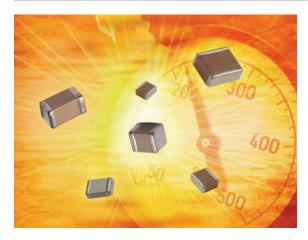
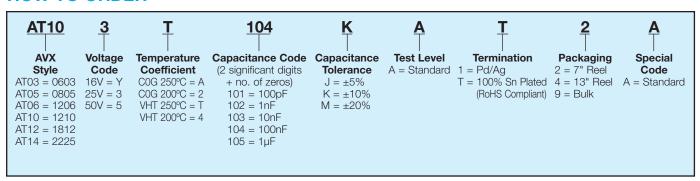
High Temperature MLCC - 200°C & 250°C Rated



Present military specifications, as well as a majority of commercial applications, require a maximum operating temperature of 125°C. However, the emerging market for high temperature electronics demands capacitors operating reliably at temperatures beyond 125°C. AVX's new high temperature chip capacitor product line, with verified capability of long-term operation up to 250°C is a response to both military and commercial business needs. The new capacitors demonstrate high current handling capabilities, high volumetric efficiency, high insulation resistance and low ESR/ESL. This product has been designed for the most demanding applications, such as "down-hole" oil exploration and aerospace programs.

HOW TO ORDER



ELECTRICAL SPECIFICATIONS

Temperature Coefficient

COG: A 0±30 ppm/°C, -55°C to +250°C VHT: T ±15%, -55°C to +150°C See TCC Plot for +250°C

Capacitance Test (MIL-STD-202, Method 305) 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) @ 1kHz

Dissipation factor 25°C

COG: 0.15% Max at 1.0 \pm 0.2 Vrms (open circuit voltage) @ 1kHz VHT: 2.5% Max at 1.0 \pm 0.2 Vrms (open circuit voltage) @ 1kHz

Insulation Resistance 25°C (MIL-STD-202, Method 302) 100G Ω or 1000M Ω .µF (whichever is less)

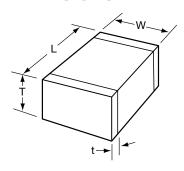
Insulation Resistance 125°C (MIL-STD-202, Method 302) $10G\Omega$ or $100M\Omega$.µF (whichever is less)

Insulation Resistance 200°C (MIL-STD-202, Method 302) $1G\Omega$ or $10M\Omega.\mu F$ (whichever is less)

Insulation Resistance 250°C (MIL-STD-202, Method 302) 100M Ω or 1M Ω .μF (whichever is less)

Direct Withstanding Voltage 25°C (Flash Test) 250% rated voltage for 5 seconds with 50mA max charging current (500 Volt units @ 750VDC)

DIMENSIONS



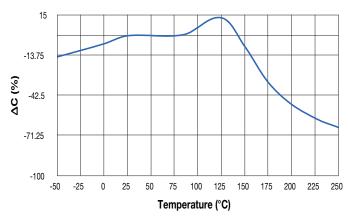
millimeters (inches)

Size	AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225		
(L) Length	1.60 ± 0.15	2.01 ± 0.20	3.20 ± 0.20	3.20 ± 0.20	4.50 ± 0.30	5.72 ± 0.25		
	(0.063 ± 0.006)	(0.079 ± 0.008)	(0.126 ± 0.008)	(0.126 ± 0.008)	(0.177 ± 0.012)	(0.225 ± 0.010)		
(W) Width	0.81 ± 0.15			2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)		
(T) Thickness	1.02	1.30	1.52	1.70	2.54	2.54		
Max.	(0.040)	(0.051)	(0.060)	(0.067)	(0.100)	(0.100)		
(t) terminal min.	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)		
max.	0.75 (0.030)	0.75 (0.030)	0.75 (0.030)	0.75 (0.030)	1.02 (0.040)	1.02 (0.040)		

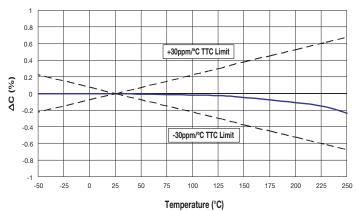
High Temperature MLCC - 200°C & 250°C Rated

PERFORMANCE CHARACTERISTICS

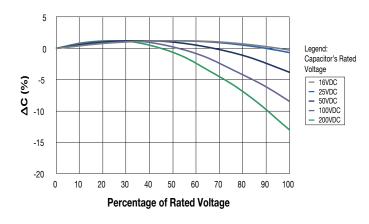
Typical Temperature Coefficient of Capacitance (VHT Dielectric)



