dielectric/ Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging
Y5U	C961U222MWWD(1)A(2)	2,200 pF	±20%	13.0	7.0	0.5 ±0.1	10	mm

⁽¹⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

A = Straight

B = Vertical Kink

C = Outside Kink

(2) To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code". See "Dimensions" section of this document, page 2, for available options.

¹ kHz ±50 Hz and 1.0 ±0.2 Vrms



Ite	em	Specif	ication	Test Method					
Operating Temp	perature Range			-25°C to +125°C					
	Between lead wires	No fa	ilures	The capacitor shall not be damaged when 4,000 VAC(rms) is applied between the lead wires for 60 seconds.				AC(rms) is applied	
Dielectric Strength	Strength Body Insulation No failures		The terminals (leads) of the capacitor shall be connected together. A metal foil is tightly wrapped around the body of the capacitor at a distance of about 3 to 4 mm from each terminal. The capacitor is then inserted into a container filled with metal balls approximately 1 mm in diameter. 4,000 VAC(rms) is applied for 60 seconds between the capacitor lead wires and metal balls.						
Insulation Re	esistance (IR)	10,000 MΩ	2 minimum	a	The insulation resis	tance shall be meas s of charging.	ured with 5	00 ±50 VDC applied	
Capac	citance	Within specif	ied tolerance		2:)/ I E \/	(00 . 080)	
Dissipation Fa	ctor (DF) or Q	DF ≤ 2.5%		Capacitance is measured at 1 kHz ±20% and 5 Vrms or less (20 ±2°C)					
					A capacitance measurement is made at each step specified:				
		Temperature Characteristics	Capacitance Change		Step	Temperature			
		Characteristics	Change		1	+20 ±2°C			
		Y5U	Within +22% / -56%		2	-25 ±2°C			
Temperature 0	Characteristics				3	+20 ±2°C			
					4	+85 ±2°C			
					5	+20 ±2°C			
				(Pre-treatment: Capacitor is stored condition ¹ for 24 ±2	at 85 ±2°C for 1 hou hours before measu	ur and then urement.	placed at room	
	Tensile	Lead wire or capacitor	r body shall not break.	With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a tensile force of 10 N is applied to the termination in the direction of its axis and acting in a direction away from the body of the specimen.					
Terminal Strength	Bending	Lead wire or capacitor body shall not break.			With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a mass force of 5 N is then suspended from the end of the termination. The body of the specimen is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then resumed to its initial position over the same period of time; this operation constitutes one bend. One bend immediately followed by a second bend in the opposite direction.				
Solder	Solderability		e a uniform coating of ction and over 3/4 of its erence.	The lead wire of the capacitor is dipped into molten solder for 2 ±0.5 seconds. The depth of immersion is up to 1.5 mm (+5/-0 mm) from the root of lead wires. Solder Temperature: Lead free solder (Sn-3Ag – 0.5Cu) 245°C ±5°C.					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specif	ication	Test N	lethod			
	Appearance	No visua	al defect	As shown in the figure below, the le solder up to 1.5 mm (+5/-0 mm) fror	ad wires are immersed in molten			
	IR	1,000) ΜΩ	(root of lead wire). Duration/Solder Temperature: 3.5 ±				
	Dielectric Strength	Per it	tem 1	seconds/260°C ±5°C Thermal Capacitor Screen to 2.0mm Molten Solder Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
Soldering Effect (Non-Preheat)	Capacitance	Within	±10%					
	Appearance		al defect	Capacitor is stored at 120°C +0/-5°	C for 60 +0/-5 seconds. Then, as			
	IR	1,000) ΜΩ	up to 1.5 mm (+5/-0mm) from the er	wires are immersed in molten solder and of the epoxy meniscus (root of			
	Dielectric Strength	Per it	tem 1	lead wire). Duration/Solder Temperature: 7.5 +	0/-1 seconds/260°C ±5°C			
Soldering Effect (Preheat)	Capacitance	Within	±10%	Thermal Capacitor Screen 1.5 Wolten Solder Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
	Appearance	No visua	al defect	Steady State Humidity:	Load Humidity:			
Biased Humidity	Capacitance	Temperature Characteristics Y5U	Capacitance Change Within ±30%	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours.	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours with full rated voltage applied.			
	DF	5.0% m	aximum	Post Treatment: Capacitor is stored for 1 to 2				
	IR	3,000 MΩ	2 minimum	hours at room condition ¹ .	Capacitor is stored for 1 to 2 hours at room condition ¹ .			
	Dielectric Strength	No fa	ilures					
	Appearance	No visua	al defect	Impulse Voltage: Each individual ca impulses prior to life testing.	pacitor is subjected to three 8 kv			
	Capacitance Change	Within	±20%	Vp Upg Cx tr	td			
	IR	3,000 MΩ	2 minimum	0.5Vp	46			
High Temperature Life	Dielectric Strength	No failures		Capacitors are placed in a circulatir hours. The air in the oven is maintai ±2°C throughout the test. The capa Vrms. Each hour the voltage is increseconds.	g air oven for a period of 1,000 ned at a temperature of 125°C citors are subjected to AC 850			

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Item	Specification	Test Method					
Flame Test	The capacitor flame extinguishes as follows: Cycle Time 1 ~ 4 30 seconds maximum 5 60 seconds maximum	The capacitor is exposed to a flame for 15 seconds and then removed for 15 seconds. This test is repeated for 5 cycles. Capacitor Flame (Unit:mm)					
Active Flammability	The cheesecloth should not ignite.	The capacitors are individually wrapped in at least one, but not more than two, complete layers of cheesecloth. They are then subjected to 20 discharges. The interval between successive discharges is 5 seconds. The VAC is maintained for 2 minutes after the last discharge. C1.2					
		time					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	em	Specifi	cation			Test Method		
Passive Flammability		The burning time sh seco The tissue paper	The capacitor under test is held into a flame and in a position which best promotes burning. Each specimen is exposed to the flame one time. Test Specimen Time of exposure to flame: Length of flame: Gas burner length: Inside diameter: Outside diameter: Outside diameter: Gas butane gas purity: 95% minimum					
	Appearance	No visua	The capacitor is subjected to 5 temperature cycles.					
		Temperature	Capacitance		(Temperature Cycle)			
	Capacitance	Characteristics Y5V	Change Within ±20%		Step	Temperature (°C)	Time (minutes)	
	DE/O	DE 4	7.50/		1	-25 +0/-3	30	
Temperature	DF/Q	DF≤			2	Room temperature	3	
Cycle	IR	3,000 ΜΩ	minimum		3	125 +3/-0	30	
					4	Room temperature	3	
	Dielectric Strength	No fai	ilures	placed a	Pre-treatment: Capacitor shall be stored at 85 ±2 for 1 hour then placed at room condition¹ for 24 ±2 hours. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition.			

^{1 &}quot;Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Soldering and Mounting Information

Soldering:

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could reflow the solder joint between the lead and ceramic element and/or may result in thermal shocks that can crack the ceramic element.

When soldering these capacitors with a soldering iron, it should be performed under the following conditions:

- Temperature of iron-tip: 400°C maximum
- · Soldering iron wattage: 50 W maximum
- · Soldering time: 3.5 seconds maximum

Cleaning (ultrasonic cleaning):

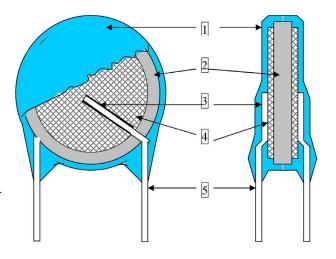
To perform ultrasonic cleaning, observe the following conditions:

- · Rinse bath capacity: Output of 20 watts per liter or less
- Rinsing time: 5 minute maximum
- Do not vibrate the PCB/PWB directly
- Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires

Construction

Reference	Item	Material			
1	Encapsulation ¹	Epoxy resin, Pigment (Blue/UL 94 V-0)			
2	Dielectric Material	BaTiO ₃			
3	Solder	Sn 96.5, Ag 3, Cu 0.5			
4	Electrodes	Ag (Glass frit)			
5	Lead Wires	Tinned copper clad steel wire (Sn Plating 100% 3-7 μm)			

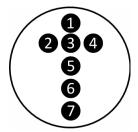
¹ The minimum thickness of the insulation coating (encapsulation) is 0.4 mm Note: Image is exaggerated in order to clearly identify all components of construction.





Capacitor Marking

These capacitors shall be stamped or laser marked with KEMET's trademark, type designation, capacitor class, rated voltage, rated capacitance, and capacitance tolerance codes. In addition, all devices are marked with the recognized approval mark and a date/lot code for traceability. Marking will be supplied either on one side or both sides of the encapsulated capacitor body. All marking shall be legible to allow for clear identification of the component. Marking appears in legible contrast. Illustrated below is an example of the marking format and content. (Two sided marking is limited to capacitors with body diameters ≤ 8.0 mm.)





