

# ATC 100 B Series Porcelain Superchip® Multilayer Capacitors

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

ATC, 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.

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

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

## ENVIRONMENTAL TESTS

ATC 100 B Series Capacitors are designed and manufactured to meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123.

**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 Volts DC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours min.

### 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.



## ELECTRICAL AND MECHANICAL SPECIFICATIONS

**QUALITY FACTOR (Q):** greater than 10,000 at 1 MHz.

### TEMPERATURE COEFFICIENT OF CAPACITANCE (TCC):

- +90 ±20 PPM/°C (-55°C to +125°C)
- +90 ±30 PPM/°C (+125°C to +175°C)

### INSULATION RESISTANCE (IR):

- 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.

IR above +125°C is derated by one order of magnitude.

**WORKING VOLTAGE (WVDC):** See Capacitance Values Table, page 2.

### 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.

**RETRACE:** Less than ±(0.02% or 0.02 pF), whichever is greater.

**AGING EFFECTS:** None

### PIEZOELECTRIC EFFECTS:

None (No capacitance variation with voltage or pressure).

**CAPACITANCE DRIFT:** ±(0.02% or 0.02 pF), whichever is greater.

### OPERATING TEMPERATURE RANGE:

- 0.1 to 330 pF: from -55°C to +175°C
- 360 to 1000 pF: from -55°C to +125°C

### TERMINATION STYLES:

Available in various surface mount and leaded styles. See Mechanical Configurations, page 3.

**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. Test per MIL-STD-202, method 211.



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ATC # 001-807 Rev. S; 8/18

# ATC 100 B 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. |
| 0R1       | 0.1       | B       | 500        | 1500 | 2R4       | 2.4       | 500  | 1500       | 200  | 20        | F, G, J, K, M | 500  | 1500       | 151  | 150       | F, G, J, K, M | 300  | 1000       |      |
| 0R2       | 0.2       | B, C    |            |      | 2R7       | 2.7       |      |            | 220  | 22        |               |      |            | 161  | 160       |               |      |            |      |
| 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, D |            |      | 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       |         |            |      | 5R1       | 5.1       |      |            | 430  | 43        |               |      |            | 331  | 330       |               |      |            |      |
| 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        |           |      |            |      |           |               |      |            |      |           |               |      |            |      |

$V_{RMS} = 0.707 \times V_{WDC}$

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

## ATC PART NUMBER CODE

Series ATC100 Case Size B Capacitance Code: 91 First 2 significant digits for capacitance. R=Decimal Point

Indicates number of zeros following digits of capacitance in picofarads except for decimal values. 0

Capacitance Tolerance J

Termination Code W

Laser Marking 500

WVDC X

Packaging T

T - Tape and Reel, 1000 pc. qty.\*  
TV - Vertical Orientation of Product, Tape and Reel, 1000 pc. qty.\*  
I - Special Packaging. Consult Factory.  
\*Consult ATC for other quantities  
ATC Cap-Pac® packaging (100 pc. qty. std.) is also available.  
For this option, leave last field blank.

| CAPACITANCE TOLERANCE |         |          |         |     |     |     |      |      |
|-----------------------|---------|----------|---------|-----|-----|-----|------|------|
| Code                  | B       | C        | D       | F   | G   | J   | K    | M    |
| Tol.                  | ±0.1 pF | ±0.25 pF | ±0.5 pF | ±1% | ±2% | ±5% | ±10% | ±20% |

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.

ATC accepts orders for our parts using designations **with** or **without** the "ATC" prefix. Both methods of defining the part number are equivalent, i.e., part numbers referenced with the "ATC" prefix are interchangeable to parts referenced without the "ATC" prefix. Customers are free to use either in specifying or procuring parts from American Technical Ceramics.

For additional information and catalogs contact your ATC representative or call direct at (+1-631) 622-4700.

Consult factory for additional performance data.

