

# RF/Microwave Capacitors

## RF/Microwave Multilayer Capacitors (MLC)

### 100A Series Porcelain Superchip® Multilayer Capacitors



#### FEATURES

- Case A Size (.055" x .055")
- Lowest ESR/ESL
- High Q
- Low Noise
- Capacitance Range 0.1 pF to 100 pF
- Extended WVDC up to 250 VDC
- Ultra-Stable Performance
- High Self-Resonance
- Established Reliability (QPL)

#### GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 100A Series RF/Microwave Capacitors. This is KYOCERA AVX most versatile high Q, high self resonant multilayer capacitor. High density porcelain construction provides a rugged, hermetic package.

Typical functional applications: Bypass, Coupling, Tuning, Feedback, Impedance Matching and DC Blocking.

Typical circuit applications: Microwave/RF/IF Amplifiers, Mixers, Oscillators, Low Noise Amplifiers, Filter Networks, Timing Circuits and Delay Lines.

#### PACKAGING OPTIONS



#### ELECTRICAL SPECIFICATIONS

|  |   |
|--|---|
| <b>Temperature Coefficient (TCC)</b>         | 90 ± 20 PPM/°C  |
| <b>Capacitance Range</b>                     | 0.1 pF to 100 pF  |
| <b>Operating Temperature</b>                 | -55°C to +125°C*  |
| <b>Quality Factor</b>                        | Greater than 10,000 @ 1 MHz.  |
| <b>Insulation Resistance (IR)</b>            | 0.1 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 |
| <b>Working Voltage (WVDC)</b>                | See Capacitance Values table  |
| <b>Dielectric Withstanding Voltage (DWV)</b> | 250% of rated WVDC for 5 seconds  |
| <b>Aging Effects</b>                         | None  |
| <b>Piezoelectric Effects</b>                 | None  |
| <b>Capacitance Drift</b>                     | ± (0.02% or 0.02 pF), whichever is greater  |

#### 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.  |
| <b>Termination Styles</b>   | Available in various surface mount styles. See Mechanical Configurations, page 3   |
| <b>Terminal Strength</b>    | Terminations for chips and pellets withstand a pull of 5 lbs. min., 10 lbs. typical, 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 |         |
|-----------|-----------|------------------|------------|------------------|-----------|-----------|---------|------------|------------------|-----------|-----------|-----------------|------------|---------|
|           |           |                  | STD.       | EXT.             |           |           |         | STD.       | EXT.             |           |           |                 | STD.       | EXT.    |
| 0R1       | 0.1       | A, B             | 150        | EXTENDED VOLTAGE | 2R2       | 2.2       | B, C, D | 150        | EXTENDED VOLTAGE | 160       | 16        | F, G, J<br>K, M | 150        | VOLTAGE |
| 0R2       | 0.2       |                  |            |                  | 2R4       | 2.4       |         |            |                  | 180       | 18        |                 |            |         |
| 0R3       | 0.3       | 2R7              |            |                  | 2.7       | 200       |         |            |                  | 20        |           |                 |            |         |
| 0R4       | 0.4       | 3R0              |            |                  | 3.0       | 220       |         |            |                  | 22        |           |                 |            |         |
| 0R5       | 0.5       | 3R3              |            |                  | 3.3       | 240       |         |            |                  | 24        |           |                 |            |         |
| 0R6       | 0.6       | 3R6              |            |                  | 3.6       | 270       |         |            |                  | 27        |           |                 |            |         |
| 0R7       | 0.7       | 3R9              |            |                  | 3.9       | 300       |         |            |                  | 30        |           |                 |            |         |
| 0R8       | 0.8       | 4R3              |            |                  | 4.3       | 330       |         |            |                  | 33        |           |                 |            |         |
| 0R9       | 0.9       | 4R7              |            |                  | 4.7       | 360       |         |            |                  | 36        |           |                 |            |         |
| 1R0       | 1.0       | 5R1              |            |                  | 5.1       | 390       |         |            |                  | 39        |           |                 |            |         |
| 1R1       | 1.1       | 5R6              |            |                  | 5.6       | 430       |         |            |                  | 43        |           |                 |            |         |
| 1R2       | 1.2       | 6R2              |            |                  | 6.2       | 470       |         |            |                  | 47        |           |                 |            |         |
| 1R3       | 1.3       | EXTENDED VOLTAGE | 6R8        | 6.8              | 510       | 51        | 250     | EXTENDED   |                  |           |           |                 |            |         |
| 1R4       | 1.4       |                  | 7R5        | 7.5              | 560       | 56        |         |            |                  |           |           |                 |            |         |
| 1R5       | 1.5       |                  | 8R2        | 8.2              | 620       | 62        |         |            |                  |           |           |                 |            |         |
| 1R6       | 1.6       |                  | 9R1        | 9.1              | 680       | 68        |         |            |                  |           |           |                 |            |         |
| 1R7       | 1.7       |                  | 100        | 10               | 750       | 75        |         |            |                  |           |           |                 |            |         |
| 1R8       | 1.8       |                  | 110        | 11               | 820       | 82        |         |            |                  |           |           |                 |            |         |
| 1R9       | 1.9       |                  | 120        | 12               | 910       | 91        |         |            |                  |           |           |                 |            |         |
| 2R0       | 2.0       |                  | 130        | 13               | 101       | 100       |         |            |                  |           |           |                 |            |         |
| 2R1       | 2.1       |                  | 150        | 15               |           |           |         |            |                  |           |           |                 |            |         |

$v_{rms} = 0.707 \times WVDC$

Special values, tolerances, different WVDC and matching available. Please consult factory.

