

# ATC 700 B Series NPO Porcelain and Ceramic Multilayer Capacitors

- Case B Size (.110" x .110")
- Low ESR/ESL
- Low Noise
- Rugged Construction
- Available with Encapsulation Option\*
- 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.

ATC offers an encapsulation option for applications requiring extended protection against arc-over and corona.

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

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

\*For leaded styles only.

## 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:

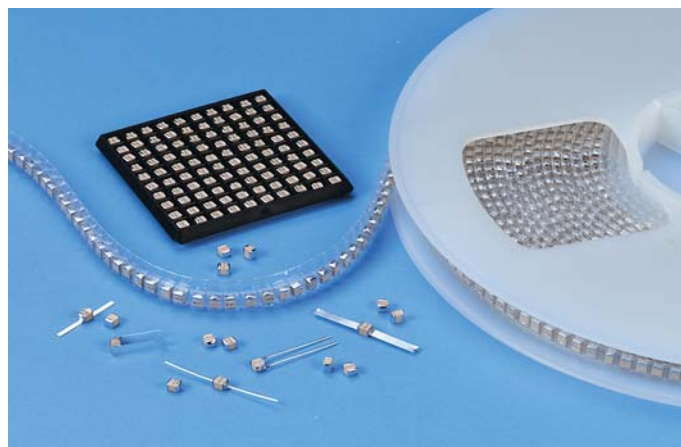
MIL-STD-202, Method 106.

### 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.



## 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):

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

**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 5100 pF: from -55°C to +125°C (No derating of working voltage)

### 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.

ATC # 001-814 Rev. L 1/07



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

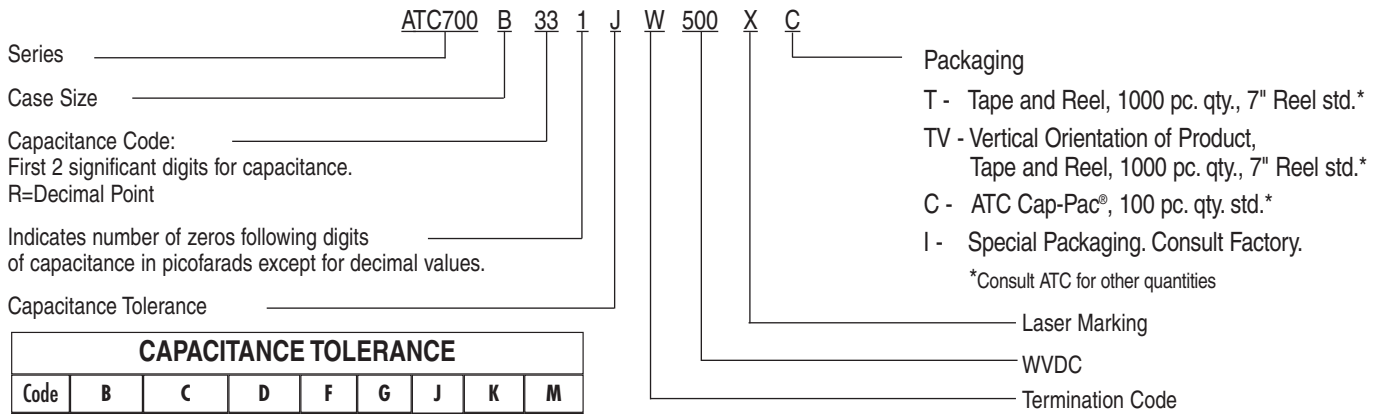
VRMS = 0.707 x WVDC

• SPECIAL VALUES, TOLERANCES, HIGHER WVDC AND MATCHING AVAILABLE. • ENCAPSULATION OPTION 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.

### ATC PART NUMBER CODE



CAPACITANCE TOLERANCE								
Code	B	C	D	F	G	J	K	M
Tol.	±0.1 pF	±0.25 pF	±0.5 pF	±1%	±2%	±5%	±10%	±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 (631) 622-4700.  
 Consult factory for additional performance data.

