

# ATC 600S Series Ultra-Low ESR, High Q, NPO RF & Microwave Capacitors

## Features:

- **Lowest ESR in Class**
- Highest Working Voltage in class – 250V
- Standard EIA Size: 0603
- Laser Marking (Optional)
- RoHS Compliant
- High Self Resonance Frequencies

## Applications:

- Cellular Base Stations
- Wireless Communications
- Broadband Wireless Services
- Satellite Communications
- WiMAX (802.16)

## Circuit Applications:

- Filter Networks
- High Q Frequency Sources
- Matching Networks
- Tuning, Coupling, Bypass and DC Blocking



## ATC 600 SERIES OVERVIEW

| ATC Series | ATC Case Size | EIA Case Size |
|------------|---------------|---------------|
| 600        | L             | 0402          |
| <b>600</b> | <b>S</b>      | <b>0603</b>   |
| 600        | F             | 0805          |

## Electrical Specifications

|  |   |
|--|---|
| <b>Capacitance:</b>                                  | 0.1 to 100 pF   |
| <b>Tolerances:</b>                                   | See Cap Value Chart   |
| <b>Working Voltage (WVDC):</b>                       | 250 V   |
| <b>Quality Factor (Q):</b>                           | > 2000 @ 1 MHz  |
| <b>Operating Temperature Range:</b>                  | -55°C to +125°C<br>(no derating of working voltage)   |
| <b>Temperature coefficient of Capacitance (TCC):</b> | 0 ± 30 ppm/°C, -55°C to +125°   |
| <b>Insulation Resistance:</b>                        | 10 <sup>5</sup> MΩ min. at +25°C at rated WVDC<br>10 <sup>4</sup> MΩ min. at +125°C at rated WVDC |
| <b>Dielectric Withstanding Voltage (DWV):</b>        | 2.5 x WVDC for 5 seconds  |
| <b>Aging:</b>  | None  |
| <b>Piezo Effects:</b>                                | None  |

## Mechanical Specifications

|                           |  |
|---------------------------|--|
| <b>Terminations:</b>      | T = Tin Plated over Nickel Barrier* (Standard)<br>TN = Tin Plated over Non-Magnetic Barrier*<br>W = Tin/Lead Solder Plated over Nickel Barrier |
| <b>Solderability:</b>     | Solder coverage > 90% of end termination   |
| <b>Terminal Strength:</b> | 4 lbs. Typ., 2 lbs. min.   |

## Environmental Specifications

|                             |                               |
|-----------------------------|-------------------------------|
| <b>Life Test:</b>           | 2000 hours, +125°C at 2X WVDC |
| <b>Thermal Shock:</b>       | 5 cycles, -55°C to +125°C     |
| <b>Moisture Resistance:</b> | MIL-STD-202, Method 106       |

## Military Approval

DSCC Drawing Number 05002



ATC 600 Series Capacitors are designed and manufactured to meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123.



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ATC 001-924; Rev. S, 1/15

# ATC 600S Series Ultra-Low ESR, High Q NPO RF & Microwave Capacitors

## Capacitance Values

| Value (pF) | Cap Code | Marking | Tolerances | Value (pF) | Cap Code | Marking | Tolerances    | Value (pF) | Cap Code | Marking | Tolerances    |
|------------|----------|---------|------------|------------|----------|---------|---------------|------------|----------|---------|---------------|
| 0.1        | 0R1      | A9      | A, B       | 2.7        | 2R7      | L0      | A, B, C, D    | 20         | 200      | H1      | F, G, J, K, M |
| 0.2        | 0R2      | H9      | A, B       | 3.0        | 3R0      | M0      | A, B, C, D    | 22         | 220      | J1      | F, G, J, K, M |
| 0.3        | 0R3      | M9      | A, B, C    | 3.3        | 3R3      | N0      | A, B, C, D    | 24         | 240      | K1      | F, G, J, K, M |
| 0.4        | 0R4      | d9      | A, B, C    | 3.6        | 3R6      | P0      | A, B, C, D    | 27         | 270      | L1      | F, G, J, K, M |
| 0.5        | 0R5      | f9      | A, B, C    | 3.9        | 3R9      | Q0      | A, B, C, D    | 30         | 300      | M1      | F, G, J, K, M |
| 0.6        | 0R6      | m9      | A, B, C    | 4.3        | 4R3      | R0      | A, B, C, D    | 33         | 330      | N1      | F, G, J, K, M |
| 0.7        | 0R7      | n9      | A, B, C    | 4.7        | 4R7      | S0      | A, B, C, D    | 36         | 360      | P1      | F, G, J, K, M |
| 0.8        | 0R8      | t9      | A, B, C    | 5.1        | 5R1      | T0      | A, B, C, D    | 39         | 390      | Q1      | F, G, J, K, M |
| 0.9        | 0R9      | y9      | A, B, C    | 5.6        | 5R6      | U0      | A, B, C, D    | 43         | 430      | R1      | F, G, J, K, M |
| 1.0        | 1R0      | A0      | A, B, C, D | 6.2        | 6R2      | V0      | A, B, C, D    | 47         | 470      | S1      | F, G, J, K, M |
| 1.1        | 1R1      | B0      | A, B, C, D | 6.8        | 6R8      | W0      | B, C, J, K    | 51         | 510      | T1      | F, G, J, K, M |
| 1.2        | 1R2      | C0      | A, B, C, D | 7.5        | 7R5      | X0      | B, C, J, K    | 56         | 560      | U1      | F, G, J, K, M |
| 1.3        | 1R3      | D0      | A, B, C, D | 8.2        | 8R2      | Y0      | B, C, J, K    | 62         | 620      | V1      | F, G, J, K, M |
| 1.5        | 1R5      | E0      | A, B, C, D | 9.1        | 9R1      | Z0      | B, C, J, K    | 68         | 680      | W1      | F, G, J, K, M |
| 1.6        | 1R6      | F0      | A, B, C, D | 10         | 100      | A1      | F, G, J, K, M | 75         | 750      | X1      | F, G, J, K, M |
| 1.8        | 1R8      | G0      | A, B, C, D | 11         | 110      | B1      | F, G, J, K, M | 82         | 820      | Y1      | F, G, J, K, M |
| 2.0        | 2R0      | H0      | A, B, C, D | 12         | 120      | C1      | F, G, J, K, M | 91         | 910      | Z1      | F, G, J, K, M |
| 2.2        | 2R2      | J0      | A, B, C, D | 15         | 150      | E1      | F, G, J, K, M | 100        | 101      | A2      | F, G, J, K, M |
| 2.4        | 2R4      | K0      | A, B, C, D | 18         | 180      | G1      | F, G, J, K, M |            |          |         |               |

