

# RF/Microwave Capacitors

## RF/Microwave Multilayer Capacitors (MLC)

### 700C Series NPO Porcelain and Ceramic Multilayer Capacitors



#### GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 700C Series RF Capacitors. This high Q multilayer capacitor is ultra-stable under high RF current and voltage applications. High density porcelain construction provides a rugged, hermetic package.

KYOCERA AVX offers an encapsulation option for applications requiring extended protection against arc-over and corona

#### FUNCTIONAL APPLICATIONS

- Bypass
- Coupling
- Tuning
- Impedance Matching
- DC Blocking

#### CIRCUIT APPLICATIONS

- VHF/UHF RF Power Amplifiers
- Antenna Tuning
- Plasma Chambers
- Medical (MRI coils)

\*For leaded styles only

#### ENVIRONMENTAL CHARACTERISTICS

<b>Thermal Shock</b>	MIL-STD-202, Method 107, Condition A
<b>Moisture Resistance</b>	MIL-STD-202, Method 106
<b>Low Voltage Humidity</b>	MIL-STD-202, Method 103, Condition A, with 1.5 Volts DC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours min.
<b>Life Test</b>	MIL-STD-202, Method 108, for 2000 hours, at 125°C. Voltage applied. 200% of WVDC for capacitors rated at 500 volts DC or less. 120% of WVDC for capacitors rated at 1250 volts DC or less. 100% of WVDC for capacitors rated above 1250 volts DC.
<b>Termination Styles</b>	Available in various surface mount and leaded styles. See Mechanical Configurations
<b>Terminal Strength</b>	Terminations for chips and pellets withstand a pull of 10 lbs. min., 20 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor. Test per MIL-STD-202, method 211.

#### FEATURES

- Case C Size (.250" x .250")
- High Q
- Low ESR/ESL
- High RF Power
- Available with Encapsulation Options\*
- Capacitance Range 1 pF to 2700 pF
- Ultra-Stable Performance
- High RF Current/Voltage
- High Reliability

#### PACKAGING OPTIONS



Tape & Reel



Tray  
(180 pcs)



#### ELECTRICAL SPECIFICATIONS

<b>Quality Factor (Q)</b>	Greater than 10,000 (1.0 pF to 1000 pF) @ 1 MHz. Greater than 10,000 (1100 pF to 2700 pF) @ 1 KHz.
<b>Temperature Coefficient of Capacitance (TCC)</b>	0 ±30 PPM/°C (-55°C to +125°C)
<b>Insulation Resistance (IR)</b>	1 pF to 2700 pF: 10 <sup>5</sup> Megohms min. @ +25°C at rated WVDC. 10 <sup>4</sup> Megohms min. @ +125°C at rated WVDC. Max. test voltage is 500 VDC.
<b>Working Voltage (WVDC)</b>	See Capacitance Values Table
<b>Dielectric Withstanding Voltage (DWV)</b>	250% of WVDC for capacitors rated at 500 volts DC or less for 5 seconds. 150% of WVDC for capacitors rated at 1250 volts DC or less for 5 seconds. 120% of WVDC for capacitors rated above 1250 volts DC for 5 seconds.
<b>Retrace</b>	Less than ±(0.02% or 0.02 pF), whichever is greater
<b>Aging Effects</b>	None
<b>Piezoelectric Effects</b>	None
<b>Capacitance Drift</b>	±(0.02% or 0.02 pF), whichever is greater
<b>Operating Temperature Range</b>	From -55°C to +125°C (No derating of working voltage)

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#### CAPACITANCE VALUES

CAP. CODE	CAP. (pF)	TOL.	RATED WVDC	CAP. CODE	CAP. (pF)	TOL.	RATED WVDC	CAP. CODE	CAP. (pF)	TOL.	RATED WVDC	CAP. CODE	CAP. (pF)	TOL.	RATED WVDC
1R0	1.0	B, C, D	2500	5R1	5.1	B, C, D	2500	390	39	F, G, J K, M	2500	301	300	F, G, J K, M	1500
1R1	1.1			5R6	5.6			430	43			331	330		
1R2	1.2			6R2	6.2			470	47			361	360		
1R3	1.3			6R8	6.8			510	51			391	390		
1R4	1.4			7R5	7.5			560	56			431	430		
1R5	1.5			8R2	8.2			620	62			471	470		
1R6	1.6			9R1	9.1			680	68			511	510		
1R7	1.7			100	10			750	75			561	560		
1R8	1.8			110	11			820	82			621	620		
1R9	1.9			120	12			910	91			681	680		
2R0	2.0	B, C, D	2500	130	13	F, G, J K, M	2500	101	100	F, G, J K, M	2500	751	750	F, G, J K, M	1000
2R1	2.1			150	15			111	110			821	820		
2R2	2.2			160	16			121	120			911	910		
2R4	2.4			180	18			131	130			102	1000		
2R7	2.7			200	20			151	150			112	1100		
3R0	3.0			220	22			161	160			122	1200		
3R3	3.3			240	24			181	180			152	1500		
3R6	3.6			270	27			201	200			182	1800		
3R9	3.9			300	30			221	220			222	2200		
4R3	4.3			330	33			241	240			242	2400		
4R7	4.7	360	36	271	270	272	2700	272	2700					300	

