

RF/Microwave Capacitors

RF/Microwave Multilayer Capacitors (MLC)

100B Series Porcelain Superchip® Multilayer Capacitors



FEATURES

- Case B Size (.110" x .110")
- Capacitance Range 0.1pF to 1000pF
- Extended WVDC up to 1500 VDC
- Low ESR/ESL
- High Q
- Low Noise
- Ultra-Stable Performance
- High Self-Resonance
- Established Reliability (QPL)

GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 100 B Series RF/Microwave Capacitors. This Series is now available with extended operating temperatures up to 175°C. High Density porcelain construction provides a rugged, hermetic package.

FUNCTIONAL APPLICATIONS

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

CIRCUIT APPLICATIONS

- UHF/Microwave RF Power Amplifiers
- Oscillators
- Low Noise Amplifiers
- Filter Networks
- Timing Circuits

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 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours |
| Life Test | MIL-STD-202, Method 108, for 2000 hours, at 125°C. Voltage applied. 200% of WVDC for capacitors rated at 500 volts DC or less. 120% of WVDC for capacitors rated at 1250 volts DC or less. 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 5 lbs. min., 15 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor. |

PACKAGING OPTIONS



Tape & Reel



Vertical Orientation Tape & Reel



Cap Pac® (100 pcs)



ELECTRICAL SPECIFICATIONS

| | |
|--|---|
| Temperature Coefficient (TCC) | +90 ±20 PPM/°C (-55°C to +125°C) +90 ±30 PPM/°C (+125°C to +175°C) |
| Capacitance Range | 0.1pF to 1000pF |
| Operating Temperature | -55°C to +125°C* |
| Quality Factor | greater than 10,000 at 1 MHz |
| Insulation Resistance (IR) | 0.1 pF to 470 pF: 10 ⁶ Megohms min. @ +25°C at rated WVDC. 10 ⁵ Megohms min. @ +125°C at rated WVDC. 510 pF to 1000 pF: 10 ⁵ Megohms min. @ +25°C at rated WVDC. 10 ⁴ Megohms min. @ +125°C at rated WVDC. |
| 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. 150% of WVDC for capacitors rated at 1250 volts DC or less for 5 seconds. 120% of WVDC for capacitors rated above 1250 Volts DC for 5 seconds |
| Aging Effects | None |
| Piezoelectric Effects | None |
| Capacitance Drift | ± (0.02% or 0.02 pF), whichever is greater |
| Retrace | Less than ±(0.02% or 0.02 pF), whichever is greater. |

