

# **ATC 180 R Series NPO Porcelain Ultra-Low ESR Multilayer Capacitors**

- Case R Size (.070" x .105")
- Capacitance Range 0.5 pF to 100 pF
- High Q
- High Self-Resonance
- ATC's Lowest ESR
- 500 WVDC
- ATC's Lowest Noise
- High Reliability

ATC, the industry leader, is announcing new improved ESR/ESL performance for the 180 R Series RF/Microwave Capacitors. This is ATC's lowest ESR multilayer capacitor. The high Q, high self-resonance characteristic supports many RF/Microwave applications.

Self-encapsulating porcelain construction provides a rugged, hermetic package without the need or liability of external encapsulants.

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

Typical circuit applications: RF Power Amplifiers, Filters, Oscillators, Timing Circuits and Delay Lines.

## **ENVIRONMENTAL TESTS**

ATC 180 R Series Capacitors are designed and manufactured to meet and exceed the requirements of EIA-198, MIL-C-55681 and MIL-C-123.

### **THERMAL SHOCK:**

MIL-STD-202, Method 107, Condition A.

### **MOISTURE RESISTANCE:**

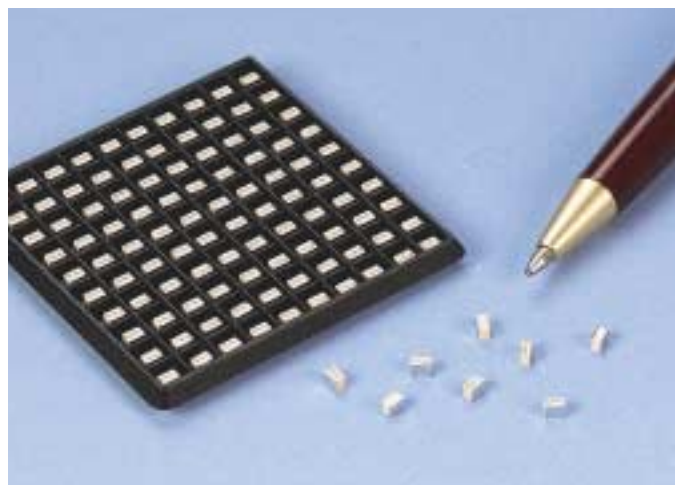
MIL-STD-202, Method 106.

### **LOW VOLTAGE HUMIDITY:**

MIL-STD-202, Method 103, Condition A, with 1.5 Volts D.C. 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.  
200% WVDC applied.



## **ELECTRICAL AND MECHANICAL SPECIFICATIONS**

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

### **TEMPERATURE COEFFICIENT OF CAPACITANCE (TCC):**

0  $\pm$  30 PPM/°C (-55°C to +125°C).

0  $\pm$  60 PPM/°C (+125°C to +175°C).

### **INSULATION RESISTANCE (IR):**

0.5 pF to 100 pF:

10<sup>6</sup> Megohms min. @ +25°C at rated WVDC.

10<sup>5</sup> Megohms min. @ +125°C at rated WVDC.

10<sup>4</sup> Megohms min. above +125°C.

**WORKING VOLTAGE (WVDC):** 500 WVDC.

### **DIELECTRIC WITHSTANDING VOLTAGE (DWV):**

Case R: 250% of rated WVDC for 5 secs.

**AGING EFFECTS:** None

### **PIEZOELECTRIC EFFECTS:** None

(No capacitance variation with voltage or pressure).

**CAPACITANCE DRIFT:**  $\pm$ (0.02% or 0.02 pF), whichever is greater.

### **OPERATING TEMPERATURE RANGE:**

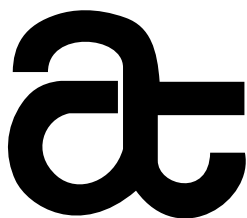
From -55°C to +175°C (No derating of working voltage).