## A M E R I C A N T E C H N I C A L C E R A M I C S

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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		.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	B Axial Ribbon						.250 (6.35) min.	.093 ±.005 (2.36 ±0.13)	.004 ±.001 (.102 ±.025)
700B	RR	CDR24BP	B Radial Ribbon						.145 ±.020 (3.68 ±0.51)	.102 (2.59) max.	N/A
700B	RW	CDR23BP	B Radial Wire								
700B	AW	CDR25BP	B Axial Wire								

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\*

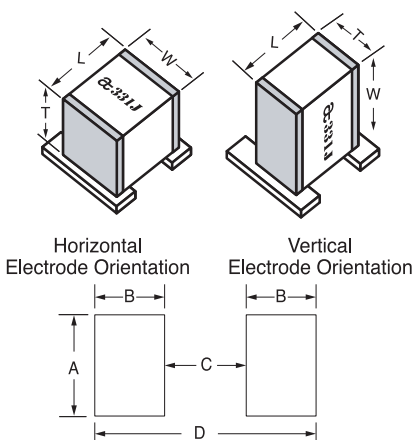
ATC SERIES & CASE SIZE	ATC TERM. CODE	MIL-PRF-55681	CASE SIZE & TYPE	OUTLINES W/T IS A TERMINATION SURFACE	BODY DIMENSIONS INCHES (mm)			LEAD AND TERMINATION** DIMENSIONS AND MATERIALS			
					LENGTH (L)	WIDTH (W)	THICKNESS (T)	OVERLAP (Y)	MATERIALS		
700B	WN	Meets Requirements	B Non-Mag Solder Plate		.110 +.025 -.010 (2.79 +.64 -.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 +.035 -.010 (2.79 +.89 -.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 +.025 -.010 (2.79 +.64 -.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		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		A Min.	B Min.	C Min.	D Min.
All values	Normal	.130	.050	.075	.175
	High Density	.110	.030	.075	.135

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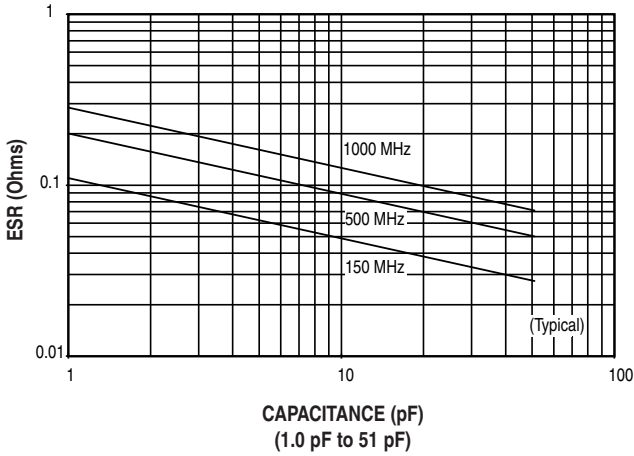
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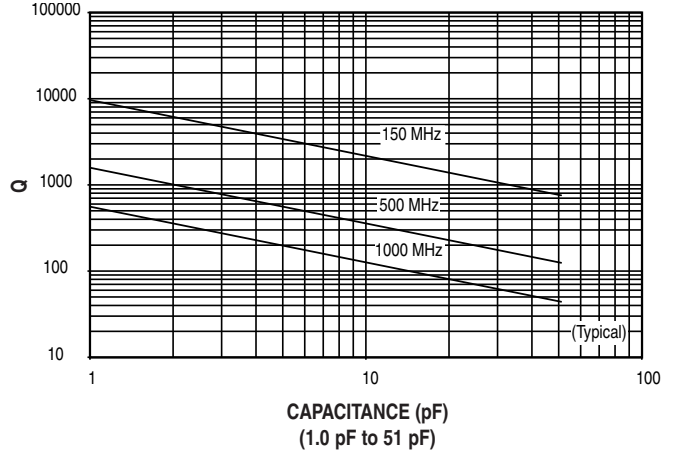
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# ATC 700 B Performance Data

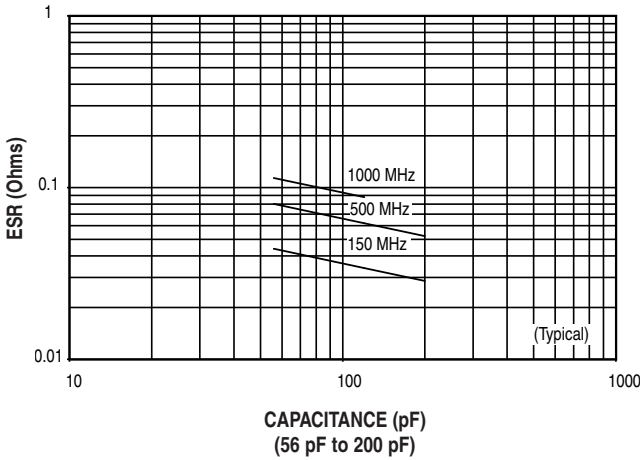
**ESR VS. CAPACITANCE**  
ATC SERIES 700, CASE B



