

# ATC 700 B Series NPO Porcelain and Ceramic Multilayer Capacitors

- Case B Size (.110" x .110")
- Low ESR/ESL
- Low Noise
- Rugged Construction
- Extended WVDC up to 1500 VDC
- Capacitance Range 0.1 pF to 5100 pF
- Zero TCC
- High Self-Resonance
- Established Reliability (QPL)

ATC, the industry leader, is announcing new improved ESR/ESL performance for the 700 B Series RF/Microwave Capacitors. The superior high self-resonance and zero TCC characteristic of this Series provide excellent performance over a broad range of RF and microwave applications requiring minimum drift, including RF power. Porcelain and ceramic construction provide a rugged, hermetic package.

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

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

## ENVIRONMENTAL TESTS

ATC 700 B 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:

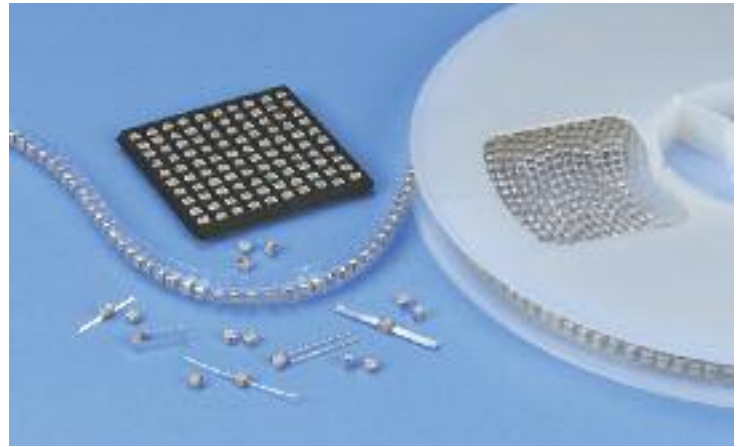
MIL-STD-202, Method 103, Condition A, with 1.5 Volts DC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours min.

### LIFE TEST:

MIL-STD-202, Method 108, for 2000 hours, at 125°C.  
200% WVDC applied.

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 (0.1 pF to 200 pF) @ 1 MHz.  
Greater than 2000 (220 pF to 1000 pF) @ 1 MHz.  
Greater than 2000 (1100 pF to 5100 pF) @ 1 KHz.

### TEMPERATURE COEFFICIENT OF CAPACITANCE (TCC):

0  $\pm$  30 PPM/°C (-55°C to +125°C)

### INSULATION RESISTANCE (IR):

0.1 pF to 470 pF:

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

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

510 pF to 5100 pF:

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

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

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

**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:

0.1 to 200 pF: from -55°C to +175°C

220 to 5100 pF: from -55°C to +125°C

### 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 5 lbs. min., 15 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor. Test per MIL-STD-202, method 211.



AMERICAN

ATC North America  
sales@atceramics.com

TECHNICAL

ATC Europe  
sales@atceramics.com

CERAMICS

ATC Asia  
sales@atceramics-asia.com

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# ATC 700 B 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.
0R1	0.1	B	500	1500	3R3	3.3	B, C, D	500	1500	330	33	F, G, J K, M	500	1500	331	330	F, G, J K, M	200	N/A
0R2	0.2				3R6	3.6				360	36				361	360			
0R3	0.3	3R9			3.9	390				39	391				390				
0R4	0.4	4R3			4.3	430				43	431				430				
0R5	0.5	4R7			4.7	470				47	471				470				
0R6	0.6	5R1			5.1	510				51	511				510				
0R7	0.7	5R6			5.6	560				56	561			560					
0R8	0.8	6R2			6.2	620				62	621			620					
0R9	0.9	6R8			6.8	680				68	681			680					
1R0	1.0	7R5			7.5	750				75	751			750					
1R1	1.1	8R2			8.2	820				82	821			820					
1R2	1.2	9R1			9.1	910				91	911			910					
1R3	1.3	100			10	101				100	102			1000					
1R4	1.4	110			11	111	110			112	1100								
1R5	1.5	120			12	121	120			122	1200								
1R6	1.6	130			13	131	130			152	1500								
1R7	1.7	150			15	151	150			182	1800								
1R8	1.8	160			16	161	160			222	2200								
1R9	1.9	180			18	181	180			272	2700								
2R0	2.0	200			20	201	200			302	3000								
2R1	2.1	220			22	221	220			332	3300								
2R2	2.2	240			24	241	240			392	3900								
2R4	2.4	270			27	271	270			472	4700								
2R7	2.7	300			30	301	300			512	5100								
3R0	3.0																		

