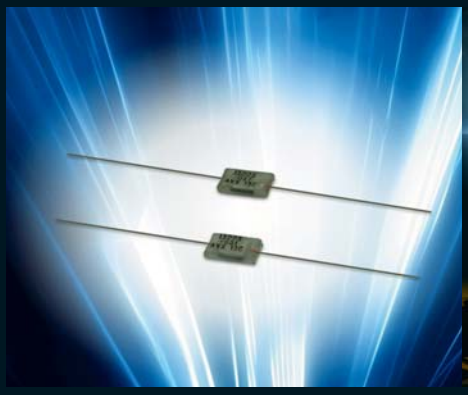
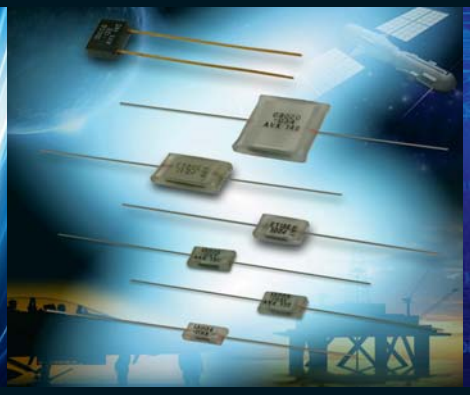
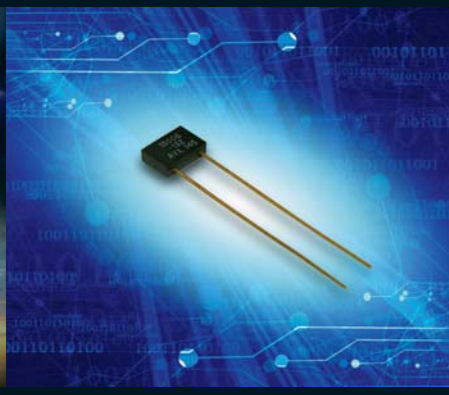
AVX **Glass Dielectric Capacitors**

Version 15.2

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Glass Dielectric Caps

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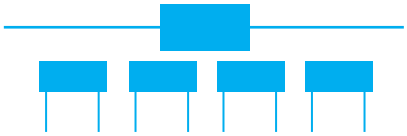

For the following:

- Placement of Orders
- Delivery
- Specifications of Drawing Reviews
- Location of Franchised Distributors
- Technical Information
  - Product Capabilities
  - Applications Assistance

Contact:

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AVX/Kyocera: your source for multilayer capacitors, glass capacitors, and tantalum capacitors. See other MLC parts in AVX's standard Leaded and Chip catalogs.

Glass Dielectric Caps

Cross Reference Listing

OLD MILITARY PART NUMBER	OLD AVX PART NUMBER SERIES	NEW DLA LAND AND MARITIME DRAWING NUMBER	PRODUCT CONFIGURATION
MIL-C-11272/1 MIL-PRF-23269/1	CY10 CYR10	13004	Axial
MIL-C-11272/2 MIL-PRF-23269/2	CY15 CYR15	13005	Axial
MIL-C-11272/3 MIL-PRF-23269/3	CY20 CYR20	09019	Axial
MIL-C-11272/4 MIL-PRF-23269/4	CY30 CYR30	09020	Axial
MIL-C-11272/13	CY06	13006	Radial
MIL-C-11272/14	CY07		
MIL-C-11272/15	CY08		
MIL-PRF-23269/10	CYR51/52/53		

DLA DRAWING	EXAMPLE OF MARKING
13004	13004 — DLA Land and Maritime drawing number -001 — Non-significant dash number TM 12A Trademark — Year code — Sequential 4 week lot code
13005	13005 — DLA Land and Maritime drawing number -001 — Non-significant dash number TM 12A Trademark — Year code — Sequential 4 week lot code
13006	13006 — DLA Land and Maritime drawing number -001 — Non-significant dash number TM 12A Trademark — Year code — Sequential 4 week lot code
09019	09019 — DSCC drawing number -001 — Non-significant dash number TM 09A Trademark — Year code — Sequential 4 week lot code
09020	09020 — DLA Land and Maritime drawing number -001 — Non-significant dash number TM 09A Trademark — Year code — Sequential 4 week lot code

Glass Capacitors

Selector Guide

CAPACITOR CHARACTERISTICS		DIELECTRIC TYPES			
		GLASS		ELEVATED TEMPERATURE GLASS	
AVX TYPES		13004 13005	13006	ET10 ET15	ET06 ET07 ET08
Capacitance	Capacitance Range	.5 - 1200 pF	1 - 2400 pF	0.5 to 1200 pF	1.0 to 2400 pF
	Standard Tolerance	±1 to 20%	±1 to 20%	±.25pF to ±20%	±.25pF to ±20%
	Minimum Tolerance	±1% or ±.25pF	±1% or ±.25pF	±.25%	±.25%
Volts	DC Operating Volts	100 VDC 300 VDC 500 VDC	300 VDC	50 VDC	50 VDC
Frequency	Operating Frequency	DC to UHF	DC to UHF	DC to VHF	DC to VHF
Dissipation Factor	% @ 1kHz >100pF 1MHz <100pF	.1% @ 25°C	.1%>100pF .2%<100pF	@ 25°C 1kHz: .1% @ 200°C 1kHz: 1%	@ 25°C 1kHz: <.1% @ 200°C 1kHz: <1%
Insulation Resistance	Meg Ω	100,000 @25°C	>100,000 100,000 @25°C	>100,000 @ 25°C >1 x 10^8 Ohms @ 200°C	@ 25°C >1 x 10^8 Ohms @ 200°C
Temperature	Operating Range	-55°C to +125°C	-55°C to +125°C	-75°C to +200°C	-75°C to +200°C
	Temperature Characteristics	+140 ±25 PPM/°C	+140 ±25 PPM/°C	+140 PPM ±25 PPM/°C	+140 PPM ±25 PPM/°C
Form Factor	Lead Type	Axial	Radial	Axial	Radial

