Glass/ET Series Caps
Elevated Temperature

HEAT

It's the enemy of reliable, long-term circuit performance. In many applications, very high temperatures are not a consideration in circuit design. But in a few specialized areas, elevated temperatures create very real design problems.

That's why AVX ET-Series capacitors keep working at temperatures where more ordinary capacitors usually fail...up to 200°C.

And, of course, AVX ET-Series capacitors provide all the high performance, high reliability characteristics you've come to expect from all AVX glass capacitors...excellent stability, outstanding capacitance retraceability, rugged, simple construction to eliminate mechanical problems, and electrical performance specifications among the best available at any price.

So when the heat's on your next design and you can't alter the environment, choose AVX ET-Series glass capacitors. That'll be one less problem you'll have to solve.

FEATURES

- Available in both axial and radial leaded configurations
- Values from 0.5 pF to 2400 pF
- Working temperature range -75°C to 200°C
- "Burned In" versions available – 50 hours @ 1500 VDC, 25°C
- Simple, rugged design and construction
- Short lead times for most values

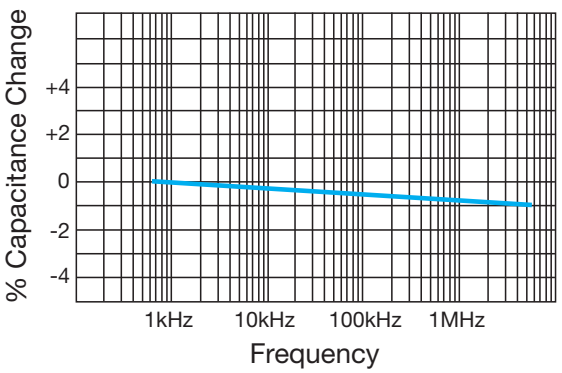
STANDARD OPERATING CHARACTERISTICS OF AVX ET-SERIES AXIAL AND RADIAL LEADED GLASS CAPACITORS

Working Temperature Range	-75°C to 200°C
Voltage Rating	50 VDC
Capacitance Range	0.5 pF to 2400 pF
Insulation Resistance	@ 25°C > 100,000 Megohms @ 200°C > 100 Megohms
Dissipation Factor	@ 25°C < .1% at 1kHz @ 200°C < 1% at 1kHz
Life	(1000 hours at rated voltage at 200°C) Post Test Delta C @ 25°C < 2% DF @ 25°C < 2.5% IR > 100 Megohms (axials) IR > 10 Megohms (radials)
Short Time (1 Hour) Exposure to Overtemperature (250°C)	No degradation
Voltage Coefficient	0

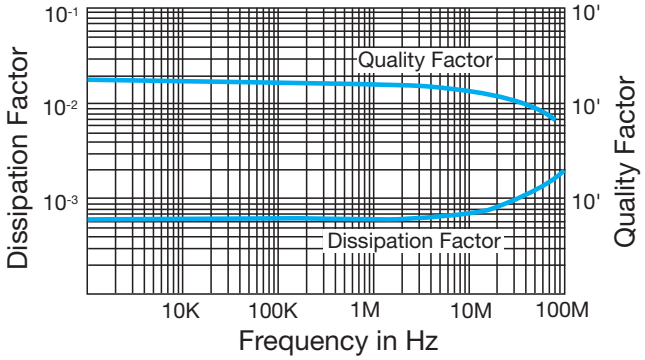
TYPICAL APPLICATIONS

In general, AVX ET-Series glass capacitors are ideally suited for any environment where high temperature could alter or destroy circuit performance. And since they are rated down to -75°C, ET-Series capacitors are also useful where cycling to colder temperatures may be a problem. Some applications where AVX ET-Series capacitors have already proven themselves include:

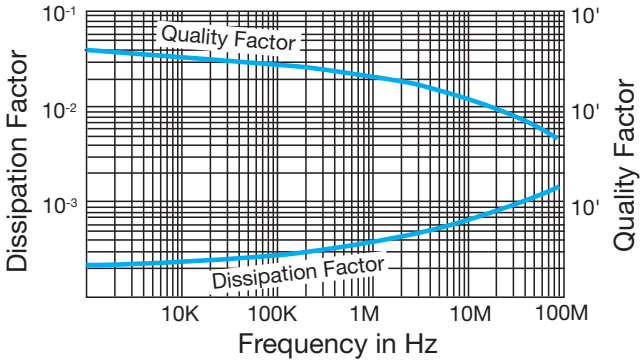
- Oil, well logging and downhole instrumentation, where frictional or geothermal heat is a problem.
- Geophysical pressure probes.
- Missile or aerospace applications where engine or environmental heat needs to be monitored or may cause circuit failure.
- Radar or other microwave applications.
- RF output circuitry where conduction or fan cooling cannot be entirely relied upon to remove all of the heat.
- Space and satellite applications where temperature changes are extreme and "zero failures" are a must.
- Industrial chemical process instrumentation where heat is a part of the process.
- Instrumentation for monitoring at-the-tool performance in metal cutting machinery.
- Fire-safe alarm or control circuitry.