### **TERMINATION STYLES:**

Termination code W (nickel barrier, solder plated).

See Mechanical Configuration, page 2.

**TERMINAL STRENGTH:** Terminations for chips withstand a pull of 5 lbs. min., 15 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor.



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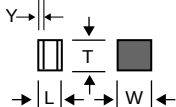
phone: 631-622-4700 • fax: 631-622-4748 • e-mail: [sales@atceramic](mailto:sales@atceramic) ATC # 001-810 Rev. E  
<http://www.atceramics.com> 12/00; 1 of 8

## ATC 180 R Capacitance Values

| CAP. CODE | CAP. (pF) | TOL. | RATED WVDC | CAP. CODE | CAP. (pF) | TOL.    | RATED WVDC | CAP. CODE | CAP. (pF) | TOL.    | RATED WVDC |
|-----------|-----------|------|------------|-----------|-----------|---------|------------|-----------|-----------|---------|------------|
| 0R5       | 0.5       |      |            | 3R0       | 3.0       |         |            | 200       | 20        |         |            |
| 0R6       | 0.6       |      |            | 3R3       | 3.3       |         |            | 220       | 22        |         |            |
| 0R7       | 0.7       |      |            | 3R6       | 3.6       |         |            | 240       | 24        |         |            |
| 0R8       | 0.8       |      |            | 3R9       | 3.9       | C, D    |            | 270       | 27        |         |            |
| 0R9       | 0.9       |      |            | 4R3       | 4.3       |         |            | 300       | 30        |         |            |
| 1R0       | 1.0       |      |            | 4R7       | 4.7       |         |            | 330       | 33        |         |            |
| 1R1       | 1.1       |      |            | 5R1       | 5.1       |         |            | 360       | 36        |         |            |
| 1R2       | 1.2       |      |            | 5R6       | 5.6       |         |            | 390       | 39        |         |            |
| 1R3       | 1.3       |      |            | 6R2       | 6.2       |         |            | 430       | 43        | J, K, M |            |
| 1R4       | 1.4       | C, D |            | 6R8       | 6.8       |         |            | 470       | 47        |         |            |
| 1R5       | 1.5       |      | 500        | 7R5       | 7.5       |         | 500        | 510       | 51        |         | 500        |
| 1R6       | 1.6       |      |            | 8R2       | 8.2       |         |            | 560       | 56        |         |            |
| 1R7       | 1.7       |      |            | 9R1       | 9.1       |         |            | 620       | 62        |         |            |
| 1R8       | 1.8       |      |            | 100       | 10        | J, K, M |            | 680       | 68        |         |            |
| 1R9       | 1.9       |      |            | 110       | 11        |         |            | 750       | 75        |         |            |
| 2R0       | 2.0       |      |            | 120       | 12        |         |            | 820       | 82        |         |            |
| 2R1       | 2.1       |      |            | 130       | 13        |         |            | 910       | 91        |         |            |
| 2R2       | 2.2       |      |            | 150       | 15        |         |            | 101       | 100       |         |            |
| 2R4       | 2.4       |      |            | 160       | 16        |         |            |           |           |         |            |
| 2R7       | 2.7       |      |            | 180       | 18        |         |            |           |           |         |            |

VRMS = 0.707 x WVDC

## Mechanical Configuration

| ATC SERIES & CASE SIZE | ATC TERM. CODE | CASE SIZE & TYPE                                                                                   | OUTLINES<br><br>W/T IS A TERMINATION SURFACE                                        | BODY DIMENSIONS<br>Inches (mm) |                            |                        | LEAD AND TERMINATION DIMENSIONS AND MATERIALS  |                                                                                                                                      |
|------------------------|----------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------|----------------------------|------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                        |                |                                                                                                    |                                                                                     | LENGTH (L)                     | WIDTH (W)                  | THICKNESS (T)          | OVERLAP (Y)                                    | MATERIALS                                                                                                                            |
| 180R                   | W              | R  Solder Plate |  | .070 ±.015<br>(1.78 ±0.38)     | .105 ±.010<br>(2.67 ±0.25) | .090<br>(2.29)<br>max. | .010<br>+.010 - .005<br>(0.25<br>+.025 - 0.13) | <b>SOLDER PLATE</b><br>Nickel barrier, solder plated. Rugged, high performance termination for lower cost, high volume applications. |

All 180 R Capacitors are available laser marked with ATC's identification, capacitance code and tolerance.