INTRODUCTION

For the 1% of designs where you can't stand failures: In most types of electronic equipment, the occasional failure of a capacitor is tolerable – though it is inconvenient and often costly. For these applications, an acceptable level of reliability is provided by many of the excellent types of capacitors available today.

But in a few designs you can't stand failures – satellite systems, undersea cable repeaters, mountaintop microwave relay stations, to name just a few. For these designs AVX glass capacitors may be the optimum choice.

Where reliability is critical and replacement of a failed part is not possible or practical, consider glass capacitors.

Where stability is essential, even in severe environments, consider glass capacitors.

Glass capacitors have experienced over four decades of usage in some of America's most demanding circuit applications. Among these are:

TDRSS	Saturn IV	Phalnyx
GOES	Trident	Standard Missile
Cassini	Space Shuttle	Minuteman Missile
Mercury	Galileo	AWACS
Gemini	Matrix	Delta II
Titan II	Hubble Space Telescope	MK-46 Torpedo

OVER 5 DECADES OF MAJOR PROGRAM EXPERIENCE

RELIABILITY

The reasons for the high reliability of glass capacitors are straightforward.

- Simple construction — few things to go wrong.
- Glass dielectric — one of the most stable, inert materials available.
- Thorough inspection — every glass capacitor is individually inspected during production. This testing includes visual inspection, capacitance check, rated voltage check, and hermetic seal check (for glass case types).

AVX glass capacitors have been used in virtually all critical military and space programs for the past thirty-five years. Increasingly, they are also being used in non-military applications where failures can't be tolerated and circuit performance is critical.

STABILITY

Capacitor stability, or lack of it, is an inherent characteristic of the dielectric used. Few materials can match glass for stability, and few companies can match AVX Corporation for glass technology.

Glass doesn't corrode or degrade in any way. Glass is not subject to microfractures, delaminations, and other problems associated with certain crystalline materials. In addition, axial glass capacitors are hermetically encased in glass, with a true glass-to-metal seal at the leads. This construction is practically immune to severe environmental effects such as shock, vibration, radiation resistance, moisture, salt spray, and solder heat.

RADIATION RESISTANCE

The unique materials and construction techniques involved with glass capacitors make them ideal for use in radiation environments. After a total dose of nearly 10^8 rads (H_2O) glass capacitors exhibit only a minor change in capacitance. (≤.5%) and an 8% change in dissipation factor. Furthermore, glass capacitors can operate in fast neutron flux environments of 1 x $10^{15}cm^{-2}sec^{-1}$ and experience little or no damage in component parameters.

PREDICTABILITY

The dielectric is formed as a continuous ribbon of glass. Physical and electrical properties and dimensions are precisely controlled.

This results in every AVX glass capacitor being just like every other, part-to-part, and lot-to-lot. Couple this built-in predictability with complete performance specifications and you know what performance to expect before the first prototype is built.

CONSTRUCTION

Simplicity is the key to reliable construction. There are only three materials in axial glass capacitors: glass dielectric and case, aluminum foil electrodes, and wire leads. (Radial capacitors have a molded case.)

The leads are welded to the electrodes so there are no pressure connections to come loose and no solder connections to melt.

PERFORMANCE

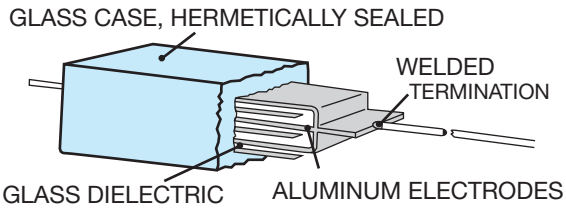
Quality control and simplicity of design mean that AVX glass capacitors are close to being a "perfect circuit symbol capacitance." Here is what you get with AVX glass capacitors:

- Nuclear Radiation Resistance
- Zero Aging Rate
- High Q Factor
- Large RF Current Capability
- No Piezoelectric Noise
- Low Dielectric Absorption
- ±5ppm Temperature Coefficient Retraceability
- High Breakdown Voltage
- Zero Voltage Coefficient

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

Glass Capacitors
Introduction

Although all AVX glass capacitors are of similar construction, performance characteristics vary slightly between axial and radial types due to differences in form factor and lead configuration. The performance descriptions and curves that follow are identified as applying to axial or radial types or both.