Location #	Description			Detail			
0	KEMET Trademark	<u>K</u>					
2	Type Designation (2 characters)			AS			
3	Rated Capacitance (3 numeric characters)	First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, 2,200 pF is identified as 222. (For values below 10 pF an "R" is used in place of the decimal point, e.g., 2R0 = 2.0 pF.)					
4	Capacitance Tolerance Code (1 character)	M = ±20%					
6	VDE & ENEC approval mark IEC 60384–14 3rd (2005)	10 DYE					
6	Capacitor Class and Rated Voltage		X1: 760 V	′ ~ Y1: 500 V ~			
			Date/Lot Co	de, e.g., 3 <u>C</u> 12345			
		3	<u>C</u>	1	2345		
•	Date/Lot Code	Last digit of year, e.g., 3 = 2013	Manufacturing Location Code	Manufacturing Month: 1-9 = Jan - Sept A = October N = November D = December	Last 4 digits of lot no.		

Packaging Quantities

Deckering Type	Lagge (Bully Bag)	Carrier Tape Quantity		
Packaging Type	Loose (Bulk Bag)	(25.4 mm Pitch¹)		
Ammo Pack	N/A	500 pieces/box		
Bulk	500 pieces/bag	N/A		

¹ For details regarding component pitch on carrier tape, see "Ammo Pack Taping Format" and "Ammo Pack Taping Specifications" sections of this document.

Safety Standard Recognized, 900 Series, Radial Disc, Encapsulated, AH Type, X1 400 VAC/Y1 250 VAC (Industrial Grade)

Electronic Components

Overview

KEMET's 900 series encapsulated radial through-hole ceramic disc capacitors are specifically designed for interferencesuppression AC line filtering applications. Having internationally recognized safety certifications, these capacitors are well-suited for applications that require keeping potentially disruptive or damaging line transients and EMI out of susceptible equipment. They are also an ideal solution when needing to suppress line disturbances at the source.

Safety Certified Capacitors are classified as either X and/or Y capacitors. Class X capacitors are primarily used in line-to line (across-the-line) applications. In this application there is no danger of electric shock to humans should the capacitor fail, but could result in a risk of fire. The class Y capacitor is primarily used in line-to-ground (line by-pass) applications. In this application, failure of the capacitor could lead to danger of electric shock.

With a working voltage of 400 VAC in line-to-line (Class X) and 250 VAC in line-to-ground (Class Y) applications, these safety capacitors meet the impulse test criteria outlined in IEC Standard 60384. Meeting subclass X1 and Y1 requirements, these devices are certified to withstand impulses up to 4 KV (X1) and 8 KV (Y1) respectively. These encapsulated devices also meet the flame test requirements outlined in UL Standard 94V-0.



Ordering Information

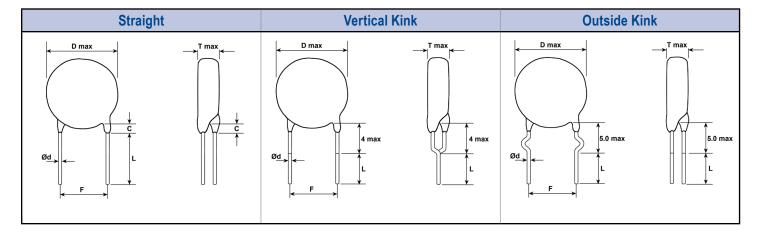
C9	1	1	U	620	J	U	S	D	Α	Α	7317
Ceramic Series	Body Diameter	Lead Spacing ¹	Spec.	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage	Dielectric/ Temp. Char.	Design	Lead Config. ²	Failure Rate	Packaging (C-Spec) ^{1,2}
C9 = Ceramic 900 Series	0 = 7.0 mm 1 = 8.0 mm 2 = 9.0 mm 3 = 10.0 mm 4 = 11.0 mm 5 = 12.0 mm 7 = 14.0 mm	1 = 10.0 mm	U = Safety	2 significant digits + number of zeroes Use 9 for 1.0 - 9.9pF e.g., 2.2pF = 229	C = ±0.25pF D = ±0.5pF J = ±5% K = ±10% M = ±10%	U = X1 400 VAC /Y1 250 VAC	N = CH (NP0) S = SL Y = Y5P W = Y5U V = Y5V	D = Disc	A = Straight B = Vertical Kink C = Outside Kink	A = N/A	7317 = Ammo Pack WL30 = Bulk/3.0 mm Lead length WL35 = Bulk/3.5 mm Lead length WL40 = Bulk/4.0 mm Lead length WL45 = Bulk/4.5 mm Lead length WL50 = Bulk/5.0 mm Lead length WL50 = Bulk/20 mm Lead length WL20 = Bulk/20 mm Lead length

^{1 &}quot;Vertical Kink" and "Outside Kink" lead configurations cannot be combined with the bulk/20 mm lead length option (WL20). 20 mm lead length is only available on capacitors ordered with straight leads (lead configuration ordering code "A"). For nonstandard lead length inquiries, please contact KEMET.

² Bulk packaging lead length availability is dependent upon "Lead Configuration." See "Dimensions" section of this document to verify availability of a specific lead length option. For nonstandard lead length inquiries, please contact KEMET.



Lead Configurations



Dimensions – Millimeters

	Lead	F	Lead		L	Packaging	D	Т	е	Ød
Lead Config.	Config. Ordering Code ¹	Lead Spacing	Spacing Tolerance	Packaging Type	Lead Length	C-Spec Ordering Code ²	Body Diameter	Body Thickness	Lead Meniscus	Lead Dia.
				Ammo Pack	20.0 +1.5/-1.0	7317				
					3.0 ±1.0	WL30			3.0	
Straight	Straight A	A 10.0	±1.0	Dulk	4.5 ±1.0	WL45				0.5 ±0.1
				Bulk	5.0 ±1.0	WL50				
					20.0 minimum	WL20				
		10.0	±1.0	Ammo Pack	18.0 +2.0/-0	7317		1 - "Product		
Vertical Kink (Preformed)	В			Dulk	3.5 ±1.0	WL35		Codes and ings"	maximum	
(**************************************				Bulk	4.0 ±1.0	WL40				
				Ammo Pack	18.0 +2.0/-0	7317				
Outside Kink	С	10.0	.10		3.5 ±1.0	WL35				
(Preformed)		C 10.0	±1.0	Bulk	4.0 ±1.0	WL40				
					5.0 ±1.0	WL50				

¹ Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Benefits

- Safety Standard Recognized (IEC 60384-14)
- Reliable operation up to 125°C
- · Class X1/Y1
- 10 mm lead spacing
- · Lead (Pb)-free and RoHS Compliant
- · Halogen Free
- Capacitance offerings ranging from 2.0 pF up to 4,700 pF
- Available capacitance tolerances of ±0.25 pF, ±0.5 pF, ±5%, ±10%, and ±20%
- · High reliability
- Preformed (crimped) or straight lead configurations
- · Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated lead finish allowing for excellent solderability
- Encapsulation meets flammability standard UL 94V–0

Applications

Typical applications include:

- · Line-to-line (Class X) filtering
- · Line-to-ground (Class Y) filtering
- · Antenna coupling
- Primary and secondary coupling (switching power supplies)
- Line disturbances suppression (motors and motor controls, relays, switching power supplies, and inverters)

Approval Standard and Certification No.

Safety Standard	Standard No.	Subclass	Working Voltage	Certificate No.	
VDE	IEC 60384-14	X1	400 VAC	40036417	
(ENEC)	IEC 00304-14	Y1	250 VAC	40030417	

These devices are VDE/ENEC recognized for antenna coupling and AC line-to-line (Class X) and line-to-ground (Class Y) applications per IEC60384-14.

Environmental Compliance

These devices are Halogen Free and RoHS Compliant. They meet all requirements set forth by both EU and China RoHS directives.





