

# 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

<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. 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
<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 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

<b>Temperature Coefficient (TCC)</b>	+90 ±20 PPM/°C (-55°C to +125°C) +90 ±30 PPM/°C (+125°C to +175°C)
<b>Capacitance Range</b>	0.1pF to 1000pF
<b>Operating Temperature</b>	-55°C to +125°C*
<b>Quality Factor</b>	greater than 10,000 at 1 MHz
<b>Insulation Resistance (IR)</b>	0.1 pF to 470 pF: 10 <sup>6</sup> Megohms min. @ +25°C at rated WVDC. 10 <sup>5</sup> Megohms min. @ +125°C at rated WVDC. 510 pF to 1000 pF: 10 <sup>5</sup> Megohms min. @ +25°C at rated WVDC. 10 <sup>4</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 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
<b>Aging Effects</b>	None
<b>Piezoelectric Effects</b>	None
<b>Capacitance Drift</b>	± (0.02% or 0.02 pF), whichever is greater
<b>Retrace</b>	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	5R1								5.1	430								43	331				330				
1R0	1.0	B, C, D								500	1500								5R6	5.6				B, C, J, K, M	500		1500	470
1R1	1.1		6R2	6.2			510	51	391			390	VOLT.															
1R2	1.2	6R8	6.8	560			56	431	430																			
1R3	1.3	7R5	7.5	620			62	471	470			100																
1R4	1.4	8R2	8.2	680			68	511	510																			
1R5	1.5	9R1	9.1	750	75	561	560																					
1R6	1.6	D	500	1500	100	10	F, G, J, K, M	500	1500			820	82	F, G, J, K, M	500	1500	621	620	F, G, J, K, M	300	EXT.							
1R7	1.7				110	11						910	91				681	680										
1R8	1.8	120			12	101						100	751				750	50										
1R9	1.9	130			13	111						110	821				820											
2R0	2.0	150			15	121				120	911	910																
2R1	2.1	D			500	1500				160	16	F, G, 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    **Termination Style Code** 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 ±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	P	CDR14BG	Pellet		.110+ .035 - .01 (2.79 + 0.89-0.25)	.110 ±.015 (2.79 ±0.38)			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 ±0.38)			<b>RoHS Compliant</b> 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 ±0.38)			<b>RoHS Compliant</b> 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 ±0.38)	.110 ±.015 (2.79 ±0.38)	.120 (3.05) max.	N/A	Length (L <sub>L</sub> )	Width (W <sub>L</sub> )	Thickness (T <sub>L</sub> )	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.

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#### 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)			<b>RoHS Compliant</b> 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 <sub>L</sub> )	Width (W <sub>L</sub> )	Thickness (T <sub>L</sub> )	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						.145 ±.020 (3.68 ±0.51)	.102 (2.59) max.	N/A	.500 (12.7)	#26 AWG., .016 (.406) dia. nominal
100B	RN	Meets Requirements	Radial Wire		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.

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## SUGGESTED MOUNTING PAD DIMENSIONS

Horizontal  
Electrode Orientation

Vertical  
Electrode Orientation

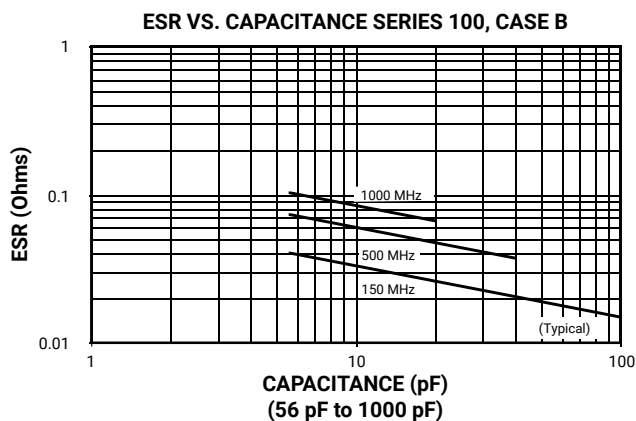
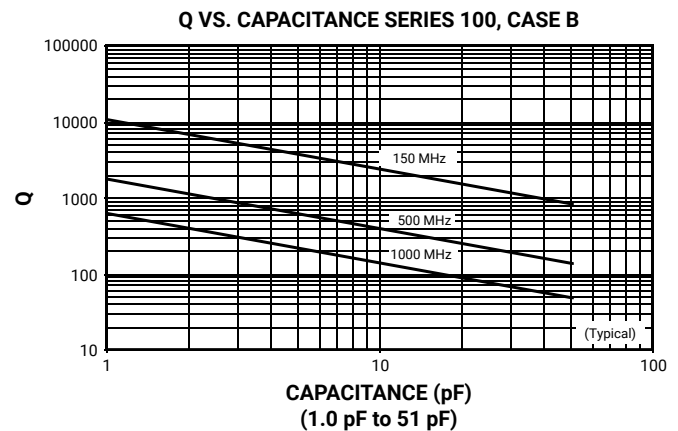
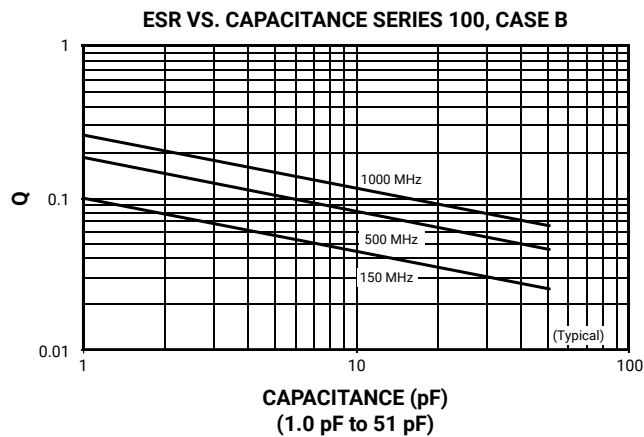
### Case B Vertical Mount

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