Simplicity of construction, combined with the excellent dielectric characteristics of glass, make AVX Glass Capacitors outstanding performers.

Temperature Coefficient: The actual temperature coefficient for glass capacitors is shown in Figure 1. It is a slightly nonlinear curve varying from +115ppm/°C at -55°C to +165ppm/°C at +125°C. Temperature coefficient can be accurately represented by the linear approximation 140±25ppm/°C.

Temperature coefficient is not affected by DC bias voltage nor by measurement frequency over the range of 1kHz to 1MHz. There is no hysteresis in the T.C. curve and part-to-part and lot-to-lot variations are no greater than ±5ppm.

Capacitance drift over the temperature range -55°C to 125°C is no greater than 0.1% or 0.1pF, whichever is larger.

Capacitance Change vs. Temperature: Derived from the T.C. curve, ΔC vs. temperature is shown in Figure 2 for both axials and radials.

Losses vs. Temperature: Maximum dissipation factor (DF) is 0.1% at 0.1kHz and 25°C. The variation of DF vs. temperature is shown in Figure 3 for radials and Figure 4 for axials. There is no significant variation in DF or Q with different capacitance values when measured at 1.0kHz. See losses vs. capacitance, below, for variations with capacitance value when measured at 1.0MHz.

Insulation Resistance vs.Temperature: Insulation resistance is greater than 100,000 megohms at 25°C. At 125°C, insulation resistance is greater than 10,000 megohms.

Capacitance Change vs. Frequency: Capacitance change vs. frequency is typically less than one percent up to 1MHz. See Figure 5.

Losses vs. Frequency: Dissipation factor at 1.0kHz and 25°C is 0.1% maximum for all axials and for radials greater than 100pF. DF is 0.2% for radials 100pF and below. The variation of DF and its reciprocal Q vs. frequency is shown in Figure 6 for radials and Figure 7 for axials. There is no significant variation in DF or Q with capacitance value when measured at 1.0kHz. See below for losses vs. capacitance value when measured at 1.0MHz.

Losses vs. Capacitance Value: The variation of Q with capacitance value when measured at 1.0MHz is shown in Figure 8 for radials and Figure 9 for axials.

Resonant Frequency vs. Capacitance Value: The frequency at which the capacitor becomes self-resonant is a function of both capacitance value and lead length. Typical curves are given in Figure 10 and radials and Figure 11 for axials.

Voltage Coefficient: Voltage coefficient is zero. There is no measurable change in capacitance from 0 to full working voltage. Voltage coefficient remains zero over the full temperature range and at all useful frequencies.

Surge Voltage: AVX Glass capacitors can withstand a surge voltage of 1500±30 VDC.

Temperature Range: The operating temperature range for all glass capacitors is -55°C to 125°C with no voltage derating required. Elevated Temperature (ET) capacitor operating temperature range -75°C to +200°C (with overexposure to +250°C ≤1 hour (axial) with no performance degradation).

Moisture Resistance: Meets or exceeds all requirements of applicable DLA Land & Maritime drawings..

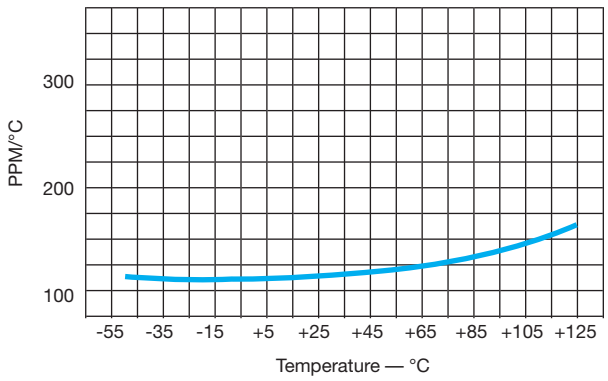
Life: When tested under accelerated conditions of 125°C with 150% of rated voltage applied for 2,000 hours, glass capacitors meet the requirements listed below. Pre- and post-test measurements are at 25°C.

Capacitance Change — Less than 0.5% or 0.5pF, whichever is greater, for all glass capacitors.

Dissipation Factor —
13004, 13005 — 0.15% maximum
13006 — 0.25% maximum for values above 100pF, 0.45% for 100pF and below

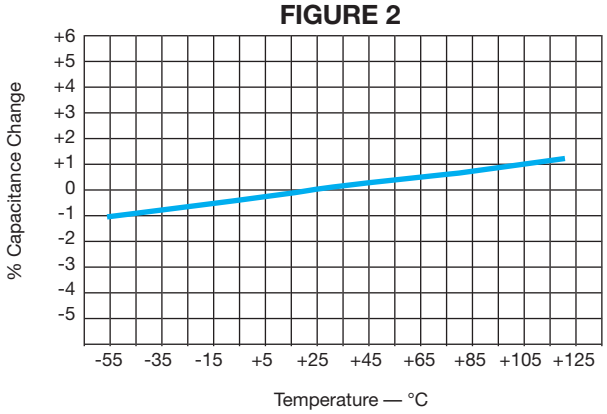
Noise: Glass dielectric capacitors have zero piezoelectric noise due to their unique dielectric material construction.