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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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|-----------|---------|------------|------|-----------|-----------|---------|------------|---------------|-----------|-----------|---------------|---------------|------|-----------|---------------|---------------|------------|---------------|------|---------------|-----|---------------|---------------|-----|---------------|------|---------------|---------------|---------------|------|---------------|-----|---------------|---------------|------|-------|---------------|---------------|-----|------|-----|---------------|---------------|------|------|------|---------------|-----|------|---------------|---------------|---------------|-----|-------|
| | | | STD. | EXT. | | | | STD. | EXT. | | | | STD. | EXT. | | | | STD. | EXT. | STD. | EXT. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R1 | 0.1 | B | 500 | 1500 | 2R4 | 2.4 | B, C, D | 500 | 1500 | 200 | 20 | F, G, J, K, M | 500 | 1500 | 151 | 150 | F, G, J, K, M | 300 | EXT. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R2 | 0.2 | | | | 2R7 | 2.7 | | | | 220 | 22 | | | | 161 | 160 | | | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R3 | 0.3 | 3R0 | | | 3.0 | 240 | | | | 24 | 181 | | | | 180 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R4 | 0.4 | 3R3 | | | 3.3 | 270 | | | | 27 | 201 | | | | 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R5 | 0.5 | B, C | | | 500 | 1500 | | | | 3R6 | 3.6 | | | | B, C, D | 500 | | 1500 | 300 | 30 | F, G, J, K, M | 500 | 1500 | 221 | 220 | F, G, J, K, M | 200 | VOLT. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R6 | 0.6 | | | | | | | | | 3R9 | 3.9 | | | | | | | | 330 | 33 | | | | 241 | 240 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R7 | 0.7 | 4R3 | | | | | | | | 4.3 | 360 | | | | | | | | 36 | 271 | | | | 270 | 600 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R8 | 0.8 | 4R7 | | | | | | | | 4.7 | 390 | | | | | | | | 39 | 301 | | | | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0R9 | 0.9 | B, C, D | | | | | | | | 500 | 1500 | | | | | | | | 5R1 | 5.1 | | | | B, C, J, K, M | 500 | | 1500 | 430 | 43 | F, G, J, K, M | 500 | 1500 | 331 | 330 | F, G, J, K, M | 200 | 600 | | | | | | | | | | | | | | | | | | |
| 1R0 | 1.0 | | | | | | | | | | | | | | | | | | 5R6 | 5.6 | | | | | | | | 470 | 47 | | | | 361 | 360 | | | | | | | | | | | | | | | | | | | | | |
| 1R1 | 1.1 | B, C, D | 500 | 1500 | | | 6R2 | 6.2 | B, C, J, K, M | | | 500 | 1500 | 510 | | | 51 | | F, G, J, K, M | 500 | | | | | | | | 1500 | 391 | | | | 390 | F, G, J, K, M | | 200 | VOLT. | | | | | | | | | | | | | | | | | | |
| 1R2 | 1.2 | | | | | | 6R8 | 6.8 | | | | | | 560 | | | 56 | | | | | | | | | | | | 431 | | | | 430 | | | | | | | | | | | | | | | | | | | | | | |
| 1R3 | 1.3 | B, C, D | | | | | 500 | 1500 | | | | | | 7R5 | | | 7.5 | | | | | | | | | | | | B, C, J, K, M | | | | 500 | | | 1500 | 620 | 62 | F, G, J, K, M | 500 | 1500 | 471 | 470 | F, G, J, K, M | 100 | EXT. | | | | | | | | | |
| 1R4 | 1.4 | | | | | | | | | | | | | 8R2 | | | 8.2 | | | | | | | | | | | | | | | | | | | | 680 | 68 | | | | 511 | 510 | | | | | | | | | | | | |
| 1R5 | 1.5 | B, C, D | | | 500 | 1500 | | | | | | | | 9R1 | 9.1 | B, C, J, K, M | 500 | 1500 | | | 750 | 75 | F, G, J, K, M | | | 500 | | | | | | | | | | | 1500 | 561 | | | | 560 | F, G, J, K, M | | 100 | EXT. | | | | | | | | | |
| 1R6 | 1.6 | | | | | | | | | | | | | 100 | 10 | | | | | | 820 | 82 | | | | | | | | | | | | | | | | 621 | | | | 620 | | | | | | | | | | | | | |
| 1R7 | 1.7 | B, C, D | | | | | | | | | | | | 500 | 1500 | | | | | | 110 | 11 | | | | | | | | | | | | | | | | B, C, J, K, M | | | | 500 | | | 1500 | 910 | 91 | F, G, J, K, M | 500 | 1500 | 681 | 680 | F, G, J, K, M | 300 | EXT. |
| 1R8 | 1.8 | | | | | | | | | | | | | | | | | | | | 120 | 12 | | | | | | | | | | | | | | | | | | | | | | | | 101 | 100 | | | | 751 | 750 | | | |
| 1R9 | 1.9 | B, C, D | | | | | | | | 500 | 1500 | | | | | | | | | | 130 | 13 | | B, C, J, K, M | 500 | | 1500 | | | 111 | 110 | F, G, J, K, M | | | 500 | | | | | | | | | | | 1500 | 821 | | | | 820 | F, G, J, K, M | | 50 | EXT. |
| 2R0 | 2.0 | | | | | | | | | | | | | | | | | | | | 150 | 15 | | | | | | | | 121 | 120 | | | | | | | | | | | | | | | | 911 | | | | 910 | | | | |
| 2R1 | 2.1 | B, C, D | 500 | 1500 | | | | | 160 | | | 16 | B, C, J, K, M | | | | | | 500 | 1500 | 131 | 130 | | | | | | F, G, J, K, M | | 500 | 1500 | | | 102 | | | | | | | | | | | | | 1000 | | | | F, G, J, K, M | | | 50 | VOLT. |
| 2R2 | 2.2 | | | | | | | | 180 | | | 18 | | | | | | | | | 101 | 100 | | | | | | | | | | | | 821 | | | | | | | | | | | | | 820 | | | | | | | | |

VRMS = 0.707 X WVDC

• SPECIAL VALUES, TOLERANCES, DIFFERENT WVDC AND MATCHING AVAILABLE. • ENCAPSULATION OPTION AVAILABLE. PLEASE CONSULT FACTORY. NOTE: EXTENDED WVDC DOES NOT APPLY TO CDR PRODUCTS.