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# ATC 100 B Capacitors: Mechanical Configurations

| ATC SERIES & CASE SIZE | ATC TERM. CODE | MIL-PRF-55681 | CASE SIZE & TYPE               | OUTLINES<br>W/T IS A TERMINATION SURFACE | BODY DIMENSIONS INCHES (mm)                    |                            |                     | LEAD AND TERMINATION DIMENSIONS AND MATERIALS |  |  |                                  |
|------------------------|----------------|---------------|--------------------------------|--|--|----------------------------|---------------------|---|--|--|----------------------------------|
|                        |                |               |                                |  | LENGTH (L)                                     | WIDTH (W)                  | THICKNESS (T)       | OVERLAP (Y)                                   | MATERIALS  |  |                                  |
| 100B                   | W              | CDR14BG       | B<br>Solder Plate.1            |  | .110<br>+0.020 -.010<br>(2.79 +0.51<br>-.25)   | .110 ±.015<br>(2.79 ±0.38) | .102 (2.59)<br>max. | .015 (0.38)<br>±.010 (0.25)                   | Tin/Lead, Solder Plated over Nickel Barrier Termination              |  |                                  |
| 100B                   | P              | CDR14BG       | B<br>Pellet                    |  | .110<br>+0.035 -.010<br>(2.79<br>+0.89-.25)    | .110 ±.015<br>(2.79 ±0.38) |                     |   | Heavy Tin/Lead Coated, over Nickel Barrier Termination               |  |                                  |
| 100B                   | T              | N/A           | B<br>Solderable Nickel Barrier |  | .110<br>+0.020 -.010<br>(2.79 +0.51<br>-.25)   | .110 ±.015<br>(2.79 ±0.38) |                     |   | <b>RoHS Compliant</b><br>Tin Plated over Nickel Barrier Termination  |  |                                  |
| 100B                   | CA             | CDR13BG       | B<br>Gold Chip                 |  | .110 ±.015<br>020 -.010<br>(2.79<br>+0.51-.25) | .110 ±.015<br>(2.79 ±0.38) |                     |   | <b>RoHS Compliant</b><br>Gold Plated over Nickel Barrier Termination |  |                                  |
| 100B                   | MS             | CDR21BG       | B<br>Microstrip                |  | .135 ±.015<br>(3.43 ±0.38)                     | .110 ±.015<br>(2.79 ±0.38) | .120 (3.05)<br>max. | N/A   | Length (L <sub>L</sub> )   | Width (W <sub>L</sub> )                  | Thickness (T <sub>L</sub> )      |
| 100B                   | AR             | CDR22BG       | B<br>Axial Ribbon              |  |  |                            |                     |   | .250<br>(6.35)<br>min.   | .093<br>±.005<br>(2.36<br>±0.13)         | .004<br>±.001<br>(.102<br>±.025) |
| 100B                   | RR             | CDR24BG       | B<br>Radial Ribbon             |  | .145 ±.020<br>(3.68 ±0.51)                     | .110 ±.015<br>(2.79 ±0.38) | .102 (2.59)<br>max. | N/A   | .500<br>(12.7)in.<br>min.  | #26 AWG.,<br>.016 (.406) dia.<br>nominal |                                  |
| 100B                   | RW             | CDR23BG       | B<br>Radial Wire               |  |  |                            |                     |   |  |  |                                  |
| 100B                   | AW             | CDR25BG       | B<br>Axial Wire                |  |  |                            |                     |   |  |  |                                  |

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. For a complete military catalog, request American Technical Ceramics document ATC 001-818.