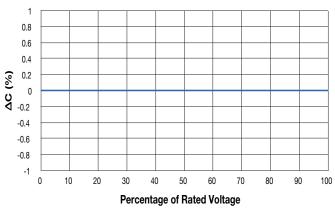
Typical Temperature Coefficient of Capacitance (COG Dielectric)



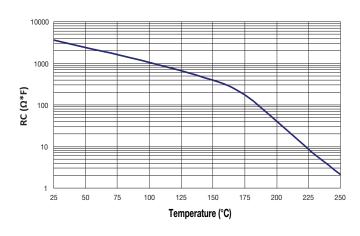
Typical Voltage Coefficient of Capacitance (VHT Dielectric)



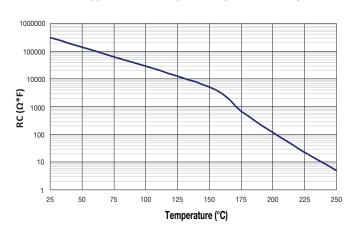
Typical Voltage Coefficient of Capacitance (COG Dielectric)



Typical RC vs Temperature (VHT Dielectric)



Typical RC vs Temperature (COG Dielectric)

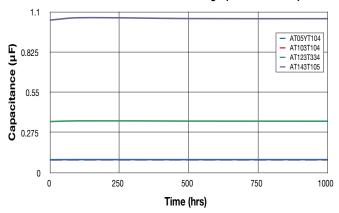




High Temperature MLCC - 200°C & 250°C Rated

RELIABILITY

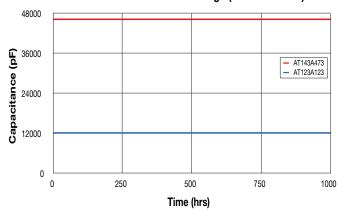




VHT - Failure Rate	@ 90% Confidence Le	vel (%/1000 hours)		
Temperature (°C)	50% Rated Voltage	100% Rated Voltage		
200	0.002	0.017		
250	0.026	0.210		

^{*}Typical 1210, 1812, 2225 Failure Rate Analysis based on 250°C testing and voltage ratings specified on the following page.

250°C Life Test @ 2x Rated Voltage (C0G Dielectric)

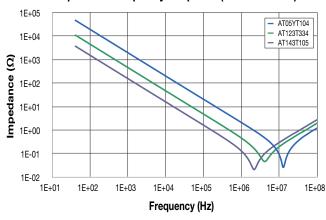


C0G - Failure Rate @ 90% Confidence Level (%/1000 hours)										
Temperature (°C) 50% Rated Voltage 100% Rated Voltage										
200	0.006	0.047								
250	0.074	0.590								

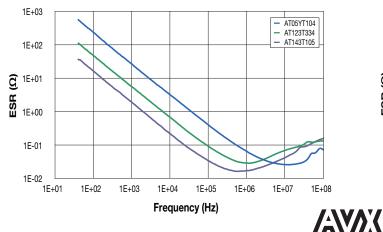
^{*}Typical 1812 and 2225 Failure Rate Analysis based on 250°C testing and voltage ratings specified on the following page.

FREQUENCY RESPONSE

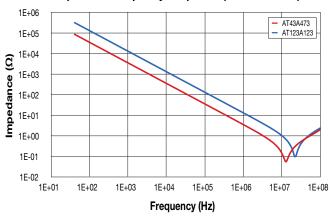
Impedance Frequency Response (VHT Dielectric)



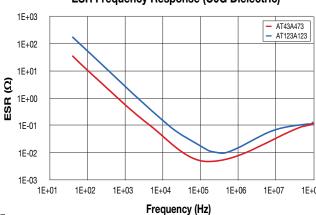
ESR Frequency Response (VHT Dielectric)



Impedance Frequency Response (COG Dielectric)



ESR Frequency Response (C0G Dielectric)



