ATC 650 Series RF Capacitors

Low ESR/High Q at Wireless Frequencies

Features:

- Low ESR at Wireless Frequencies
- Standard EIA Sizes: 0402, 0603, 0805
- Ultra-Stable NPO Performance
- High Self Resonance Frequencies

Applications:

- Cellular / Subscriber Products
- Wireless LAN / Wireless Local Loop
- Broadband Wireless Services
- GPS Portables
- Point-to-Point/Point-to-MultiPoint Radio

Circuits:

- Filter Networks
- Matching Networks
- Tuning, Coupling, Bypass and DC Block

Electrical Specifications

Parameters	Case Size L (0402)	Case Size S (0603)	Case Size F (0805)
Capacitance:	0.1 to 15 pF*	0.1 to 47 pF*	0.2 to 150 pF*
Tolerances:	0.1 to 2.2 pF: A, B, C 2.7 to 8.2 pF: B, C 10 to 15 pF: F, G, J	0.1 to 2.2 pF: A, B, C 2.7 to 8.2 pF: B, C 10 to 47 pF: F, G, J	0.2 to 2.2 pF: A, B, C 2.7 to 8.2 pF: B, C 10 to 150 pF: F, G, J
Working Voltage: (WVDC)	0.1 to 15 pF: 25V	0.1 to 18 pF: 200V 22 to 47 pF: 100V	0.2 to 100 pF: 200V 120 to 150 pF: 100V
Typical Series Resonance	1 pF 9.0 GHz 10 pF 3.2 GHz 15 pF 2.6 GHz	1 pF 8.5 GHz 10 pF 3.0 GHz 22 pF 2.1 GHz 47 pF 1.4 GHz	1 pF 8.0 GHz 10 pF 2.7 GHz 47 pF 1.2 GHz 100 pF 1.0 GHz 150 pF 0.8 GHz

*Additional non-standard values available upon request.

Common Electrical Specifications

Temperature coefficient of Capacitance (TCC): 0 ± 30 ppm/°C, -55°C to +125°C

Insulation Resistance: 10^6 MΩ min. at +25°C at WVDC; 10^5 MΩ min. at +125°C at WVDC

Dielectric Withstanding Voltage (DWV): 2.5 x WVDC min. for 5 seconds

Aging None

Piezo Effects None

Common Mechanical Specifications

Termination Material: Tin over nickel barrier

Solderability: Solder coverage > 90% of end termination

Terminal Strength:
0402 – 2 lbs. Typ.
0603 – 2 lbs. Typ.
0805 – 5 lbs. Typ.

Common Environmental Specifications

Life Test: 1000 hours, +125°C at 2✕ WVDC

Thermal Shock: 5 cycles, -55°C/+125°C

Moisture Resistance: 240 hours, 85% Relative Humidity at +85°C

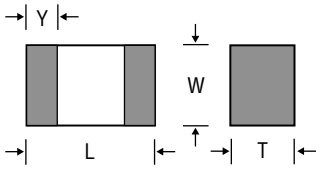
ATC 650 Series RF Capacitors

Capacitance Values*

CAP. VALUE (pF)	CAP. CODE	CASE SIZE L (0402) TOLS.	CASE SIZE S (0603) TOLS.	CASE SIZE F (0805) TOLS.	CAP. VALUE (pF)	CAP. CODE	CASE SIZE L (0402) TOLS.	CASE SIZE S (0603) TOLS.	CASE SIZE F (0805) TOLS.
0.1	0R1	A, B, C	A, B, C		5.6	5R6	B, C	B, C	B, C
0.2	0R2	A, B, C	A, B, C	A, B, C	6.8	6R8	B, C	B, C	B, C
0.3	0R3	A, B, C	A, B, C	A, B, C	8.2	8R2	B, C	B, C	B, C
0.4	0R4	A, B, C	A, B, C	A, B, C	10.0	100	F, G, J	F, G, J	F, G, J
0.5	0R5	A, B, C	A, B, C	A, B, C	12.0	120	F, G, J	F, G, J	F, G, J
0.6	0R6	A, B, C	A, B, C	A, B, C	15.0	150	F, G, J	F, G, J	F, G, J
0.7	0R7	A, B, C	A, B, C	A, B, C	18.0	180		F, G, J	F, G, J
0.8	0R8	A, B, C	A, B, C	A, B, C	22.0	220		F, G, J	F, G, J
0.9	0R9	A, B, C	A, B, C	A, B, C	27.0	270		F, G, J	F, G, J
1.0	1R0	A, B, C	A, B, C	A, B, C	33.0	330		F, G, J	F, G, J
1.2	1R2	A, B, C	A, B, C	A, B, C	39.0	390		F, G, J	F, G, J
1.5	1R5	A, B, C	A, B, C	A, B, C	47.0	470		F, G, J	F, G, J
1.8	1R8	A, B, C	A, B, C	A, B, C	56.0	560			F, G, J
2.2	2R2	A, B, C	A, B, C	A, B, C	68.0	680			F, G, J
2.7	2R7	B, C	B, C	B, C	82.0	820			F, G, J
3.3	3R3	B, C	B, C	B, C	100.0	101			F, G, J
3.9	3R9	B, C	B, C	B, C	120.0	121			F, G, J
4.7	4R7	B, C	B, C	B, C	150.0	151			F, G, J

