

# 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.

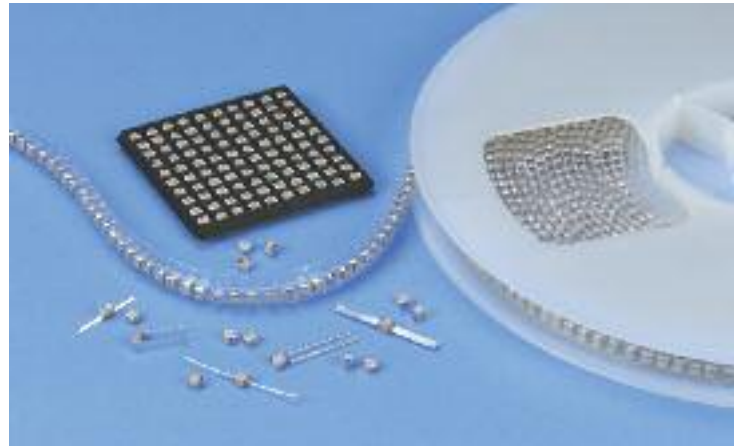
200% WVDC applied.

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 ±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 ±(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:

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.



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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.											
OR1	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											
OR2	0.2				3R6	3.6				360	36				331	360														
OR3	0.3	B, C			1500 VOLT	3R9				3.9	500				1500	390				39	391	390								
OR4	0.4					4R3				4.3						430				43	431	430								
OR5	0.5	B, C, D			500	1500				4R7	4.7				B, C, J K, M	500				1500	470	47	F, G, J K, M	500	1500	471	470	F, G, J K, M	50	N/A
OR6	0.6									5R1	5.1										510	51				511	510			
OR7	0.7									5R6	5.6										560	56				561	560			
OR8	0.8									6R2	6.2										620	62				621	620			
OR9	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																													

$VRMS = 0.707 \times WVDC$

• 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 R=Decimal Point 1 Indicates number of zeros following digits of capacitance in picofarads except for decimal values. J Capacitance Tolerance W Termination Code X Laser Marking T Packaging

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 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	B Solder Plate		.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	B Pellet		.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	B Solderable Nickel Barrier		.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	B Gold Chip		.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	B Microstrip				.120 (3.05) max.		Length (L <sub>L</sub> )	Width (W <sub>L</sub> )	Thickness (T <sub>L</sub> )
700B	AR	CDR22BP	B Axial Ribbon		.135 ±.015 (3.43 ±0.38)				.250 (6.35) min.	.093 ±.005 (2.36 ±0.13)	.004 ±.001 (.102 ±.025)
700B	RR	CDR24BP	B Radial Ribbon			.110 ±.015 (2.79 ±0.38)		N/A			
700B	RW	CDR23BP	B Radial Wire								
700B	AW	CDR25BP	B Axial Wire		.145 ±.020 (3.68 ±0.51)				.500 (12.7) min.	#26 AWG., .016 (.406) dia. nominal	

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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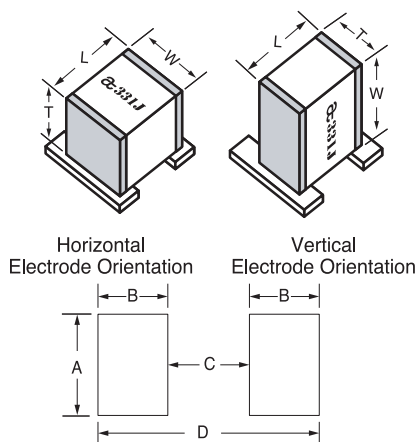
# ATC 700 B Capacitors: Non-Magnetic Mechanical Configurations