General Specifications/Performance Characteristics

Dielectric/Temperature Characteristic:	CH(NP0)	SL	Y5P	Y5U	Y5V
Operating Temperature Range:			-25°C to +125°C		
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC):	±60 ppm/°C	-1,000 ~ +350 ppm/°C	±10%	+20%/-55%	~ +30%/-80%
Dielectric Withstanding Voltage	4,000 VAC (60 ±5 seconds at 25°C)				
Quality Factor (Q)	30 pF% and above: ≥ 1,000 Below 30 pF: ≥ 400 +(20xC)* See "Dissipation Factor"				ctor"
Dissipation Factor (tanδ) at +25°C¹	See "Quality Factor"		2.50%	2.50%	5.0%
Insulation Resistance (IR) Limit at +25°C	10,000 M Ω Minimum (500 VDC applied for 60 ±5 seconds @ 25°C)				

^{*} C = Nominal capacitance

CH(NP0) and SL: 1 MHz ±100 kHz and 1.0 ±0.2 Vrms

X5P, Y5U and Y5V: 1 kHz ± 50 Hz and 1.0 ± 0.2 Vrms

Note: When measuring capacitance, it is important to ensure the set voltage level is held constant. The HP4284 & Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

Table 1 - Product Ordering Codes and Ratings

Dialogatuia				Din	nensions (mn	1)	Lead Spacing	
Dielectric/ Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging
	C901U209CUND(1)A(2)	2.0 pF						
	C901U309CUND(1)A(2)	3.0 pF	±0.25 pF				10 mm	
	C901U409CUND(1)A(2)	4.0 pF	±0.23 pi					
	C901U509CUND(1)A(2)	5.0 pF						
	C901U609DUND(1)A(2)	6.0 pF		7.0				
	C901U709DUND(1)A(2)	7.0 pF		7.0				
	C901U809DUND(1)A(2)	8.0 pF	±0.5 pF		5.0			
CH	C901U909DUND(1)A(2)	9.0 pF				0.5 ±0.1		
(NP0)	C901U100DUND(1)A(2)	10 pF			0.0			
	C901U120JUND(1)A(2)	12 pF						
	C911U150JUND(1)A(2)	15 pF						
	C911U180JUND(1)A(2)	18 pF						
	C911U200JUND(1)A(2)	20 pF	±5%	8.0				
	C911U220JUND(1)A(2)	22 pF		0.0				
	C911U240JUND(1)A(2)	24 pF						
	C911U270JUND(1)A(2)	27 pF						
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing

⁽¹⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

- A = Straight
- B = Vertical Kink
- C = Outside Kink

¹ Capacitance and Dissipation Factor (DF) measured under the following conditions:

⁽²⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Table 1 – Product Ordering Codes and Ratings cont'd

Dielectrie				Din	nensions (mm	1)	Lead S	Lead Spacing	
Dielectric/ Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging	
	C901U150JUSD(1)A(2)	15 pF							
	C901U180JUSD(1)A(2)	18 pF							
	C901U200JUSD(1)A(2)	20 pF							
	C901U220JUSD(1)A(2)	22 pF							
	C901U240JUSD(1)A(2) C901U270JUSD(1)A(2)	24 pF 27 pF		7.0					
	. , , , ,	27 pF 30 pF							
	C901U300JUSD(1)A(2) C901U330JUSD(1)A(2)	33 pF							
	C901U360JUSD(1)A(2)	36 pF							
SL	C901U390JUSD(1)A(2)	39 pF	±5%		5.0	0.5 ±0.1	10	mm	
SL.	C911U470JUSD(1)A(2)	47 pF	±3 //		5.0	0.5 ±0.1	101	11111	
	C911U500JUSD(1)A(2)	50 pF							
	C911U510JUSD(1)A(2)	51 pF		8.0					
	C911U560JUSD(1)A(2)	56 pF		0.0					
	C911U620JUSD(1)A(2)	62 pF							
	C921U680JUSD(1)A(2)	68 pF							
	C921U750JUSD(1)A(2)	75 pF		9.0					
	C921U820JUSD(1)A(2)	82 pF		5.0					
	C931U101JUSD(1)A(2)	100 pF		10.0					
	0001010100002(1)/1(2)	.σσρ.		10.0					
	C901U101KUYD(1)A(2)	100 pF				İ			
	C901U151KUYD(1)A(2)	150 pF				0.5 ±0.1	10 mm		
	C901U221KUYD(1)A(2)	220 pF		7.0					
V5D	C901U331KUYD(1)A(2)	330 pF	400/		5.0				
Y5P	C911U471KUYD(1)A(2)	470 pF	±10%	8.0	5.0		10 1	mm	
	C921U561KUYD(1)A(2)	560 pF		0.0					
	C921U681KUYD(1)A(2)	680 pF		9.0					
	C941U102KUYD(1)A(2)	1,000 pF		11.0					
	C911U102MUWD(1)A(2)	1,000 pF		8.0					
	C921U152MUWD(1)A(2)	1,500 pF		9.0					
Y5U	C931U222MUWD(1)A(2)	2,200 pF	±20%	10.0	5.0	0.5 ±0.1	10	mm	
130	C951U332MUWD(1)A(2)	3,300 pF	±£0/0	12.0	3.0	0.0 10.1	101		
	C961U392MUWD(1)A(2)	3,900 pF		13.0					
	C971U472MUWD(1)A(2)	4,700 pF		14.0					
	C901U102MUVD(1)A(2)	1,000 pF		7.0		1			
	C911U152MUVD(1)A(2)	1,000 pF 1,500 pF		7.0 8.0					
Y5V	C921U222MUVD(1)A(2)	2,200 pF	±20%	9.0	5.5	0.5 ±0.1	10	mm	
134	C941U332MUVD(1)A(2)	3,300 pF	±2U /0	11.0	3.3	0.5 ±0.1	101	11111	
	C951U472MUVD(1)A(2)	4,700 pF		12.0					
	33010712WOVD(1)A(2)	- ,,, ου μι		12.0					
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing	

⁽¹⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

A = Straight

B = Vertical Kink

C = Outside Kink

⁽²⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Ite	em	Specif	ication			Test Meth	nod		
Operating Tem	perature Range	-25°C to +125°C							
	Between lead wires	No fa	ilures	The capacitor shall not be damaged when 4,000 VAC(rms) is applied between the lead wires for 60 seconds.					
Dielectric Strength	Body Insulation	No fa	iilures	The terminals (leads) of the capacitor shall be connected together. A metal foil is tightly wrapped around the body of the capacitor at a distance of about 3 to 4 mm from each terminal. The capacitor is then inserted into a container filled with metal balls approximately 1 mm in diameter. 4,000 VAC(rms) is applied for 60 seconds between the capacitor lead wires and metal balls.					
Insulation Re	esistance (IR)	10,000 MΩ	Ω minimum			tance shall be meas s of charging.	ured with 500 ±50 VDC applied		
Capac	citance	Within specif	fied tolerance			<u> </u>			
		Temperature Characteristics	Specification						
		Y5P, Y5U	DF ≤ 2.5%	Y5P, Y5U and Y5V: Capacitance is measured at 1 kHz ±20% and 5 Vrms or less. (20 ±2°C) NP0 and SL: Capacitance is measured at 1 MHz ±20% and 1.0 ±0.2 Vrms (25°C)					
5	(DE) 0	Y5V	DF ≤ 5.0%						
Dissipation Fa	ictor (DF) or Q	NP0,SL	≥ 30 pF: Q ≥ 1,000 < 30 pF: Q ≥ 400 +(20 x C) C = Nominal capacitance						
					A capacitance measurement is made at each step specified:				
			Capacitance Change		tep 1	Temperature +20 ±2°C			
		Y5P	Within ±10%		2	-25 ±2°C			
Temperature (Characteristics	Y5U	Within +22%/-56%		3	+20 ±2°C			
		Y5V	Within ~+30%/-80%		4	+85 ±2°C			
		СН	0 ±60 ppm/°C		5	+20 ±2°C			
		SL	-1,000 ~+350 ppm°C (+20°C ~+85°C)		r is stored	at 85 ±2°C for 1 hou hours before measu	ir and then placed at room		
	Tensile	Lead wire or capacito	r body shall not break.	With the body in s tensile fo	termination uch a man rce of 10 N	n in its normal position ner that the axis of the terminal to	on, the specimen is held by its the termination is vertical; a mination in the direction of its the body of the specimen.		
Terminal Strength	Bending	Lead wire or capacito	With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a mass force of 5 N is then suspended from the end of the termination. The body of the specimen is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then resumed to its initial position over the same period of time; this operation constitutes one bend. One bend immediately followed by a second bend in the opposite direction.						
Solde	rability	solder in the axial direct	e a uniform coating of ction and over 3/4 of its ference.	The lead wire of the capacitor is dipped into molten solder for 2 ±0.5 seconds. The depth of immersion is up to 1.5 mm (+5/-0 mm) from the root of lead wires. Solder Temperature: Lead free solder (Sn-3Ag – 0.5Cu) 245°C ±5°C.					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specif	ication	Test N	Method			
	Appearance	No visua	al defect	As shown in the figure below, the le solder up to 1.5 mm (+5/-0 mm) fror	ad wires are immersed in molten			
	IR	1,000) ΜΩ	(root of lead wire). Duration/Solder Temperature: 3.5 ±	:0.5 seconds/350°C ±10°C or 10 ±1			
	Dielectric Strength	Per it	tem 1	seconds/260°C ±5°C Thermal Capacitor				
Soldering Effect (Non-Preheat)	Capacitance	SL, CH (NP0): Within	5V: Within ±10% n ±2.5% or ±0.25 pF, r is larger.	Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.				
	Appearance	No visua	al defect	Capacitor is stored at 120°C +0/-5°				
	IR	1,000) ΜΩ	up to 1.5 mm (+5/-0mm) from the er	wires are immersed in molten solder and of the epoxy meniscus (root of			
	Dielectric Strength	Per it	tem 1	lead wire). Duration/Solder Temperature: 7.5 +0/-1 seconds/260°C ±5°C Thermal Capacitor Screen				
Soldering Effect (Preheat)	Capacitance	SL, CH (NP0): Withir	5V: Within ±10% n ±2.5% or ±0.25 pF, r is larger.					
	Appearance	No visua	al defect	Steady State Humidity:	Load Humidity:			
		Temperature Characteristics	Capacitance Change					
		Y5P	Within ±10%					
	Capacitance	Y5U	Within ±20%					
		Y5V	Within ±30%					
Biased Humidity		SL CH (NP0)	Within ±2.5% or ±0.25 pF, whichever is larger.	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours. Post Treatment:	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours with full rated voltage applied.			
	DF	Y5P and Y5U:	5.0% maximum maximum	Capacitor is stored for 1 to 2 hours at room condition ¹ .	Post Treatment: Capacitor is stored for 1 to 2			
	Q	SL&CH(NP0): Le: 100+1 More than 30 C = Nominal	ss than 30 pF: Q ≥ 0×C/3 0 pF: Q ≥ 200 capacitance		hours at room condition ¹ .			
	IR		3,000 M Ω minimum 1,000 M Ω minimum					
	Dielectric Strength	i ,	ilures					