*Additional non-standard values available upon request.

Outline Dimensions



L (0402)	L: .040 ± .004 (1.02 ± 0.1) W: .020 ± .004 (.51 ± 0.1)	T: .020 ± .004 (.51 ± 0.1) Y: .010 max. (.25 max.)
S (0603)	L: .062 ± .006 (1.57 ± .15) W: .032 ± .006 (.81 ± .15)	T: .030 + .005/-.003 (.76 +.13/-.08) Y: .015 max. (.38 max.)
F (0805)	L: .080 ± .008 (2.03 ± .20) W: .050 ± .008 (1.27 ± .20)	T: .040 ± .006 (1.02 ± .15) Y: .020 max. (.51 max.)

inches(mm)

ATC Part Number Code

ATC 650 S 0R 2 B T 200 T

- 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
  T - Tape and Reel (7" Reel)
  as per EIA 481
  0402: 2mm pitch, 10,000/reel
  0603: 4mm pitch, 4,000/reel
  0805: 4mm pitch, 4,000/reel
- WVDC
- Termination Code
  T = Tin over nickel barrier

TOLERANCE CODE TABLE						
Code	**A**	**B**	**C**	**F**	**G**	**J**
Tol.	±0.05 pF	±0.1 pF	±0.25 pF	±1%	±2%	±5%

The above part number refers to a 650S Series (case size S) 0.2 pF capacitor, B tolerance (±0.1pF), 200 WVDC, with T termination (Tin over nickel barrier) 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 (631) 622-4700.

Consult factory for additional performance data.

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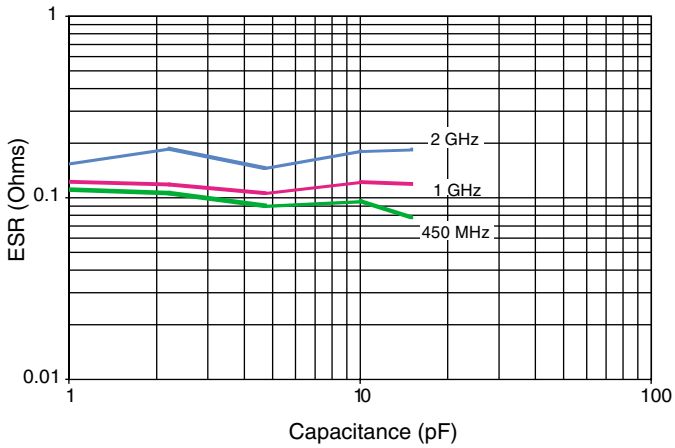
ATC Asia 631-622-4700 sales@atceramics-asia.com