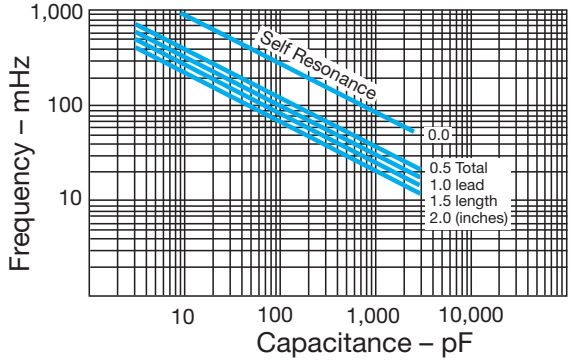
% Capacitance Change vs. Frequency
Radial and Axial



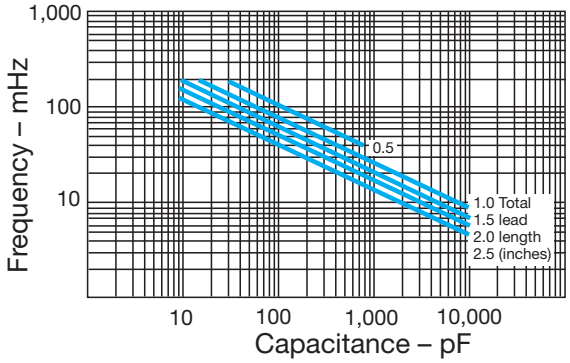
Quality Factor and Dissipation Factor vs. Frequency
Radial



Quality Factor and Dissipation Factor vs. Frequency
Axial



Resonant Frequency vs. Capacitance
Radial

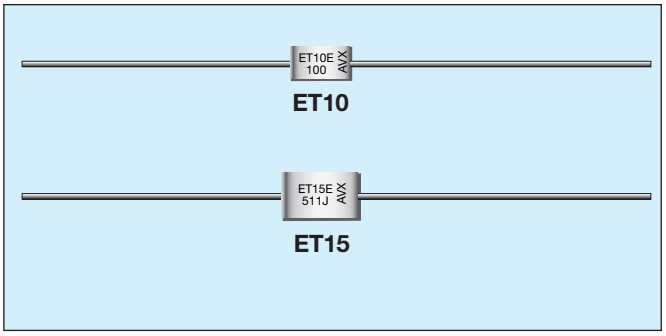


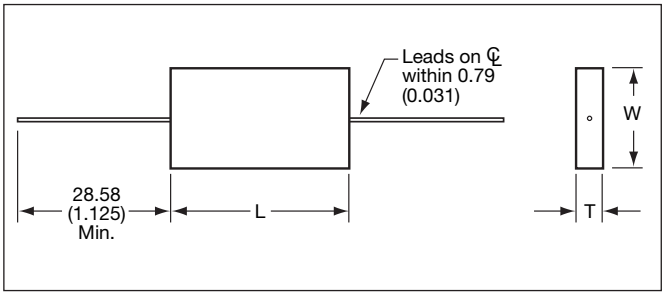
Resonant Frequency vs. Capacitance
Axial

Glass/ET Series Caps
Axial Lead Elevated Temperature

INTRODUCTION

AVX ET-Series axial leaded glass capacitors* are available in two standard case sizes and in a wide range of values and tolerances. All feature extremely stable glass dielectric, fused monolithic construction and true glass-to-metal hermetic seals at the leads for moisture resistance. All case sizes conform to industry dimensional standards.





PERFORMANCE CHARACTERISTICS

Tolerance: Available tolerances for each capacitance value are shown in the ordering information table on following page. Part marking codes are also provided.

Temperature Coefficient: Capacitance exhibits retraceability to within 10 ppm/°C over the temperature range -75°C to +200°C. See graph on following page.

Voltage Coefficient: Zero

Losses: Extremely low over the entire specified operating temperature range. Dissipation factor is 1% or less at 200°C at 1kHz.

Life: Delta C is less than 2% after 1000 hours at rated voltage, 200°C.

Insulation Resistance: Greater than 100,000 megohms at 25°C; greater than 100 megohms at 200°C. More than 100 megohms after life-testing.

Voltage/Temperature Rating: All ET-Series capacitors are rated at 50 VDC over their operating temperature range of -75°C to 200°C. No derating is required.