### ATC PART NUMBER CODE

Series ATC180

Case Size R

Capacitance Code: 10 0  
First 2 significant digits for capacitance.  
R=Decimal Point

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

W

500

X

B

Packaging  
T - Tape and Reel (7" Reel)  
B - Bulk Packaging (packed in plastic bags)  
C - ATC Cap-Pac®  
I - Special Packaging. Consult Factory

Laser Marking

WVDC

Termination Code

| CAPACITANCE TOLERANCE |          |         |     |      |      |
|-----------------------|----------|---------|-----|------|------|
| Code                  | C        | D       | J   | K    | M    |
| Tol.                  | ±0.25 pF | ±0.5 pF | ±5% | ±10% | ±20% |

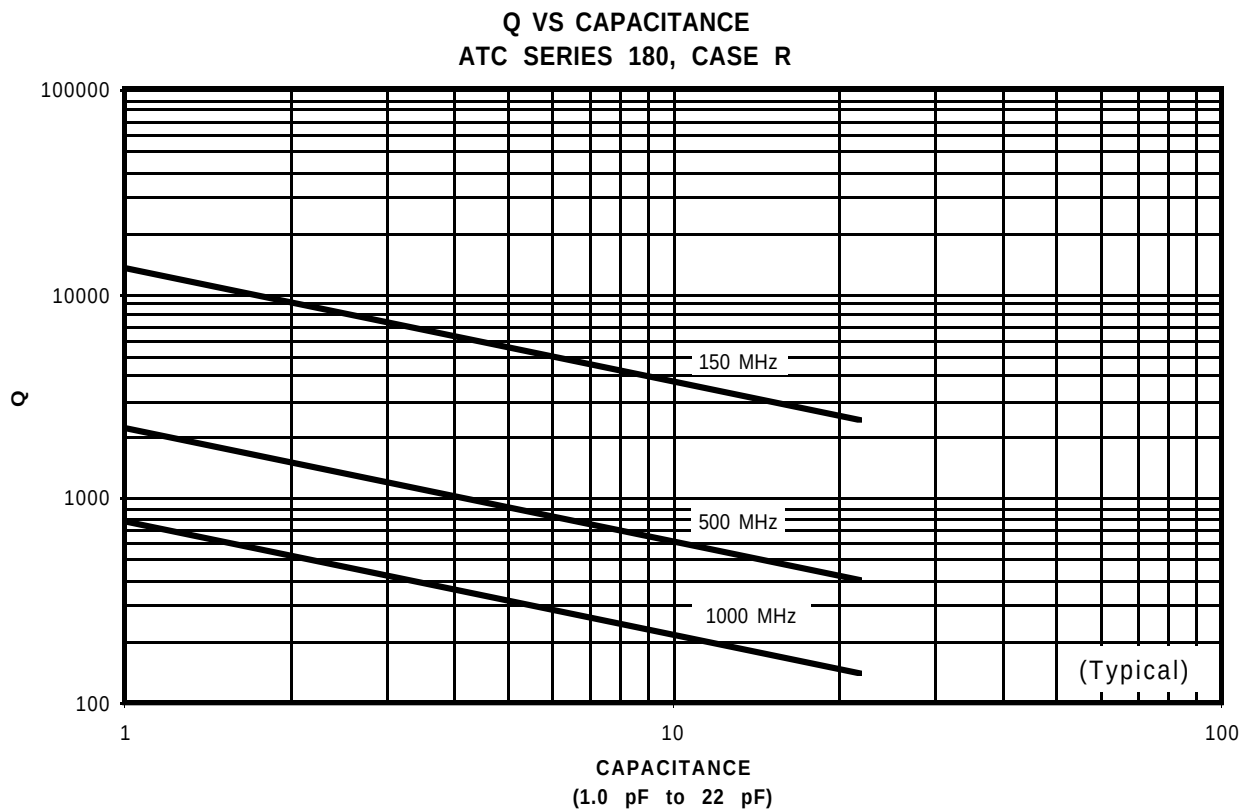
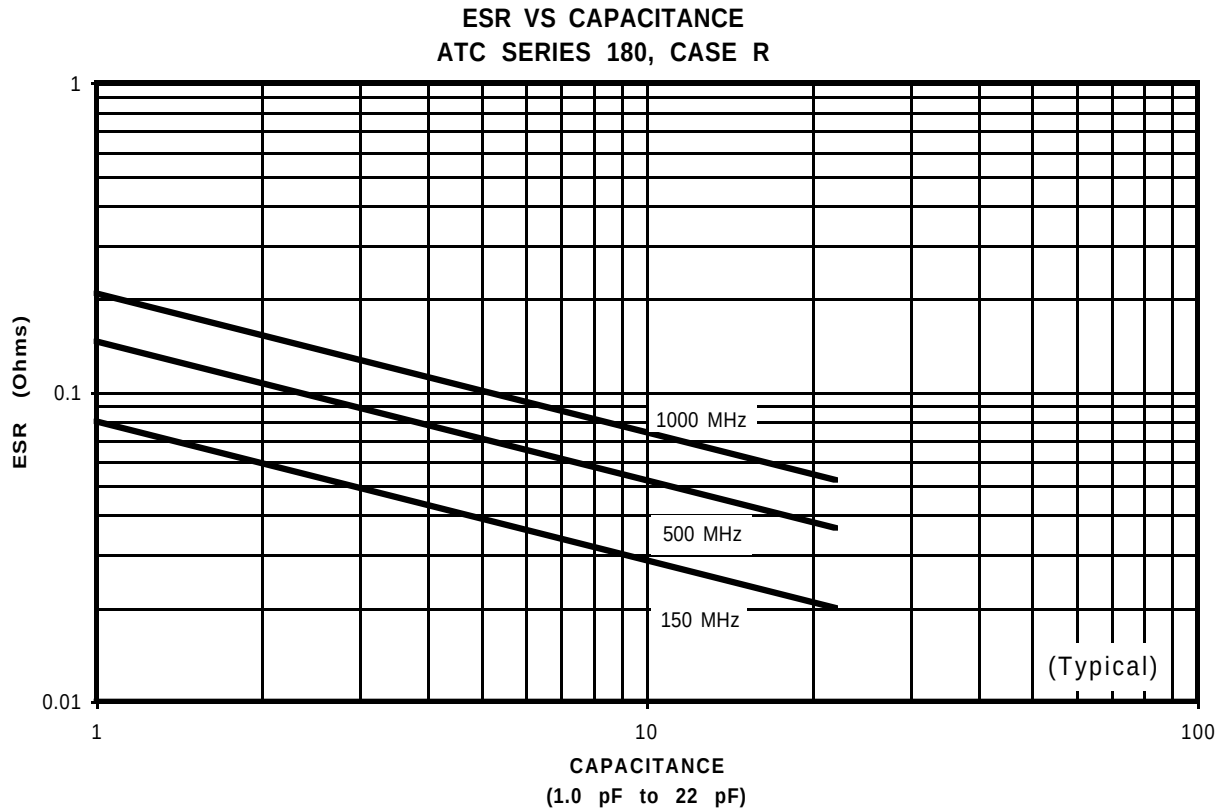
The above part number refers to a 180 R Series (case size R) 10 pF capacitor, J tolerance (±5%), 500 WVDC, with W termination (solder plate), laser marking and bulk packaging.