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# ATC 100 B Non-Magnetic Capacitors: Mechanical Configurations

| ATC SERIES & CASE SIZE | ATC TERM. CODE | MIL-PRF-55681      | CASE SIZE & TYPE                | OUTLINES<br>W/T IS A TERMINATION SURFACE | BODY DIMENSIONS<br>INCHES (mm)              |                               |                     | LEAD AND TERMINATION<br>DIMENSIONS AND MATERIALS |  |                         |                             |                               |                                  |                                  |
|------------------------|----------------|--------------------|---------------------------------|--|---|-------------------------------|---------------------|--|--|-------------------------|-----------------------------|-------------------------------|----------------------------------|----------------------------------|
|                        |                |                    |                                 |  | LENGTH (L)                                  | WIDTH (W)                     | THICKNESS (T)       | OVERLAP (Y)                                      | MATERIALS  |                         |                             |                               |                                  |                                  |
| 100B                   | WN             | Meets Requirements | B<br>Non-Mag Solder Plate       |  | .110<br>+.025 -.010<br>(2.79 +0.64<br>-.25) | 110 ±.015<br>(2.79 ±0.38)     | .102 (2.59)<br>max  | .015 (0.38)<br>±.010 (0.25)                      | Tin/Lead, Solder Plated over<br>Non-Magnetic Barrier Termination             |                         |                             |                               |                                  |                                  |
| 100B                   | PN             | Meets Requirements | B<br>Non-Mag Pellet             |  | .110<br>+.035 -.010<br>(2.79 +0.89<br>-.25) | 110 ±.015<br>(2.79 ±0.38)     |                     |  | Heavy Tin/Lead Coated, over<br>Non-Magnetic Barrier Termination              |                         |                             |                               |                                  |                                  |
| 100B                   | TN             | Meets Requirements | B<br>Non-Mag Solderable Barrier |  | .110<br>+.025 -.010<br>(2.79 +0.64<br>-.25) | 110 ±.015<br>(2.79 ±0.38)     |                     |  | <b>RoHS Compliant</b><br>Tin Plated over<br>Non-Magnetic Barrier Termination |                         |                             |                               |                                  |                                  |
| 100B                   | MN             | Meets Requirements | B<br>Non-Mag Microstrip         |  | .135 ±.015<br>(3.43<br>±0.38)               | .110 ±.015<br>(2.79<br>±0.38) | .120 (3.05)<br>max. | N/A  | Length (L <sub>L</sub> )   | Width (W <sub>L</sub> ) | Thickness (T <sub>L</sub> ) |                               |                                  |                                  |
| 100B                   | AN             | Meets Requirements | B<br>Non-Mag Axial Ribbon       |  |   |                               |                     |  | .110 ±.015<br>(2.79<br>±0.38)  | .102 (2.59)<br>max.     | N/A                         | .250<br>(6.35)<br>min         | .093<br>±.005<br>(2.36<br>±0.13) | .004<br>±.001<br>(.102<br>±.025) |
| 100B                   | FN             | Meets Requirements | B<br>Non-Mag Radial Ribbon      |  |   |                               |                     |  |  |                         |                             | .145 ±.020<br>(3.68<br>±0.51) | .102 (2.59)<br>max.              | N/A                              |
| 100B                   | RN             | Meets Requirements | B<br>Non-Mag Radial Wire        |  |   |                               |                     |  |  |                         |                             |                               |                                  |                                  |
| 100B                   | BN             | Meets Requirements | B<br>Non-Mag Axial Wire         |  |   |                               |                     |  |  |                         |                             |                               |                                  |                                  |

Additional lead styles available: Narrow Microstrip (DN), Narrow Axial Ribbon (GN) and Vertical Narrow Microstrip (HN). 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

| 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       | Normal       | .130 | .050 | .075 | .175 |
|                  | High Density | .110 | .030 | .075 | .135 |

Horizontal Electrode Orientation

Vertical Electrode Orientation

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# ATC 100 B Performance Data

**ESR VS. CAPACITANCE  
ATC SERIES 100, CASE B**



**Q VS. CAPACITANCE  
ATC SERIES 100, CASE B**



**ESR VS. CAPACITANCE  
ATC SERIES 100, CASE B**



**Q VS. CAPACITANCE  
ATC SERIES 100, CASE B**



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



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



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# ATC 100 B Performance Data

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



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



**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 100, CASE B, EXTENDED VOLTAGE**



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