

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

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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## RF/Microwave Multilayer Capacitors (MLC)

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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 <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.	.500 (12.7)	#26 AWG, .016 (.406) dia. nominal		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)	.110 ±.015 (2.79 ±0.38)	.102 (2.59) max.	N/A			Box, 20 or 100 pcs	B20 or B100	
100B	RN	Meets Requirements	 Radial Wire								Box, 20 or 100 pcs	B20 or B100	
100B	BN	Meets Requirements	 Axial Wire						#26 AWG, .016 (.406) dia. nominal	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

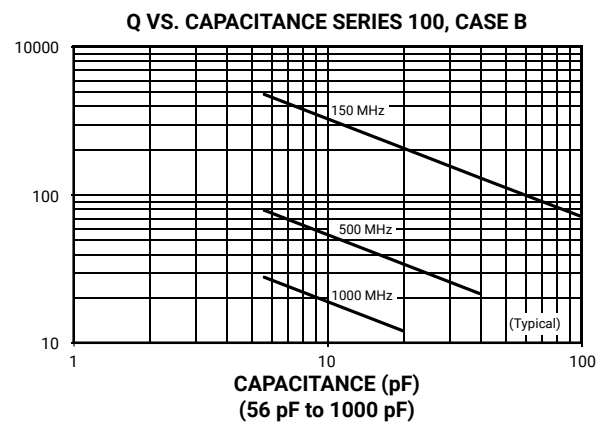
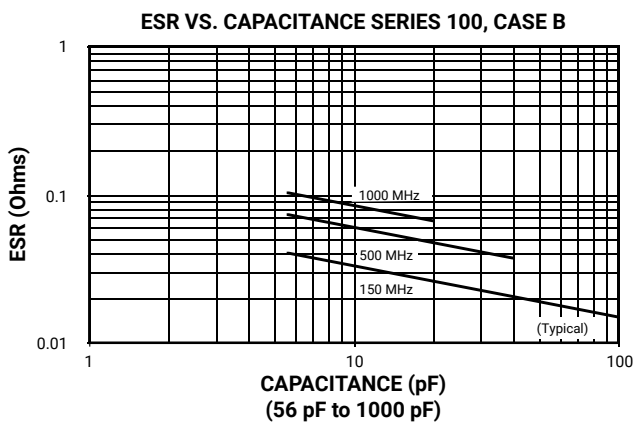
**Case B Vertical Mount**

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

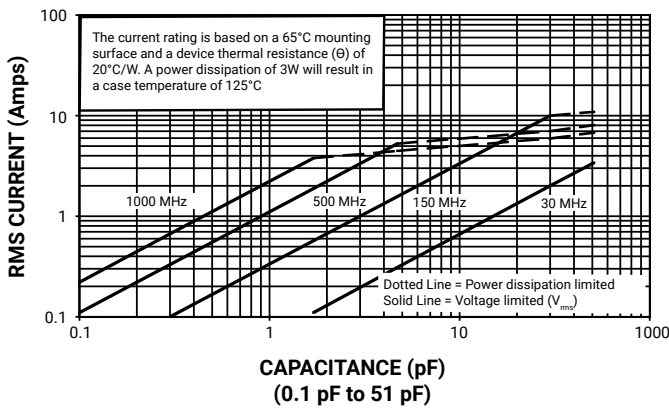
**SERIES RESONANCE VS. CAPACITANCE**  
SERIES 100, CASE B



**CAPACITANCE CHANGE VS. TEMPERATURE**  
SERIES 100, CASE B



**CURRENT RATING VS. CAPACITANCE**  
SERIES 100, CASE B



**CURRENT RATING VS. CAPACITANCE**  
SERIES 100, CASE B