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.

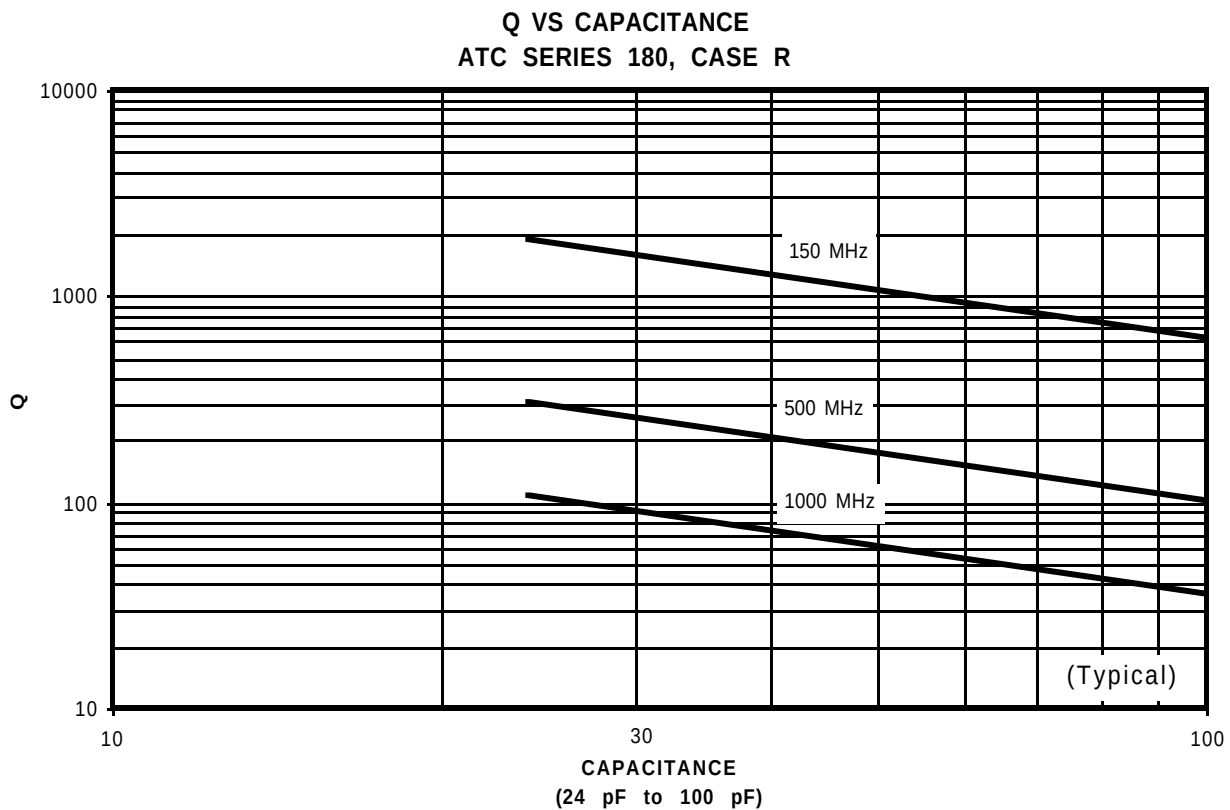
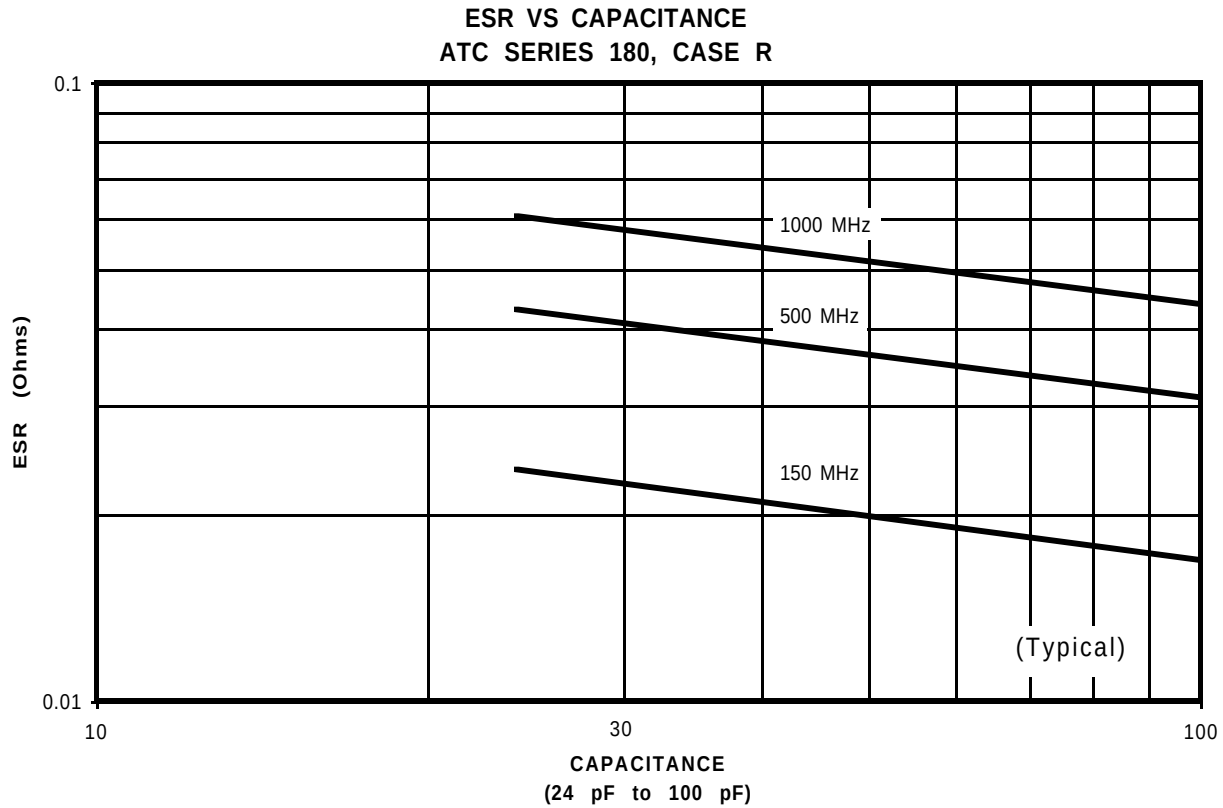
For additional information and catalogs contact your ATC representative or call direct at (631) 622-4700.