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specification	Test Method			
	Appearance	No visual defect	Impulse Voltage: Each individual capacitor is subjected to three 8 kv impulses prior to life testing.			
	Capacitance Change	Y5P, Y5V and Y5U: Within ±20% SL and CH (NP0): Within ±3 or ±0.3 pF, which was a series larger.	V_{p} V_{p			
	IR	3,000 M Ω minimum SL and CH (NPO): 1,000 M Ω minimum	0.5Vp			
High Temperature Life	Dielectric Strength	No failures	Capacitors are placed in a circulating air oven for a period of 1,000 hours. The air in the oven is maintained at a temperature of 125°C ±2°C throughout the test. The capacitors are subjected to AC 425 Vrms. Each hour the voltage is increased to AC 1,000 Vrms for 0.1 seconds.			
Flame	e Test	The capacitor flame extinguishes as follows: Cycle Time 1 ~ 4 30 seconds maximum 5 60 seconds maximum	The capacitor is exposed to a flame for 15 seconds and then removed for 15 seconds. This test is repeated for 5 cycles. Capacitor Flame Gas Burner (Unit:mm)			
			The capacitors are individually wrapped in at least one, but not more than two, complete layers of cheesecloth. They are then subjected to 20 discharges. The interval between successive discharges is 5 seconds. The VAC is maintained for 2 minutes after the last discharge.			
			C _{1,2} 1 μF ±10% C ₃ 0.033 μF ±5% 10 kV			
Active Flai	mmability	The cheesecloth should not ignite.	L _{1.4} 1.5 Mh ±20% 16A Rod core choke Cx Test capacitor			
			R 100 ±2% V _{AC} VR ±5%			
			Ct $3 \mu F \pm 5\% 10 \text{ kV}$ V_R Rated Voltage F Fuse, Rated 10A Vt Voltage applied to Ct			
			Vx SkV time			

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	em	Specif	cation	Test Method						
Passive Flammability		The burning time sh seco The tissue paper	Time of exposure to flame: Length of flame: Gas burner length: Inside diameter: Outside diameter: Outside diameter: Gas butane gas purity: The capacitor under test is held into a flame and in a position which best promotes the position and in a position which best promotes and in a position which best promotes the flame one time. Test Specimen Tissue About 10mm Thick Board Time of exposure to flame: 12 ±1 mm Gas burner length: 0.5 ±0.1 mm Outside diameter: 0.9 mm maximum Gas butane gas purity: 95% minimum							
	Appearance	No visua	al defect							
	Capacitance	Temperature Characteristics SL, CH (NP0)	Capacitance Change Within ±5%	The capacitor is subjected to 5 temperature cycles. (Temperature Cycle)						
		Y5P Y5U, Y5V	Within ±10% Within ±20%		Step	Temperature (°C)	Time (minutes)			
					1	-25 +0/-3	30			
Temperature Cycle		SL, CH (NP0)	≥30 pF: Q ≥ 350 <30 pF: Q ≥ 275		2	Room temperature	3			
			+5/2C C = Nominal		3	125 +3/-0	30			
	DF/Q		capacitance		4	Room temperature	3			
		Y5P	DF ≤ 5%							
		Y5U, Y5V	DF ≤ 7.5%	placed a	it room cond	acitor shall be stored at 85 ition ¹ for 24 ±2 hours.				
	IR	3,000 MΩ SL and CH (NPO):		Post-tre	eatment: Ca	pacitor is stored for 1 to 2	hours at room co	ondition ¹ .		
	Dielectric Strength	No fa	ilures							

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Soldering and Mounting Information

Soldering:

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could reflow the solder joint between the lead and ceramic element and/or may result in thermal shocks that can crack the ceramic element.

When soldering these capacitors with a soldering iron, it should be performed under the following conditions:

- Temperature of iron-tip: 400°C maximum
- Soldering iron wattage: 50 W maximum
- · Soldering time: 3.5 seconds maximum

Cleaning (ultrasonic cleaning):

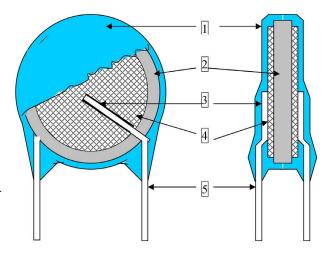
To perform ultrasonic cleaning, observe the following conditions:

- · Rinse bath capacity: Output of 20 watts per liter or less
- · Rinsing time: 5 minute maximum
- Do not vibrate the PCB/PWB directly
- Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires

Construction

Reference	Item	Material			
1	Encapsulation ¹	Epoxy resin, Pigment (Blue/UL 94 V-0)			
2	Dielectric Material	BaTiO ₃			
3	Solder	Sn 96.5, Ag 3, Cu 0.5			
4	Electrodes	Ag (Glass frit)			
5	Lead Wires	Tinned copper clad steel wire (Sn Plating 100% 3-7 μm)			

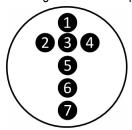
¹ The minimum thickness of the insulation coating (encapsulation) is 0.4 mm Note: Image is exaggerated in order to clearly identify all components of construction.





Capacitor Marking

These capacitors shall be stamped or laser marked with KEMET's trademark, type designation, capacitor class, rated voltage, rated capacitance, and capacitance tolerance codes. In addition, all devices are marked with the recognized approval mark and a date/lot code for traceability. Marking will be supplied either on one side or both sides of the encapsulated capacitor body. All marking shall be legible to allow for clear identification of the component. Marking appears in legible contrast. Illustrated below is an example of the marking format and content. (Two sided marking is limited to capacitors with body diameters ≤ 8.0 mm.)





Location #	Description			[Detail			
1	KEMET Trademark	<u>K</u>						
2 ¹	Type Designation (2 characters)				AH			
3 1	Rated Capacitance (3 numeric characters)	n	First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, 2,200 pF is identified as 222. (For values below 10 pF an "R" is used in place of the decimal point, e.g., 2R0 = 2.0 pF.)					
4	Capacitance Tolerance Code (1 character)	C = 0.25 pF, D = 0.5 pF, J = ±5%, K = ±10%, M = ±20%						
6	VDE & ENEC approval mark IEC 60384–14 3rd (2005)	10 DYE						
6	Capacitor Class and Rated Voltage			X1: 400	V~ Y1: 250 V~			
		Date/Lot Code, e.g., 3 <u>C</u> 12345						
			3	<u>C</u>	1	2345		
7	Date/Lot Code		Last digit of year, e.g., 3 = 2013	Manufacturing Location Code	Manufacturing Month: 1-9 = Jan - Sept A = October N = November D = December	Last 4 digits of lot no.		

Packaging Quantities

	Packaging Type	Loose (Pulk Peg)	Carrier Tape Quantity		
		Loose (Bulk Bag)	(25.4 mm Pitch¹)		
	Ammo Pack	N/A	500 pieces/box		
	Bulk	500 pieces/bag	N/A		

¹ For details regarding component pitch on carrier tape, see "Ammo Pack Taping Format" and "Ammo Pack Taping Specifications" sections of this document.

Safety Standard Recognized, 900 Series, Radial Disc, Encapsulated, AH Type, X1 400 VAC/Y1 400 VAC (Industrial Grade)

Electronic Components

Overview

KEMET's 900 series encapsulated radial through-hole ceramic disc capacitors are specifically designed for interferencesuppression AC line filtering applications. Having internationally recognized safety certifications, these capacitors are well-suited for applications that require keeping potentially disruptive or damaging line transients and EMI out of susceptible equipment. They are also an ideal solution when needing to suppress line disturbances at the source.