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 Requirements	B Non-Mag Solder Plate		.110 +0.025 -0.010 (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 Requirements	B Non-Mag Pellet		.110 +0.035 -0.010 (2.79) +0.89 -0.25)	.110 ±.015 (2.79 ±0.38)			Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination		
700B	TN	Meets Requirements	B Non-Mag Solderable Barrier		.110 +0.025 -0.010 (2.79) +0.64 -0.25)	.110 ±.015 (2.79 ±0.38)			<b>RoHS Compliant</b> Tin Plated over Non-Magnetic Barrier Termination		
700B	MN	Meets Requirements	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 Requirements	B Non-Mag Axial Ribbon						.250 (6.35) min.	.093 ±.005 (2.36 ±0.13)	.004 ±.001 (.102 ±.025)
700B	FN	Meets Requirements	B Non-Mag Radial Ribbon						.145 ±.020 (3.68 ±0.51)	.106 (2.69) max.	N/A
700B	RN	Meets Requirements	B Non-Mag Radial Wire								
700B	BN	Meets Requirements	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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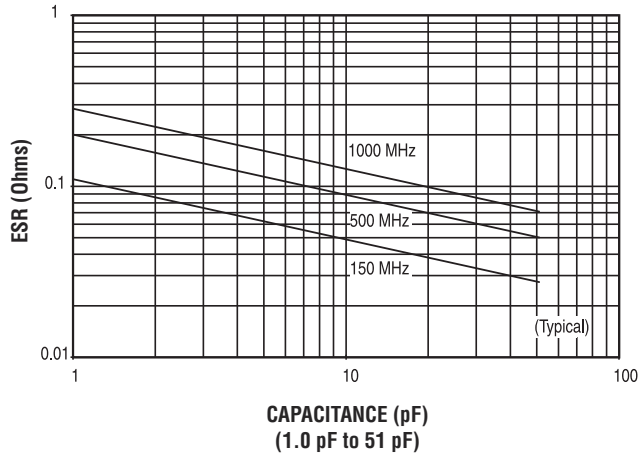
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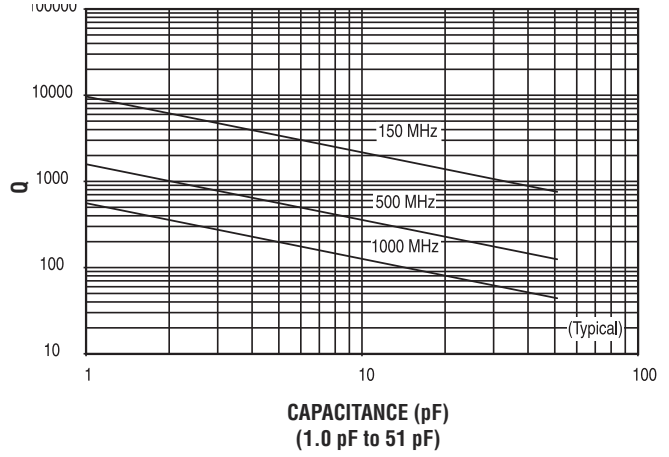
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# ATC 700 B Performance Data

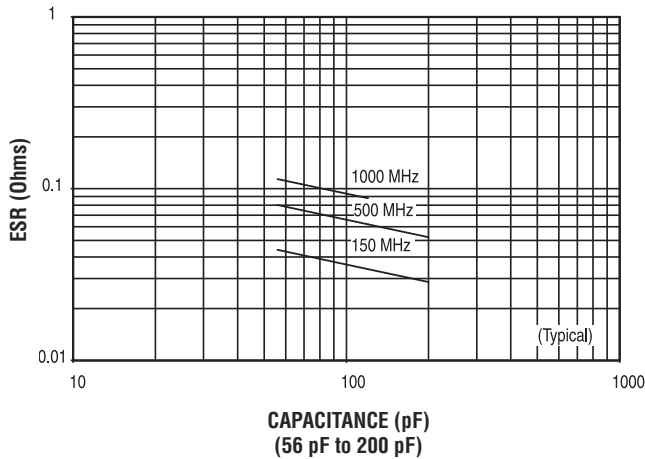
**ESR VS. CAPACITANCE  
ATC SERIES 700, CASE B**



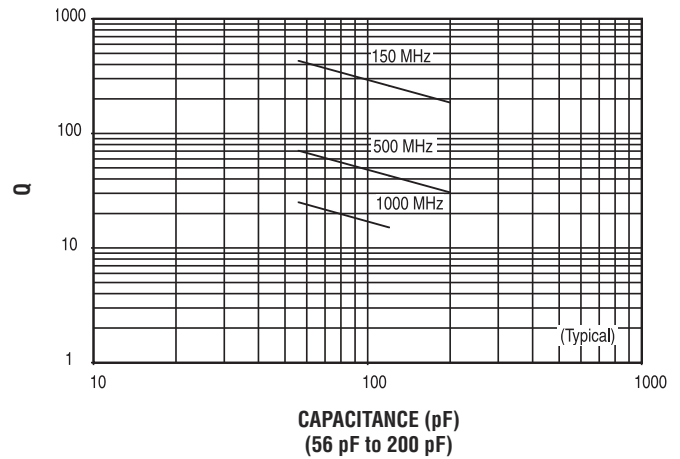
**Q VS. CAPACITANCE  
ATC SERIES 700, CASE B**



