

# ATC 100 C Series Porcelain High RF Power Multilayer Capacitors

- Case C Size (.250" x .250")
- High Q
- Low ESR/ESL
- High RF Power
- Available with Encapsulation Option\*
- Capacitance Range 1 pF to 2700 pF
- Ultra-Stable Performance
- High RF Current/Voltage
- High Reliability
- Extended WVDC up to 3600 VDC

ATC, the industry leader, offers new improved ESR/ESL performance for the 100 C 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: VHF/UHF RF Power Amplifiers, Antenna Tuning, Plasma Chambers and Medical (MRI coils).

\*For leaded styles only.

## ENVIRONMENTAL TESTS

ATC 100 C 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:

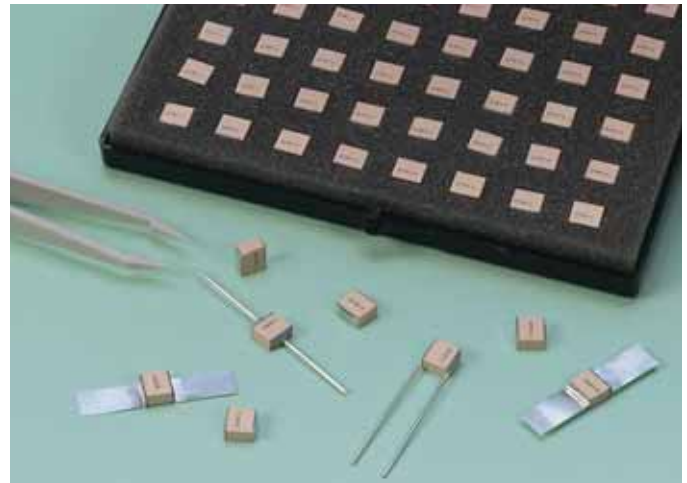
MIL-STD-202, Method 108, for 2000 hours, at 125°C.

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 (1.0 pF to 1000 pF) @ 1 MHz.

Greater than 10,000 (1100 pF to 2700 pF) @ 1 KHz.

### TEMPERATURE COEFFICIENT OF CAPACITANCE (TCC):

+90 ±30 PPM/°C (-55°C to +125°C)

### INSULATION RESISTANCE (IR):

1 pF to 2700 pF:

10<sup>5</sup> Megohms min. @ +25°C at rated WVDC.

10<sup>4</sup> Megohms min. @ +125°C at rated WVDC.

Max. test voltage is 500 VDC.

**WORKING VOLTAGE (WVDC):** See Capacitance Values Table, p 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., 20 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor. Test per MIL-STD-202, method 211.



