

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

| | |
|-----------------------------|--|
| Thermal Shock | Mil-STD-202, Method 107, Condition A |
| Moisture Resistance | Mil-STD-202, Method 106 |
| Low Voltage Humidity | 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 |
| Life Test | 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 |
| Termination Styles | Available in various surface mount and leaded styles. See Mechanical Configurations |
| Terminal Strength | 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

| | |
|--|--|
| Temperature Coefficient (TCC) | 90 ± 30 PPM/°C |
| Capacitance Range | 1 pF to 5100 pF |
| Operating Temperature | -55°C to +125°C* |
| Quality Factor | Greater than 10,000 (1 pF to 1000 pF) @ 1 MHz. Greater than 10,000 (1100 pF to 5100 pF) @ 1 KHz. |
| Insulation Resistance (IR) | 1 pF to 5100 pF 10 ⁵ Megohms min. @ 25°C at 500 VDC 10 ⁴ Megohms min. @ 125°C at 500 VDC |
| Working Voltage (WVDC) | See Capacitance Values table |
| Dielectric Withstanding Voltage (DWV) | 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 |
| Aging Effects | None |
| Piezoelectric Effects | None |
| Capacitance Drift | ± (0.02% or 0.02 pF), whichever is greater |
| Retrace | 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) | | | | RoHS Compliant 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 | N/A | High Purity Silver Leads $L_L = .750 (19.05) \text{ min}$ $W_L = .350 \pm .010 (8.89 \pm 0.25)$ $T_L = .010 \pm .005 (0.25 \pm 0.13)$ Leads are Attached with High Temperature Solder. | Tray, 16 or 32 pcs | J16 J32 |
| 100E | AR | E Axial Ribbon | | | | | | | Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) $L_L = 2.25 (57.2) \text{ min.}$ | Tray, 16 or 32 pcs | J16 J32 |
| 100E | AW | E Non-Mag Axial Wire | | | | | | | Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) $L_L = 1.0 (25.4) \text{ min.}$ | Box, 20 pcs | B20 |
| 100E | RW | E Non-Mag Radial Wire | | | | | | | | | |

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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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 | 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) | | | | RoHS Compliant 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 | | | | | | | Tray, 16 or 32 pcs | J16 J32 | |
| 100E | BN | Non-Mag Axial Wire | | | | | | | Box, 20 pcs | B20 | |
| 100E | RN | 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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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