$$V_{RMS} = 0.707 \times WVDC$$

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

Capacitance values in **bold** type indicate porcelain dielectric. All other capacitance values indicate ceramic dielectric.

All 700 B Capacitors are available laser marked with ATC's identification, capacitance code and tolerance.

NOTE: EXTENDED WVDC DOES NOT APPLY TO CDR PRODUCTS.

## ATC PART NUMBER CODE

Series ATC700 Case Size B Capacitance Code: 33 First 2 significant digits for capacitance. R=Decimal Point

Indicates number of zeros following digits of capacitance in picofarads except for decimal values. 1

Capacitance Tolerance J

Termination Code W

WVDC 500

Laser Marking X

Packaging T

T - Tape and Reel, 1000 pc. qty.\*  
TV - Vertical Orientation of Product, Tape and Reel, 1000 pc. qty.\*  
I - Special Packaging. Consult Factory.  
\*Consult ATC for other quantities  
ATC Cap-Pac® packaging (100 pc. qty. std.) is also available. For this option, leave last field blank.

CAPACITANCE TOLERANCE							
Code	B	C	D	F	G	J	M
Tol.	±0.1 pF	±0.25 pF	±0.5 pF	±1%	±2%	±5%	±20%

The above part number refers to a 700 B Series (case size B) 330 pF capacitor, J tolerance (±5%), 500 WVDC, with W termination (Tin/Lead, Solder Plated over Nickel Barrier), laser marking and ATC Cap-Pac® 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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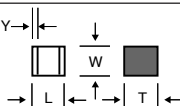

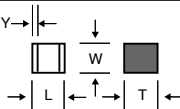

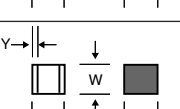

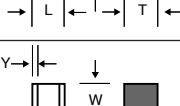

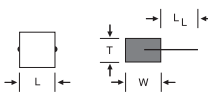
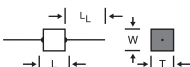
ATC North America  
sales@atceramics.com

ATC Europe  
sales@atceramics.com

ATC Asia  
sales@atceramics-asia.com

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# ATC 700 B Capacitors: Mechanical Configurations

