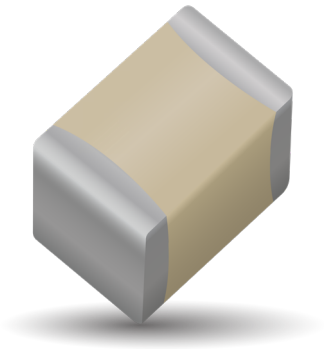
# RF/Microwave Capacitors

## RF/Microwave Multilayer Capacitors (MLC)

## 100C Series Porcelain Superchip® Multilayer Capacitors



## GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 100C 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)

## 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 Volts DC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours min. |
| **Life Test** | MIL-STD-202, Method 108, for 2000 hours, at 125°C. Voltage applied.<br>200% of WVDC for capacitors rated at 500 volts DC or less.<br>120% of WVDC for capacitors rated at 1250 volts DC or less.<br>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., 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")
- Capacitance Range 1pF to 2700pF
- Extended WVDC up to 3600 VDC
- Low ESR/ESL
- High Q
- Low Noise
- Ultra-Stable Performance
- High Self-Resonance
- Established Reliability (QPL)

## PACKAGING OPTIONS

**Tape & Reel**

**Tray (180 pcs)**

RoHS COMPLIANT

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Temperature Coefficient (TCC)** | +90 ±30 PPM/°C (-55°C to +125°C) |
| **Insulation Resistance (IR)** | 1 pF to 2700 pF:<br>$10^5$ Megohms min. @ +25°C at rated WVDC.<br>$10^4$ Megohms min. @ +125°C at rated WVDC.<br>Max. test voltage is 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.<br>150% of WVDC for capacitors rated at 1250 volts DC or less for 5 seconds.<br>120% of WVDC for capacitors rated above 1250 Volts DC for 5 seconds |
| **Retrace** | Less than ±(0.02% or 0.02 pF), whichever is greater. |
| **Aging Effects** | None |
| **Piezoelectric Effects** | None |
| **Capacitance Drift** | ±(0.02% or 0.02 pF), whichever is greater. |
| **Operating Temperature Range** | From -55°C to +125°C<br>(No derating of working voltage) |

# RF/Microwave Capacitors

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## 100C Series Porcelain Superchip® Multilayer Capacitors

| 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 | 2500 | EXTENDED VOLTAGE 3600 | 5R1 | 5.1 | B, C, D | 2500 | EXTENDED VOLTAGE 3600 | 390 | 39 | F, G, J, K, M | 2500 | VOLTAGE 3600 EXTENDED | 301 | 300 | F, G, J, K, M | 1500 | 2000 |
| 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 | | 1000 | VOLTAGE 1500 EXTENDED |
| 1R7 | 1.7 | | | | 100 | 10 | F, G, J, K, M | | | 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 | | | | 130 | 13 | | | | 101 | 100 | | | | 751 | 750 | | | |
| 2R1 | 2.1 | | | | 150 | 15 | | | | 111 | 110 | | | VOLTAGE 3000 EXTENDED | 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 | | 500 | 800 |
| 3R6 | 3.6 | | | | 270 | 27 | | | | 201 | 200 | | | | 182 | 1800 | | | |
| 3R9 | 3.9 | | | | 300 | 30 | | | | 221 | 220 | | | | 222 | 2200 | | 300 | 500 |
| 4R3 | 4.3 | | | | 330 | 33 | | | | 241 | 240 | | | | 242 | 2400 | | | |
| 4R7 | 4.7 | | | | 360 | 36 | | | | 271 | 270 | | | | 272 | 2700 | | | |

VRMS = 0.707 x WVDC

• SPECIAL VALUES, TOLERANCES, HIGHER WVDC AND MATCHING AVAILABLE. • ENCAPSULATION OPTION AVAILABLE . PLEASE CONSULT FACTORY.

## HOW TO ORDER

**100 C 100 J W 2500 X T**

**Series**

**Case Size**

See mechanical dimensions below

**Capacitance**

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. | ±0.1 pF | ±0.25 pF | ±0.5 pF | ±1% | ±2% | ±5% | ±10% | ±20% |

**Packaging**

T = Tape and Reel, 500 pc. qty.
Please see last column of mechanical configuration table for other options.

**Laser Marking (Optional)**

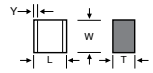
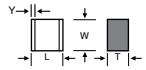
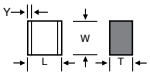
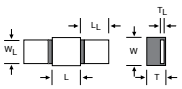
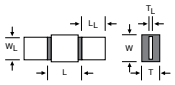
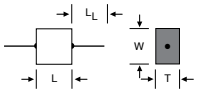
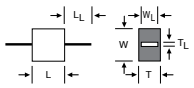
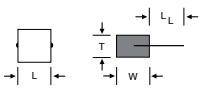
**WVDC**

**Termination Style Code**

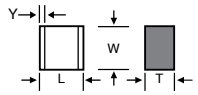
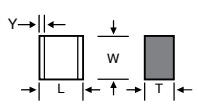
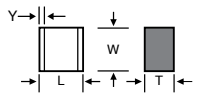
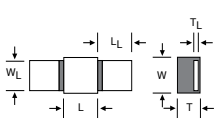
Please see 2nd Column Mechanical Configuration Table

The above part number refers to a 100 C 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.