HOW TO ORDER

Series 100 **Case Size** B **Capacitance** 910 **Termination Style Code** J **Voltage Rating** W **Rated WVDC** 500 **Laser Marking (Optional)** 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. | ±1 pF | ±25 pF | ±5 pF | ±1% | ±2% | ±5% | ±10% | ±20% |

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

Laser Marking (Optional)

Voltage Rating

Termination Style Code
Please see 2nd Column Mechanical Configuration Table

The above part number refers to a 100 B Series (case size B) 91 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 | 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 | Pkg Code | | |
|--------------------|------------|---------------|-------------------|--------------------------------------|--|----------------------------|----------------------------|--|--|-----------------------------------|---|--------------------------|-------------|-------------|
| | | | | | Length (L) | Width (W) | Thickness (T) | Overlap (Y) | Materials | | | | | |
| 100B | W | CDR14BG | Solder Plate | | .110+ .020 - .01 (2.79 + 0.51-0.25) | .110 ±.015 (2.79 ±.038) | .102 (2.59) max. | .015 (0.38) ±.010 (0.25) | Tin / Lead, Solder Plated over Nickel Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | P | CDR14BG | Pellet | | .110+ .035 - .01 (2.79 + 0.89-0.25) | .110 ±.015 (2.79 ±.038) | | | Heavy Tin/Lead Coated, over Nickel Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | T | N/A | Solderable Nickel | | .110+ .035 - .01 (2.79 + 0.51-0.25) | .110 ±.015 (2.79 ±.038) | | | RoHS Compliant Tin Plated over Nickel Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | CA | CDR13BG | Gold Chip | | .110+.020 - .010 (2.79 + 0.51-0.25) | .110 ±.015 (2.79 ±.038) | | | RoHS Compliant Gold Plated over Nickel Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | MS | CDR21BG | Microstrip | | .135 ±.015 (3.43 ±.038) | .110 ±.015 (2.79 ±.038) | .120 (3.05) max. | N/A | Length (L _L) | Width (W _L) | Thickness (T _L) | Cap Pac, 20 pcs | C20 | |
| 100B | AR | CDR22BG | Axial Ribbon | | | | .250 (6.35) min. | | .093±.005 (2.36 ±0.13) | .004 ± .001 (.102±.025) | Box, 20 or 100 pcs | | B20 or B100 | |
| 100B | RR | CDR24BG | Radial Ribbon | | | | .145 ±.020 (3.68 ±0.51) | | .102 (2.59) max. | #26 AWG, .016 (.406) dia. nominal | | Box, 20 or 100 pcs | | B20 or B100 |
| 100B | RW | CDR23BG | Radial Wire | | | | | | | Box, 20 or 100 pcs | | B20 or B100 | | |
| 100B | AW | CDR25BG | Axial Wire | | Box, 20 or 100 pcs | | B20 or B100 | | | | | | | |

Additional lead styles available: Narrow Microstrip (NM), Narrow Axial Ribbon (NA) and Vertical Narrow Microstrip (H). Other lead lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.

RF/Microwave Capacitors

RF/Microwave Multilayer Capacitors (MLC)