ATC SERIES & CASE SIZE	ATC TERM. CODE	MIL-PRF- 55681	CASE SIZE & TYPE	OUTLINES  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	
700B	W	CDR14BP	<div>B</div> <div></div> <div>Solder Plate</div> <div></div>	.110 +.020 -.010 (2.79 +0.51 -0.25)	.110 ±.015 (2.79 ±0.38)	.102 (2.59) max.	.015 (0.38) ±.010 (0.25)	Tin/Lead, Solder Plated over Nickel Barrier Termination		
700B	P	CDR14BP	<div>B</div> <div></div> <div>Pellet</div> <div></div>	.110 +.035 -.010 (2.79 +0.89 -0.25)	.110 ±.015 (2.79 ±0.38)			Heavy Tin/Lead Coated, over Nickel Barrier Termination		
700B	T	N/A	<div>B</div> <div></div> <div>Solderable Nickel Barrier</div> <div></div>	.110 +.020 -.010 (2.79 +0.51 -0.25)	.110 ±.015 (2.79 ±0.38)			<b>RoHS Compliant</b> Tin Plated over Nickel Barrier Termination		
700B	CA	CDR13BP	<div>B</div> <div></div> <div>Gold Chip</div> <div></div>	.110 +.020 -.010 (2.79 +0.51 -0.25)	.110 ±.015 (2.79 ±0.38)			<b>RoHS Compliant</b> Gold Plated over Nickel Barrier Termination		
700B	MS	CDR21BP	<div>B</div> <div></div> <div>Microstrip</div> <div></div>	.135 ±.015 (3.43 ±0.38)	.110 ±.015 (2.79 ±0.38)	.120 (3.05) max.	N/A	Length (L <sub>L</sub> )	Width (W <sub>L</sub> )	Thickness (T <sub>L</sub> )
700B	AR	CDR22BP	<div>B</div> <div>Axial Ribbon</div> <div></div>			.102 (2.59) max.		.250 (6.35) min.	.093 ±.005 (2.36 ±0.13)	.004 ±.001 (.102 ±.025)
700B	RR	CDR24BP	<div>B</div> <div>Radial Ribbon</div> <div></div>							
700B	RW	CDR23BP	<div>B</div> <div>Radial Wire</div> <div></div>	.145 ±.020 (3.68 ±0.51)				.500 (12.7) min.	#26 AWG., .016 (.406) dia. nominal	
700B	AW	CDR25BP	<div>B</div> <div>Axial Wire</div> <div></div>							

Additional lead styles available: Narrow Microstrip (NM), Narrow Axial Ribbon (NA) and Vertical Narrow Microstrip (H). Other lead lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant. For a complete military catalog, request American Technical Ceramics document ATC 001-818.

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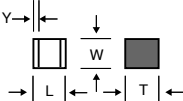

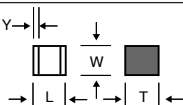



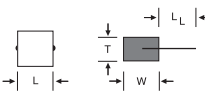

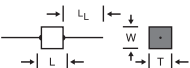
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sales@atceramics.com

ATC Europe  
saleseur@atceramics.com

ATC Asia  
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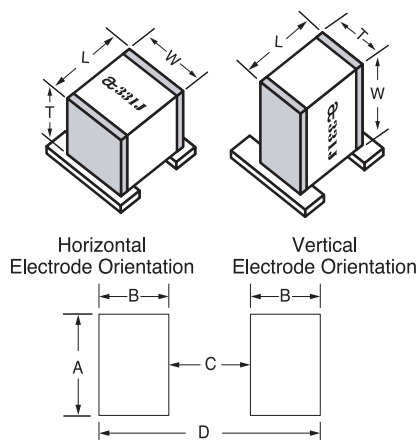
# ATC 700 B Capacitors: Non-Magnetic Mechanical Configurations

ATC SERIES & CASE SIZE	ATC TERM. CODE	MIL-PRF- 55681	CASE SIZE & TYPE	OUTLINES  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				
700B	WN	Meets Require- ments	 B Non-Mag Solder Plate		.110 +.025 -.010 (2.79 +0.64 -0.25)	.110 ±.015 (2.79 ±0.38)	.102 (2.59) max.	.015 (0.38) ±.010 (0.25)	Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination				
700B	PN	Meets Require- ments	 B Non-Mag Pellet		.110 +.035 -.010 (2.79 +0.89 -0.25)	.110 ±.015 (2.79 ±0.38)			Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination				
700B	TN	Meets Require- ments	 B Non-Mag Solderable Barrier		.110 +.025 -.010 (2.79 +0.64 -0.25)	.110 ±.015 (2.79 ±0.38)			<b><i>RoHS Compliant</i></b> Tin Plated over Non-Magnetic Barrier Termination				
700B	MN	Meets Require- ments	 B Non-Mag Microstrip		.135 ±.015 (3.43 ±0.38)	.110 ±.015 (2.79 ±0.38)	.120 (3.05) max.	N/A	Length (L <sub>L</sub> )	Width (W <sub>L</sub> )	Thickness (T <sub>L</sub> )		
700B	AN	Meets Require- ments	B  Non-Mag Axial Ribbon				.106 (2.69) max.						
700B	FN	Meets Require- ments	B  Non-Mag Radial Ribbon										
700B	RN	Meets Require- ments	B  Non-Mag Radial Wire		.145 ±.020 (3.68 ±0.51)								
700B	BN	Meets Require- ments	 B Non-Mag Axial Wire										

\*Capacitors with values greater than 200 pF contain a trace magnetic element that may exhibit weak magnetic properties.