FIGURE 1



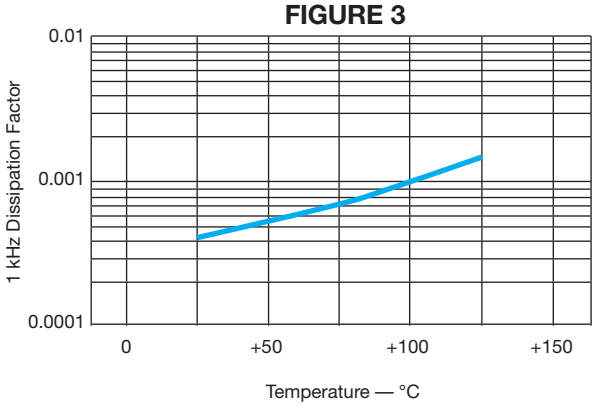
Temperature Coefficient vs. Temperature Radial and Axial

FIGURE 2



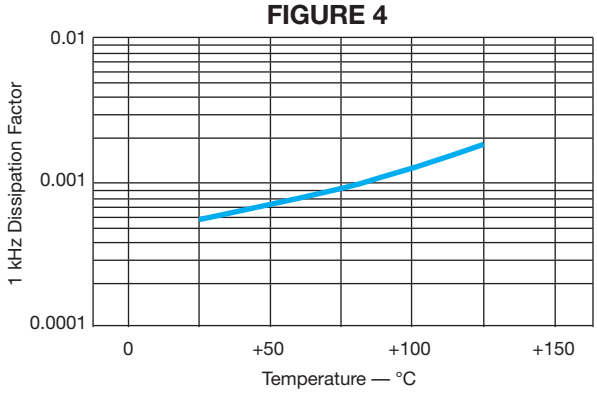
% Capacitance Change vs. Temperature Radial and Axial

FIGURE 3



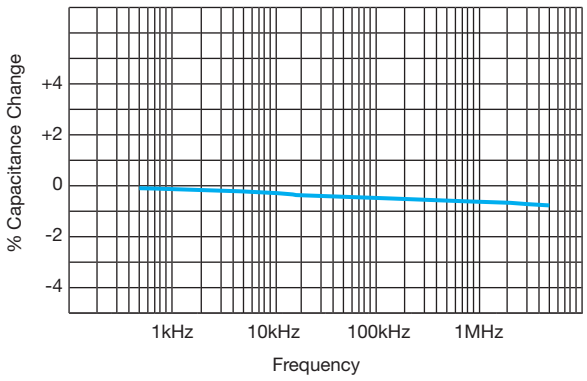
Dissipation Factor vs. Temperature Radial

FIGURE 4



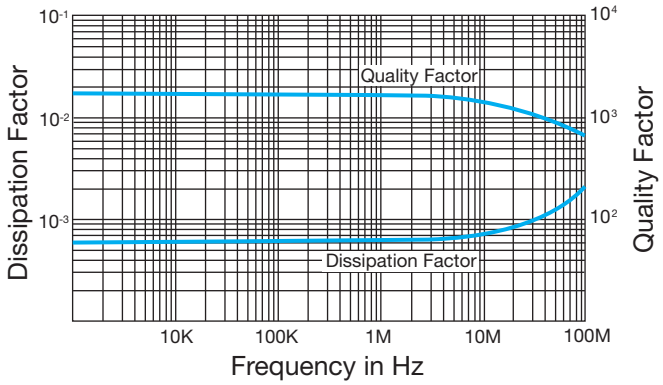
Dissipation Factor vs. Temperature Axial

FIGURE 5



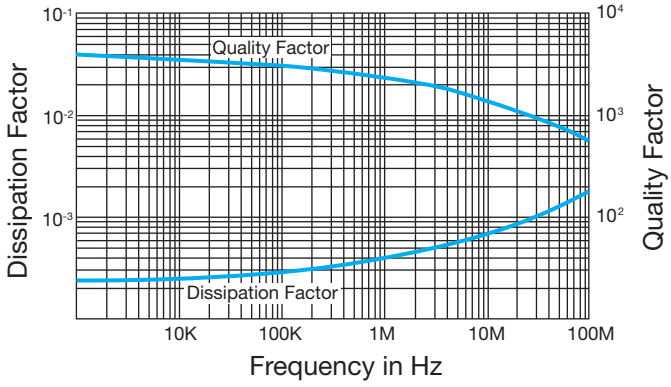
% Capacitance Change vs. Frequency Radial and Axial

FIGURE 6



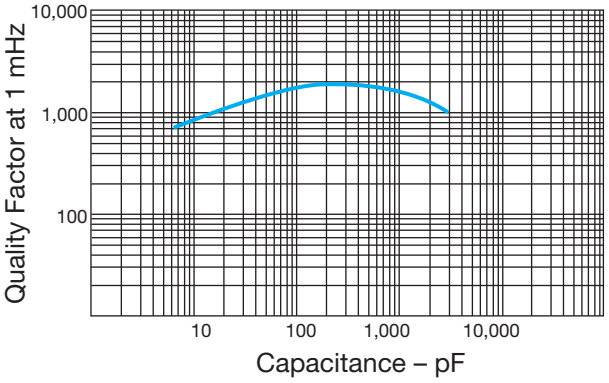
Quality Factor and Dissipation Factor vs. Frequency Radial

