

# RF/Microwave Capacitors

## RF/Microwave Multilayer Capacitors (MLC)

### 180R Series NPO Porcelain Ultra-Low ESR



## FEATURES

- Case R Size (.070" x .090")
- Capacitance Range 0.5pF to 100pF
- 500 WVDC
- Low ESR/ESL
- High Q
- Ultra-Stable Performance
- High Self-Resonance

## GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 180R Series RF Capacitors. This is KYOCERA AVX's lowest ESR multilayer capacitor. The high Q, high self-resonance characteristic many RF/Microwave applications

## FUNCTIONAL APPLICATIONS

- Bypass
- Coupling
- Tuning
- Feedback
- Impedance Matching
- DC Blocking

## CIRCUIT APPLICATIONS

- RF Power Amplifiers
- Filters
- Oscillators
- Timing Circuits
- Delay Lines

## 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. 200% WVDC applied   |

## PACKAGING OPTIONS



Tape & Reel



Cap Pac  
(100 pcs)



## ELECTRICAL & MECHANICAL SPECIFICATIONS

|   |   |
|---|---|
| <b>Quality Factor (Q)</b>                           | greater than 10,000 at 1 MHz  |
| <b>Temperature Coefficient of Capacitance (TCC)</b> | 0±30 PPM/°C (-55°C to +125°C)<br>0±60 PPM/°C (+125°C to +175°C)   |
| <b>Insulation Resistance (IR)</b>                   | 0.5 pF to 100 pF:<br>10 <sup>6</sup> Megohms min. @ +25°C at rated WVDC<br>10 <sup>5</sup> Megohms min. @ +125°C at rated WVDC<br>10 <sup>4</sup> Megohms min. above +125°C |
| <b>Working Voltage (WVDC)</b>                       | 500 WVDC  |
| <b>Dielectric Withstanding Voltage (DWV)</b>        | Case R: 250% of rated WVDC for 5 secs.  |
| <b>Aging Effects</b>                                | None  |
| <b>Piezoelectric Effects</b>                        | None (no capacitance variation with voltage or pressure)  |
| <b>Capacitance Drift</b>                            | ±(0.02% or 0.02 pF), whichever is greater   |
| <b>Operating Temperature Range</b>                  | -55°C to +175°C<br>(No derating of working voltage)   |
| <b>Termination Style</b>                            | See Mechanical Configuration  |
| <b>Terminal Strength</b>                            | Termination for chips withstand a pull of 5 lbs. min., 15 lbs, for 5 seconds in direction perpendicular to the termination surface of the capacitor                         |

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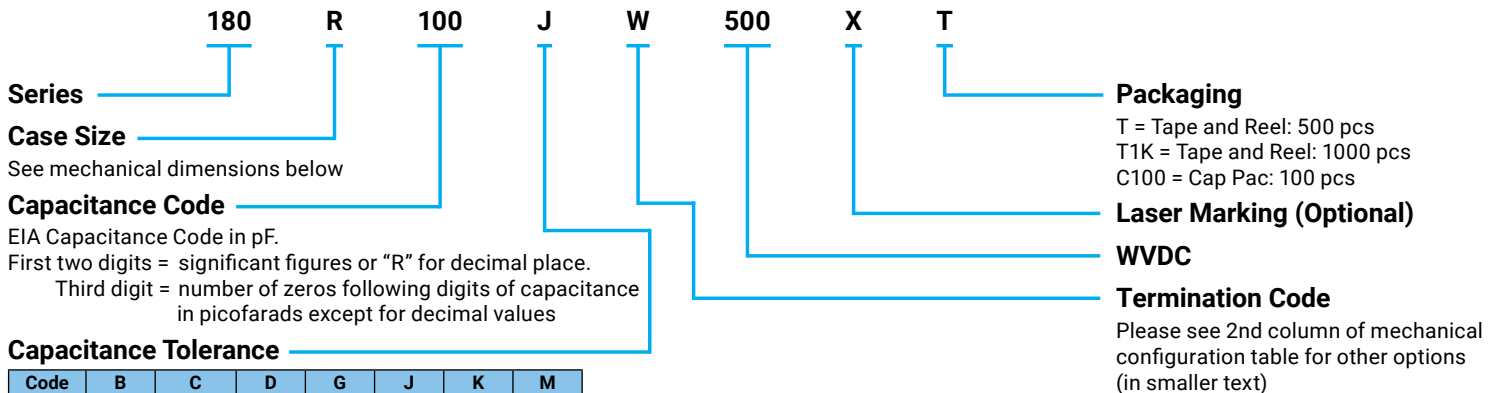