\*\*Additional lead styles available: Narrow Microstrip (DN), Narrow Axial Ribbon (GN) and Vertical Narrow Microstrip (HN). Other lead lengths are available; consult factory; All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.

## Suggested Mounting Pad Dimensions



Case B Vertical Mount

Cap Value	Pad Size	A Min.	B Min.	C Min.	D Min.
0.1 pF	Normal	.065	.050	.075	.175
	High Density	.045	.030	.075	.135
0.2 pF	Normal	.090	.050	.075	.175
	High Density	.070	.030	.075	.135
0.3 to 510 pF	Normal	.110	.050	.075	.175
	High Density	.090	.030	.075	.135
> 510 pF	Normal	.120	.050	.075	.175
	High Density	.100	.030	.075	.135

Horizontal Mount

All values	Normal	.130	.050	.075	.175
	High Density	.110	.030	.075	.135

Dimensions are in inches.

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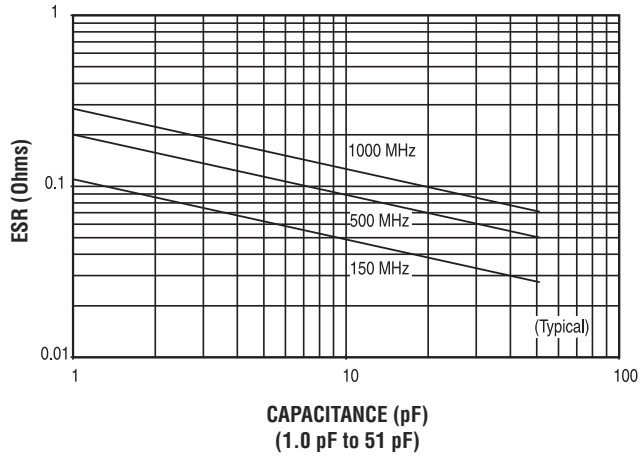
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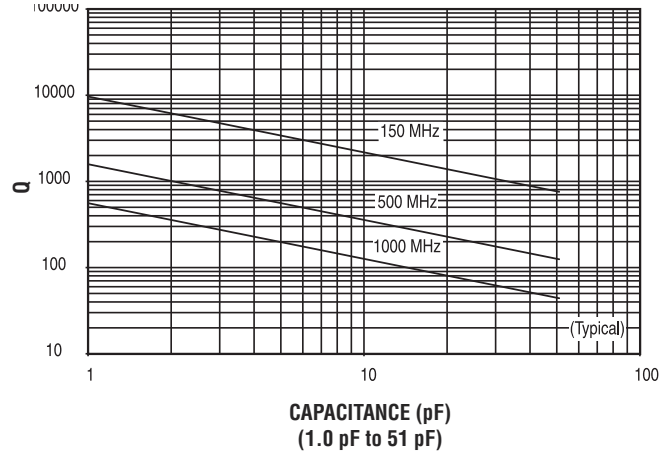
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# ATC 700 B Performance Data

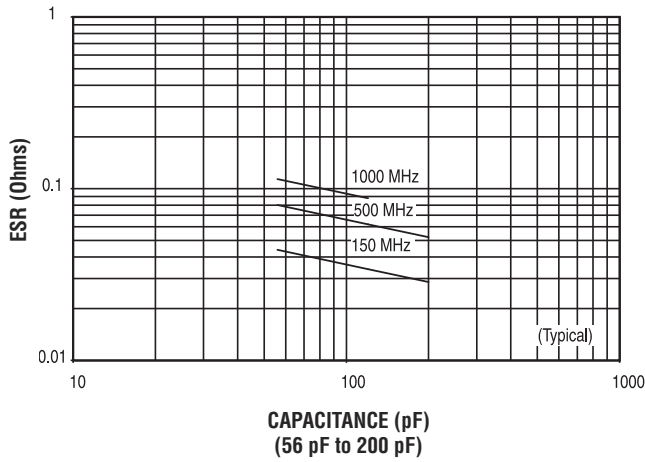
**ESR VS. CAPACITANCE  
ATC SERIES 700, CASE B**