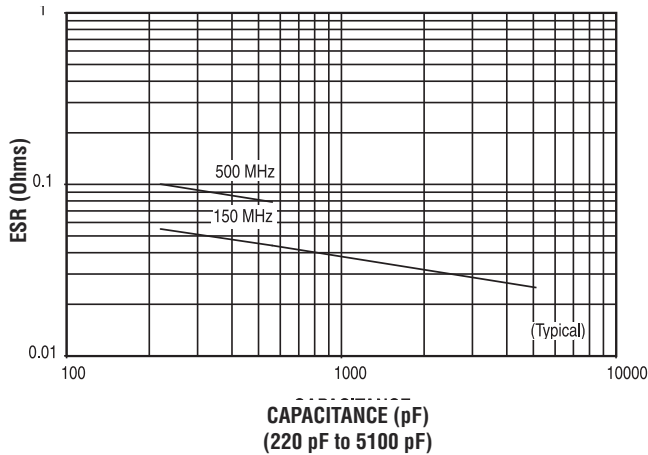
**ESR VS. CAPACITANCE  
ATC SERIES 700, CASE B**



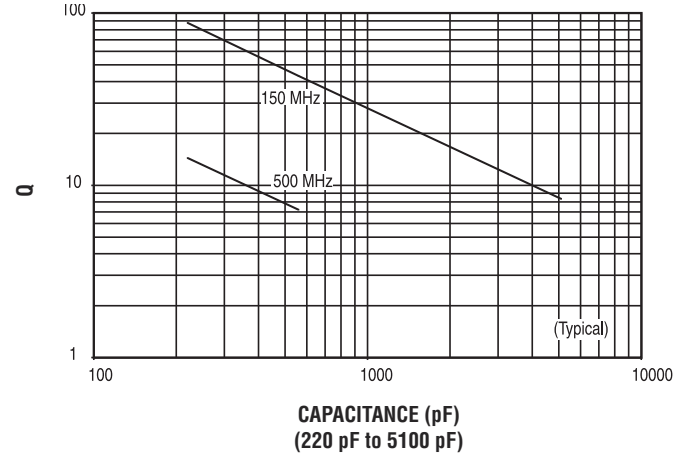
**Q VS. CAPACITANCE  
ATC SERIES 700, CASE B**



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



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



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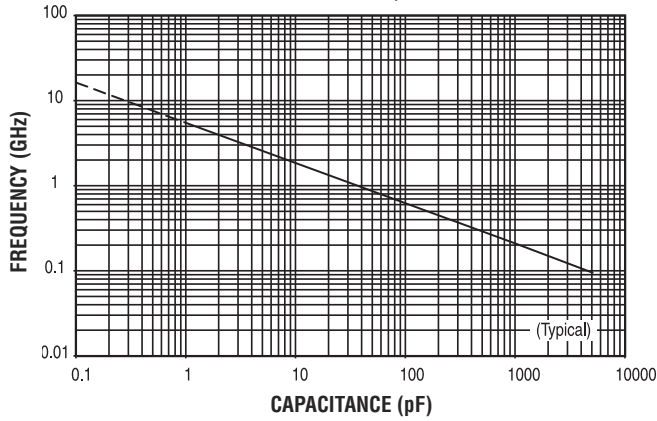
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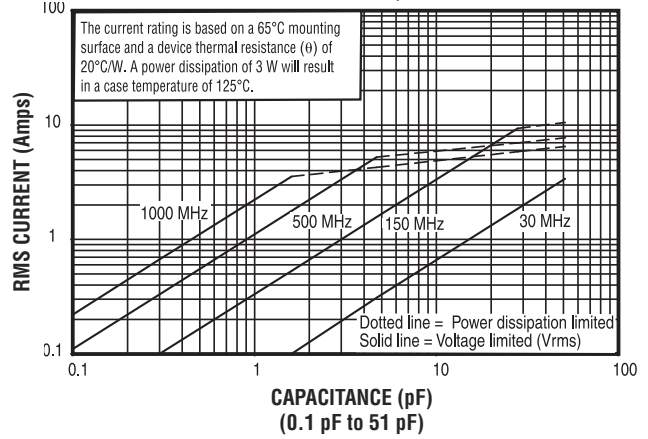
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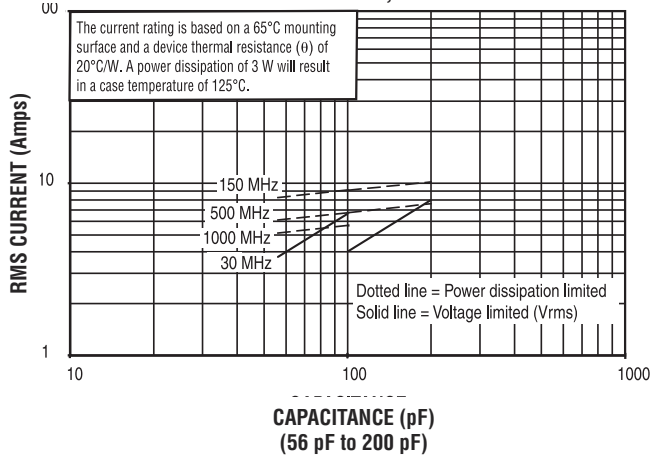
**SERIES RESONANCE VS. CAPACITANCE  
ATC SERIES 700, CASE B**