AMERICAN TECHNICAL CERAMICS

ATC North America  
+1-631-622-4700  
sales@atceramics.com

ATC Europe  
+46 8 6800410  
sales@atceramics-europe.com

ATC Asia  
+86-755-2386-8759  
sales@atceramics-asia.com

  
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ATC # 001-808 Rev. K 3/10

# ATC 100 C Capacitance Values

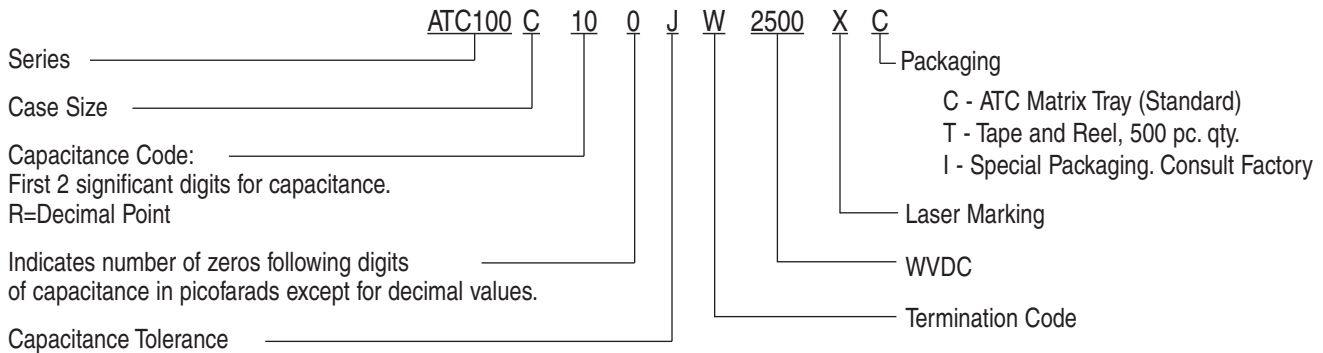
| CAP. CODE | CAP. (pF) | TOL.    | RATED WVDC |                  | CAP. CODE- | CAP. (pF) | TOL.            | RATED WVDC |      | CAP. CODE | CAP. (pF) | TOL.            | RATED WVDC |      | CAP. CODE | CAP. (pF) | TOL. | RATED WVDC |            |
|-----------|-----------|---------|------------|------------------|------------|-----------|-----------------|------------|------|-----------|-----------|-----------------|------------|------|-----------|-----------|------|------------|------------|
|           |           |         | STD.       | EXT.             |            |           |                 | STD.       | EXT. |           |           |                 | STD.       | EXT. |           |           |      | STD.       | EXT.       |
| 1R0       | 1.0       |         |            |                  | 5R1        | 5.1       |                 |            |      | 390       | 39        |                 |            |      | 301       | 300       |      |            |            |
| 1R1       | 1.1       |         |            | EXTENDED VOLTAGE | 5R6        | 5.6       |                 |            |      | 430       | 43        |                 |            |      | 331       | 330       |      |            |            |
| 1R2       | 1.2       |         |            |                  | 6R2        | 6.2       |                 |            |      | 470       | 47        |                 |            |      | 361       | 360       |      |            |            |
| 1R3       | 1.3       |         |            |                  | 6R8        | 6.8       | B, C,           |            |      | 510       | 51        |                 |            |      | 391       | 390       |      | 1500       | 2000       |
| 1R4       | 1.4       |         |            |                  | 7R5        | 7.5       | D               |            |      | 560       | 56        |                 |            |      | 431       | 430       |      |            | EXT. VOLT. |
| 1R5       | 1.5       |         |            |                  | 8R2        | 8.2       |                 |            |      | 620       | 62        |                 |            |      | 471       | 470       |      |            |            |
| 1R6       | 1.6       |         |            |                  | 9R1        | 9.1       |                 |            |      | 680       | 68        |                 |            |      | 511       | 510       |      |            |            |
| 1R7       | 1.7       |         |            |                  | 100        | 10        |                 |            |      | 750       | 75        |                 |            |      | 561       | 560       |      |            |            |
| 1R8       | 1.8       |         |            |                  | 110        | 11        |                 |            |      | 820       | 82        |                 |            |      | 621       | 620       |      |            |            |
| 1R9       | 1.9       |         |            |                  | 120        | 12        |                 |            |      | 910       | 91        |                 |            |      | 681       | 680       |      |            |            |
| 2R0       | 2.0       | B, C, D | 2500       | 3600             | 130        | 13        |                 | 2500       | 3600 | 101       | 100       | F, G, J<br>K, M | 2500       | 751  | 750       |           |      |            |            |
| 2R1       | 2.1       |         |            |                  | 150        | 15        |                 |            |      | 111       | 110       |                 |            | 821  | 820       |           | 1000 | 1500       |            |
| 2R2       | 2.2       |         |            | EXTENDED VOLTAGE | 160        | 16        |                 |            |      | 121       | 120       |                 |            | 911  | 910       |           |      |            |            |
| 2R4       | 2.4       |         |            |                  | 180        | 18        |                 |            |      | 131       | 130       |                 |            | 102  | 1000      |           |      |            |            |
| 2R7       | 2.7       |         |            |                  | 200        | 20        |                 |            |      | 151       | 150       |                 |            | 112  | 1100      |           |      |            |            |
| 3R0       | 3.0       |         |            |                  | 220        | 22        | F, G, J<br>K, M |            |      | 161       | 160       |                 |            | 122  | 1200      |           |      |            |            |
| 3R3       | 3.3       |         |            |                  | 240        | 24        |                 |            |      | 181       | 180       |                 |            | 152  | 1500      |           | 500  |            |            |
| 3R6       | 3.6       |         |            |                  | 270        | 27        |                 |            |      | 201       | 200       |                 |            | 182  | 1800      |           |      | 800        |            |
| 3R9       | 3.9       |         |            |                  | 300        | 30        |                 |            |      | 221       | 220       |                 |            | 222  | 2200      |           |      |            |            |
| 4R3       | 4.3       |         |            |                  | 330        | 33        |                 |            |      | 241       | 240       |                 |            | 242  | 2400      |           | 300  |            |            |
| 4R7       | 4.7       |         |            |                  | 360        | 36        |                 |            |      | 271       | 270       |                 |            | 272  | 2700      |           |      | 500        |            |

VRMS = 0.707 x WVDC

• SPECIAL VALUES, TOLERANCES, HIGHER WVDC AND MATCHING AVAILABLE. • ENCAPSULATION OPTION AVAILABLE. PLEASE CONSULT FACTORY.