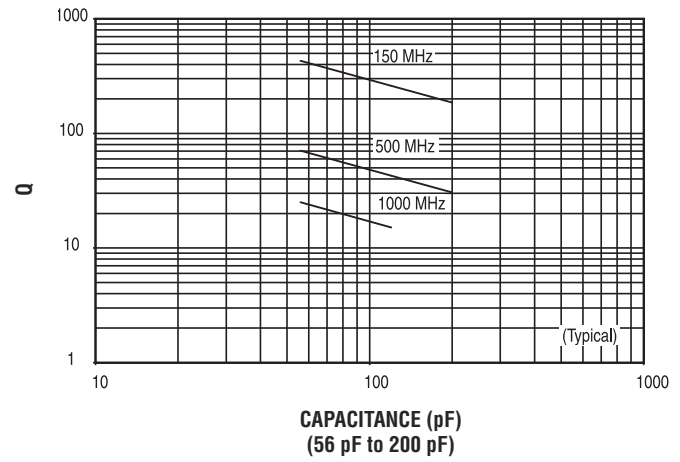
**Q VS. CAPACITANCE  
ATC SERIES 700, CASE B**



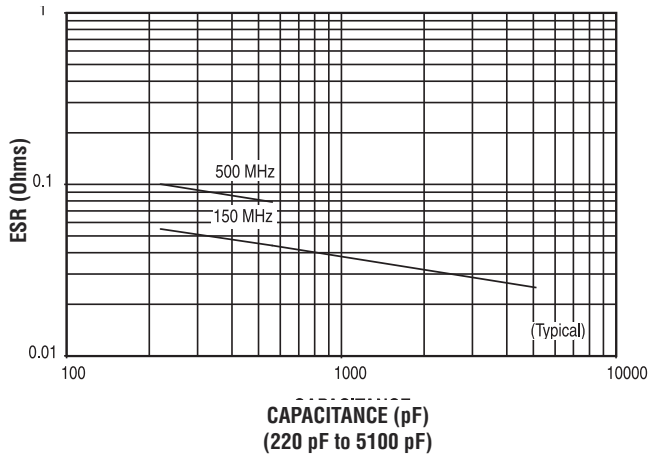
**ESR VS. CAPACITANCE  
ATC SERIES 700, CASE B**



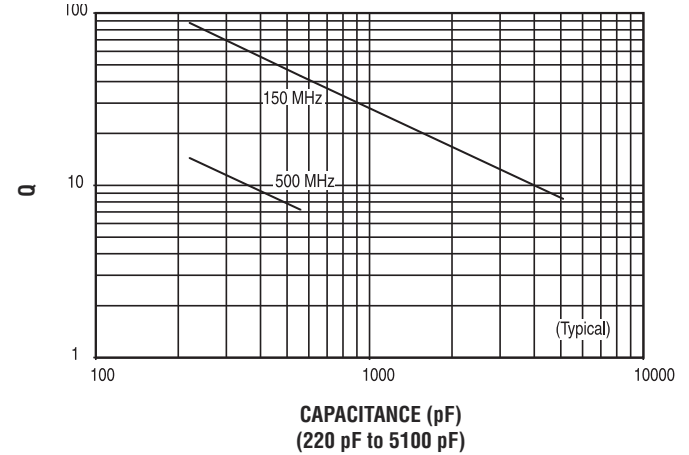
**Q VS. CAPACITANCE  
ATC SERIES 700, CASE B**



