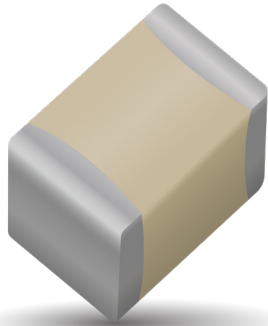


# RF/Microwave Capacitors

## 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.<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")
- 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<br>(1.0 pF to 1000 pF) @ 1 MHz.<br>Greater than 10,000<br>(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:<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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#### 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<br>K, M | 2500       | 301       | 300       | F, G, J<br>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<br>K, M | 2500       | 101       | 100       | F, G, J<br>K, M | 2500       | 751       | 750       | F, G, J<br>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** Capacitance **100** Tolerance Code **J** Termination Code **W** WVDC **2500** Laser Marking **X** Packaging **T**

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

**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. Surface Mount Termination Only  
Please see last column of mechanical configuration table for other options.

**Laser Marking (Optional)**

**WVDC**

**Termination Code** Please see 2nd Column Mechanical Configuration Table

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<br>(5.84+0.51-0.25) | .250 ±.015<br>(6.35 ±0.38) | .145 (3.68)<br>max. for capacitance values ≤ 680 pF;<br>.165 (4.19)<br>max. for capacitance values > 680 pF. | .040 (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 |
| 700C               | 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 |
| 700C               | T          | Solderable Nickel Barrier |                                       | .230+.020-.010<br>(5.84+0.51-0.25) |                            |  |   | RoHS Compliant Tin Plated over Nickel Barrier Termination   | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 700C               | MS         | Microstrip                |                                       | .245 ±.025<br>(6.22 ±0.64)         |                            |  | N/A   | High Purity Silver Leads<br>LL = .500 (12.7) min.<br>WL = .240 ±.005 (6.10 ±.127)<br>TL = .004 ±.001 (.102 ±.025)<br>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<br>(5.84+0.51-0.25) | .250 ±.015<br>(6.35 ±0.38) | .145 (3.68)<br>max. for capacitance values ≤ 680 pF;<br>.165 (4.19)<br>max. for capacitance values > 680 pF. | .040 (1.02)<br>max.                           | Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination   | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 700C               | PN         | Pellet                    |                                       | .230+.025-.010<br>(5.84+0.64-0.25) |                            |  |   | Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination  | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 700C               | TN         | Solderable Nickel Barrier |                                       | .230+.020-.010<br>(5.84+0.51-0.25) |                            |  |   | RoHS Compliant Tin Plated over Non-Magnetic Barrier Termination   | T&R, 250 or 500 pcs<br>Tray, 36 or 180 pcs | T250 or T J36 or J180 |
| 700C               | MN         | Microstrip                |                                       | .245 ±.025<br>(6.22 ±0.64)         |                            |  | N/A   | 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            |
| 700C               | AN         | Axial Ribbon              |                                       |                                    |                            |  |   |   | Tray, 24 or 60 pcs                         | J24 or J60            |

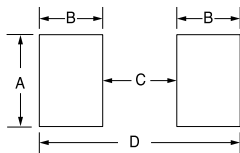
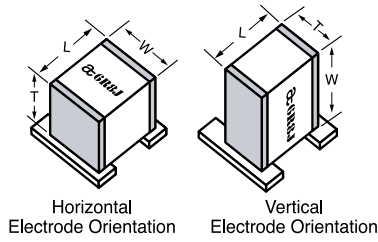
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#### SUGGESTED MOUNTING PAD DIMENSIONS



| 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