#### HOW TO ORDER

**Series** 700  
**Case Size** C  
 See mechanical dimensions below  
**Capacitance** 100  
 EIA Capacitance Code in pF.  
 First two digits = significant figures or "R" for decimal place.  
 Third digit = number of zeros or after "R" significant figures  
**Capacitance Tolerance Code** J  

Code	B	C	D	F	G	J	K	M
Tol.	±0.1 pF	±0.25 pF	±0.5 pF	±1%	±2%	±5%	±10%	±20%

**WVDC** 2500  
**Termination Code** W  
 Please see 2nd Column Mechanical Configuration Table  
**Packaging** X  
 T = Tape and Reel, 500 pc. qty. Surface Mount Termination Only  
 Please see last column of mechanical configuration table for other options.  
**Laser Marking (Optional)** T

The above part number refers to a 700C Series (case size C) 10 pF capacitor, J tolerance (±5%), 2500 WVDC, with W termination (Tin/Lead, Solder Plated over Nickel Barrier), laser marking and 500 pc T&R packaging.

#### MECHANICAL CONFIGURATIONS

SERIES & CASE SIZE	TERM. CODE	CASE SIZE & TYPE	OUTLINES W/T IS A TERMINATION SURFACE	BODY DIMENSIONS INCHES (mm)			LEAD AND TERMINATION DIMENSIONS AND MATERIALS			
				LENGTH (L)	WIDTH (W)	THICKNESS (T)	OVERLAP (Y)	MATERIALS	Pkg Type	Pkg Code
700C	W	Solder Plate		.230+.020-.010 (5.84+0.51-0.25)	.250 ±.015 (6.35 ±0.38)	.145 (3.68) max. for capacitance values ≤ 680 pF; .165 (4.19) max. for capacitance values > 680 pF.	.040 (1.02) max.	Tin /Lead, Solder Plated over Nickel Barrier Termination	T&R, 250 or 500 pcs Tray, 36 or 180 pcs	T250 or T J36 or J180
700C	P	Pellet		.230+.025-.010 (5.84+0.64-0.25)				Heavy Tin/Lead Coated, over Nickel Barrier Termination	T&R, 250 or 500 pcs Tray, 36 or 180 pcs	T250 or T J36 or J180
700C	T	Solderable Nickel Barrier		.230+.020-.010 (5.84+0.51-0.25)				RoHS Compliant Tin Plated over Nickel Barrier Termination	T&R, 250 or 500 pcs Tray, 36 or 180 pcs	T250 or T J36 or J180
700C	MS	Microstrip		.245 ±.025 (6.22 ±0.64)			N/A	High Purity Silver Leads LL = .500 (12.7) min. WL = .240 ±.005 (6.10 ±.127) TL = .004 ±.001 (.102 ±.025) Leads are Attached with High Temperature Solder.	Tray, 24 or 60 pcs	J24 or J60
700C	AR	Axial Ribbon							Tray, 24 or 60 pcs	J24 or J60

#### NON-MAGNETIC MECHANICAL CONFIGURATION

SERIES & CASE SIZE	TERM. CODE	CASE SIZE & TYPE	OUTLINES W/T IS A TERMINATION SURFACE	BODY DIMENSIONS INCHES (mm)			LEAD AND TERMINATION DIMENSIONS AND MATERIALS			
				LENGTH (L)	WIDTH (W)	THICKNESS (T)	OVERLAP (Y)	MATERIALS	Pkg Type	Pkg Code
700C	WN	Solder Plate		.230+.020-.010 (5.84+0.51-0.25)	.250 ±.015 (6.35 ±0.38)	.145 (3.68) max. for capacitance values ≤ 680 pF; .165 (4.19) max. for capacitance values > 680 pF.	.040 (1.02) max.	Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination	T&R, 250 or 500 pcs Tray, 36 or 180 pcs	T250 or T J36 or J180
700C	PN	Pellet		.230+.025-.010 (5.84+0.64-0.25)				Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination	T&R, 250 or 500 pcs Tray, 36 or 180 pcs	T250 or T J36 or J180
700C	TN	Solderable Nickel Barrier		.230+.020-.010 (5.84+0.51-0.25)				RoHS Compliant Tin Plated over Non-Magnetic Barrier Termination	T&R, 250 or 500 pcs Tray, 36 or 180 pcs	T250 or T J36 or J180
700C	MN	Microstrip		.245 ±.025 (6.22 ±0.64)			N/A	High Purity Silver Leads L <sub>L</sub> = .500 (12.7) min. W <sub>L</sub> = .240 ±.005 (6.10 ±.127) T <sub>L</sub> = .004 ±.001 (.102 ±.025) Leads are Attached with High Temperature Solder.	Tray, 24 or 60 pcs	J24 or J60
700C	AN	Axial Ribbon							Tray, 24 or 60 pcs	J24 or J60

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## SUGGESTED MOUNTING PAD DIMENSIONS

Horizontal  
Electrode Orientation

Vertical  
Electrode Orientation

Case C Vertical Mount					
Cap Value	Pad Size	A Min.	B Min.	C Min.	D Min.
< 680 pF	Normal	.150	.050	.200	.300
	High Density	.130	.030	.200	.260
> 680 pF	Normal	.185	.050	.200	.300
	High Density	.165	.030	.200	.260

  

Horizontal Mount					
All Values	Pad Size	A Min.	B Min.	C Min.	D Min.
All Values	Normal	.280	.050	.200	.300
	High Density	.260	.030	.200	.260

## PERFORMANCE DATA