**ESR VS. CAPACITANCE  
ATC SERIES 700, CASE B**



**Q VS. CAPACITANCE  
ATC SERIES 700, CASE B**



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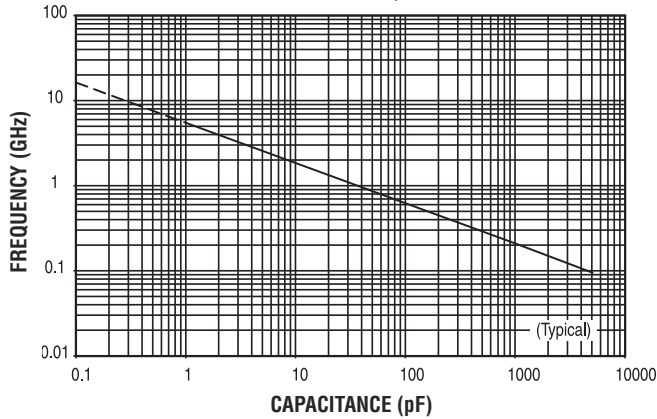
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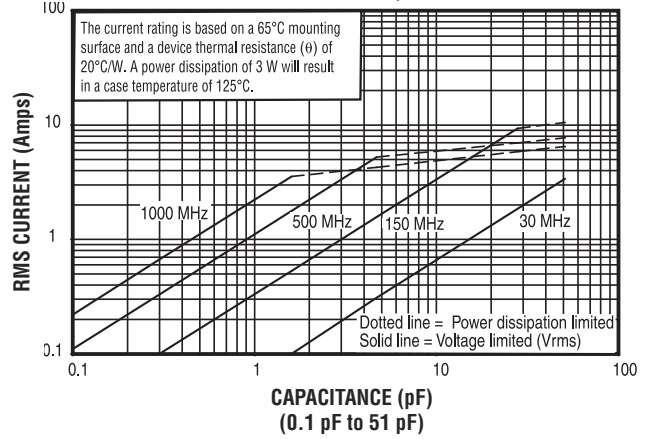
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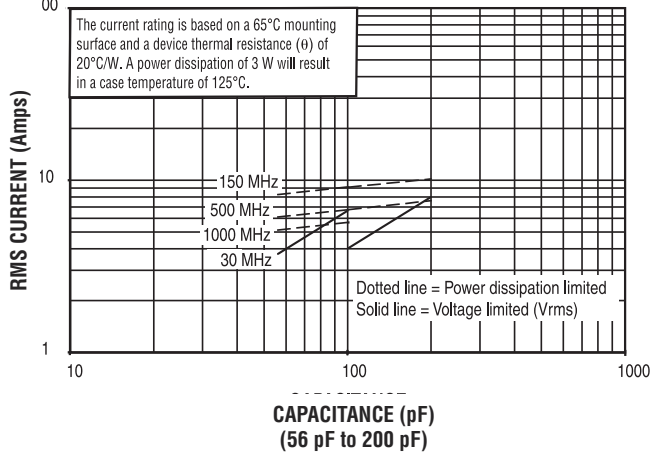
**SERIES RESONANCE VS. CAPACITANCE  
ATC SERIES 700, CASE B**



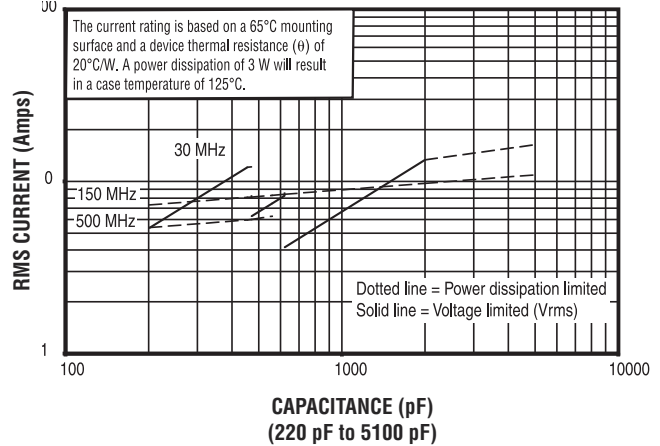
**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 700, CASE B**



