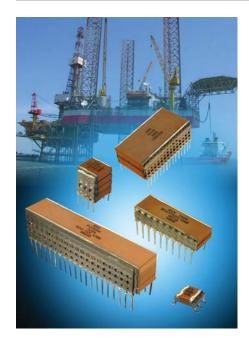


SMX Style for High Temperature Applications up to 200°C



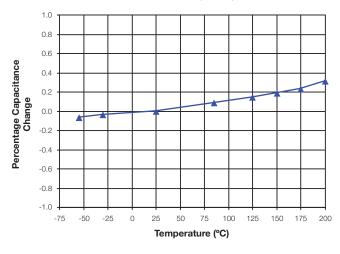
SMX-style, stacked Switch Mode Power Supply Capacitors (SMPS) utilizing Multilayer Ceramic (MLCC) construction are ideally suited for high temperature applications up to 200°C. This product is intended for downhole oil exploration, including logging while drilling, geophysical probes, as well as space and aerospace electronics. The high temperature solder utilized in the construction of SMX-style parts assures reliable operation in harsh environments. The wide product offering provides designers a solution for high capacitance value and high voltage capacitors rated at 200°C. The SMX-style capacitors are ideally suited for applications as DC filters in high power, high frequency motor drives, high pulsed-current circuitry, as well as low power electronics.

SMX-style, SMPS capacitors are characterized with excellent performance in comparison to wet tantalum products. The main benefits of SMX-product over wet tantalum capacitors include:

- Much lower ESR and lower losses
- Excellent capacitance retention with frequency
- Excellent high frequency performance
- Low DC leakage current
- · Much higher current handling capabilities

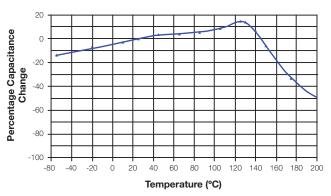
Typical Extended Temperature TCC Characterization of C0G, SMPS Capacitors

Test conditions: 1 Vrms, 1 kHz, 0 VDC bias

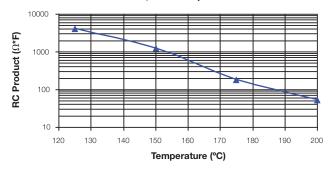


Typical Extended Temperature TCC Characterization of VHT, SMPS Capacitors

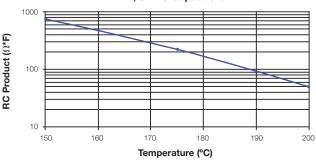
Test conditions: 1 Vrms, 1 kHz, 0 VDC bias



Typical Extended Temperature IR Characterization of COG, SMPS Capacitors



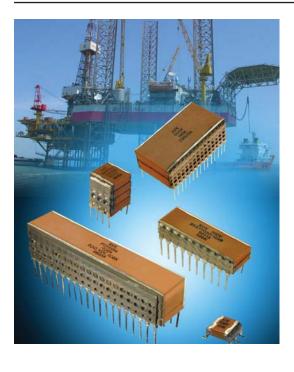
Typical Extended Temperature IR Characterization of VHT, SMPS Capacitors







SMX Style for High Temperature Applications up to 200°C



ELECTRICAL SPECIFICATIONS

Temperature Coefficient

COG: A Temperature Coefficient 0 ±30 ppm/°C, -55° to +200°C VHT: C Temperature Coefficient ±15%, -55°C to +125°C +15% - 56%, -55°C to +200°C

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

Dissipation Factor 25°C

COG: 0.15% Max @ 25°C, 1.0±0.2 Vrms (open circuit voltage) at 1KHz VHT: 2.5% Max @ 25°C, 1.0±0.2 Vrms (open circuit voltage) at 1KHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)

100K M Ω or 1000 M Ω - μ F, whichever is less.

Insulation Resistance 125°C (MIL-STD-202 Method 302)

10K M Ω or 100 M $\Omega\text{-}\mu\text{F},$ whichever is less.

Insulation Resistance 200°C (MIL-STD-202 Method 302) 1K M Ω or 10 M Ω - μ F, whichever is less.

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

Moisture Resistance (MIL-STD-202 Method 106) Ten cycles with no voltage applied.