Safety Certified Capacitors are classified as either X and/or Y capacitors. Class X capacitors are primarily used in line-to line (across-the-line) applications. In this application there is no danger of electric shock to humans should the capacitor fail, but could result in a risk of fire. The class Y capacitor is primarily used in line-to-ground (line by-pass) applications. In this application, failure of the capacitor could lead to danger of electric shock.

With a working voltage of 400 VAC in line-to-line (Class X) and 400 VAC in line-to-ground (Class Y) applications, these safety capacitors meet the impulse test criteria outlined in IEC Standard 60384. Meeting subclass X1 and Y1 requirements, these devices are certified to withstand impulses up to 4 KV (X1) and 8 KV (Y1) respectively. These encapsulated devices also meet the flame test requirements outlined in UL Standard 94V-0.



Ordering Information

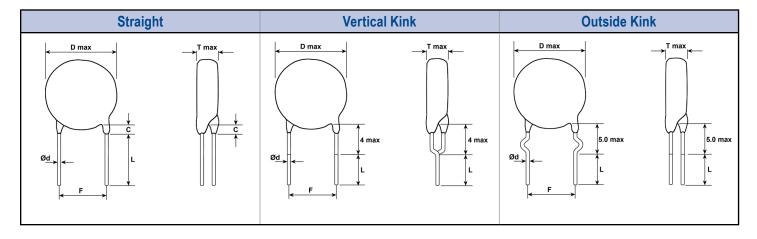
C 9	3	1	U	101	J	٧	S	D	Α	Α	7317
Ceramic Series	Body Diameter	Lead Spacing ¹	Spec.	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage	Dielectric/ Temp. Char.	Design	Lead Config. ²	Failure Rate	Packaging (C-Spec) ^{1,2}
C9 = Ceramic 900 Series	0 = 7.0 mm 1 = 8.0 mm 2 = 9.0 mm 3 = 10.0 mm 4 = 11.0 mm 5 = 12.0 mm 6 = 13.0 mm 7 = 14.0 mm	1 = 10.0 mm	U = Safety	2 significant digits + number of zeroes Use 9 for 1.0 - 9.9 pF e.g., 2.2 pF = 229	C = $\pm 0.25 \text{ pF}$ D = $\pm 0.5 \text{ pF}$ J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$	V = X1 400 VAC /Y1 400 VAC	N = CH (NP0) S = SL Y = Y5P W = Y5U V = Y5V	D = Disc	A = Straight B = Vertical Kink C = Outside Kink	A = N/A	7317 = Ammo Pack WL30 = Bulk/3.0 mm Lead length WL35 = Bulk/3.5 mm Lead length WL40 = Bulk/4.0 mm Lead length WL45 = Bulk/4.5 mm Lead length WL50 = Bulk/5.0 mm Lead length WL50 = Bulk/2.0 mm Lead length WL20 = Bulk/20 mm Lead length

^{1 &}quot;Vertical Kink" and "Outside Kink" lead configurations cannot be combined with the bulk/20 mm lead length option (WL20). 20 mm lead length is only available on capacitors ordered with straight leads (lead configuration ordering code "A"). For nonstandard lead length inquiries, please contact KEMET.

² Bulk packaging lead length availability is dependent upon "Lead Configuration." See "Dimensions" section of this document to verify availability of a specific lead length option. For nonstandard lead length inquiries, please contact KEMET.



Lead Configurations



Dimensions – Millimeters

	Lead	F	Lead		L	Packaging	D	Т	е	Ød
Lead Config.			Spacing Tolerance	Packaging Type	Lead Length	C-Spec Ordering Code ²	Body Diameter			Lead Dia.
				Ammo Pack	20.0 +1.5/-1.0	7317				
				Bulk	3.0 ±1.0	WL30			3.0	
Straight	A	A 10.0	±1.0		4.5 ±1.0	WL45				0.5 ±0.1
					5.0 ±1.0	WL50				
					20.0 minimum	WL20				
				Ammo Pack	18.0 +2.0/-0	7317		1 - "Product		
Vertical Kink (Preformed)	В	10.0	±1.0	Dulk	3.5 ±1.0	WL35		Codes and ings"	maximum	
(. 15.554)				Bulk	4.0 ±1.0	WL40				
				Ammo Pack	18.0 +2.0/-0	7317				
Outside Kink		10.0	.10		3.5 ±1.0	WL35				
(Preformed)	C	C 10.0	±1.0	Bulk	4.0 ±1.0	WL40				
					5.0 ±1.0	WL50				

Lead Configuration is identified in the 13th character of the ordering code. See "Lead Configuration" and "Ordering Information" sections of this document for further details.

² The "Packaging C-Spec" is a 4-digit numeric or alphanumeric code which identifies both the packaging type and lead length requirement. When ordering, this code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.



Benefits

- Safety Standard Recognized (IEC 60384-14)
- Reliable operation up to 125°C
- · Class X1/Y1
- 10 mm lead spacing
- · Lead (Pb)-free and RoHS Compliant
- · Halogen Free
- Capacitance offerings ranging from 2.0 pF up to 4,700 pF
- Available capacitance tolerances of ±0.25 pF, ±0.5 pF, ±5%, ±10%, and ±20%
- · High reliability
- Preformed (crimped) or straight lead configurations
- · Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated lead finish allowing for excellent solderability
- Encapsulation meets flammability standard UL 94V–0

Applications

Typical applications include:

- · Line-to-line (Class X) filtering
- · Line-to-ground (Class Y) filtering
- · Antenna coupling
- Primary and secondary coupling (switching power supplies)
- Line disturbances suppression (motors and motor controls, relays, switching power supplies, and inverters)

Approval Standard and Certification No.

Safety Standard	Standard No.	Subclass	Working Voltage	Certificate No.
VDE	IEC 60384-14	X1	400 VAC	40036417
(ENEC)	IEC 00304-14	Y1	400 VAC	40030417

These devices are VDE/ENEC recognized for antenna coupling and AC line-to-line (Class X) and line-to-ground (Class Y) applications per IEC60384-14.

Environmental Compliance

These devices are Halogen Free and RoHS Compliant. They meet all requirements set forth by both EU and China RoHS directives.





General Specifications/Performance Characteristics

Dielectric/Temperature Characteristic:	CH(NP0)	SL	Y5P	Y5U	Y5V
Operating Temperature Range:			-25°C to +125°C		
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC):	±60 ppm/°C	-1,000 ~ +350 ppm/°C	±10%	+20%/-55%	~ +30%/-80%
Dielectric Withstanding Voltage	2,600 VAC (60 ±5 seconds at 25°C)				
Quality Factor (Q)	30 pF% and a Below 30 pF: 2	above: ≥ 1,000 ≥ 400 +(20xC)*	See	"Dissipation Fa	ctor"
Dissipation Factor (tanδ) at +25°C1	See "Quality Factor"		2.50%	2.50%	5.0%
Insulation Resistance (IR) Limit at +25°C	C 10,000 MΩ Minimum (500 VDC applied for 60 ±5 seconds @ 25°C)				

^{*} C = Nominal capacitance

CH(NP0) and SL: 1 MHz ± 100 kHz and 1.0 ± 0.2 Vrms

X5P, Y5U and Y5V: 1 kHz \pm 50 Hz and 1.0 \pm 0.2 Vrms

Note: When measuring capacitance, it is important to ensure the set voltage level is held constant. The HP4284 & Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

Table 1 - Product Ordering Codes and Ratings

Dielectrie				Din	nensions (mn	1)	Lead Spacing		
Dielectric/ Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging	
	C901U209CVND(1)A(2)	2.0 pF							
	C901U309CVND(1)A(2)	3.0 pF	±0.25 pF						
	C901U409CVND(1)A(2)	4.0 pF	±0.25 pi						
	C901U509CVND(1)A(2)	5.0 pF							
	C901U609DVND(1)A(2)	6.0 pF	±0.5 pF	7.0	5.0				
	C901U709DVND(1)A(2)	7.0 pF							
	C901U809DVND(1)A(2)	8.0 pF					10 mm		
CH	C901U909DVND(1)A(2)	9.0 pF				0.5 ±0.1			
(NP0)	C901U100DVND(1)A(2)	10 pF							
	C901U120JVND(1)A(2)	12 pF							
	C911U150JVND(1)A(2)	15 pF							
	C911U180JVND(1)A(2)	18 pF							
	C911U200JVND(1)A(2)	20 pF	±5%	8.0					
	C911U220JVND(1)A(2)	22 pF		0.0					
	C911U240JVND(1)A(2)	24 pF							
	C911U270JVND(1)A(2)	27 pF							
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing	