Note: Extended WVDC does not apply to CDR products

## HOW TO ORDER



The above part number refers to a 100 A Series (case size A) 10 pF capacitor, J tolerance (±5%), 150 WVDC, with W termination (Tin / Lead, Solder Plated over Nickel Barrier), Laser Marking and Tape and Reel 1000 pc qty packaging.

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#### MECHANICAL CONFIGURATION

| Series & Case Size | Term. Code | MIL-PRF-55681 | 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   |   |                                   |
| 100A               | W          | CDR12BG       | A Solder Plate              |                                      | .055+.015-.010<br>(1.40+0.38-0.25) | .055 ±.015<br>(1.40 ±0.38) | .057<br>(1.45)<br>max. | .010 + .010 - .005<br>(0.25 + 0.25 - 0.13)   | Tin/ Lead, Solder Plated over Nickel Barrier Termination      | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |
| 100A               | P          | CDR12BG       | A Pellet                    |                                      | .055+.025-.010<br>(1.40+0.64-0.25) | .055 ±.015<br>(1.40 ±0.38) |                        |  | Heavy Tin/ Lead Coated, over Nickel Barrier Termination       | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |
| 100A               | T          | N/A           | A Solderable Nickel Barrier |                                      | .055+.015-.010<br>(1.40+0.38-0.25) | .055 ±.015<br>(1.40 ±0.38) |                        |  | RoHS Compliant<br>Tin Plated over Nickel Barrier Termination  | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |
| 100A               | CA         | CDR11BG       | A Gold Chip                 |                                      | .055+.015-.010<br>(1.40+0.38-0.25) | .055 ±.015<br>(1.40 ±0.38) |                        |  | RoHS Compliant<br>Gold Plated over Nickel Barrier Termination | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |

#### NON-MECHANICAL CONFIGURATION

| Series & Case Size | Term. Code | MIL-PRF-55681      | 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  |   |                                   |
| 100A               | WN         | Meets Requirements | A Solder Plate              |                                      | .055+.015-.010<br>(1.40+0.38-0.25) | .055 ±.015<br>(1.40 ±0.38) | .057<br>(1.45)<br>max. | .010 + .010 - .005<br>(0.25 + 0.25 - 0.13)   | Tin/ Lead, Solder Plated over Non-Magnetic Barrier Termination     | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |
| 100A               | PN         | Meets Requirements | A Pellet                    |                                      | .055+.025-.010<br>(1.40+0.64-0.25) | .055 ±.015<br>(1.40 ±0.38) |                        |  | Heavy Tin/ Lead Coated, over Non-Magnetic Barrier Termination      | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |
| 100A               | TN         | Meets Requirements | A Solderable Nickel Barrier |                                      | .055+.015-.010<br>(1.40+0.38-0.25) | .055 ±.015<br>(1.40 ±0.38) |                        |  | RoHS Compliant<br>Tin Plated over Non-Magnetic Barrier Termination | T&R, 1000 or 500 pcs<br>Vertical T&R, 1000 or 500 pcs<br>Cap Pac, 100 pcs | T1K or T<br>TV1K or<br>TV<br>C100 |

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#### SUGGESTED MOUNTING PAD DIMENSIONS

Horizontal Electrode Orientation

Vertical Electrode Orientation

| Case A           |              |        |        |        |        |
|------------------|--------------|--------|--------|--------|--------|
| Mount Type       | Pad Size     | A Min. | B Min. | C Min. | D Min. |
| Vertical Mount   | Normal       | .070   | .050   | .030   | .130   |
|                  | High Density | .050   | .030   | .030   | .090   |
| Horizontal Mount | Normal       | .080   | .050   | .030   | .130   |
|                  | High Density | .060   | .030   | .030   | .090   |

Dimensions are in inches.

#### PERFORMANCE DATA

ESR VS. CAPACITANCE  
SERIES 100, CASE A



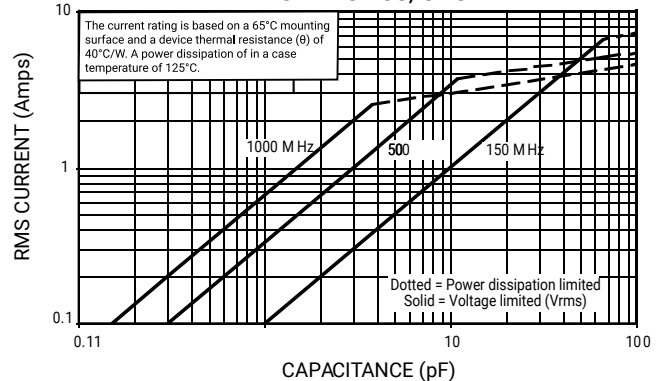
Q VS. CAPACITANCE  
SERIES 100, CASE A



SERIES RESONANCE VS. CAPACITANCE  
SERIES 100, CASE A



CURRENT RATING VS. CAPACITANCE  
SERIES 100, CASE A



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**PERFORMANCE DATA**