Thermal Shock (MIL-STD-202 Method 107, Condition A)

Immersion Cycling (MIL-STD-202 Method 104, Condition B)

Resistance To Solder Heat (MIL-STD-202, Method 210, Condition B, for 20 seconds)

Not RoHS Compliant

HOW TO ORDER

AVX Styles: SMX1, SMX2, SMX3, SMX4, SMX5, SMX6

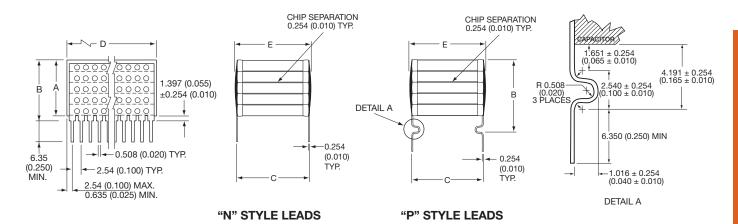
SMX	1	7	C	106	M	A	N 	<u>650</u>
AVX Style SMX = Uncoated	Size See Dimensions chart	Voltage 25 = 3 50V = 5 100V = 1 200V = 2 500V = 7	Temperature Coefficient COG = A VHT = C	Capacitance Code (2 significant digits + number of zeros) 10 pF = 100 100 pF = 101 1,000 pF = 102 22,000 pF = 223 220,000 pF = 224 1μF = 105 10 μF = 106 100 μF = 107	Capacitance Tolerance COG: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	Test Level A = Standard	Termination N = Straight Lead J = Leads formed in L = Leads formed out P = P Style Leads Z = Z Style Leads	Height Max Dimension "A" 120 = 0.120" 240 = 0.240" 360 = 0.360" 480 = 0.480" 650 = 0.650"

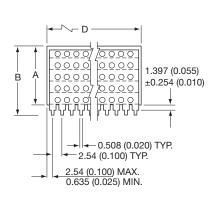
Note: Capacitors with X7R/X9U dielectric is not intended for applications across AC supply mains or AC line filtering with polarity reversal. Contact plant for recommendations.

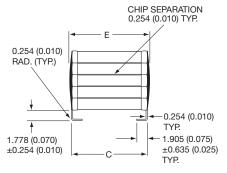


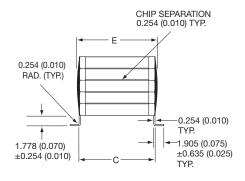


SMX Style for High Temperature Applications up to 200°C



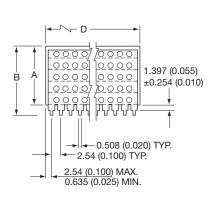




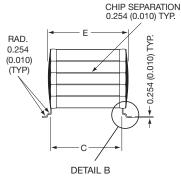


"J" STYLE LEADS

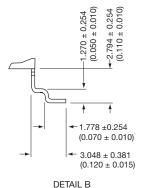
"L" STYLE LEADS



DIMENSIONS



"Z" STYLE LEADS



millimeters (inches)

Style	A (max.)	B (max.)	C ±.635 (±0.025)	D ±.635 (±0.025)	E (max.)	No. of Leads per side
SMX1			11.4 (0.450)	52.1 (2.050)	12.7 (0.500)	20
SMX2	See page 40 for	For "N" Style Leads: "A" Dimension Plus 1.651 (0.065)	20.3 (0.800)	38.4 (1.510)	22.1 (0.870)	15
SMX3	maximum "A"	For "J" & "L" Style Leads: "A" Dimension Plus 2.032 (0.080)	11.4 (0.450)	26.7 (1.050)	12.7 (0.500)	10
SMX4	Dimension	For "P" Style Leads: "A" Dimension Plus 4.445 (0.175)	10.2 (0.400)	10.2 (0.400)	11.2 (0.440)	4
SMX5	Difficision	For "Z" Style Leads: "A" Dimension Plus 3.048 (0.120)	6.35 (0.250)	6.35 (0.250)	7.62 (0.300)	3
SMX6			31.8 (1.250)	52.1 (2.050)	34.3 (1.350)	20





SMX Style for High Temperature Applications up to 200°C

Max Capacitance (μF) Available Versus Style with Height (A) of 0.120" - 3.05mm

AVX		SN	1X1 _		AN1	120	SN	IX2		_ AN1	20	SN	1X3		_ AN1	20	SN	ИX4		AN1	20	S	MX5 _		_ AN1	20	SM	X6		_AN12	0
STYLE	2	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V
COG	-	1.0	.70	.40	.18	.068	1.2	1.0	.60	.26	.10	.50	.40	.20	.09	.033	.16	.13	.07	.02	.01	.05	.04	.02	.01	.0039	3.2	2.4	1.3	.50	.20
VHT		-	18	10	3.9	1.8	-	27	15	5.6	2.7	12	8.2	4.7	1.8	.82	3.9	2.7	1.5	.56	.27	1.5	1.0	.56	.22	.10	-	56	33	12	5.6