⁽¹⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

- A = Straight
- B = Vertical Kink
- C = Outside Kink

¹ Capacitance and Dissipation Factor (DF) measured under the following conditions:

⁽²⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Table 1 – Product Ordering Codes and Ratings cont'd

Dielectric/				Din	nensions (mn	1)	Lead S	pacing
Temp. Char.	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Bulk Packaging	Ammo Packaging
	C901U150JVSD(1)A(2)	15 pF 18 pF						
	C901U180JVSD(1)A(2) C901U200JVSD(1)A(2)	20 pF						
	C901U220JVSD(1)A(2)	20 pF						
	C901U240JVSD(1)A(2)	24 pF						
	C901U270JVSD(1)A(2)	27 pF		7.0				
	C901U300JVSD(1)A(2)	30 pF						
	C901U330JVSD(1)A(2)	33 pF						
	C901U360JVSD(1)A(2)	36 pF						
SL	C901U390JVSD(1)A(2)	39 pF	±5%		5.0	0.5 ±0.1	10	mm
-	C911U470JVSD(1)A(2)	47 pF						
	C911U500JVSD(1)A(2)	50 pF						
	C911U510JVSD(1)A(2)	51 pF		8.0				
	C911U560JVSD(1)A(2)	56 pF						
	C911U620JVSD(1)A(2)	62 pF						
	C921U680JVSD(1)A(2)	68 pF						
	C921U750JVSD(1)A(2)	75 pF		9.0				
	C921U820JVSD(1)A(2)	82 pF						
	C931U101JVSD(1)A(2)	100 pF		10.0				
	C901U101KVYD(1)A(2)	100 pF						
	C901U151KVYD(1)A(2)	150 pF		7.0			10 mm	
	C901U221KVYD(1)A(2)	220 pF		•		0.5 ±0.1		
Y5P	C901U331KVYD(1)A(2)	330 pF	±10%		5.0			
	C911U471KVYD(1)A(2)	470 pF	,	8.0				
	C921U561KVYD(1)A(2)	560 pF		9.0				
	C921U681KVYD(1)A(2)	680 pF		44.0				
	C941U102KVYD(1)A(2)	1,000 pF		11.0				
	C911U102MVWD(1)A(2)	1,000 pF		8.0		1		
	C921U152MVWD(1)A(2)	1,000 pF 1,500 pF		9.0				
	C931U222MVWD(1)A(2)	2,200 pF		10.0				
Y5U	C951U332MVWD(1)A(2)	3,300 pF	±20%	12.0	5.0	0.5 ±0.1	10	mm
	C961U392MVWD(1)A(2)	3,900 pF		13.0				
	C971U472MVWD(1)A(2)	4,700 pF		14.0				
	., ()							
	C901U102MVVD(1)A(2)	1,000 pF		7.0				
	C911U152MVVD(1)A(2)	1,500 pF		8.0				
Y5V	C921U222MVVD(1)A(2)	2,200 pF	±20%	9.0	5.5	0.5 ±0.1	10	mm
	C941U332MVVD(1)A(2)	3,300 pF		11.0				
	C951U472MVVD(1)A(2)	4,700 pF	L	12.0				
	KEMET Part Number	Capacitance	Capacitance Tolerance	Body Diameter (Maximum)	Body Thickness (Maximum)	Lead Diameter	Lead S	pacing

⁽¹⁾ To properly complete ordering code, insert the one-digit character code to reflect the required lead configuration: (See "Lead Configuration" section of this document, page 2, for further details.)

A = Straight

B = Vertical Kink

C = Outside Kink

⁽²⁾ To properly complete ordering code, enter the four-digit numeric or alphanumeric "Packaging C-Spec Ordering Code." See "Dimensions" section of this document, page 2, for available options.



Ite	em	Specification		Test Method				
Operating Tem	perature Range			-25°C to +125°C				
	Between lead wires	No fa	ilures	The capacitor shall not be damaged when 4,000 VAC(rms) is applied between the lead wires for 60 seconds.				
Dielectric Strength Body Insulation		No failures		diameter. 4,000 VAC(rms) is applied for 60		control and a state of the stat		
Insulation Re	esistance (IR)	10,000 MΩ	2 minimum	The insulation resis		ured with 500 ±50 VDC applied		
Сарас	citance	Within specif	ied tolerance		J J			
		Temperature Characteristics	Specification					
		Y5P, Y5U	DF ≤ 2.5%	Y5P, Y5U and Y5V: Capacitance is measured at 1 kHz ±20% and 5				
Dissipation Fa	otor (DE) or O	Y5V	DF ≤ 5.0%	Vrms or less. (20 ±2°C) NP0 and SL: Capacitance is measured at 1 MHz ±20% and 1.0 ±0.2				
Dissipation Fa	Dissipation Factor (DF) or Q		≥ 30 pF: Q ≥ 1,000 < 30 pF: Q ≥ 400 +(20 x C) C = Nominal capacitance	Vrms (25°C)				
				A capacitance measurement is made at each step specified:				
			naracteristics Change	Step	Temperature			
		VED		1	+20 ±2°C			
-	n	Y5P	Within ±10%	2	-25 ±2°C			
remperature (Characteristics	Y5U	Within +22%/-56%	3	+20 ±2°C			
		Y5V CH	Within ~+30%/-80%	5	+85 ±2°C			
		SL	0 ±60 ppm/°C -1,000 ~+350 ppm°C (+20°C ~+85°C)	Pre-treatment: Capacitor is stored		ır and then placed at room		
	Tensile		Lead wire or capacitor body shall not break.		condition¹ for 24 ±2 hours before measurement. With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a tensile force of 10 N is applied to the termination in the direction of its axis and acting in a direction away from the body of the specimen.			
Terminal Strength	Bending	Lead wire or capacitor body shall not break.		With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; a mass force of 5 N is then suspended from the end of the termination. The body of the specimen is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then resumed to its initial position over the same period of time; this operation constitutes one bend. One bend immediately followed by a second bend in the opposite direction.				
Solderability		Lead wire should have a uniform coating of solder in the axial direction and over 3/4 of its circumference.		The lead wire of the capacitor is dipped into molten solder for 2 ±0.5 seconds. The depth of immersion is up to 1.5 mm (+5/-0 mm) from the root of lead wires. Solder Temperature: Lead free solder (Sn-3Ag – 0.5Cu) 245°C ±5°C.				

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specification		Test Method			
	Appearance	No visua	al defect	As shown in the figure below, the le solder up to 1.5 mm (+5/-0 mm) fror	ad wires are immersed in molten		
	IR	1,000	Ο ΜΩ	(root of lead wire). Duration/Solder Temperature: 3.5 ±0.5 seconds/350°C ±10°C or 10 ±1			
	Dielectric Strength	Per item 1		seconds/260°C ±5°C Thermal Capacitor Screen 1.5 to 2.0mm Molten Solder Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.			
Soldering Effect (Non-Preheat)	Capacitance	Y5P, Y5U and Y5V: Within ±10% SL, CH (NP0): Within ±2.5% or ±0.25 pF, whichever is larger.					
	Appearance	No visua	al defect	Capacitor is stored at 120°C +0/-5°	C for 60 +0/-5 seconds. Then, as wires are immersed in molten solder		
	IR	1,000 ΜΩ		up to 1.5 mm (+5/-0mm) from the er	nd of the epoxy meniscus (root of		
_	Dielectric Strength	Per item 1		lead wire). Duration/Solder Temperature: 7.5 +0/-1 seconds/260°C ±5°C Thermal Capacitor Screen to 2.0mm Molten Solder Pre-treatment: Capacitor is stored at 85°C ±2°C for 1 hour and then placed at room condition¹ for 24 ±2 hours before initial measurements. Post-treatment: Capacitor is stored for 1 to 2 hours at room condition¹.			
Soldering Effect (Preheat)	Capacitance	Y5P, Y5U and Y5V: Within ±10% SL, CH (NP0): Within ±2.5% or ±0.25 pF, whichever is larger.					
	Appearance	No visua	al defect	Steady State Humidity:	Load Humidity:		
		Temperature Characteristics	Capacitance Change				
		Y5P	Within ±10%				
	Capacitance	Y5U	Within ±20%				
		Y5V	Within ±30%		00 / 050/ / 1111 / 4000		
Biased Humidity		SL CH (NP0)	Within ±2.5% or ±0.25 pF, whichever is larger.	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours. Post Treatment:	90 to 95% humidity at 40°C ±2°C for 500 ±12 hours with full rated voltage applied.		
	DF		5.0% maximum	Capacitor is stored for 1 to 2 hours at room condition ¹ .	Post Treatment: Capacitor is stored for 1 to 2		
	Q	Y5V: 7.5% maximum SL&CH(NP0): Less than 30 pF: Q ≥ 100+10×C/3 More than 30 pF: Q ≥ 200 C = Nominal capacitance			hours at room condition ¹ .		
	IR		3,000 M Ω minimum 1,000 M Ω minimum				
	Dielectric Strength		illures				