## CAPACITANCE VALUES

| Cap. Code | Cap. (pF) | Tol.    | Rated WVDC | Cap. Code | Cap. (pF) | Tol.    | Rated WVDC | Cap. Code | Cap. (pF) | Tol.       | Rated WVDC |
|-----------|-----------|---------|------------|-----------|-----------|---------|------------|-----------|-----------|------------|------------|
| 0R5       | 0.5       | B, C, D | 500        | 3R0       | 3.0       | B, C, D | 500        | 200       | 20        | G, J, K, M | 500        |
| 0R6       | 0.6       |         |            | 3R3       | 3.3       |         |            | 220       | 22        |            |            |
| 0R7       | 0.7       |         |            | 3R6       | 3.6       |         |            | 240       | 24        |            |            |
| 0R8       | 0.8       |         |            | 3R9       | 3.9       |         |            | 270       | 27        |            |            |
| 0R9       | 0.9       |         |            | 4R3       | 4.3       |         |            | 300       | 30        |            |            |
| 1R0       | 1.0       |         |            | 4R7       | 4.7       |         |            | 330       | 33        |            |            |
| 1R1       | 1.1       |         |            | 5R1       | 5.1       | 360     |            | 36        |           |            |            |
| 1R2       | 1.2       |         |            | 5R6       | 5.6       | 390     |            | 39        |           |            |            |
| 1R3       | 1.3       |         |            | 6R2       | 6.2       | 430     |            | 43        |           |            |            |
| 1R4       | 1.4       |         |            | 6R8       | 6.8       | 470     |            | 47        |           |            |            |
| 1R5       | 1.5       |         |            | 7R5       | 7.5       | 510     |            | 51        |           |            |            |
| 1R6       | 1.6       |         |            | 8R2       | 8.2       | 560     |            | 56        |           |            |            |
| 1R7       | 1.7       |         |            | 9R1       | 9.1       | 620     |            | 62        |           |            |            |
| 1R8       | 1.8       |         |            | 100       | 10        | 680     |            | 68        |           |            |            |
| 1R9       | 1.9       |         |            | 110       | 11        | 750     |            | 75        |           |            |            |
| 2R0       | 2.0       |         |            | 120       | 12        | 820     |            | 82        |           |            |            |
| 2R1       | 2.1       |         |            | 130       | 13        | 910     |            | 91        |           |            |            |
| 2R2       | 2.2       |         |            | 150       | 15        | 101     |            | 100       |           |            |            |
| 2R4       | 2.4       | 160     | 16         |           |           |         |            |           |           |            |            |
| 2R7       | 2.7       | 180     | 18         |           |           |         |            |           |           |            |            |

VRMS = 0.707 X WVDC

## HOW TO ORDER



The above part number refers to a 180R Series (case size R) 10 pF capacitor, J tolerance (±5%), 500 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 |   |
|--------------------|------------|--------------------------------|--------------------------------------|-----------------------------|----------------------------|------------------------|--|---|
|                    |            |                                |                                      | Length (L)                  | Width (W)                  | Thickness (T)          | Overlap (Y)                                  | Materials   |
| 180R               | W          | R<br>Solder Plate              |                                      | .070 ±.015<br>(1.78 ±0.38)  | .090 ±.010<br>(2.29 ±0.25) | .115<br>(2.92)<br>max. | .010+.010 - .005<br>(0.25+0.25 - 0.13)       | Tin/Lead, Solder Plated over Nickel Barrier Termination             |
| 180R               | T          | R<br>Solderable Nickel Barrier |                                      | .070 ±.015<br>(1.78 ±0.38)  | .090 ±.010<br>(2.29 ±0.25) | .115<br>(2.92)<br>max. | .010+.010 - .005<br>(0.25+0.25 - 0.13)       | <b>RoHS Compliant</b><br>Tin Plated over Nickel Barrier Termination |

All 180 R Capacitors are available laser marked with ATC's identification, capacitance code and tolerance.

## SUGGESTED MOUNTING PAD DIMENSIONS

Horizontal  
Electrode Orientation

Vertical  
Electrode Orientation

| Mount Type       | Case R       |        |        |        |        |
|------------------|--------------|--------|--------|--------|--------|
|                  | Pad Size     | A Min. | B Min. | C Min. | D Min. |
| Vertical Mount   | Normal       | .125   | .050   | .030   | .130   |
|                  | High Density | .115   | .030   | .030   | .090   |
| Horizontal Mount | Normal       | .110   | .050   | .030   | .130   |
|                  | High Density | .090   | .030   | .030   | .090   |

Dimensions are in inches.

**PERFORMANCE DATA**