100B Series Porcelain Superchip® Multilayer Capacitors



NON-MAGNETIC 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 | Pkg Code | | |
|--------------------|------------|--------------------|----------------------------|--------------------------------------|--|----------------------------|------------------------|--|---|---------------------------|---|--------------------------------|-----|-------------|
| | | | | | Length (L) | Width (W) | Thickness (T) | Overlap (Y) | Materials | | | | | |
| 100B | WN | Meets Requirements | Non-Mag | | .110+ .020 - .01 (2.79 + 0.51-0.25) | .110 ±.015 (2.79 ±0.38) | .102 (2.59) max. | .015 (0.38) ±.010 (0.25) | Tin / Lead, Solder Plated over Nickel Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | PN | Meets Requirements | Solderable Nickel | | .110+ .035 - .01 (2.79 + 0.51-0.25) | .110 ±.015 (2.79 ±0.38) | | | Heavy Tin / Lead, Coated over Non-Magnetic Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | TN | Meets Requirements | Non-Mag Solderable Barrier | | .110+.020 - .010 (2.79 + 0.51-0.25) | .110 ±.015 (2.79 ±0.38) | | | RoHS Compliant Tin Plated over Non-Magnetic Barrier Termination | | T&R, 1000 or 500 pcs Vertical T&R, 1000 or 500 pcs Cap Pac, 100 pcs | T1K or T TV1K or TV C100 | | |
| 100B | MN | Meets Requirements | Microstrip | | .135 ±.015 (3.43 ±0.38) | .110 ±.015 (2.79 ±0.38) | .120 (3.05) max. | N/A | Length (L _L) | Width (W _L) | Thickness (T _L) | Cap Pac, 20 pcs | C20 | |
| 100B | AN | Meets Requirements | Axial Ribbon | | | | | | .250 (6.35) (6.35) min. | .093±.005 (2.36 ±0.13) | .004 ± .001 (.102±.025) | Box, 20 or 100 pcs | | B20 or B100 |
| 100B | FN | Meets Requirements | Radial Ribbon | | | | | | | | | Box, 20 or 100 pcs | | B20 or B100 |
| 100B | RN | Meets Requirements | Radial Wire | | .145 ±.020 (3.68 ±0.51) | .102 (2.59) max. | N/A | .500 (12.7) | #26 AWG., .016 (.406) dia. nominal | | Box, 20 or 100 pcs | B20 or B100 | | |
| 100B | BN | Meets Requirements | Axial Wire | | | | | | Box, 20 or 100 pcs | | B20 or B100 | | | |

Additional lead styles available: Narrow Microstrip (NM), Narrow Axial Ribbon (NA) and Vertical Narrow Microstrip (H). Other lead lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.

SUGGESTED MOUNTING PAD DIMENSIONS

Horizontal
Electrode Orientation

Vertical
Electrode Orientation

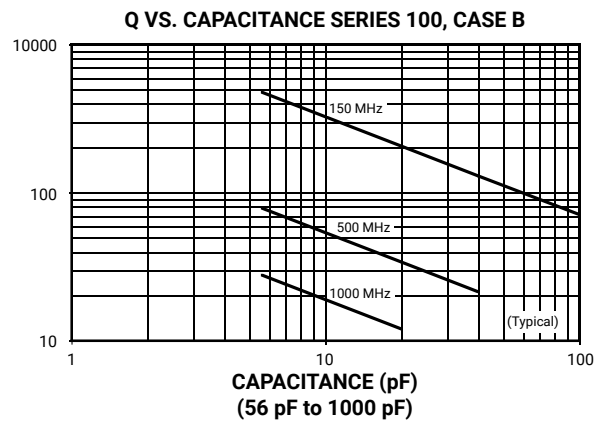
Case B Vertical Mount

| Cap Value | Pad Size | A Min. | B Min. | C Min. | D Min. |
|---------------|--------------|--------|--------|--------|--------|
| 0.1 pF | Normal | .065 | .050 | .075 | .175 |
| | High Density | .045 | .030 | .075 | .135 |
| 0.2 pF | Normal | .090 | .050 | .075 | .175 |
| | High Density | .070 | .030 | .075 | .135 |
| 0.3 to 510 pF | Normal | .110 | .050 | .075 | .175 |
| | High Density | .090 | .030 | .075 | .135 |
| > 510 pF | Normal | .120 | .050 | .075 | .175 |
| | High Density | .100 | .030 | .075 | .135 |

Horizontal Mount

| All Values | Pad Size | A Min. | B Min. | C Min. | D Min. |
|------------|--------------|--------|--------|--------|--------|
| All Values | Normal | .130 | .050 | .075 | .175 |
| | High Density | .110 | .030 | .075 | .135 |

PERFORMANCE DATA



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PERFORMANCE DATA

SERIES RESONANCE VS. CAPACITANCE
SERIES 100, CASE B



CAPACITANCE CHANGE VS. TEMPERATURE
SERIES 100, CASE B



CURRENT RATING VS. CAPACITANCE
SERIES 100, CASE B



CURRENT RATING VS. CAPACITANCE
SERIES 100, CASE B