| 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% |

### ATC PART NUMBER CODE



The above part number refers to a 100 C Series (case size C) 10 pF capacitor, J tolerance (±5%), 2500 WVDC, with W termination (Tin/Lead, Solder Plated over Nickel Barrier), laser marking and ATC Waffle-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 North America

+1-631-622-4700 • sales@atceramics.com


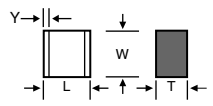
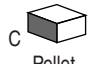
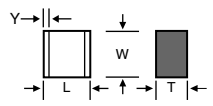

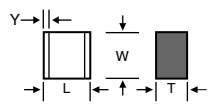
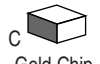
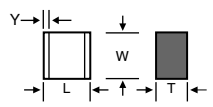
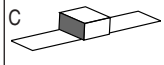
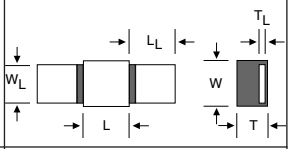

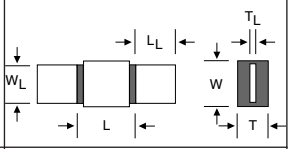
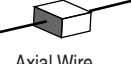
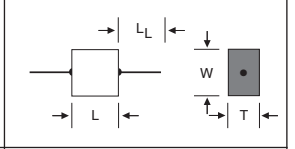

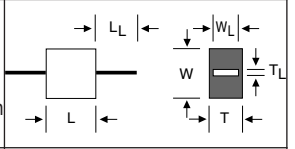

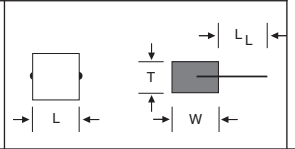
ATC Europe

+46 8 6800410 • sales@atceramics-europe.com

ATC Asia

+86-755-2396-8759 • sales@atceramics-asia.com

# ATC 100 C Capacitors: Mechanical Configurations

| ATC SERIES & CASE SIZE | ATC TERM. CODE | 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)                                   | MATERIAL   |     |  |  |
| 100C                   | W              | <br>Solder Plate              |    | .230<br>+0.020 -.010<br>(5.84<br>+0.51<br>-0.25) |           |               | .040 (1.02)<br>max.                           | Tin/Lead, Solder Plated over Nickel Barrier Termination  |     |  |  |
| 100C                   | P              | <br>Pellet                    |    | .230<br>+0.025 -.010<br>(5.84<br>+0.64<br>-0.25) |           |               |   | Heavy Tin/Lead Coated, over Nickel Barrier Termination   |     |  |  |
| 100C                   | T              | <br>Solderable Nickel Barrier |    | .230<br>+0.020 -.010<br>(5.84<br>+0.51<br>-0.25) |           |               |   | <b>RoHS Compliant</b><br>Tin Plated over Nickel Barrier Termination  |     |  |  |
| 100C                   | CA             | <br>Gold Chip                 |    | .230<br>+0.020 -.010<br>(5.84<br>+0.51<br>-0.25) |           |               |   | <b>RoHS Compliant</b><br>Gold Plated over Nickel Barrier Termination   |     |  |  |
| 100C                   | MS             | <br>Microstrip               |   | .250 ±.015<br>(6.35 ±0.38)                       |           |               |   | High Purity Silver Leads<br>$L_L = .500$ (12.7) min.<br>$W_L = .240 \pm .005$ (6.10 ±.127)<br>$T_L = .004 \pm .001$ (.102 ±.025)<br>Leads are Attached with High Temperature Solder. |     |  |  |
| 100C                   | AR             | <br>Axial Ribbon            |  |  |           |               |   | .245 ±.025<br>(6.22 ±0.64)   | N/A |  | Silver-plated Copper Leads<br>$L_L = 2.25$ (57.15) min.<br>Dia. = .032 ±.002 (0.81 ±0.05)              |
| 100C                   | AW             | <br>Axial Wire              |  |  |           |               |   |  |     |  | Silver Leads<br>$L_L = .500$ (12.7) min.<br>$W_L = **$ See below<br>$T_L = .004 \pm .001$ (.102 ±.025) |
| 100C                   | VA             | <br>Vertical Axial Ribbon   |  |  |           |               |   |  |     |  |  |
| 100C                   | RW             | <br>Radial Wire             |  |  |           |               |   |  |     |  |  |

Custom lead styles and lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.  
 \*\* $W_L = .110$  (2.79) for capacitance values  $\leq 680$  pF;  $W_L = .130$  (3.30) for capacitance values  $> 680$  pF