Consult factory for additional performance data.

# ATC 180 R Performance Data

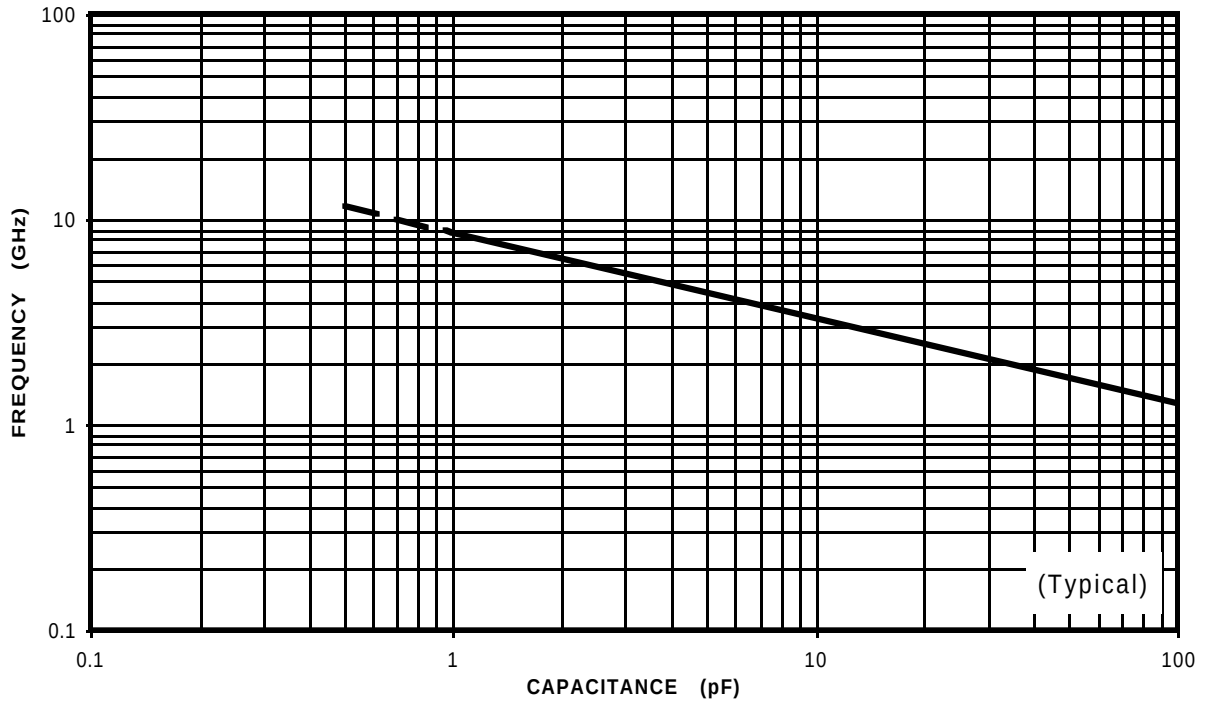


# ATC 180 R Performance Data

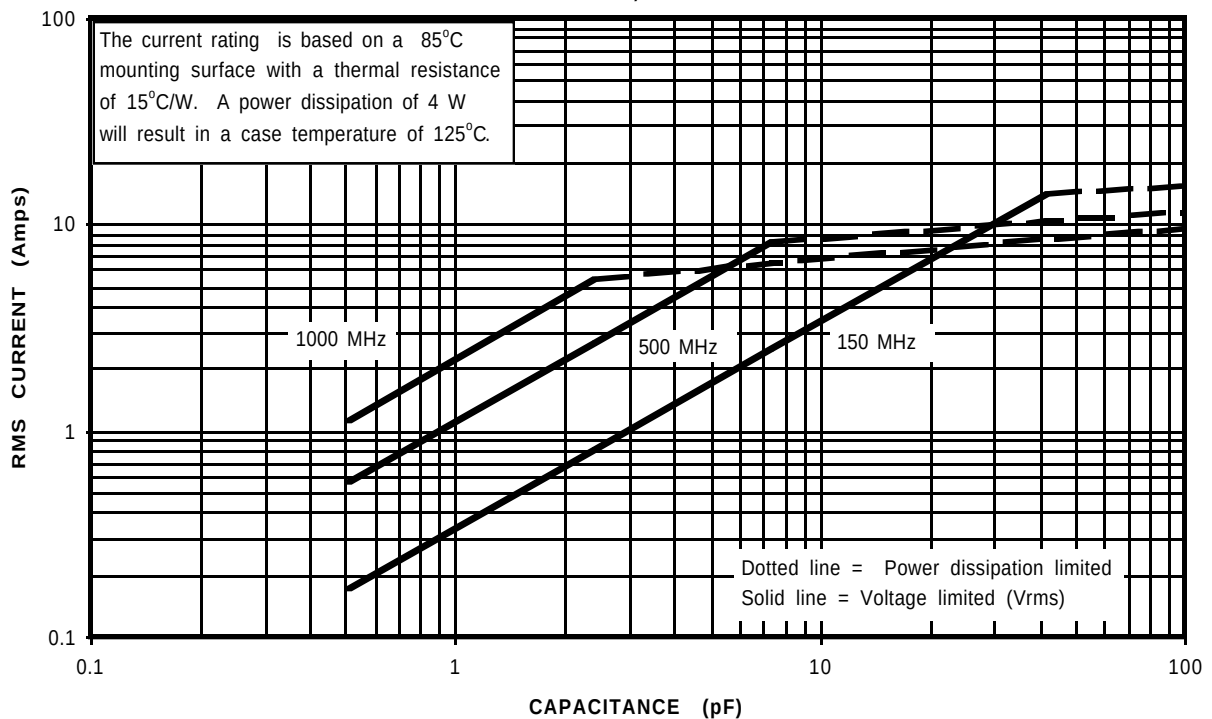


# ATC 180 R Performance Data

SERIES RESONANCE VS CAPACITANCE  
SERIES 180, CASE R