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High Temperature MLCC

200°C Rated Capacitance Range

CAPACITANCE RANGE PREFERRED SIZES ARE SHADED

VHT Temp. Coefficient: 4 200°C Rated											
Case Siz	ze	AT03 = 0603	AT05 =	= 0805	AT06	AT06 = 1206		= 1210	AT12 = 1812	AT14 = 2225	
Soldering	g	Reflow/Wave	Reflow			Reflow/Wave		w Only	Reflow Only	Reflow Only	
(L) Length	mm	1.60 ± 0.15	2.01 ±			3.20 ± 0.20 (0.126 ± 0.008)		± 0.20	4.50 ± 0.30 (0.177 ± 0.012)	5.72 ± 0.25	
(W) Width	(in.) mm	(0.063 ± 0.006) 0.81 ± 0.15	(0.079 ± 0.008) 1.25 ± 0.20			£ 0.008)		± 0.008) ± 0.20	3.20 ± 0.20	(0.225 ± 0.010) 6.35 ± 0.25	
(11) 111001	(in.)	(0.032 ± 0.006)	(0.049 ± 0.008)		(0.063			± 0.008)	(0.126 ± 0.008)	(0.250 ± 0.010)	
(T) Thickness	mm	1.02	1.30 (0.051)			52		70	2.54	2.54	
(t) Terminal	(in.) min	(0.040) 0.25 (0.010)	0.25 (0			0.010)		0.010)	(0.100) 0.25 (0.010)	(0.100) 0.25 (0.010)	
	max	0.75 (0.030)	0.75 (0.030)			0.030)		0.030)	1.02 (0.040)	1.02 (0.040)	
Rated Temp.	(°C)	200	20	00	21	00	2	00	200	200	
Temp. Coeffic		4	4					4	4	4	
Voltage (V		25	25	50	25	50	25 50		50	50	
	102										
. ,	122										
	152										
	182 222				<u> </u>		\vdash				
	272				—		_				
	332										
	392										
4700	472										
5600	562										
6800 682											
8200	822										
	103										
u ,	123										
	153										
	183										
	223						_				
	273 333										
	393										
	473										
	563										
0.068	683										
0.082	823										
0.100	104										
-	124										
	154										
	184										
	224										
	274 334										
	394										
	474				 						
-	564										
	684										
	824										
1.000	105				İ		İ				
Voltage (V	/)	25	25	50	25	50	25	50	50	50	
Rated Temp.	(°C)	200	20	00	21	00	2	00	200	200	
Case Size		AT03 = 0603	AT05 = 0805		AT06 = 1206		AT10 = 1210		AT12 = 1812	AT14 = 2225	

Voltage rating per table. Capacitance values specified at 25°C, derate capacitance value based on TCC and VCC Plots on page 2. NOTE: Contact factory for non-specified capacitance values.



High Temperature MLCC

250°C Rated Capacitance Range

CAPACITANCE RANGE PREFERRED SIZES ARE SHADED

VHT	Те	mp. Coefficion	ent: T 250°	C Rated		
Case Size		AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 =
Solder	ing	Reflow/Wave	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow
(L) Length	mm (in.)	1.60 ± 0.15 (0.063 ± 0.006)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.50 ±
(W) Width	(in.) mm	0.81 ± 0.15	1.25 ± 0.20	1.60 ± 0.20	2.50 ± 0.20	3.20 ±

Case Size		ze	AT03 = 0603	AT05 :	= 0805	AT06 = 1206		AT10 = 1210		AT12 = 1812	AT14 = 2225	
Soldering		ng	Reflow/Wave	Reflow/Wave		Reflow/Wave		Reflow Only		Reflow Only	Reflow Only	
(L) Le	-	mm (in.)	1.60 ± 0.15 (0.063 ± 0.006) 0.81 ± 0.15	2.01 ± (0.079 ±	0.008)	(0.126 :	± 0.20 ± 0.008) ± 0.20	(0.126 :	± 0.20 ± 0.008) ± 0.20	4.50 ± 0.30 (0.177 ± 0.012) 3.20 ± 0.20	5.72 ± 0.25 (0.225 ± 0.010) 6.35 ± 0.25	
	(in.)		(0.032 ± 0.006) 1.02	(0.049 ±	£ 0.008)	(0.063 -	± 0.008)	(0.098 ± 0.008)		(0.126 ± 0.008) 2.54	(0.250 ± 0.010) 2.54	
(1) 11	IICKI IESS	(in.)	(0.040)	1.30 (0.051)		1.52 (0.060)			067)	(0.100)	(0.100)	
(t) Ter	rminal	min	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)		0.25 (0.010) 0.75 (0.030)		0.25 (0.010) 0.75 (0.030)		0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	
Rate	ed Temp	o. (°C)	250	250		250		250		250	250	
	Temp. Coefficeint		T	T		T		T		T	T	
	/oltage (16	16	25	16 25		16 25		25	25	
Cap	1000	102										
(pF)	1200	122										
	1500	152										
	1800	182										
	2200	222										
	2700	272										
	3300	332										
	3900	392										
	4700	472										
	5600	562										
	6800	682										
	8200	822										
Cap	0.010	103										
(µF)	0.012	123										
	0.015	153										
	0.018	183										
	0.022	223										
	0.027	273										
	0.033	333										
	0.039	393										
	0.047	473										
	0.056	563										
	0.068	683										
ļ	0.082	823										
	0.100	104										
	0.120	124										
-	0.150	154										
	0.180	184										
-	0.220	224										
-	0.270	274										
-	0.330	334										
-		474										
- }	0.470	564										
- }	0.680	684						\vdash				
-	0.820	824						<u> </u>				
-	1.000	105						-				
	/oltage (16	16	25	16	25	16	25	25	25	
	ed Temp		250	25		25			50	250	250	
	ase Si	• /									AT14 = 2225	
	ase S	ze	AT03 = 0603	AT05 =	- 0000	AIU0:	= 1206	AIIO	= 1210	AT12 = 1812	A1 14 = 2225	