**A M E R I C A N T E C H N I C A L C E R A M I C S**

ATC North America

+1-631-622-4700 • sales@atceramics.com

ATC Europe

+46 8 6800410 • sales@atceramics-europe.com

ATC Asia

+86-755-2396-8759 • sales@atceramics-asia.com

# ATC 100 C Capacitors: Non-Magnetic Mechanical Configurations

| ATC SERIES & CASE SIZE | ATC TERM. CODE | 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   |
| 100C                   | WN             | C<br>Non-Mag Solder Plate       |  | .230<br>+.025 -.010<br>(5.84<br>+.64<br>-.25) | .250 ±.015<br>(6.35 ±0.38) | .145 (3.68)<br>max. for<br>capacitance<br>values<br>≤ 680 pF; | .040 (1.02)<br>max.                           | Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination   |
| 100C                   | PN             | C<br>Non-Mag Pellet             |  | .230<br>+.035 -.010<br>(5.84<br>+.89<br>-.25) |                            |   |   | Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination  |
| 100C                   | TN             | C<br>Non-Mag Solderable Barrier |  | .230<br>+.025 -.010<br>(5.84<br>+.64<br>-.25) |                            |   |   | .165 (4.19)<br>max. for<br>capacitance<br>values<br>> 680 pF.   |
| 100C                   | MN             | C<br>Non-Mag Microstrip         |  | .245 ±.025<br>(6.22 ±0.64)                    |                            |   |   | High Purity Silver Leads<br>L <sub>L</sub> = .500 (12.7) min.<br>W <sub>L</sub> = .240 ±.005 (6.10 ±.127)<br>T <sub>L</sub> = .004 ±.001 (.102 ±.025)<br>Leads are Attached with High Temperature Solder. |

Custom lead styles and 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 C Vertical Mount

| Cap Value | Pad Size     | A Min. | B Min. | C Min. | D Min. |
|-----------|--------------|--------|--------|--------|--------|
| < 680 pF  | Normal       | .150   | .050   | .200   | .300   |
|           | High Density | .130   | .030   | .200   | .260   |
| > 680 pF  | Normal       | .185   | .050   | .200   | .300   |
|           | High Density | .165   | .030   | .200   | .260   |

Horizontal Mount

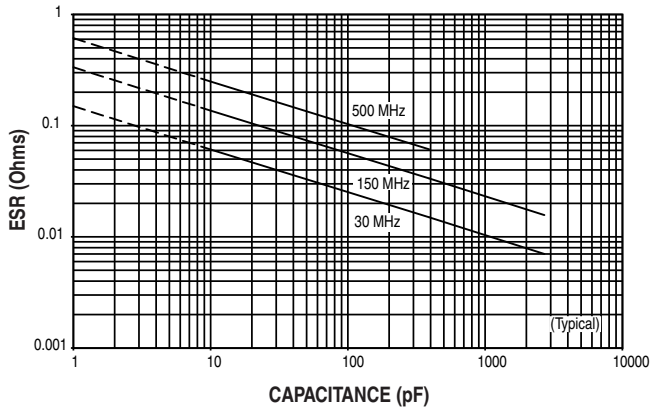
| All values | Pad Size     | A Min. | B Min. | C Min. | D Min. |
|------------|--------------|--------|--------|--------|--------|
| All values | Normal       | .280   | .050   | .200   | .300   |
|            | High Density | .260   | .030   | .200   | .260   |

**A M E R I C A N T E C H N I C A L C E R A M I C S**

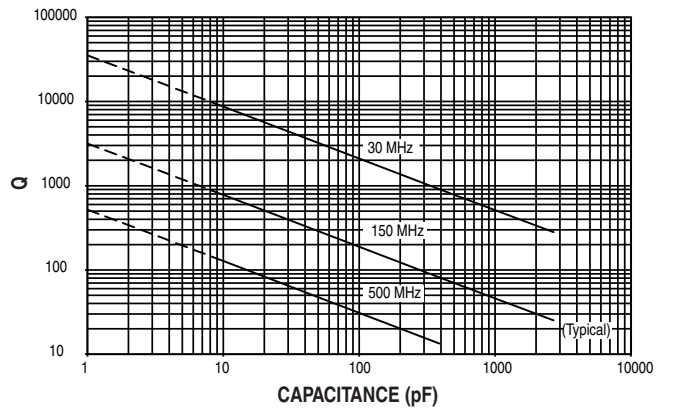
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 +1-631-622-4700 • sales@atceramics.com      +46 8 6800410 • sales@atceramics-europe.com      +86-755-2396-8759 • sales@atceramics-asia.com

