ATC 100 E Series Porcelain High RF Power Multilayer Capacitors

- Case E Size (.380" x .380")
- Capacitance Range 1 pF to 5100 pF
- High Q
- Ultra-Stable Performance
- Low ESR/ESL
- High RF Current/Voltage
- High RF Power
- High Reliability
- Extended WVDC up to 7200 VDC
- Available with Encapsulation Option*

ATC, the industry leader, offers new improved ESR/ESL performance for the 100 E Series RF Capacitors. This high Q multilayer capacitor is ultra-stable under high RF current and voltage applications. High density porcelain construction provides a rugged, hermetic package.

ATC offers an encapsulation option for applications requiring extended protection against arc-over and corona.

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

Typical circuit applications: HF/RF Power Amplifiers, Transmitters, Antenna Tuning, Plasma Chambers and Medical (MRI coils).

*For leaded styles only

ENVIRONMENTAL TESTS

ATC 100 E 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:

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:
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 (1 pF to 1000 pF) @ 1 MHz.
Greater than 10,000 (1100 pF to 5100 pF) @ 1 KHz.

TEMPERATURE COEFFICIENT OF CAPACITANCE (TCC):
+90 ±30 PPM/°C (-55°C to +125°C)

INSULATION RESISTANCE (IR):
1 pF to 5100 pF:
10^6 Megohms min. @ +25°C at 500 VDC,
10^4 Megohms min. @ +125°C at 500 VDC.

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:
From -55°C to +125°C (No derating of working voltage).

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 10 lbs. min., 25 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor. Test per MIL-STD-202, method 211.
# ATC 100 E Capacitance Values

<table>
<thead>
<tr>
<th>CAP. CODE</th>
<th>CAP. (pF)</th>
<th>TOL.</th>
<th>RATED WVDC (pF)</th>
<th>CAP. CODE</th>
<th>TOL.</th>
<th>RATED WVDC (pF)</th>
<th>CAP. CODE</th>
<th>TOL.</th>
<th>RATED WVDC (pF)</th>
<th>CAP. CODE</th>
<th>TOL.</th>
<th>RATED WVDC (pF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1R0</td>
<td>1.0</td>
<td></td>
<td>5R6</td>
<td>1R1</td>
<td>1.1</td>
<td>6R2</td>
<td>1R2</td>
<td>1.2</td>
<td>6R8</td>
<td>1R3</td>
<td>1.3</td>
<td>7R5</td>
</tr>
<tr>
<td>1R4</td>
<td>1.4</td>
<td></td>
<td>8R2</td>
<td>1R5</td>
<td>1.5</td>
<td>9R1</td>
<td>1R6</td>
<td>1.6</td>
<td>100</td>
<td>1R7</td>
<td>1.7</td>
<td>110</td>
</tr>
<tr>
<td>1R8</td>
<td>1.8</td>
<td></td>
<td>100</td>
<td>1R9</td>
<td>1.9</td>
<td>120</td>
<td>2R0</td>
<td>2.0</td>
<td>150</td>
<td>2R1</td>
<td>2.1</td>
<td>160</td>
</tr>
<tr>
<td>2R2</td>
<td>2.2</td>
<td></td>
<td>180</td>
<td>2R3</td>
<td>3.3</td>
<td>270</td>
<td>3R6</td>
<td>3.6</td>
<td>300</td>
<td>3R9</td>
<td>3.9</td>
<td>360</td>
</tr>
<tr>
<td>4R3</td>
<td>4.3</td>
<td></td>
<td>360</td>
<td>4R7</td>
<td>4.7</td>
<td>430</td>
<td>5R1</td>
<td>5.1</td>
<td>5R8</td>
<td>5R2</td>
<td>5.2</td>
<td>6R8</td>
</tr>
</tbody>
</table>

**Series**

**Case Size**

**Capacitance Code:***
- First 2 significant digits for capacitance.
- R=Decimal Point
- Indicates number of zeros following digits of capacitance in picofarads except for decimal values.
- Capacitance Tolerance

The above part number refers to a 100 E Series (case size E) 390 pF capacitor, K tolerance (±10%), 3600 WVDC, with W termination (Tin/Lead, Solder Plated over Nickel Barrier), laser marking and Waffle-packaging.