FIGURE 7



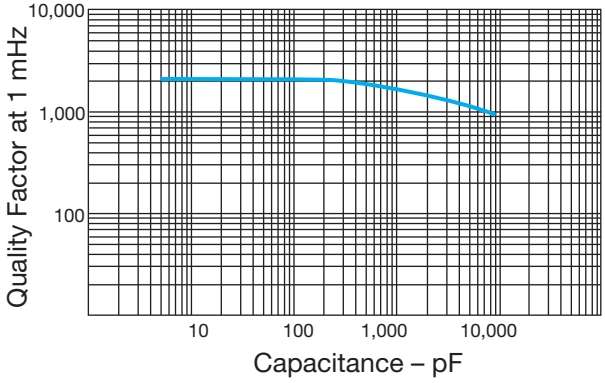
Quality Factor and Dissipation Factor vs. Frequency Axial

FIGURE 8



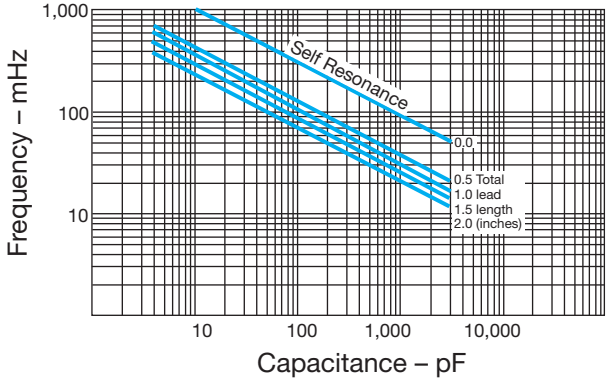
Quality Factor vs. Capacitance Radial

FIGURE 9



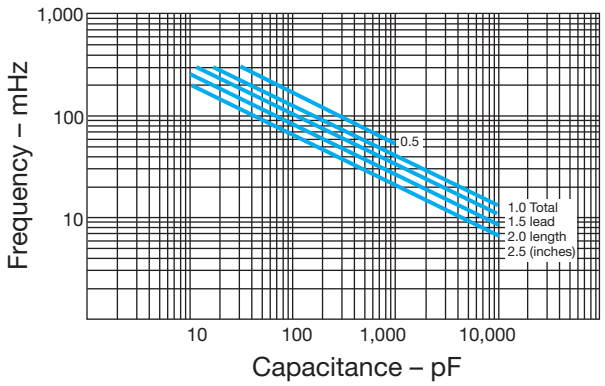
Quality Factor vs. Capacitance Axial

FIGURE 10



Resonant Frequency vs. Capacitance Radial

FIGURE 11



Resonant Frequency vs. Capacitance Axial

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

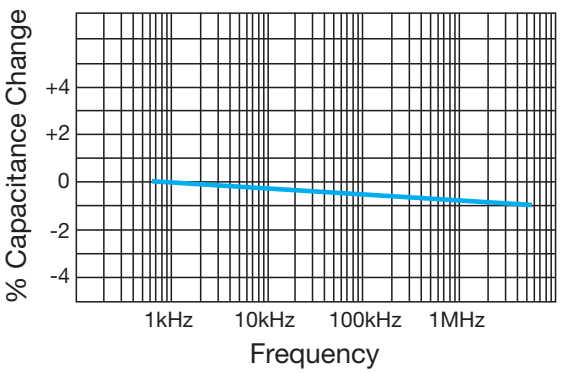
Working Temperature Range	-75°C to 200°C
Voltage Rating	50 VDC
Capacitance Range	0.5 pF to 2400 pF
Insulation Resistance	@ 25°C > 100,000 Megohms @ 200°C > 100 Megohms
Dissipation Factor	@ 25°C < .1% at 1kHz @ 200°C < 1% at 1kHz
Life	(1000 hours at rated voltage at 200°C) Post Test Delta C @ 25°C < 2% 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

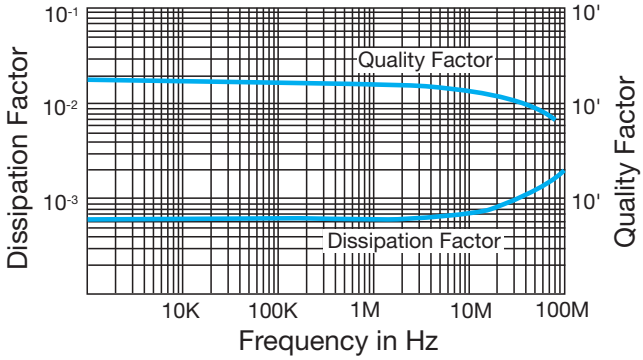
In general, AVX ET-Series glass capacitors are ideally suited for any environment where high temperature could alter or destroy circuit performance. And since they are rated down to -75°C, ET-Series capacitors are also useful where cycling to colder temperatures may be a problem. Some applications where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