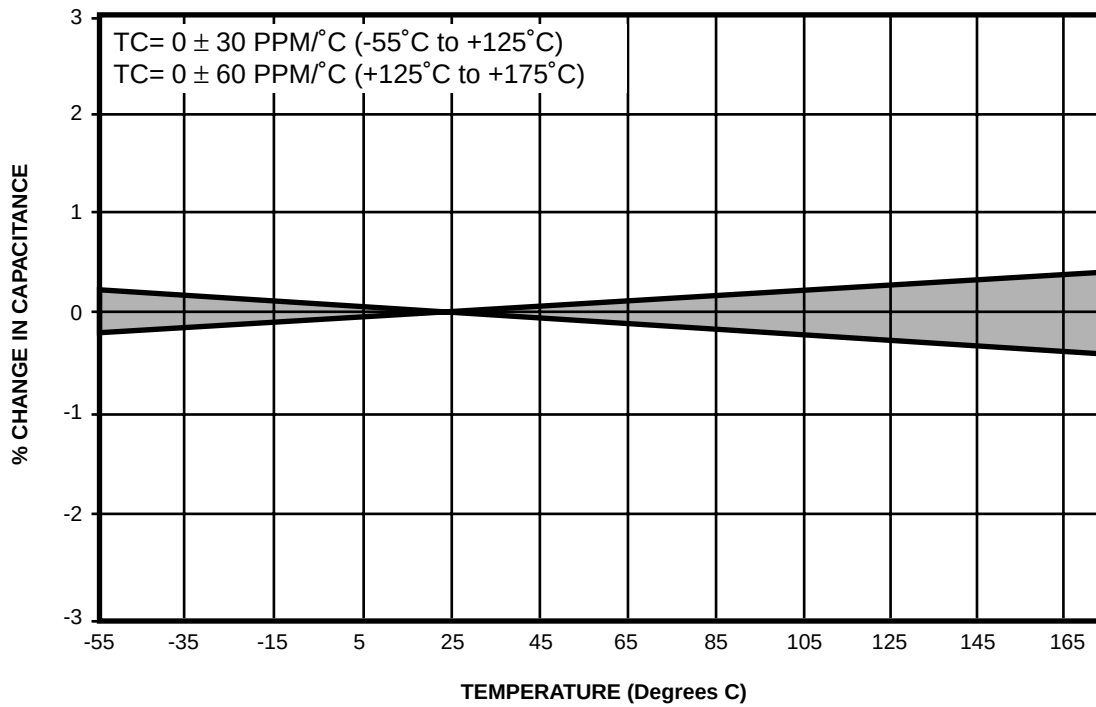


CURRENT RATING VS CAPACITANCE  
ATC SERIES 180, CASE R



# ATC 180 R Performance Data

## CAPACITANCE CHANGE VS TEMPERATURE ATC SERIES 180, CASE R



## ***Notes***



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