High Voltage Stabilization Screening: A special version of ET-Series axial leaded capacitors – designated ETR – is available. These capacitors have been "burned in" at room temperature for 50 hours at 1500 VDC.

Short Time Overtemperature Exposure: After exposure to 250°C for one hour, ET-Series capacitors have continued to perform to specification.

Moisture Resistance: Axial glass capacitors are hermetically sealed in glass, with a true metal-to-glass seal at the leads. This construction provides practical immunity to environmental effects such as shock, moisture, salt spray and solder heat.

Additional performance details are given in the AVX "Performance Characteristics of Multilayer Glass Dielectric Capacitors" technical paper.

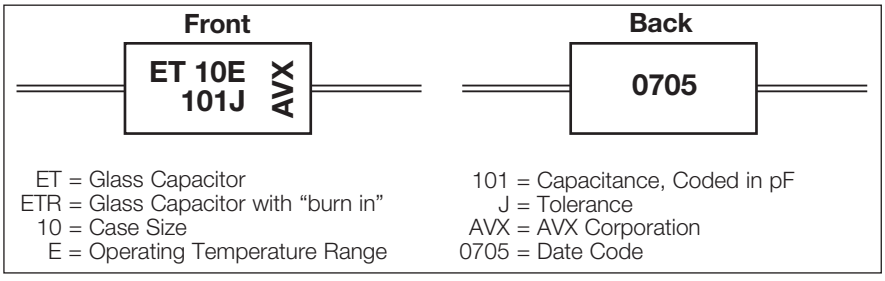
DIMENSIONS:

millimeters (inches)

Case Size	L	W	T	Lead Dia. +0.1 (+0.004) -0.03 (-0.001)	Weight (grams)
ET10	8.74 ± 1.19 (0.344 ± 0.047)	4.37 ± 0.79 (0.172 ± 0.031)	1.98 ± 0.79 (0.078 ± 0.031)	5.08 (0.200)	.25 - .50
ET15	11.91 ± 1.19 (0.469 ± 0.047)	6.76 ± 0.79 (0.266 ± 0.031)	2.77 ± 1.19 (0.109 ± 0.047)	5.08 (0.200)	.75 - 1.25

Note: Standard leads are solder-coated Dumet.

MARKING



*Radiation Resistance to the same level as the CY, CYR axial series.

Glass/ET Series Caps
Part Numbers and Ordering Information

HOW TO ORDER

ET	10	E	101	J
Style Glass Capacitor	**Case Size** 10 15	**Operating Temperature Range** -75°C to +200°C	**Capacitance Code** Capacitance Code is expressed in picofarads (pF). The first two digits represent significant figures and the third digit specifies the number of zeros to follow; i.e. 101 indicates 100 pF. For values below 10 pF, R = decimal point; i.e. 1R5 indicates 1.5 pF.	**Capacitance Tolerance** C = ±.25 pF D = ±.50 pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%

RATINGS & PART NUMBER REFERENCE (Standard Values)

ET Part No.	ETR Part No.	Cap (pF)	Tolerances Available Voltage	DC Working
	ET10, ETR10			
ET10E0R5 *	ETR10E0R5 **	0.5	C	50
ET10E1R0__	ETR10E1R0__	1.0	C, D	50
ET10E1R5__	ETR10E1R5__	1.5	C, D	50
ET10E2R2__	ETR10E2R2__	2.2	C, D	50
ET10E2R7__	ETR10E2R7__	2.7	C, D	50
ET10E3R0__	ETR10E3R0__	3.0	C, D	50
ET10E3R3__	ETR10E3R3__	3.3	C, D	50
ET10E3R6__	ETR10E3R6__	3.6	C, D	50
ET10E3R9__	ETR10E3R9__	3.9	C, D	50
ET10E4R3__	ETR10E4R3__	4.3	C, D	50
ET10E4R7__	ETR10E4R7__	4.7	C, K	50
ET10E5R1__	ETR10E5R1__	5.1	C, J, K	50
ET10E5R6__	ETR10E5R6__	5.6	C, J, K	50
ET10E6R2__	ETR10E6R2__	6.2	C, J, K	50
ET10E6R8__	ETR10E6R8__	6.8	C, J, K	50
ET10E7R5__	ETR10E7R5__	7.5	C, J, K	50
ET10E8R2__	ETR10E8R2__	8.2	C, J, K	50
ET10E9R1__	ETR10E9R1__	9.1	C, J, K	50
ET10E100__	ETR10E100__	10	C, J, K, M	50
ET10E110__	ETR10E110__	11	C, J, K, M	50
ET10E120__	ETR10E120__	12	C, J, K, M	50
ET10E130__	ETR10E130__	13	C, G, J, K, M	50
ET10E150__	ETR10E150__	15	C, G, J, K, M	50
ET10E160__	ETR10E160__	16	C, G, J, K, M	50
ET10E180__	ETR10E180__	18	C, G, J, K, M	50
ET10E200__	ETR10E200__	20	C, G, J, K, M	50
ET10E220__	ETR10E220__	22	C, G, J, K, M	50
ET10E240__	ETR10E240__	24	C, G, J, K, M	50
ET10E270__	ETR10E270__	27	F, G, J, K, M	50
ET10E300__	ETR10E300__	30	F, G, J, K, M	50
ET10E330__	ETR10E330__	33	F, G, J, K, M	50
ET10E360__	ETR10E360__	36	F, G, J, K, M	50
ET10E390__	ETR10E390__	39	F, G, J, K, M	50
ET10E430__	ETR10E430__	43	F, G, J, K, M	50
ET10E470__	ETR10E470__	47	F, G, J, K, M	50
ET10E510__	ETR10E510__	51	F, G, J, K, M	50
ET10E560__	ETR10E560__	56	F, G, J, K, M	50
ET10E620__	ETR10E620__	62	F, G, J, K, M	50
ET10E680__	ETR10E680__	68	F, G, J, K, M	50
ET10E750__	ETR10E750__	75	F, G, J, K, M	50