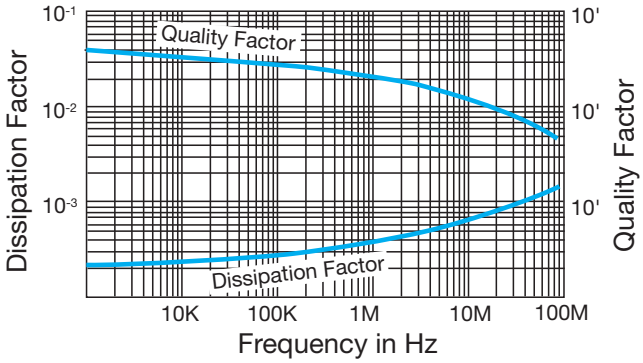
Glass/ET Series Caps
Performance Curves



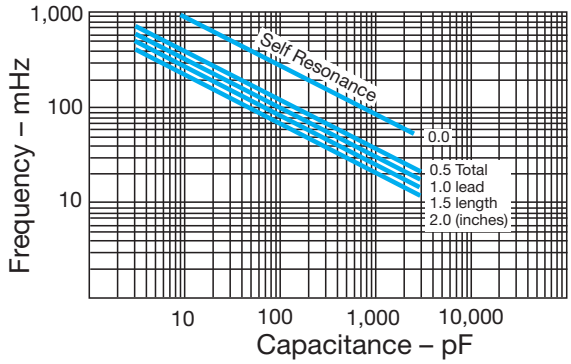
% Capacitance Change vs. Frequency
Radial and Axial



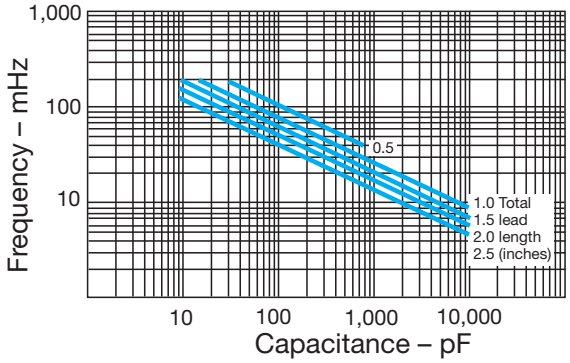
Quality Factor and Dissipation Factor vs. Frequency
Radial



Quality Factor and Dissipation Factor vs. Frequency
Axial



Resonant Frequency vs. Capacitance
Radial

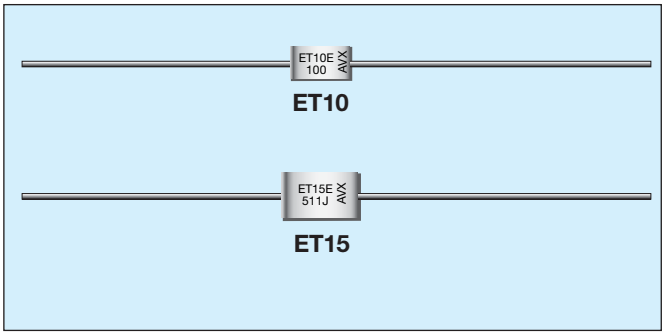


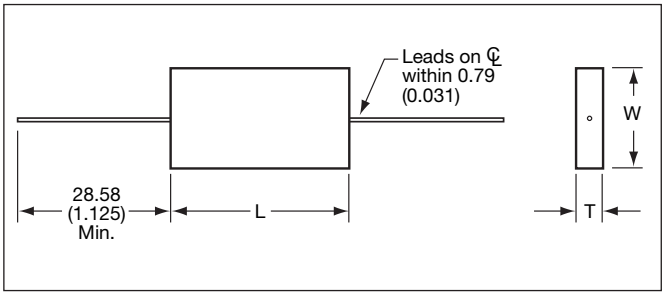
Resonant Frequency vs. Capacitance
Axial

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.

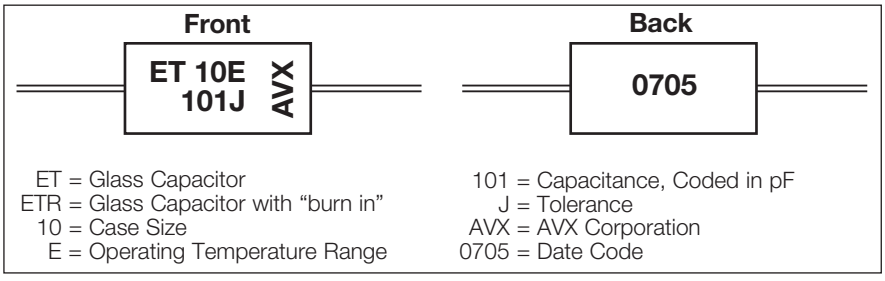
DIMENSIONS:

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.

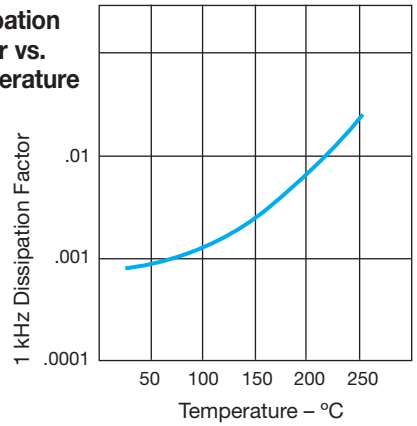
These capacitors include a "burn in", see page 10 High Voltage Stablization Screening.