Max Capacitance (μF) Available Versus Style with Height (A) of 0.240" - 6.10mm

Δ	VX	SI	/IX1 _		_ AN2	240	SM	IX2		_ AN2	40	SN	1X3		_ AN2	40	SN	/IX4		_ AN2	40	SI	MX5 _		_ AN2	10	SM	IX6		_ AN24	0
ST	YLE	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V
С	0G	2.0	1.4	.80	.36	.13	2.4	2.0	1.2	.52	.20	1.0	.80	.40	.18	.068	.33	.26	.14	.05	.02	.10	.08	.05	.02	.0078	6.4	4.8	2.6	1.0	.40
V	HT	-	33	18	6.8	3.3	-	47	27	10	4.7	22	15	8.2	3.3	1.5	6.8	4.7	2.7	1.0	.47	2.7	1.8	1.0	.39	.18	-	100	56	22	10

Max Capacitance (μF) Available Versus Style with Height (A) of 0.360" - 9.14mm

AVX	. [SN	/IX1		_ AN3	360	SM	IX2		_ AN3	60	SN	/IX3		_ AN3	60	SN	ИX4		AN3	860	S	MX5 _		_ AN3	60	SM	IX6		_ AN36	0
STYL		25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V
COG	ì	3.0	2.1	1.2	.54	.22	3.6	3.0	1.8	.78	.30	1.5	1.2	.60	.27	.10	.48	.39	.21	.07	.03	.15	.12	.07	.03	.011	10	7.2	3.9	1.5	.60
VHT		1	47	27	10	4.7	-	68	39	15	6.8	33	22	12	5.6	2.2	12	6.8	3.9	1.5	.68	3.9	2.7	1.5	.56	.27	-	150	82	33	15

Max Capacitance (μF) Available Versus Style with Height (A) of 0.480" - 12.2mm

AVX	SI	VIX1 _		AN4	180	SN	IX2		_ AN4	80	SN	/IX3		_ AN4	80	SN	/IX4		_ AN4	80	SI	MX5 _		_ AN4	30	SM	X6		AN48	0
STYLE	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V
COG	4.0	2.8	1.6	.72	.27	4.8	4.0	2.2	1.0	.40	2.0	1.6	.80	.36	.130	.64	.52	.28	.10	.04	.20	.16	.10	.04	.015	13	9.6	5.2	2.0	.80
VHT	-	68	39	15	6.8	-	100	56	22	10	47	33	18	6.8	3.3	15	10	5.6	2.2	1.0	5.6	3.9	2.2	.82	.39	-	220	120	47	22

Max Capacitance (μF) Available Versus Style with Height (A) of 0.650" - 16.5mm

AVX	SI	VIX1 _		AN6	650	SN	IX2		_ AN6	50	SN	1X3		_ AN6	50	SN	/IX4		_ AN6	50	SI	MX5 _		_ AN6	50	SM	IX6		_ AN65	0
STYLE	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V
COG	5.0	3.5	2.0	.90	.34	6.0	5.0	3.0	1.3	.50	2.5	2.0	1.0	.45	.160	.82	.65	.35	.12	.05	.25	.20	.12	.05	.019	16	12	6.5	2.5	1.0
VHT	-	82	47	18	8.2	-	120	68	27	12	56	39	22	8.2	3.9	18	12	6.8	2.7	1.2	6.8	4.7	2.7	1.0	.47	1	270	150	56	27



SMPS Capacitors



Custom Geometries and Lead Configurations

For the requirements that cannot be satisfied by standard SMPS style products (SM0-style or SM9-style), AVX offers leading edge solutions in custom configuration and packaging. Ranging from unique geometries, lead configurations, packaging and stress relief mounting options, AVX has optimized solutions for a wide range of customer specific designs. The solutions provided by AVX maintain high reliability of stacked capacitor product originally developed by AVX and historically recognized as the highest reliability product in the market. Custom packaging options provide solutions that eliminate reliability concerns in the next level assembly. These custom options provide the following benefits:

- eliminate soldering requirements altogether by providing means of electrical/mechanical connection to the circuit
- provide options for remote soldering away from large ceramic capacitor body and eliminating the risk of thermal shock (refer to photograph with soft, insulated leads soldered to the stacked capacitor using high melting point SN10 solder)

Many other innovations are available from AVX Olean Advanced Products. Let them apply these ideas to your application specific requirements. Please contact AVX for a solution that will meet demands of your program requirements.

CUSTOM LEAD CONFIGURATIONS...



CUSTOM PACKAGING...



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

AVX:

<u>SMX43C106KAN360</u> <u>SMX45C505KAN360</u> <u>SMX51C205KAN650</u> <u>SMX52A102KAN120</u> <u>SMX43C156KAN650</u> SMX52A103KAN120 SMX53A104KAN240 SMX55C105KAN240