

# RF/Microwave Capacitors

## RF/Microwave Multilayer Capacitors (MLC)

### 100E Series Porcelain High RF Power Multilayer Capacitors



#### GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 100 E 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
- Impedance Matching
- Coupling
- DC Blocking
- Tuning

#### CIRCUIT APPLICATIONS

- HF/RF Power Amplifiers
- Plasma Chambers
- Transmitters
- Medical (MRI coils)
- Antenna Tuning

#### 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 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours
<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., 25 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor.

#### FEATURES

- Case E Size (.380" x .380")
- Capacitance Range 1pF to 5100pF
- Extended WVDC up to 7200 VDC
- Low ESR/ESL
- High Q
- High RF Power
- Ultra-Stable Performance
- High RF Current/Voltage
- Available with Encapsulation Option\*

\* For leaded styles only

#### PACKAGING OPTIONS



Tape & Reel



Tray  
(96 pcs)



#### ELECTRICAL SPECIFICATIONS

<b>Temperature Coefficient (TCC)</b>	90 ± 30 PPM/°C
<b>Capacitance Range</b>	1 pF to 5100 pF
<b>Operating Temperature</b>	-55°C to +125°C*
<b>Quality Factor</b>	Greater than 10,000 (1 pF to 1000 pF) @ 1 MHz. Greater than 10,000 (1100 pF to 5100 pF) @ 1 KHz.
<b>Insulation Resistance (IR)</b>	1 pF to 5100 pF 10 <sup>5</sup> Megohms min. @ 25°C at 500 VDC 10 <sup>4</sup> Megohms min. @ 125°C at 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>Aging Effects</b>	None
<b>Piezoelectric Effects</b>	None
<b>Capacitance Drift</b>	± (0.02% or 0.02 pF), whichever is greater
<b>Retrace</b>	Less than ±(0.02% or 0.02 pF), whichever is greater.

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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															
			STD.	EXT.				STD.	EXT.				STD.	EXT.				STD.	EXT.														
1R0	1.0	B, C, D	3600	7200	5R6	5.6	B, C, D	3600	7200	470	47	F, G, J, K, M	3600	TAGE	391	390	F, G, J, K, M	3600	N/A														
1R1	1.1				6R2	6.2				510	51				431	430																	
1R2	1.2				6R8	6.8				560	56				471	470																	
1R3	1.3				7R5	7.5				620	62				511	510																	
1R4	1.4				8R2	8.2				680	68				561	560																	
1R5	1.5				9R1	9.1				750	75				621	620																	
1R6	1.6				EXTENDED VOLTAGE	100				10	820				82	EXTENDED VOLTAGE				7200	EXTENDED	681	680	751	750	821	820						
1R7	1.7																											110	11	910	91	751	750
1R8	1.8																											120	12	101	100	821	820
1R8	1.9																											130	13	111	110	911	910
2R0	2.0	150	15	121			120	102	1000																								
2R1	2.1	160	16	131			130	112	1100																								
2R2	2.2	180	18	151			150	122	1200																								
2R3	2.3	200	20	161			160	152	1500																								
2R4	2.4	220	22	181			180	182	1800																								
3R0	3.0	240	24	201			200	222	2200																								
3R3	3.3	270	27	221	220	272	2700																										
3R6	3.6	300	30	241	240	302	3000																										
3R9	3.9	330	33	271	270	332	3300																										
4R3	4.3	360	36	301	300	392	3900																										
4R7	4.7	390	39	331	330	472	4700																										
5R1	5.1	430	43	361	360	512	5100																										

VRMS = 0.707 X WVDC

• SPECIAL VALUES, TOLERANCES, MATCHING, AND CAPACITOR ASSEMBLIES ARE AVAILABLE. • KYOCERA AVX CUSTOM POWER CAPACITOR ASSEMBLY CATALOG, LISTS ASSEMBLY OPTIONS. • DIFFERENT WORKING VOLTAGES ARE AVAILABLE • ENCAPSULATION OPTION AVAILABLE. PLEASE CONSULT FACTORY.