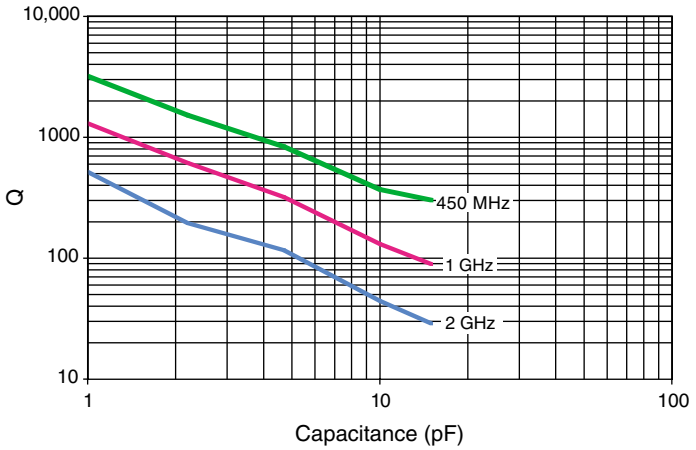
Typical Performance Data

Case Size L - 0402

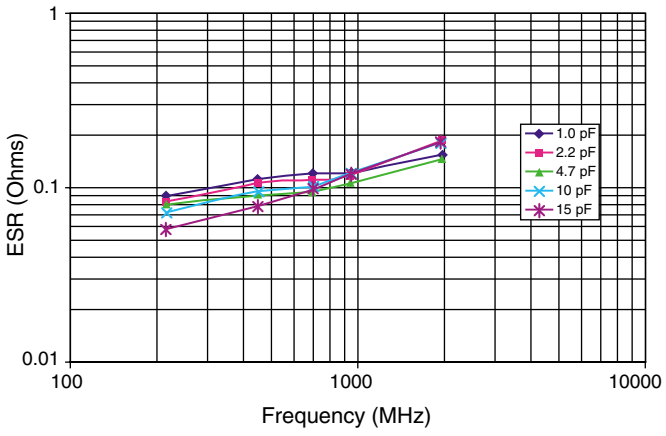
650L ESR vs Capacitance



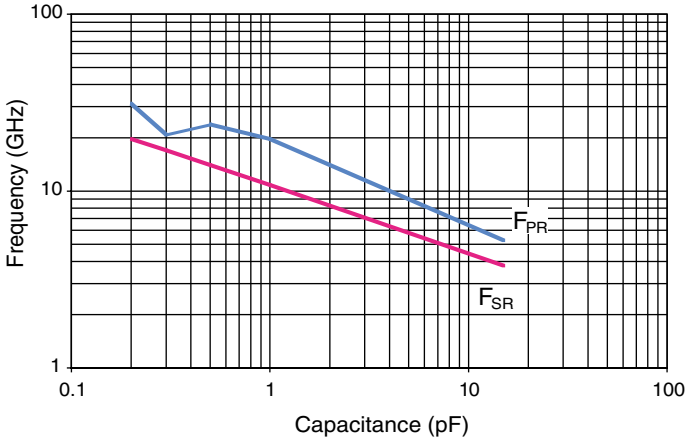
650L Q vs Capacitance



650L ESR vs Frequency



650L FSR & FPR

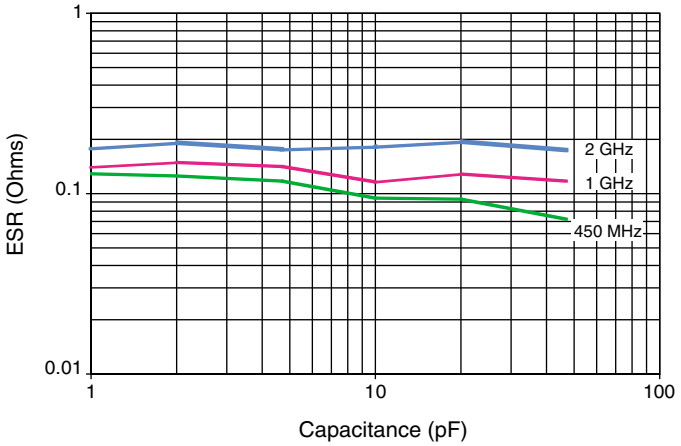


ATC 650 Series RF Capacitors

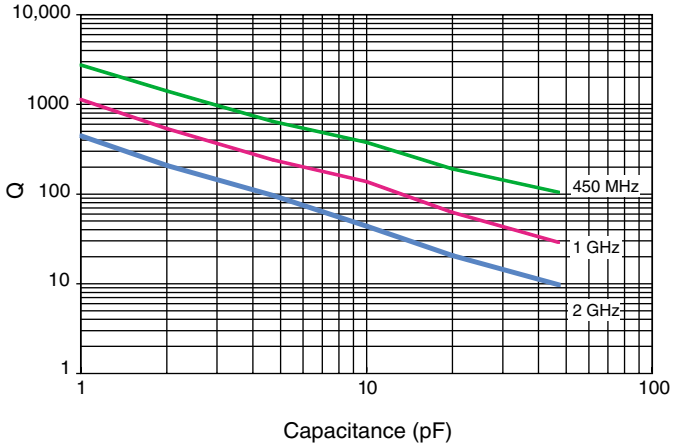
Typical Performance Data

Case Size S - 0603

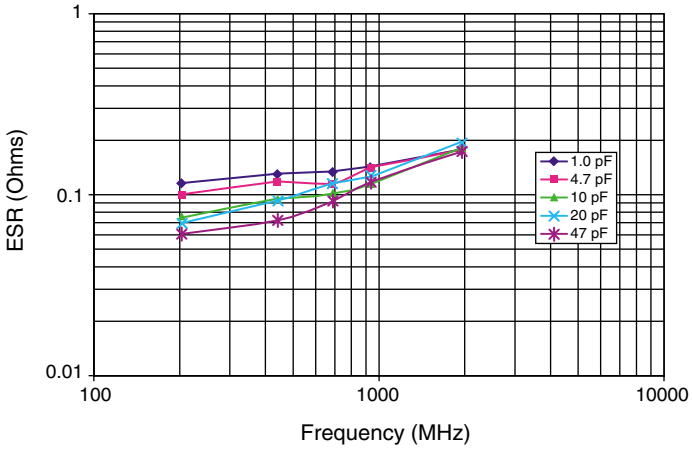
650S ESR vs Capacitance



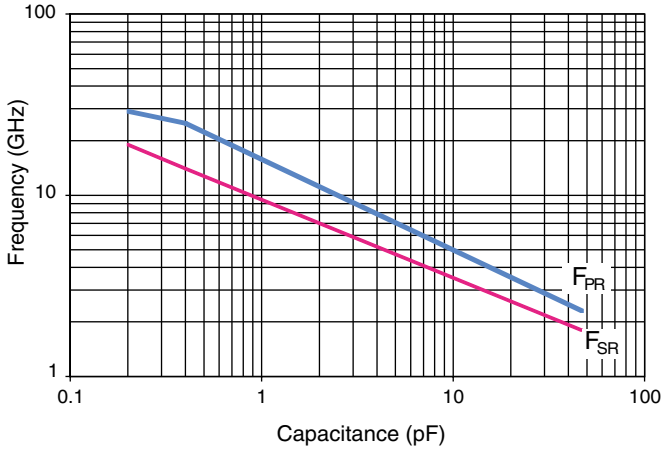
650S Q vs Capacitance



650S ESR vs Frequency



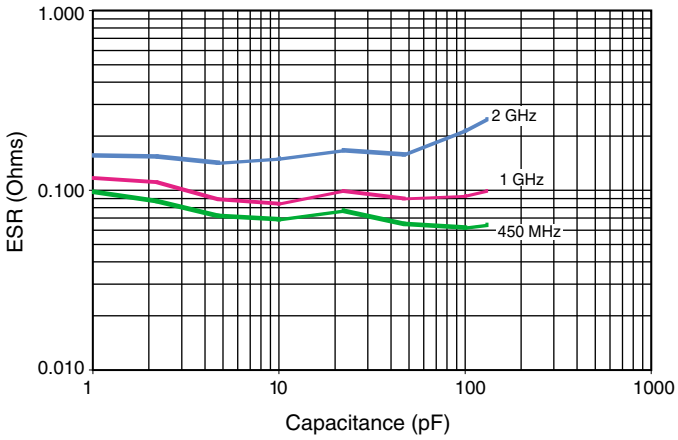
650S FSR & FPR



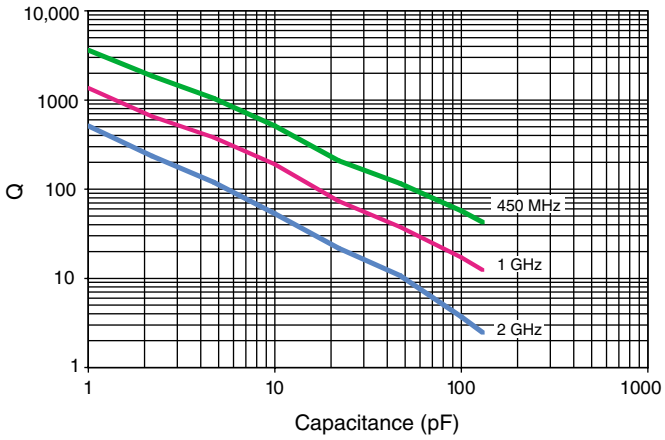
Typical Performance Data

Case Size F - 0805

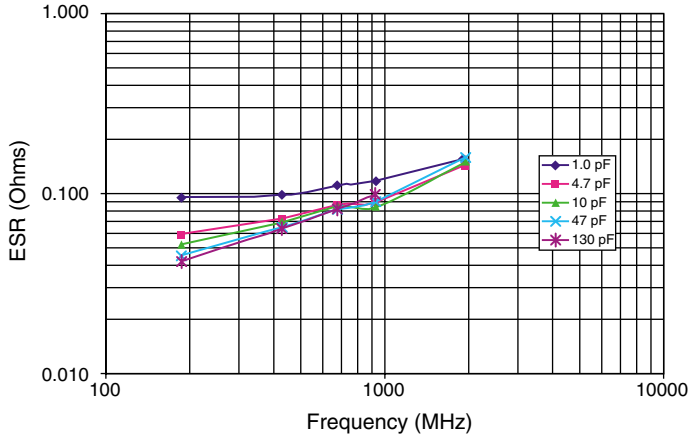
650F ESR vs Capacitance



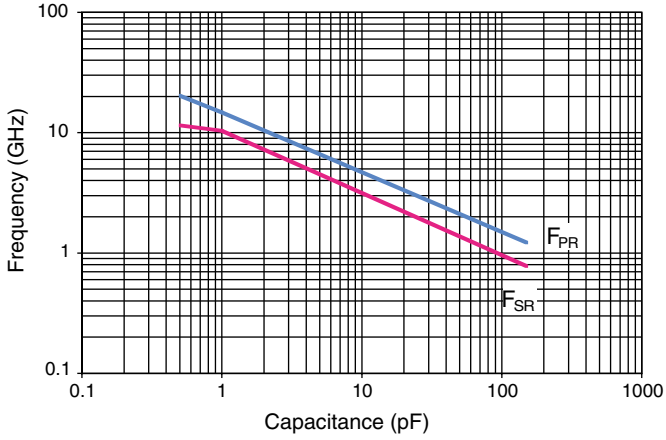
650F Q vs Capacitance



650F ESR vs Frequency



650F FSR & FPR



ATC 650 Series Data Sheet Test Condition Description