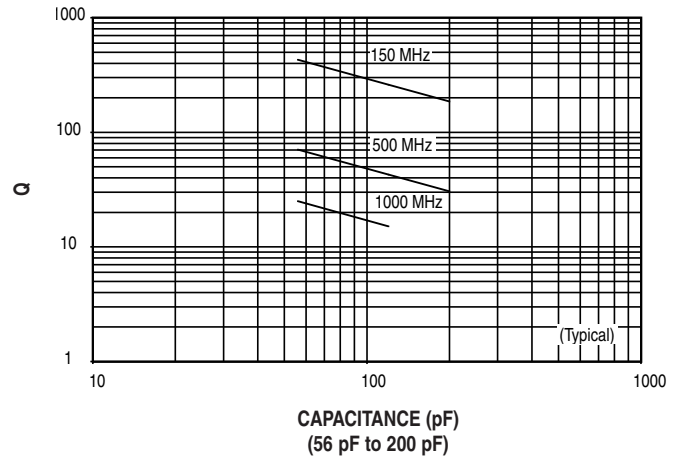
**Q VS. CAPACITANCE**  
ATC SERIES 700, CASE B



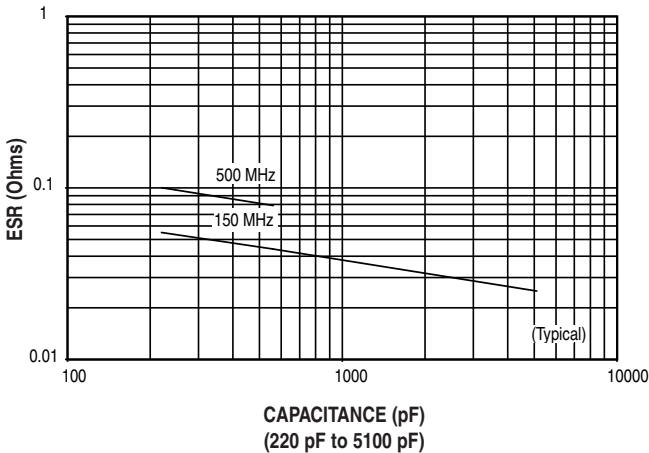
**ESR VS. CAPACITANCE**  
ATC SERIES 700, CASE B



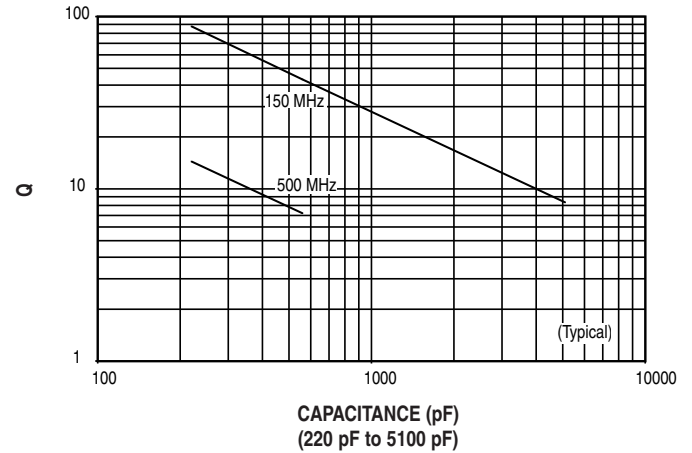
**Q VS. CAPACITANCE**  
ATC SERIES 700, CASE B



