

# 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

|                             |  |
|-----------------------------|--|
| <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.<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. |
| <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")
- 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)



#### ELECTRICAL SPECIFICATIONS

|  |  |
|--|--|
| <b>Temperature Coefficient (TCC)</b>         | +90 ±30 PPM/°C (-55°C to +125°C)   |
| <b>Insulation Resistance (IR)</b>            | 1 pF to 2700 pF:<br>10 <sup>5</sup> Megohms min. @ +25°C at rated WVDC.<br>10 <sup>4</sup> Megohms min. @ +125°C at rated WVDC.<br>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.<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 |
| <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<br>(No derating of working voltage)   |

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| 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       | 3600 | 5R1       | 5.1       | B, C, D       | 2500       | 3600 | 390       | 39        | F, G, J, K, M | 2500       | 3600 | 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       |               |            |      |
| 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       | 3600 | 130       | 13        | F, G, J, K, M | 2500       | 3600 | 101       | 100       | F, G, J, K, M | 2500       | 3000 | 751       | 750       | F, G, J, K, M | 1000       | 1500 |
| 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          |            |      |           |           |               |            |      |           |           |               |            |      |

VRMS = 0.707 x WVDC

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

## HOW TO ORDER

Series **100** Case Size **C** Capacitance **100** Tolerance **J** WVDC **2500** Termination Style Code **W** Laser Marking **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. | ±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.

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## 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              | Solder Plate              |                                       | .230+.020 -.010<br>(5.84+0.51-0.25) | .250 ±0.015<br>(6.35 ±0.38) |               | .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              | 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              | Solderable Nickel Barrier |                                       | .230+.020 -.010<br>(5.84+0.51-0.25) |                             |               |  | <b>RoHS Compliant</b><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             | Microstrip                |                                       |                                     |                             |               |  | N/A   | High Purity Silver Leads<br>$L_L = .500$ (12.7) min.<br>$W_L = .240 \pm .005$ (6.10 ± 0.127)<br>$T_L = .004 \pm .001$ (.102 ± 0.025)<br>Leads are Attached with High Temperature Solder. | Tray, 24 or 60 pcs    | J24 or J60 |
| 100C                   | AR             | Axial Ribbon              |                                       |                                     |                             |               |  |   |  |                       |            |
| 100C                   | AW             | Axial Wire                |                                       | .245 ±0.025<br>(6.22 ±0.64)         |                             |               |  |   | Silver-plated Copper Leads<br>$L_L = 2.25$ (57.15) min.<br>Dia. = .032 ±0.002 (0.81 ±0.05)   | Box, 21 pcs           | B21        |
| 100C                   | VA             | Vertical Axial Ribbon     |                                       |                                     |                             |               |  |   | Silver Leads<br>$L_L = .500$ (12.7) min.<br>$W_L = **$ See below<br>$T_L = .004 \pm .001$ (.102 ± 0.025)   | Box, 24 pcs           | B24        |
| 100C                   | RW             | Radial Wire               |                                       |                                     |                             |               | Silver-plated Copper Leads<br>$L_L = 1.0$ (25.4) min.<br>Dia. = .032 ±0.002 (0.81 ±0.05) | Tray, 16 pcs  | J16  |                       |            |

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## 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             | Non-Mag Solder Plate              |                                       | .230±.025-.010<br>(5.84±0.64-0.25) | .250 ±.015<br>(6.35 ±0.38) | .145(3.68) max. for capacitance values ≤680pF<br><br>.165(4.19) max. for capacitance values >680pF | .040<br>(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             | Non-Mag Pellet                    |                                       | .230±.035-.010<br>(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             | Non-Mag Solderable Nickel Barrier |                                       | .230±.025-.010<br>(5.84±0.64-0.25) |                            |  |   | <b>RoHS Compliant</b><br>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             | Non-Mag Microstrip                |                                       | .245 ±.025<br>(6.22 ±0.64)         |                            |  |   | High Purity Silver Leads<br>L <sub>L</sub> = .500 (12.7) min.<br>W <sub>L</sub> = .240 ±.005 (6.10 ±.127)<br>T <sub>L</sub> = .004 ±.001 (.102 ±.025)<br>Leads are Attached with High Temperature Solder. | Tray, 24 or 60 pcs                      | J24 or J60            |

## 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   |