Voltage rating per table. Capacitance values specified at 25°C, derate capacitance value based on TCC and VCC Plots on page 2. NOTE: Contact factory for non-specified capacitance values.

High Temperature MLCC - 200°C & 250°C Rated

CAPACITANCE RANGE PREFERRED SIZES ARE SHADED

C	OG	Te	Temp. Coefficient: 2 200°C Rated							COG Temp. Coefficient: A 250°C Rated							
С	ase S	ize	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	С	ase \$	Size	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225		
- 5	olderi	na	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only		Solder	ina	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only		
	ength	mm	2.01 ± 0.20	3.20 ± 0.20	3.20 ± 0.20	4.50 ± 0.30	2.75 ± 0.25		ength	mm	2.01 ± 0.20	3.20 ± 0.20	3.20 ± 0.20	4.50 ± 0.30	2.75 ± 0.25		
		(in.)	(0.079 ± 0.008)	(0.126 ± 0.008)	(0.126 ± 0.008)	(0.177 ± 0.012)	(0.225 ± 0.010)				(0.079 ± 0.008)	(0.126 ± 0.008)	(0.126 ± 0.008)	(0.177 ± 0.012)	(0.225 ± 0.010)		
. ,	(W) Width mm (in.)		1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)	, ,	Nidth	mm (in.)	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)		
(T) TI	nickness	mm (in.)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)	(T) T	hicknes	s mm (in.)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)		
(t) Te	minal	min	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	(t) Te	rminal	min	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)	0.25 (0.010)		
Rat	Rated Temp. (°C)		0.75 (0.030) 200	0.75 (0.030)	0.75 (0.030) 200	1.02 (0.040)	1.02 (0.040)	Rat	Rated Temp. (°C)		0.75 (0.030) 250	0.75 (0.030) 250	0.75 (0.030) 250	1.02 (0.040)	1.02 (0.040)		
	Temp. Coefficeint		2	2	2	2	2		ıp. Coe		A	A	A	A	A		
	/oltage		50	50	50	50	50		Voltage		25	25	25	25	25		
Cap		101						Сар									
(pF)	120	121						(pF)	120								
(1 /	150	151						(/	150								
	180	181							180								
	220	221							220						 		
	270	271							270								
	330	331							330								
	390	391							390								
	470	471							470						 		
	560	561							560								
	680	681							680								
	820	821							820						-		
	1000	102							1000	_					<u> </u>		
	1200	122							1200								
	1500	152							1500								
	1800	182							1800	_							
	2200	222							2200								
	2700	272							2700	_							
	3300	332							3300								
	3900	392							3900								
	4700	472							4700	_							
	5600	562							5600								
	6800	682							6800								
	8200	822							8200								
Cap		103						Cap	0.010								
(uF)	0.012	123						(μF)		_							
. ,	0.015	153						. ,	0.015								
	0.018	183							0.018								
	0.022	223							0.022								
	0.027	273							0.027								
	0.033	333							0.033	333							
	0.039	393							0.039	393							
	0.047	473							0.047								
	0.056	563							0.056								
	0.068	683							0.068			İ					
	0.082	823							0.082	823							
	0.100	104							0.100	104							
	/oltage	(V)	50	50	50	50	50		Voltage	(V)	25	25	25	25	25		
	ed Tem		200	200	200	200	200		ed Ten		250	250	250	250	250		
С	ase S	ize	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	С	ase s	Size	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225		

Voltage rating per table. Capacitance values specified at 25°C, derate capacitance value based on TCC and VCC Plots on page 2. NOTE: Contact factory for non-specified capacitance values.