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



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



**A M E R I C A N T E C H N I C A L C E R A M I C S**

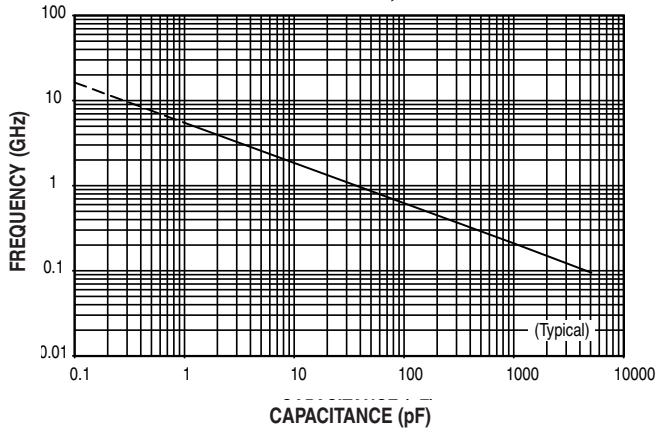
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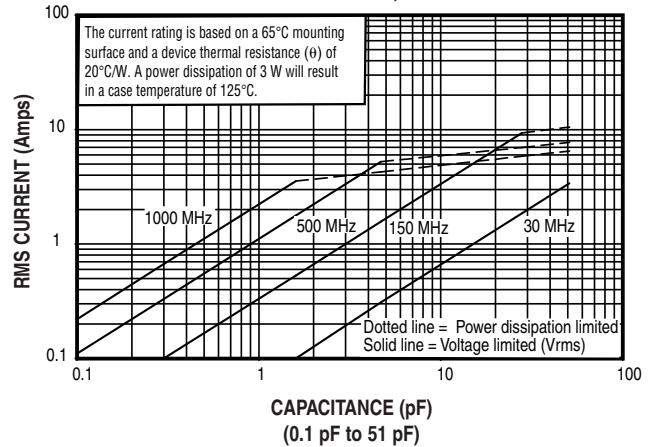
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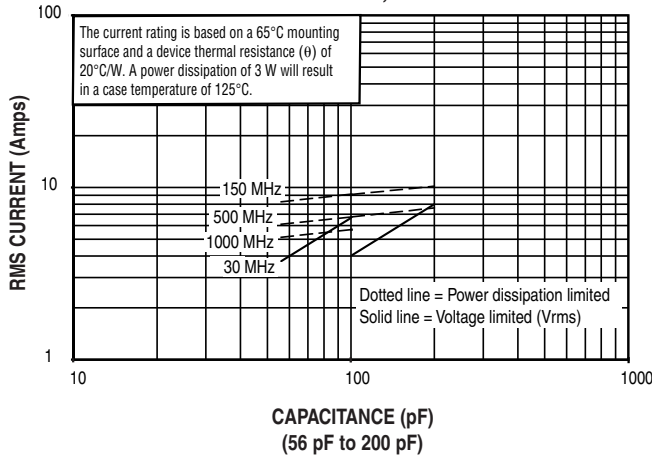
**SERIES RESONANCE VS. CAPACITANCE**  
ATC SERIES 700, CASE B



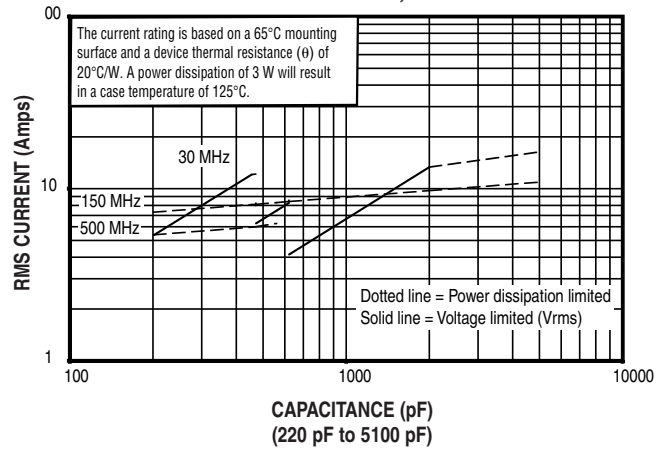
**CURRENT RATING VS. CAPACITANCE**  
ATC SERIES 700, CASE B



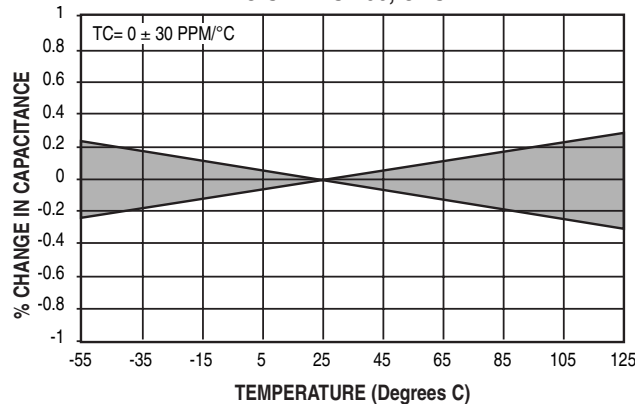
**CURRENT RATING VS. CAPACITANCE**  
ATC SERIES 700, CASE B



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



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



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