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

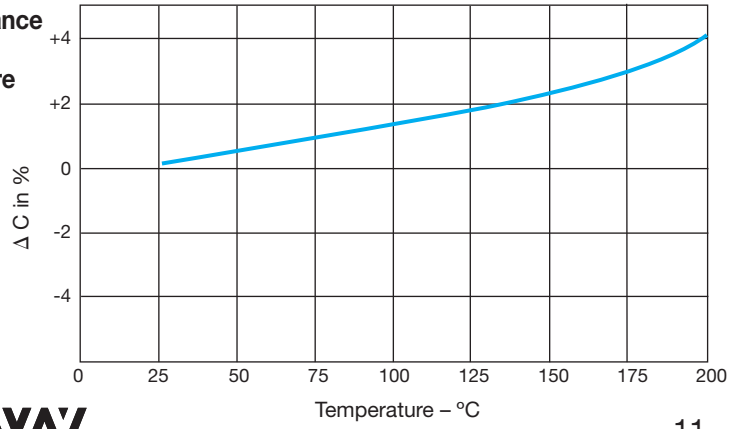
Add letter for tolerance code above lines.

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

Dissipation Factor vs. Temperature
Axial



% Capacitance Change vs. Temperature
Axial



Glass/ET Series Caps
Radial Lead Elevated Temperature

INTRODUCTION

AVX ET-Series radial leaded glass capacitors are available in a broad range of tolerances and values in three case sizes. The fused monolithic capacitive element is housed in a miniature rectangular molded case for high packaging efficiency in circuit board applications. The gold-plated Dumet leads can be soldered or welded.

PERFORMANCE CHARACTERISTICS

Tolerance: The ordering information table on the opposite page gives the available tolerances and values. An explanation of the part marking code is 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: Over the specified temperature range, losses are very low. At 200°C, 1kHz, the dissipation factor is 1% or less.

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

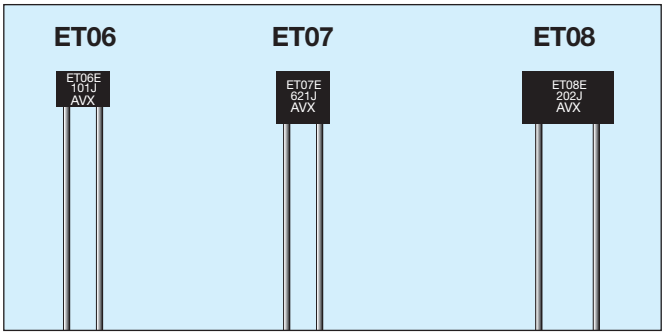
Insulation Resistance: 100,000 megohms or greater at 25°C; 100 megohms or greater at 200°C. More than 10 megohms after 1000 hour life-test.

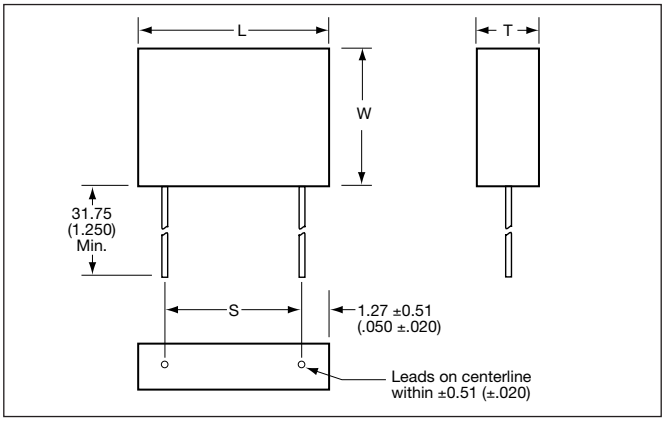
Voltage/Temperature Rating: All ET-Series capacitors are rated at 50 VDC over the operating temperature range of -75°C to 200°C. Derating is not required.

High Voltage Stabilization Screening: A special version of ET-Series radial 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.

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





DIMENSIONS:

millimeters (inches)

Case Size	L ±0.13 (±0.005)	W ±0.25 (±0.010)	T ±0.13 (±0.005)	S +0.51 (±0.020)	Weight (grams)
ET06	7.62 (0.300)	5.08 (0.200)	2.92 (0.115)	5.08 (0.200)	.3 - .4
ET07	7.62 (0.300)	7.62 (0.300)	2.92 (0.115)	5.08 (0.200)	.4 - .5
ET08	12.7 (0.500)	7.62 (0.300)	2.92 (0.115)	10.16 (0.400)	.7 - .8

Note: All leads are 24 AWG, 0.51± 0.05 (0.020±0.002) diameter. Leads are solderable and welded gold-plated Dumet.