Add letter for tolerance code above lines.

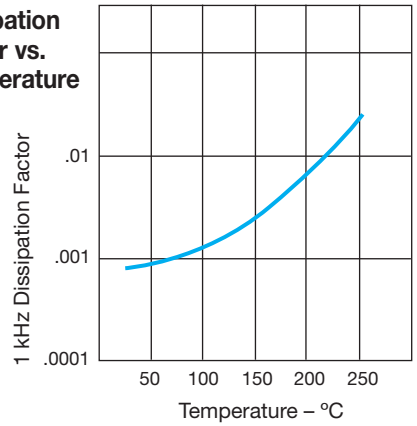
These capacitors include a "burn in", see page 10 High Voltage Stablization Screening.

ET Part No.	ETR Part No.	Cap (pF)	Tolerances Available Voltage	DC Working
	ET10, ETR10 (cont'd)			
ET10E820__	ETR10E820__	82	F, G, J, K, M	50
ET10E910__	ETR10E910__	91	F, G, J, K, M	50
ET10E101__	ETR10E101__	100	F, G, J, K, M	50
ET10E111__	ETR10E111__	110	F, G, J, K, M	50
ET10E121__	ETR10E121__	120	F, G, J, K, M	50
ET10E131__	ETR10E131__	130	F, G, J, K, M	50
ET10E151__	ETR10E151__	150	F, G, J, K, M	50
ET10E161__	ETR10E161__	160	F, G, J, K, M	50
ET10E181__	ETR10E181__	180	F, G, J, K, M	50
ET10E201__	ETR10E201__	200	F, G, J, K, M	50
ET10E221__	ETR10E221__	220	F, G, J, K, M	50
ET10E241__	ETR10E241__	240	F, G, J, K, M	50
ET10E271__	ETR10E271__	270	F, G, J, K, M	50
ET10E301__	ETR10E301__	300	F, G, J, K, M	50
	ET15, ETR15			
ET15E221__	ETR15E221__	220	F, G, J, K, M	50
ET15E241__	ETR15E241__	240	F, G, J, K, M	50
ET15E271__	ETR15E271__	270	F, G, J, K, M	50
ET15E301__	ETR15E301__	300	F, G, J, K, M	50
ET15E331__	ETR15E331__	330	F, G, J, K, M	50
ET15E361__	ETR15E361__	360	F, G, J, K, M	50
ET15E391__	ETR15E391__	390	F, G, J, K, M	50
ET15E431__	ETR15E431__	430	F, G, J, K, M	50
ET15E471__	ETR15E471__	470	F, G, J, K, M	50
ET15E511__	ETR15E511__	510	F, G, J, K, M	50
ET15E561__	ETR15E561__	560	F, G, J, K, M	50
ET15E621__	ETR15E621__	620	F, G, J, K, M	50
ET15E681__	ETR15E681__	680	F, G, J, K, M	50
ET15E751__	ETR15E751__	750	F, G, J, K, M	50
ET15E821__	ETR15E821__	820	F, G, J, K, M	50
ET15E911__	ETR15E911__	910	F, G, J, K, M	50
ET15E102__	ETR15E102__	1000	F, G, J, K, M	50
ET15E112__	ETR15E112__	1100	F, G, J, K, M	50
ET15E122__	ETR15E122__	1200	F, G, J, K, M	50

Add letter for tolerance code above lines.

These capacitors include a "burn in", see page 10 High Voltage Stablization Screening.

Dissipation Factor vs. Temperature
Axial



% Capacitance Change vs. Temperature
Axial