# ATC 100 C Performance Data

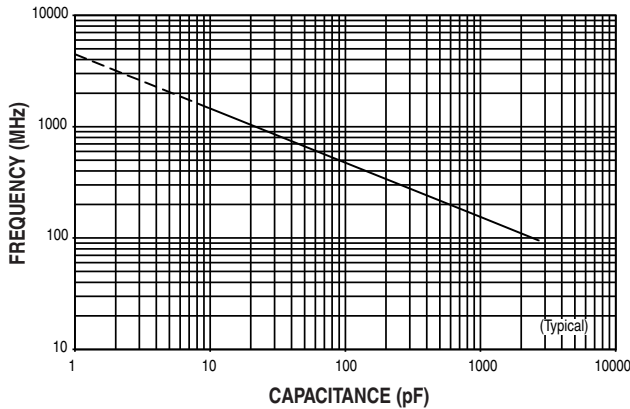
**ESR VS. CAPACITANCE  
ATC SERIES 100, CASE C**



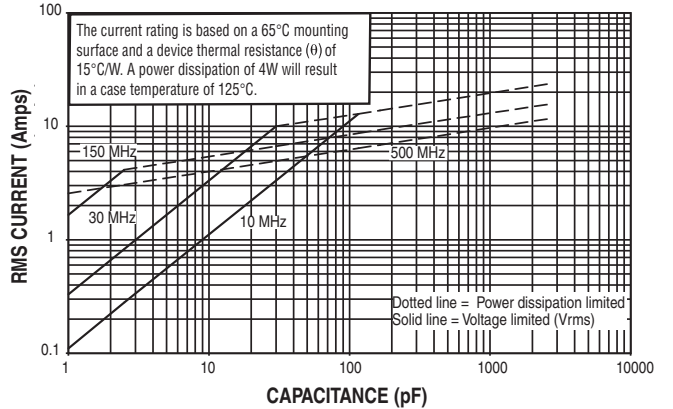
**Q VS. CAPACITANCE  
ATC SERIES 100, CASE C**



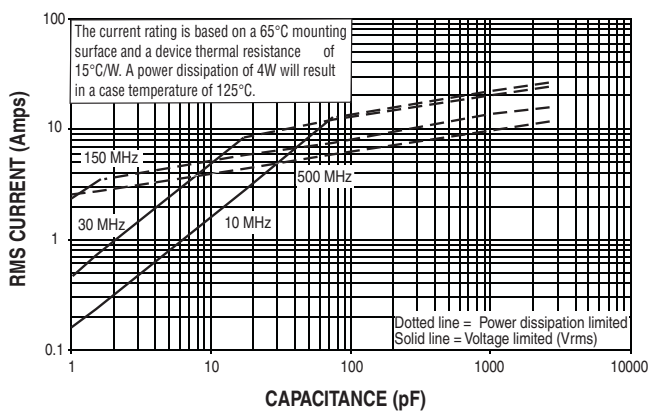
**SERIES RESONANCE VS. CAPACITANCE  
ATC SERIES 100, CASE C**



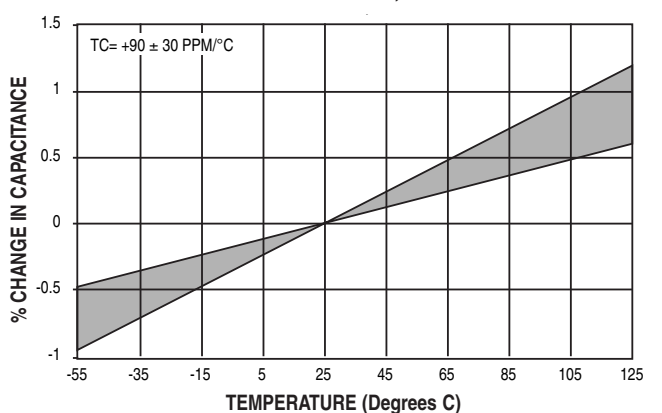
**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 100, CASE C**



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



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



**A M E R I C A N T E C H N I C A L C E R A M I C S**

ATC North America  
+1-631-622-4700 • sales@atceramics.com

ATC Europe  
+46 8 6800410 • sales@atceramics-europe.com

ATC Asia  
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**ATC North America**  
+1-631-622-4700  
sales@atceramics.com

**ATC Europe**  
+46 8 6800410  
sales@atceramics-europe.com

**ATC Asia**  
+86-755-2386-8759  
sales@atceramics-asia.com



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