**VRMS = 0.707 X WVDC**

- *SPECIAL VALUES, TOLERANCES, MATCHING, AND CAPACITOR ASSEMBLIES ARE AVAILABLE.*
- *ATC'S CUSTOM POWER CAPACITOR ASSEMBLY CATALOG, ATC # 001-900 LISTS ASSEMBLY OPTIONS.*
- *EXTENDED WORKING VOLTAGES ARE AVAILABLE FOR COMMERCIAL ORDERS ONLY.*
- *ENCAPSULATION OPTION AVAILABLE. PLEASE CONSULT FACTORY.*

### Capacitance Tolerance

<table>
<thead>
<tr>
<th>Code</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>K</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tol.</td>
<td>±0.1 pF</td>
<td>±0.25 pF</td>
<td>±0.5 pF</td>
<td>±1%</td>
<td>±2%</td>
<td>±5%</td>
<td>±10%</td>
<td>±20%</td>
<td></td>
</tr>
</tbody>
</table>

### ATC Part Number Code

- **Series**
- **Case Size**
- **Capacitance Code:**
  - First 2 significant digits for capacitance.
  - R=Decimal Point
  - Indicates number of zeros following digits of capacitance in picofarads except for decimal values.
- **Capacitance Tolerance**

**Packaging**
- C - ATC Matrix Tray (Standard)
- T - Tape and Reel, 250 pc. qty.
- I - Special Packaging, Consult Factory

**Laser Marking**

**WVDC**

**Termination Code**

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.
**ATC 100 E Capacitors: Mechanical Configurations**

<table>
<thead>
<tr>
<th>ATC SERIES &amp; CASE SIZE</th>
<th>ATC TERM. CODE</th>
<th>CASE SIZE &amp; TYPE CASE SIZE &amp; TYPE</th>
<th>OUTLINES W/T IS A TERMINATION SURFACE</th>
<th>BODY DIMENSIONS INCHES (mm)</th>
<th>LEAD AND TERMINATION DIMENSIONS AND MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100E W</td>
<td>E</td>
<td>Solder Plate</td>
<td></td>
<td>.380 +.015 - .010</td>
<td>Tin/Lead, Solder Plated over Nickel Barrier Termination</td>
</tr>
<tr>
<td>100E P</td>
<td>E</td>
<td>Pellet</td>
<td></td>
<td>.380 +.040 - .010</td>
<td>Heavy Tin/Lead Coated, over Nickel Barrier Termination</td>
</tr>
<tr>
<td>100E T</td>
<td>E</td>
<td>Solderable Nickel Barrier</td>
<td></td>
<td>.380 +.015 - .010</td>
<td>RoHS Compliant Tin Plated over Nickel Barrier Termination</td>
</tr>
<tr>
<td>100E CA</td>
<td>E</td>
<td>Gold Chip</td>
<td></td>
<td>.380 ±.010 (.965 ±.25)</td>
<td>RoHS Compliant Gold Plated over Nickel Barrier Termination</td>
</tr>
<tr>
<td>100E MS</td>
<td>E</td>
<td>Microstrip</td>
<td></td>
<td>.380 +.035 - .010</td>
<td>High Purity Silver Leads</td>
</tr>
<tr>
<td>100E AR</td>
<td>E</td>
<td>Axial Ribbon</td>
<td></td>
<td>.380 +.035 - .010</td>
<td>Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051)</td>
</tr>
<tr>
<td>100E AW</td>
<td>E</td>
<td>Axial Wire</td>
<td></td>
<td>.380 +.035 - .010</td>
<td>L_L = 2.25 (57.2) min.</td>
</tr>
<tr>
<td>100E RW</td>
<td>E</td>
<td>Radial Wire</td>
<td></td>
<td>.380 +.035 - .010</td>
<td>Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051)</td>
</tr>
</tbody>
</table>