#### HOW TO ORDER

Series **100** Case Size **E** Capacitance **391** Tolerance **K** Voltage Rating **W** Termination Style Code **3600** Laser Marking (Optional) **X** Packaging **T**

See mechanical dimensions below

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**

Code	B	C	D	F	G	J	K	M
Tol.	±1 pF	±25 pF	±5 pF	±1%	±2%	±5%	±10%	±20%

**Packaging**  
T = Tape and Reel, 250 pc qty. Please see last Column Mechanical Configuration Table for Box and Tray Options

**Voltage Rating**  
Please see 2nd Column Mechanical Configuration Table

The above part number refers to a 100 E Series (case size E) 390 pF capacitor, K tolerance (±10%), 3600 WVDC, with W termination (Tin / Lead, Solder Plated over Nickel Barrier), laser marking and Tape and Reel packaging.

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#### MECHANICAL CONFIGURATION

Series & Case Size	Term. Code	Case Size & Type	Outline W/T is a Termination Surface	Body Dimensions inches (mm)			Lead and Termination Dimensions and Material		Pkg Type & Qty	Pkg Code
				Length (L)	Width (W)	Thickness (T)	Overlap (Y)	Materials		
100E	W	E Solder Plate		.380+.015-.010 (9.65+0.38-0.25)	.380 ±.010 (9.65 ±0.25)	.170 (4.32) max.	.040 (1.02) max.	Tin/Lead, Solder Plated over Nickel Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
100E	P	E Pellet		.380+.040-.010 (9.65+1.02-0.25)				Heavy Tin/Lead Coated, over Nickel Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
100E	T	E Solderable Nickel		.380+.015-.010 (9.65+0.38-0.25)				<b>RoHS Compliant</b> Tin Plated over Nickel Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
100E	MS	E Microstrip		.380+.035-.010 (9.65+0.89-0.25)			N/A	High Purity Silver Leads L <sub>L</sub> = .750 (19.05) min W <sub>L</sub> = .350 ±.010 (8.89 ±0.25) T <sub>L</sub> = .010 ±.005 (0.25 ±0.13) Leads are Attached with High Temperature Solder.	Tray, 16 or 32 pcs	J16 J32
100E	AR	E Axial Ribbon							Tray, 16 or 32 pcs	J16 J32
100E	AW	E Non-Mag Axial Wire							Box, 20 pcs	B20
100E	RW	E Non-Mag Radial Wire							Tray, 16 or 64 pcs	J16 J64

Custom lead styles and lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.

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				Length (L)	Width (W)	Thickness (T)	Overlap (Y)	Materials			
100E	WN	Non-Mag Solder Plate		.380±.015 -.010 (9.65±0.38-0.25)	.380 ±.010 (9.65 ±0.25)	.170 (4.32) max.	.040 (1.02) max.	Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96	
100E	PN	Non-Mag Pellet		.380±.040 -.010 (9.65±1.02-0.25)				Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96	
100E	TN	Non-Mag Solderable Barrier		.380±.015 -.010 (9.65±0.38-0.25)				<b>RoHS Compliant</b> Tin Plated over Non-Magnetic Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96	
100E	MN	Non-Mag Microstrip		.380±.035 -.010 (9.65±0.89-0.25)			N/A	N/A	High Purity Silver Leads $L_L = .750$ (19.05) min $W_L = .350 \pm .010$ (8.89 ±0.25) $T_L = .010 \pm .005$ (0.25 ±0.13) Leads are Attached with High Temperature Solder.	Tray, 16 or 32 pcs	J16 J32
100E	AN	Non-Mag Axial Ribbon							Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) $L_L = 2.25$ (57.2) min.	Tray, 16 or 32 pcs	J16 J32
100E	BN	Non-Mag Axial Wire							Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) $L_L = 1.0$ (25.4) min.	Box, 20 pcs	B20
100E	RN	Non-Mag Radial Wire								Tray, 16 or 64 pcs	J16 J64

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#### SUGGESTED MOUNTING PAD DIMENSIONS

Horizontal Electrode Orientation

Mount Type	Case E				
	Pad Size	A Min.	B Min.	C Min.	D Min.
Horizontal Mount	Normal	.405	.050	.325	.425
	High Density	.385	.030	.325	.385

Dimensions are in inches.

#### PERFORMANCE DATA