Capacitors horizontally mounted on 25-mil thick alumina microstrip substrates (50-mils for 650F), 24-mil-wide traces (48 mils for 650F).

FSR = lowest frequency at which S11 response, referenced at capacitor edge, crosses real axis on Smith Chart. (FSR at or above values indicated.)

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

For further information, see Application Notes, ATC doc. #001-929.

ATC 650 Series RF Capacitors: Design Kits

Kit #	Item #	Description	Cap. Value Range (pF)	Cap. Values (pF)	Tol. (pF)	Price
Kit 19	DK0019	650L RF Capacitors 13 different values, 15 pcs. min. per value	0.2 to 2.2	0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5	±0.1	$75.00
				1.8, 2.2	±0.25	
Kit 20	DK0020	650L RF Capacitors 14 different values, 15 pcs. min. per value	1.0 to 15	1.0, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3	±0.1	$75.00
				3.9, 4.7, 5.6, 6.8, 8.2	±0.25	
				10, 15	±5%	
Kit 21	DK0021	650S RF Capacitors 15 different values, 15 pcs. min. per value	0.2 to 3.3	0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5	±0.1	$75.00
				1.8, 2.2, 2.7, 3.3	±0.25	
Kit 22	DK0022	650S RF Capacitors 14 different values, 15 pcs. min. per value	3.9 to 47	3.9, 4.7, 5.6, 6.8, 8.2	±0.1	$75.00
				10, 12, 15, 18, 22, 27, 33, 39, 47	±5%	
Kit 23	DK0023	650F RF Capacitors 16 different values, 15 pcs. min. per value	0.5 to 10	0.5, 0.6, 0.8, 1.0, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3	±0.1	$75.00
				3.9, 4.7, 5.6, 6.8, 8.2	±0.25	
				10	±5%	
Kit 24	DK0024	650F RF Capacitors 15 different values, 15 pcs. min. per value	10 to 150	10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82 100, 120, 150	±5%	$75.00

Also Available:

Lab Kit #5, ATC Part Number LK0005; 650 Kit – contains Kit 19, Kit 20, Kit 21, Kit 22,and Kit 24.(See Above listing)

Notes:

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