Custom lead styles and lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are RoHS compliant.
**ATC 100 E Capacitors: Non-Magnetic Mechanical Configurations**

<table>
<thead>
<tr>
<th>ATC SERIES &amp; CASE SIZE</th>
<th>ATC TERM. CODE</th>
<th>CASE SIZE &amp; TYPE</th>
<th>OUTLINES</th>
<th>BODY DIMENSIONS INCHES (mm)</th>
<th>LEAD AND TERMINATION DIMENSIONS AND MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>W/T IS A TERMINATION SURFACE</td>
<td>LENGTH (L)</td>
<td>WIDTH (W)</td>
</tr>
<tr>
<td>100E WN</td>
<td>E</td>
<td>Non-Mag Solder Plate</td>
<td>Y L W T</td>
<td>.380 +.015 -.010 (9.65 +.38 -.25)</td>
<td>Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination</td>
</tr>
<tr>
<td>100E PN</td>
<td>E</td>
<td>Non-Mag Pellet</td>
<td>Y L W T</td>
<td>.380 +.040 -.010 (9.65 +1.02 -.25)</td>
<td>Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination</td>
</tr>
<tr>
<td>100E TN</td>
<td>E</td>
<td>Non-Mag Solderable Barrier</td>
<td>Y L W T</td>
<td>.380 +.015 -.010 (9.65 +.38 -.25)</td>
<td>RoHS Compliant Tin Plated over Non-Magnetic Barrier Termination</td>
</tr>
<tr>
<td>100E MN</td>
<td>E</td>
<td>Non-Mag Microstrip</td>
<td>Y L W T</td>
<td>.380 +.015 -.010 (9.65 +.38 -.25)</td>
<td>High Purity Silver Leads L_L = .750 (19.05) min. W_L = .350 ±.010 (8.89 ±.25) T_L = .010 ±.005 (0.25 ±.013) Leads are Attached with High Temperature Solder.</td>
</tr>
<tr>
<td>100E AN</td>
<td>E</td>
<td>Non-Mag Axial Ribbon</td>
<td>Y L W T</td>
<td>.380 +.035 -.010 (9.65 +.89 -.25)</td>
<td>N/A</td>
</tr>
<tr>
<td>100E BN</td>
<td>E</td>
<td>Non-Mag Axial Wire</td>
<td>Y L W T</td>
<td>.380 +.035 -.010 (9.65 +.89 -.25)</td>
<td>Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) L_L = 2.25 (57.2) min.</td>
</tr>
<tr>
<td>100E RN</td>
<td>E</td>
<td>Non-Mag Radial Wire</td>
<td>Y L W T</td>
<td>.380 +.035 -.010 (9.65 +.89 -.25)</td>
<td>Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) L_L = 1.0 (25.4) min</td>
</tr>
</tbody>
</table>

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**Suggested Mounting Pad Dimensions**

<table>
<thead>
<tr>
<th>Case E</th>
<th>Vertical Mount</th>
<th>Horizontal Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>.185</td>
</tr>
<tr>
<td></td>
<td>High Density</td>
<td>.165</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>.405</td>
</tr>
<tr>
<td></td>
<td>High Density</td>
<td>.385</td>
</tr>
</tbody>
</table>

Dimensions are in inches.
ATC 100 E Performance Data

ESR VS. CAPACITANCE
ATC SERIES 100, CASE E

Q VS. CAPACITANCE
ATC SERIES 100, CASE E

ESR VS. CAPACITANCE
ATC SERIES 100, CASE E

Q VS. CAPACITANCE
ATC SERIES 100, CASE E

AMERICAN TECHNICAL CERAMICS
ATC North America
sales@atceramics.com

ATC Europe
sales@atceramics.com

ATC Asia
sales@atceramics-asia.com
The current rating is based on a 65°C mounting surface and a device thermal resistance (θ) of 12°C/W. A power dissipation of 5W will result in a case temperature of 125°C.

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