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	m	Specification	Test Method				
	Appearance	No visual defect	Impulse Voltage: Each individual capacitor is subjected to three 8 kv				
	Capacitance Change	Y5P, Y5V and Y5U: Within ±20% SL and CH (NP0): Within ±3 or ±0.3 pF, which was a series larger.	impulses prior to life testing. $ \begin{array}{c cccc} \hline Cx & tr & td \\ Cx & tr & td \\ \hline Cx & tr & td \\ \hline Cx & tr & td \\ \hline Cx & tr & td \\ Cx & tr & td \\ \hline Cx & tr & td \\ \hline Cx & tr & td \\ $				
	IR	3,000 M Ω minimum SL and CH (NPO): 1,000 M Ω minimum	0.9Vp				
High Temperature Life	Dielectric Strength	No failures	Capacitors are placed in a circulating air oven for a period of 1,000 hours. The air in the oven is maintained at a temperature of 125°C ±2°C throughout the test. The capacitors are subjected to AC 680 Vrms. Each hour the voltage is increased to AC 1,000 Vrms for 0.1 seconds.				
Flame Test		The capacitor flame extinguishes as follows: Cycle Time 1 ~ 4 30 seconds maximum 5 60 seconds maximum	The capacitor is exposed to a flame for 15 seconds and then removed for 15 seconds. This test is repeated for 5 cycles. Capacitor Flame Gas Burner (Unit:mm)				
Active Flammability		The cheesecloth should not ignite.	The capacitors are individually wrapped in at least one, but not more than two, complete layers of cheesecloth. They are then subjected to 20 discharges. The interval between successive discharges is 5 seconds. The VAC is maintained for 2 minutes after the last discharge.				
			time				

¹ "Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Ite	em	Specifi	cation	Test Method				
Passive Flammability		The burning time should not exceed 30 seconds. The tissue paper should not ignite.		The capacitor under test is held into a flame and in a position which best promotes burning. Each specimen is exposed to the flame one time. Test Specimen Time of exposure to flame: Length of flame: Gas burner length: Inside diameter: Outside diameter: Gas butane gas purity: 95% minimum				hich one
	Appearance	No visua						
	Capacitance	Temperature Characteristics SL, CH (NP0) Y5P	Capacitance Change Within ±5% Within ±10%	The capacitor is subjected to 5 temperature cycles. (Temperature Cycle) Time				
		Y5U, Y5V	Within ±20%		Step	Temperature (°C)	(minutes)	
Temperature		SL, CH (NP0)	≥30 pF: Q ≥ 350		1	-25 +0/-3	30	
Cycle			<30 pF: Q ≥ 275		2	Room temperature	3	
			+5/2C C = Nominal		3	125 +3/-0	30	
	DF/Q		capacitance		4	Room temperature	3	
		Y5P	DF ≤ 5%					
		Y5U, Y5V	DF ≤ 7.5%	Pre-treatment: Capacitor shall be stored at 85 ±2 for 1 hour then placed at room condition for 24 ±2 hours.			en	
	IR	3,000 MΩ SL and CH (NPO): 1				pacitor is stored for 1 to 2	hours at room co	ndition ¹ .
	Dielectric Strength	No fa	ilures					

^{1 &}quot;Room Condition" is defined as follows: Temperature: 15 ~ 35°C/Humidity: 45 ~ 75%/Atmospheric Pressure: 86 ~ 106 kPa.



Soldering and Mounting Information

Soldering:

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could reflow the solder joint between the lead and ceramic element and/or may result in thermal shocks that can crack the ceramic element.

When soldering these capacitors with a soldering iron, it should be performed under the following conditions:

- Temperature of iron-tip: 400°C maximum
- · Soldering iron wattage: 50 W maximum
- · Soldering time: 3.5 seconds maximum

Cleaning (ultrasonic cleaning):

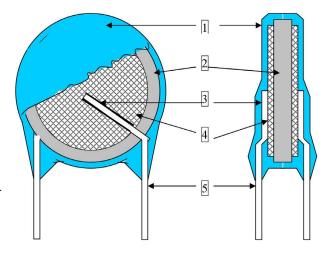
To perform ultrasonic cleaning, observe the following conditions:

- · Rinse bath capacity: Output of 20 watts per liter or less
- Rinsing time: 5 minute maximum
- Do not vibrate the PCB/PWB directly
- Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires

Construction

Reference	Item	Material
1	Encapsulation ¹	Epoxy resin, Pigment (Blue/UL 94 V-0)
2	Dielectric Material	BaTiO ₃
3	Solder	Sn 96.5, Ag 3, Cu 0.5
4	Electrodes	Ag (Glass frit)
5	Lead Wires	Tinned copper clad steel wire (Sn Plating 100% 3-7 μm)

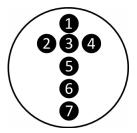
¹ The minimum thickness of the insulation coating (encapsulation) is 0.4 mm Note: Image is exaggerated in order to clearly identify all components of construction.





Capacitor Marking

These capacitors shall be stamped or laser marked with KEMET's trademark, type designation, capacitor class, rated voltage, rated capacitance, and capacitance tolerance codes. In addition, all devices are marked with the recognized approval mark and a date/lot code for traceability. Marking will be supplied either on one side or both sides of the encapsulated capacitor body. All marking shall be legible to allow for clear identification of the component. Marking appears in legible contrast. Illustrated below is an example of the marking format and content. (Two sided marking is limited to capacitors with body diameters ≤ 8.0 mm.)





Location #	Description		I	Detail		
•	KEMET Trademark	<u>K</u>				
2 ¹	Type Designation (2 characters)			АН		
3 ¹	Rated Capacitance (3 numeric characters)	First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, 2,200 pF is identified as 222. (For values below 10 pF an "R" is used in place of the decimal point, e.g., 2R0 = 2.0 pF.)				
4	Capacitance Tolerance Code (1 character)	C = 0.25 pF, D = 0.5 pF, J = ±5%, K = ±10%, M = ±20%				
6	VDE & ENEC approval mark IEC 60384–14 3rd (2005)	10 DYE				
6	Capacitor Class and Rated Voltage	X1: 400 V~ Y1: 400 V~				
			Date/Lot Co	de, e.g., 3 <u>C</u> 12345		
		3	<u>C</u>	1	2345	
•	7 Date/Lot Code		Manufacturing Location Code	Manufacturing Month: 1-9 = Jan - Sept A = October N = November D = December	Last 4 digits of lot no.	

Packaging Quantities

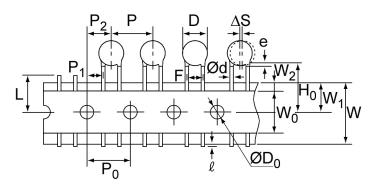
Dookoging Type	Loose (Bulk Peg)	Carrier Tape Quantity	
Packaging Type	Loose (Bulk Bag)	(25.4 mm Pitch¹)	
Ammo Pack	N/A	500 pieces/box	
Bulk	500 pieces/bag	N/A	

¹ For details regarding component pitch on carrier tape, see "Ammo Pack Taping Format" and "Ammo Pack Taping Specifications" sections of this document.

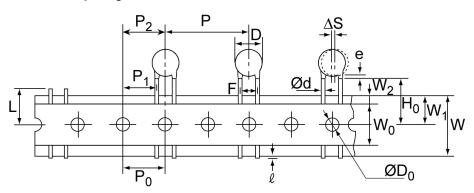


Ammo Pack Taping Format

5 mm and 7.5 mm Lead Spacing:



10 mm Lead Spacing:



Ammo Pack Taping Specifications - X1 400 VAC/Y2 250 VAC and X1 440 VAC/Y2 300 VAC

Lead Spacing	5 mm		7.5 mm		10 mm		
Lead Style	Straight	Preformed ¹	Straight	Preformed ¹	Straight	Preformed ¹	
Item	Symbol			Dimensi	ons (mm)		
Lead Spacing	F	5.0 +0	0.8/-0.2	7.5	±1.0	10.0	±1.0
Component Pitch	Р	12.7		15.0		25.4 ±2	
Sprocket Hole Pitch	P ₀	12.7 ±0.3		15.0 ±0.3		12.7 ±0.3	
Sprocket Hole Center to Component Center	P ₂	6.35 ±1.5		7.5 ±1.5		12.7 ±1.5	
Sprocket Hole Center to Lead Center	P ₁	3.75	±1.0	3.75 ±1.0		7.7 ±1.5	
Body Diameter	D	See "Product Ordering Codes and Ratings" section of this document.					
Component Alignment (side/side)	ΔS	0 ±2.0					
Carrier Tape Width	W	18.0 +1.0/-0.5					
Sprocket Hole Position	W ₁			9.0	±0.5		

¹Prefromed (crimped) lead configurations include vertical kink, outside kink and inside kink. See "Lead Configurations" and "Ordering Information" sections of this document for further details.