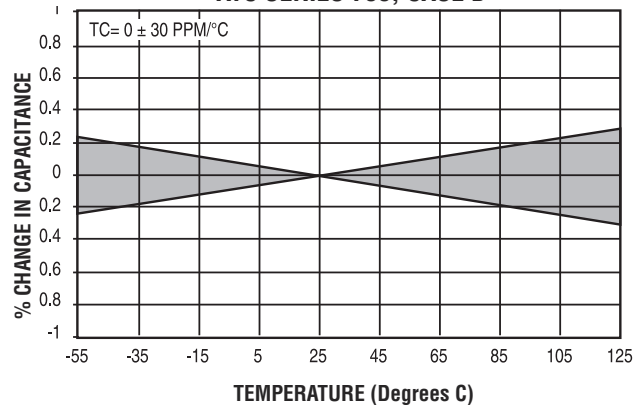
**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 700, CASE B**



**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 700, CASE B**



**CAPACITANCE CHANGE VS. TEMPERATURE  
ATC SERIES 700, CASE B**



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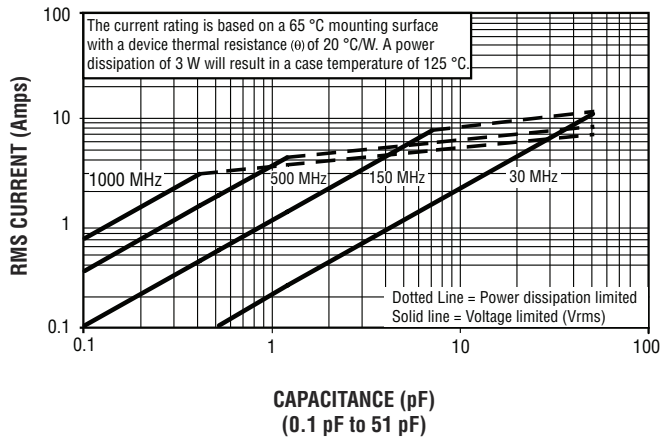
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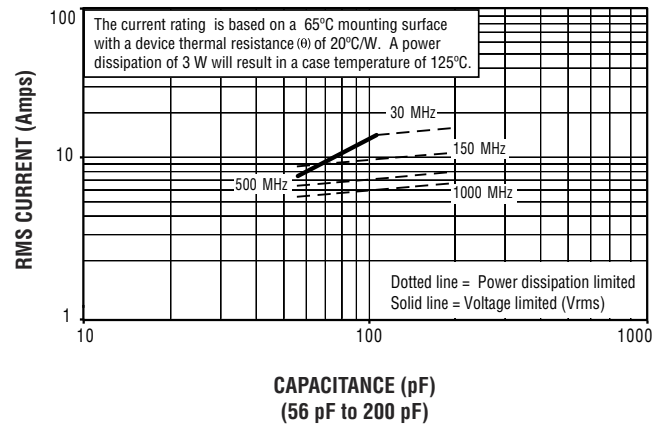
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# ATC 700 B Performance Data

**CURRENT RATING VS. CAPACITANCE**  
**ATC SERIES 700, CASE B, EXTENDED VOLTAGE**



**CURRENT RATING VS. CAPACITANCE**  
**ATC SERIES 700, CASE B, EXTENDED VOLTAGE**



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ATC North America  
sales@atceramics.com

ATC Europe  
saleseur@atceramics.com

ATC Asia  
sales@atceramics-asia.com

www.atceramics.com

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ATC North America  
[sales@atceramics.com](mailto:sales@atceramics.com)

ATC Europe  
[saleseur@atceramics.com](mailto:saleseur@atceramics.com)

ATC Asia  
[sales@atceramics-asia.com](mailto:sales@atceramics-asia.com)

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