\*Non-standard values and custom tolerances are available upon request.

## ATC Part Number Code



\*4,000 pieces on 7" reel and 500 pieces on prototype reel. Consult ATC for other options.

The above part number refers to a 600S Series (case size S) 0.2 pF capacitor, B tolerance (±0.1pF), 250 WVDC, with T termination (Tin Plated over Nickel Barrier, RoHS Compliant), Laser Marking and Tape and Reel packaging.

\*\*Marking is optional.

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 500 piece reels for prototyping.  
 Consult factory for additional performance data.

Typical Performance Data

600S ESR vs Capacitance



600S ESR vs Frequency



# ATC 600S Series Ultra-Low ESR, High Q NPO RF & Microwave Capacitors



#### ATC 600 Series Data Sheet Test Condition Description

Capacitors horizontally mounted on 13.3-mil thick Rogers RO4350<sup>®</sup> softboard, 29-mil wide, 1/2 oz. Cu traces.

**FSR** = lowest frequency at which S11 response, referenced at capacitor edge, crosses real axis on Smith Chart.

**FPR** = lowest frequency at which there is a notch in S21 magnitude response.

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# ATC 600S Series Ultra-Low, High Q ESR, NPO RF & Microwave Capacitors

## Outline Dimensions

|  |                 |   |  |
|--|-----------------|---|--|
|  | <b>S (0603)</b> | L: $.063 \pm .006$ (1.60 $\pm$ .15)<br>W: $.032 \pm .006$ (.81 $\pm$ .15) | T: .035 max. (0.89 max.)<br>Y: $.014 \pm .006$ (0.36 $\pm$ 0.15) |
|  | Inches (mm)     |   |  |

## Suggested Mounting Pad Dimensions

|             |                       |                 |                 |                 |
|-------------|-----------------------|-----------------|-----------------|-----------------|
|             | Case Sizes L, S and F |                 |                 |                 |
|             | Case Size             | A Min.          | B Min.          | C Min.          |
| 0402 (1005) | .0275<br>(0.70)       | .0354<br>(0.90) | .0157<br>(0.40) | .0866<br>(2.20) |
| 0603 (1608) | .0393<br>(1.00)       | .0433<br>(1.10) | .0236<br>(0.60) | .110<br>(2.80)  |
| 0805 (2012) | .0590<br>(1.50)       | .0512<br>(1.30) | .0236<br>(0.60) | .1259<br>(3.20) |
| Inches (mm) |                       |                 |                 |                 |

**Design Kits** Each Kit contains a selection of standard capacitor values for circuit prototyping.

| Kit #   | Item #  | Description   | Cap. Value Range (pF) | Cap. Values (pF)  | Tol. (pF)  | Price   |
|---------|---------|---|-----------------------|---|------------|---------|
| Kit 25T | DK0025T | 600S Series Ultra-low ESR, High Q Microwave Capacitors<br>16 different values, 15 pcs. min. per value | 0.1 to 2.0            | 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.5 | $\pm 0.1$  | \$90.00 |
|         |         |   |                       | 1.6, 1.8, 2.0   | $\pm 0.25$ |         |
| Kit 26T | DK0026T | 600S Series Ultra-low ESR, High Q Microwave Capacitors<br>16 different values, 15 pcs. min. per value | 1.0 to 10             | 1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.4, 2.7, 3.0, 3.3                | $\pm 0.1$  | \$90.00 |
|         |         |   |                       | 3.9, 4.7, 5.6, 6.8, 8.2   | $\pm 0.25$ |         |
|         |         |   |                       | 10  | $\pm 5\%$  |         |
| Kit 27T | DK0027T | 600S Series Ultra-low ESR, High Q Microwave Capacitors<br>16 different values, 15 pcs. min. per value | 10 to 100             | 10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100 | $\pm 5\%$  | \$90.00 |

For Online Kit Orders, Catalog & Application Notes, Visit: [www.atceramics.com](http://www.atceramics.com)

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