²Also referred to as "lead length" in this document.



Ammo Pack Taping Specifications cont'd - X1 400 VAC/Y2 250 VAC and X1 440 VAC/Y2 300 VAC

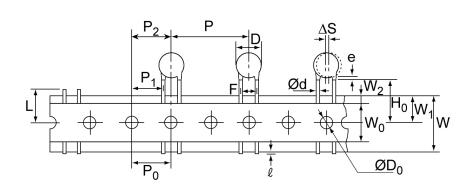
Lead Spacing	Lead Spacing		5 mm		7.5 mm		10 mm	
Lead Style		Straight	Preformed ¹	Straight	Preformed ¹	Straight	Preformed ¹	
Item	Symbol			Dimensi	ons (mm)			
Height to Seating Plane ² (preformed leads ¹)	H ₀	N/A	18.0 +2.0/-0	N/A	18.0 +2.0/-0	N/A	18.0 +2.0/-0	
Height to Seating Plane ² (straight leads)	Н	20.0 +1.5/-1.0	N/A	20.0 +1.5/-1.0	N/A	20.0 +1.5/-1.0	N/A	
Lead Protrusion	l	2.0 maximum				,		
Diameter of Sprocket Hole	D ₀	4.0 ±0.2						
Lead Diameter	φd			0.5	±0.1			
Carrier Tape Thickness	t ₁			0.6	±0.3			
Total Thickness (Carrier Tape, Hold-Down Tape and Lead)	t ₂			1.5 ma	ıximum			
Component Alignment (front/back)	$\Delta h_1 \ \Delta h_2$	2.0 maximum						
Cut Out Length	L	11.0 maximum						
Hold-Down Tape Width	W _o	11.0 minimum 11.5 minimum						
Hold-Down Tape Position	W_2	3.0 ma	ximum		1.5	±1.5		

¹Prefromed (crimped) lead configurations include vertical kink, outside kink and inside kink. See "Lead Configurations" and "Ordering Information" sections of this document for further details.

²Also referred to as "lead length" in this document.



Ammo Pack Taping Specifications – X1 400 VAC/Y1 250 VAC and X1 400 VAC/Y1 400 VAC



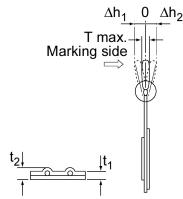


Table 3 - Ammo Pack Taping Specifications

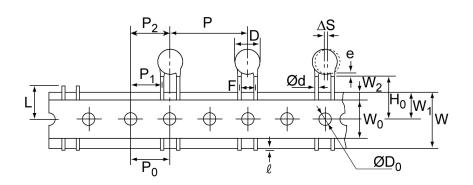
Lead Spacing		10 mm		
Lead Style		Straight	Preformed ¹	
Item	Symbol	Dimensio	ons (mm)	
Lead Spacing	F	10.0	±1.0	
Component Pitch	Р	25.4	±2	
Sprocket Hole Pitch	P ₀	12.7 :	±0.3	
Sprocket Hole Center to Component Center	P ₂	12.7	±1.5	
Sprocket Hole Center to Lead Center	P ₁	7.7 ±	±1.5	
Body Diameter	D	See "Product Ordering Codes and	Ratings" section of this document.	
Component Alignment (side/side)	ΔS	0 ±	2.0	
Carrier Tape Width	W	18.0 +1	.0/-0.5	
Sprocket Hole Position	W ₁	9.0 ±0.5		
Height to Seating Plane ² (preformed leads ¹)	H₀	N/A	18.0 +2.0/-0	
Height to Seating Plane ² (straight leads)	Н	20.0 +1.5/-1.0	N/A	
Lead Protrusion	l	2.0 ma	ximum	
Diameter of Sprocket Hole	D _o	4.0 ±	±0.2	
Lead Diameter	φd	0.5 ±	±0.1	
Carrier Tape Thickness	t,	£ 0.0	±0.3	
Total Thickness (Carrier Tape, Hold-Down Tape and Lead)	t ₂	1.5 ma:	ximum	
Component Alignment (front/back)	Δh_1	2.0 ma.	ximum	
Component Anginnent (nontroack)	Δh_2	2.0 ma	ximum	
Cut Out Length	L	11.0 ma	ıximum	
Hold-Down Tape Width	W _o	11.0 mi	nimum	
Hold-Down Tape Position	W ₂	1.5 ±		
Coating Extension on Leads (meniscus)	е	3.0 maximum for straight lead; not to configur		
Body Thickness	Т	See "Product Ordering Codes and Ratings" section of this document.		

¹Preformed (crimped) lead configurations include vertical kink and outside kink. See "Lead Configurations" and "Ordering Information" sections of this document for further details.

²Also referred to as "lead length" in this document.



Ammo Pack Taping Specifications - X1 760 VAC/Y1 500 VAC



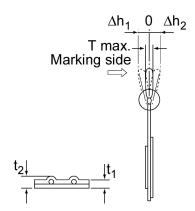


Table 3 – Ammo Pack Taping Specifications

Lead Spacing		10 mm		
Lead Style		Straight	Preformed ¹	
Item	Symbol	Dimension	ons (mm)	
Lead Spacing	F	10.0	±1.0	
Component Pitch	Р	25.4	±2	
Sprocket Hole Pitch	P _o	12.7	±0.3	
Sprocket Hole Center to Component Center	P ₂	12.7	±1.5	
Sprocket Hole Center to Lead Center	P ₁	7.7 ±	±1.5	
Body Diameter	D	13.0 Ma	aximum	
Component Alignment (side/side)	ΔS	0 ±	2.0	
Carrier Tape Width	W	18.0 +1	.0/-0.5	
Sprocket Hole Position	W ₁	9.0 ±0.5		
Height to Seating Plane ² (preformed leads ¹)	H _o	N/A	18.0 +2.0/-0	
Height to Seating Plane ² (straight leads)	Н	20.0 +1.5/-1.0	N/A	
Lead Protrusion	ł	2.0 ma	ximum	
Diameter of Sprocket Hole	D ₀	4.0 =	±0.2	
Lead Diameter	φd	0.5 :	±0.1	
Carrier Tape Thickness	t ₁	0.6 =	±0.3	
Total Thickness (Carrier Tape, Hold-Down Tape and Lead)	t ₂	1.5 ma	ximum	
Component Alignment (front/back)	Δh_1	2.0 maximum		
Component Angriment (nont/back)	Δh_2	2.0 maximum		
Cut Out Length	L	11.0 ma	iximum	
Hold-Down Tape Width	W _o	11.0 minimum		
Hold-Down Tape Position	W ₂	1.5 ±1.5		
Coating Extension on Leads (meniscus)	е	3.0 maximum for straight lead; not to configu		
Body Thickness	Т	7.0 Maximum		

¹Preformed (crimped) lead configurations include vertical kink and outside kink. See "Lead Configurations" and "Ordering Information" sections of this document for further details.

²Also referred to as "lead length" in this document.



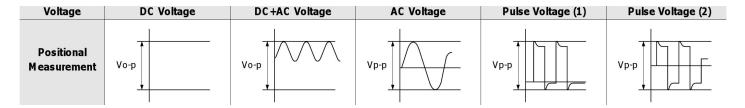
Application Notes:

Storage and Operating Conditions:

The insulating coating of these devices does not form an air and moisture-tight seal. Avoid exposure to moisture and do not use or store these devices in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt, or the like are present. Before cleaning, bonding or molding these devices, it is important to verify that your process does not affect product quality and performance. KEMET recommends testing and evaluating the performance of a cleaned, bonded or molded product prior to implementing and/or qualifying any of these processes. Store the capacitors where the temperature and relative humidity do not exceed 40 degrees Centigrade and 70% respectively. For optimum solderability, capacitor stock should be used promptly, preferably within 6 months of receipt.

Working Voltage:

Application voltage (Vp-p or Vo-p) must not exceed the voltage rating of the capacitor. Irregular voltages can be generated for a transient period of time when voltage is initially applied and/or removed from a circuit. It is important to choose a capacitor with a voltage rating greater than or equal to these irregular voltages.



Operating Temperature and Self-Generating Heat:

The surface temperature of a capacitor should be kept below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high-frequency current, pulse current or similar current, it may self-generate heat due to dielectric loss. Temperature rise due to self-generated heating should not exceed 20°C (while operated at an atmosphere temperature of 25°C).

Handling - Vibration and Impact:

Do not expose these devices or their leads to excessive shock or vibration during use.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.



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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicted or that other measures may not be required.

Product & Process Design

Sales & Marketing

Supplier

Material Management

Quality

Manufacturing

Logistics & Distribution

People: Leadership & Development

KEMET Production System



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