MARKING

AVX = AVX Corporation
ET = Glass Capacitor
ETR = Glass Capacitor with "burn in"
06 = Case Size
E = Operating Temperature Range
561 = Capacitance, Coded in pF
J = Tolerance
0725 = Date Code

Glass/ET Series Caps

HOW TO ORDER

ET	06	E	561	J
Style Glass Capacitor	**Case Size** 06 07 08	**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. 561 indicates 560 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
	ET06, ETR06			
ET06E8R2__	ETR06E8R2__	8.2	C, J, K	50
ET06E9R1__	ETR06E9R1__	9.1	C, J, K	50
ET06E100__	ETR06E100__	10	C, J, K, M	50
ET06E110__	ETR06E110__	11	C, J, K, M	50
ET06E120__	ETR06E120__	12	C, J, K, M	50
ET06E130__	ETR06E130__	13	C, G, J, K, M	50
ET06E150__	ETR06E150__	15	C, G, J, K, M	50
ET06E160__	ETR06E160__	16	C, G, J, K, M	50
ET06E180__	ETR06E180__	18	C, G, J, K, M	50
ET06E200__	ETR06E200__	20	C, G, J, K, M	50
ET06E220__	ETR06E220__	22	C, G, J, K, M	50
ET06E240__	ETR06E240__	24	C, G, J, K, M	50
ET06E270__	ETR06E270__	27	F, G, J, K, M	50
ET06E300__	ETR06E300__	30	F, G, J, K, M	50
ET06E330__	ETR06E330__	33	F, G, J, K, M	50
ET06E360__	ETR06E360__	36	F, G, J, K, M	50
ET06E390__	ETR06E390__	39	F, G, J, K, M	50
ET06E430__	ETR06E430__	43	F, G, J, K, M	50
ET06E470__	ETR06E470__	47	F, G, J, K, M	50
ET06E510__	ETR06E510__	51	F, G, J, K, M	50
ET06E560__	ETR06E560__	56	F, G, J, K, M	50
ET06E620__	ETR06E620__	62	F, G, J, K, M	50
ET06E680__	ETR06E680__	68	F, G, J, K, M	50
ET06E750__	ETR06E750__	75	F, G, J, K, M	50
ET06E820__	ETR06E820__	82	F, G, J, K, M	50
ET06E910__	ETR06E910__	91	F, G, J, K, M	50

Add letter for tolerance code above lines.

These capacitors include a "burn in", see page 12 High Voltage Stablization Screening.

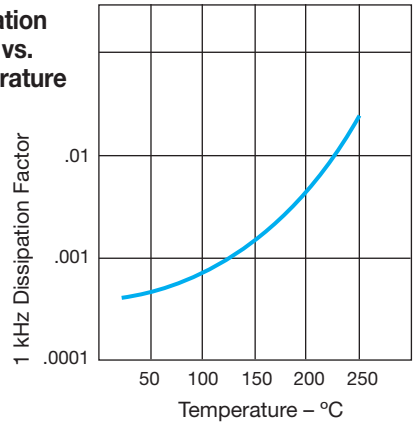
ET Part No.	ETR Part No.	Cap (pF)	Tolerances Available Voltage	DC Working
	ET08, ETR08			
ET08E112_*	ETR08E112_**	1100	F, G, J, K, M	50
ET08E122__	ETR08E122__	1200	F, G, J, K, M	50
ET08E132__	ETR08E132__	1300	F, G, J, K, M	50
ET08E152__	ETR08E152__	1500	F, G, J, K, M	50
ET08E162__	ETR08E162__	1600	F, G, J, K, M	50
ET08E182__	ETR08E182__	1800	F, G, J, K, M	50
ET08E202__	ETR08E202__	2000	F, G, J, K, M	50
ET08E222__	ETR08E222__	2200	F, G, J, K, M	50
ET08E242__	ETR08E242__	2400	F, G, J, K, M	50

Add letter for tolerance code above lines.

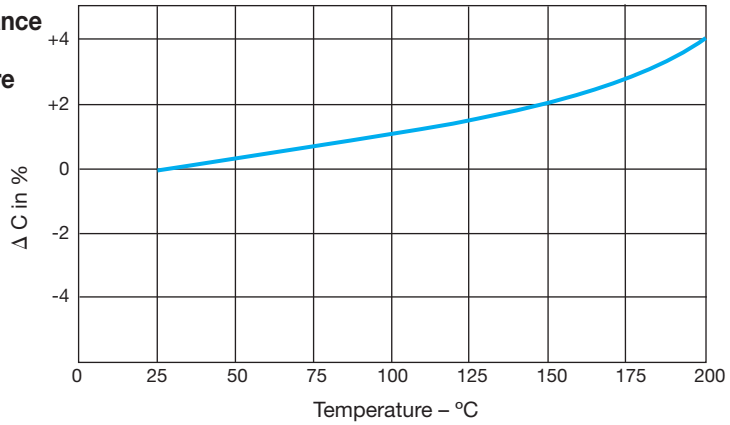
These capacitors include a "burn in", see page 12 High Voltage Stablization Screening.

*Other values may be available - contact AVX

Dissipation Factor vs. Temperature
Radial



% Capacitance Change vs. Temperature
Radial



AMERICAS

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AVX Northwest, WA
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