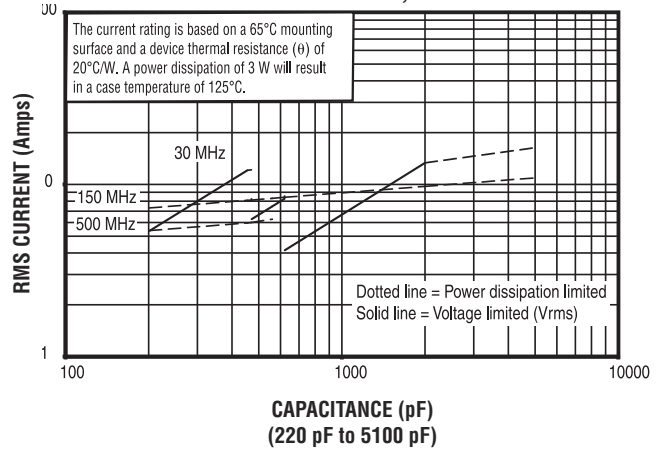
**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 700, CASE B**



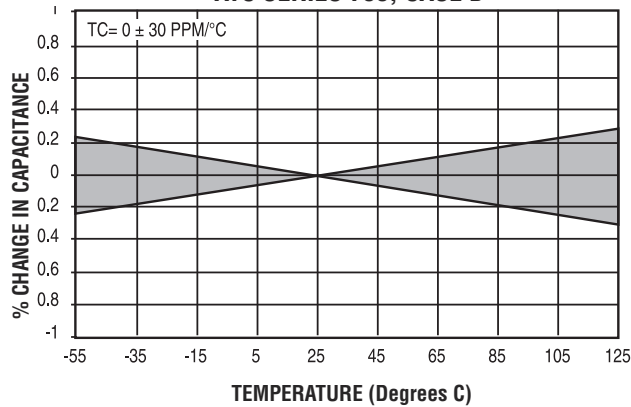
**CURRENT RATING VS. CAPACITANCE  
ATC SERIES 700, CASE B**



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



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



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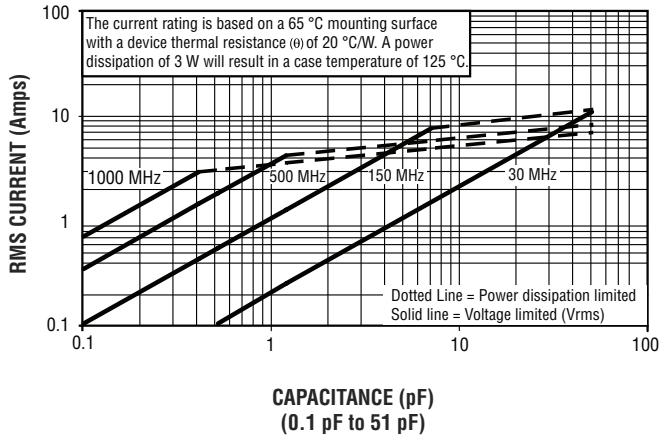
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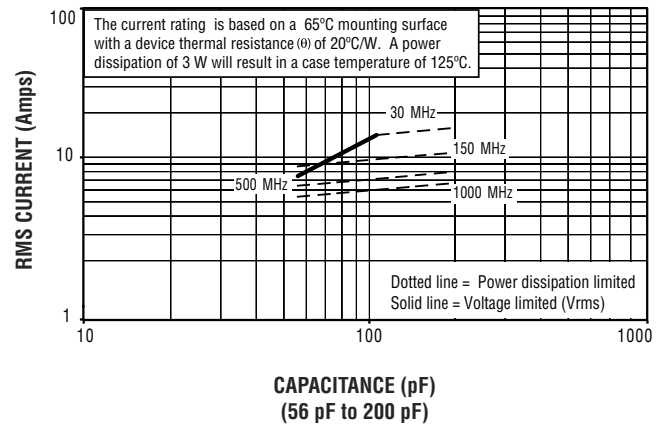
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# ATC 700 B Performance Data

**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 # 001-814 Rev. T, 4/18

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