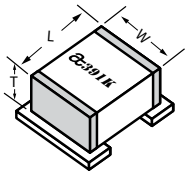
## MECHANICAL CONFIGURATIONS

| ATC SERIES & CASE SIZE | ATC TERM. CODE | CASE SIZE & TYPE | OUTLINES W/T IS A TERMINATION SURFACE | BODY DIMENSIONS INCHES (MM) | | | LEAD AND TERMINATION DIMENSIONS AND MATERIALS | | Pkg. Type | Pkg Code |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | LENGTH (L) | WIDTH (W) | THICKNESS (T) | OVERLAP (Y) | MATERIALS | | |
| 100C | W | C<br>Solder Plate |  | .230+.020 -.010<br>(5.84+0.51-0.25) | .250 ±.015<br>(6.35 ±0.38) | .145(3.68) max. for capacitance values ≤680pF<br>.165(4.19) max. for capacitance values >680pF | .040<br>(1.02)<br>max. | Tin/Lead, Solder Plated over Nickel Barrier Termination | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 100C | P | C<br>Pellet |  | .230+.025 -.010<br>(5.84+0.64-0.25) | | | | Heavy Tin/Lead Coated, over Nickel Barrier Termination | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 100C | T | C<br>Solderable Nickel Barrier |  | .230+.020 -.010<br>(5.84+0.51-0.25 | | | | ***RoHS Compliant***<br>Tin Plated over Nickel Barrier Termination | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 100C | MS | C<br>Microstrip |  | .245 ±.025<br>(6.22 ±0.64) | | | N/A | High Purity Silver Leads<br>$L_L$ = .500 (12.7) min.<br>$W_L$ = .240 ±.005 (6.10 ±.127<br>$T_L$ = .004 ±.001 (.102 ±.025)<br>Leads are Attached with High Temperature Solder. | Tray, 24 or 60 pcs | J24 or J60 |
| 100C | AR | C<br>Axial Ribbon |  | | | | | | Box, 24 pcs | B24 |
| 100C | AW | C<br>Axial Wire |  | | | | | Silver-plated Copper Leads<br>$L_L$ = 2.25 (57.15) min.<br>Dia. = .032 ±.002 (0.81 ±0.05 | Box, 21 pcs | B21 |
| 100C | VA | C<br>Vertical Axial Ribbon |  | | | | | Silver Leads<br>$L_L$ = .500 (12.7) min.<br>$W_L$ = ** See below<br>TL = .004 ±.001 (.102 ±.025) | Box, 24 pcs | B24 |
| 100C | RW | C<br>Radial Wire |  | | | | | Silver-plated Copper Leads<br>$L_L$ = 1.0 (25.4) min.<br>Dia. = .032 ±.002 (0.81 ±0.05) | Tray, 16 pcs | J16 |

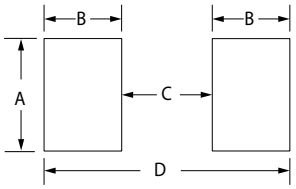
## NON-MAGNETIC MECHANICAL CONFIGURATIONS

| ATC SERIES & CASE SIZE | ATC TERM. CODE | CASE SIZE & TYPE | OUTLINES W/T IS A TERMINATION SURFACE | BODY DIMENSIONS INCHES (MM) | | | LEAD AND TERMINATION DIMENSIONS AND MATERIALS | | Pkg. Type | Pkg Code |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | LENGTH (L) | WIDTH (W) | THICKNESS (T) | OVERLAP (Y) | MATERIALS | | |
| 100C | WN | C<br>Non-Mag Solder Plate |  | .230+.025 -.010 (5.84+0.64-0.25) | .250 ±.015 (6.35 ±0.38) | .145(3.68) max. for capacitance values ≤680pF<br>.165(4.19) max. for capacitance values >680pF | .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 |
| 100C | PN | C<br>Non-Mag Pellet |  | .230+.035-.010 (5.84+0.89-0.25) | | | | 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 |
| 100C | TN | C<br>Non-Mag Solderable Nickel Barrier |  | .230+.025 -.010 (5.84+0.64-0.25) | | | | ***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 |
| 100C | MN | C<br>Non-Mag Microstrip |  | .245 ±.025 (6.22 ±0.64) | | | | High Purity Silver Leads $L_L$ = .500 (12.7) min. $W_L$ = .240 ±.005 (6.10 ±.127) $T_L$ = .004 ±.001(.102 ±.025) Leads are Attached with High Temperature Solder. | Tray, 24 or 60 pcs | J24 or J60 |

## SUGGESTED MOUNTING PAD DIMENSIONS




Horizontal Electrode Orientation




**Horizontal Mount**

| | | | | | |
|---|---|---|---|---|---|
| **All Values** | Normal | .280 | .050 | .200 | .300 |
| | High Density | .260 | .030 | .200 | .260 |

## PERFORMANCE DATA