

MultiGuard (2&4 Elements)

AVX Multilayer Ceramic

Transient Voltage Suppression Arrays

ESD Protection for CMOS and Bi Polar Systems



GENERAL DESCRIPTION AND COMMENTS

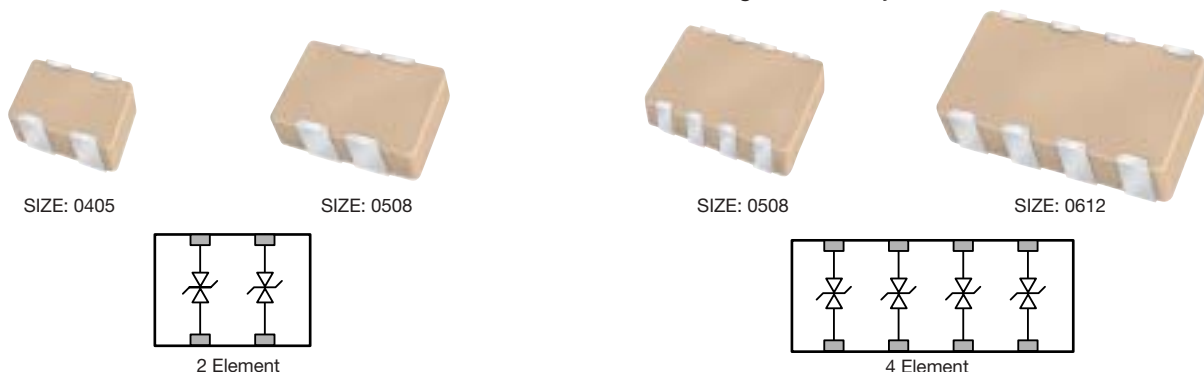
AVX's Transient Voltage Suppression (TVS) Arrays address six trends in today's electronic circuits: (1) mandatory ESD protection, (2) mandatory EMI control, (3) signal integrity improvement, (4) PCB downsizing, (5) reduced component placement costs, and (6) protection from induced slow speed transient voltages and currents.

AVX's MultiGuard products offer numerous advantages, which include a faster turn-on-time (<1nS), repetitive strike capability, and space savings. In some cases, MultiGuard consumes less than 75% of the PCB real estate required for the equivalent number of discrete chips. This size advantage, coupled with the savings associated with placing only one chip, makes MultiGuard the TVS component of choice for

ESD protection of I/O lines in portable equipment and programming ports in cellular phones. Other applications include differential data line protection, ASIC protection and LCD driver protection for portable computing devices.

Where multiple lines require the ESD protection, the 4-element 0612 or 0508 chip is an ideal solution. While the 2-element 0405 MultiGuard is the smallest TVS array, the 4-element 0508 MultiGuard is the smallest 4-element TVS device available in the market today.

Available with standard working voltage of 5.6V up to 18V with low capacitance in the 3 case sizes, AVX MultiGuard arrays offer a very broad range of integrated TVS solutions to the design community.



ELECTRICAL CHARACTERISTICS PER ELEMENT

	AVX Part Number	Working Voltage	Breakdown Voltage	Clamping Voltage	Peak Current	Transient Energy	Capacitance
Element Chip Size	Symbol	V_{WM}	V_B	V_C	I_{peak}	E_{trans}	C
	Units	Volts (max.)	Volts	Volts (max.)	Amp (max.)	Joules (max.)	pF (typ.)
	Test Condition	<50 μ A	1mA DC	8/20 μ S	8/20 μ s	10/1000 μ S	0.5Vrms @: 1 MHz
2 Element 0405 Chip	MG042S05X150 __	5.6	7.6 - 9.3	15.5	20	0.05	360
	MG042L14V400 __	14.0	16.5 - 20.5	40	15	0.02	40
	MG042L18V500 __	18.0	22.5 - 28.0	50	15	0.02	40
2 Element 0508 Chip	MG052S05A150 __	5.6	6.8 - 9.3	15.5	30	0.1	825
	MG052S09A200 __	9.0	10.0 - 14.0	20	30	0.1	550
	MG052S14A300 __	14.0	14.7 - 20.3	30	30	0.1	425
	MG052S18A400 __	18.0	20.4 - 28.0	40	30	0.1	225
	MG052L18X500 __	≤ 18.0	N/A	50	20	0.05	<75
4 Element 0508 Chip	MG054S05X150 __	5.6	6.8 - 10.3	17.5	20	50	410
	MG054S09X200 __	9.0	10.0 - 15.0	22	20	50	290
	MG054S14X300 __	14.0	14.7 - 22.0	32	20	50	150
	MG054S18X400 __	18.0	20.4 - 28.0	42	20	50	110
	MG054L18V500 __	18.0	N/A	52	15	50	50
4 Element 0612 Chip	MG064S05A150 __	5.6	6.8 - 9.3	15.5	30	0.1	825
	MG064S09A200 __	9.0	10.0 - 14.0	20	30	0.1	550
	MG064S14A300 __	14.0	14.7 - 20.3	30	30	0.1	425
	MG064S18A400 __	18.0	20.4 - 28.0	40	30	0.1	225
	MG064L18X500 __	≤ 18.0	N/A	50	20	0.05	75

Termination Finish: P = Ni/Sn Alloy (Plated)
Q = 100% Sn
X = Pt/Pd/Ag (Non-Plated)

Packaging (Pcs/Reel): see page 2

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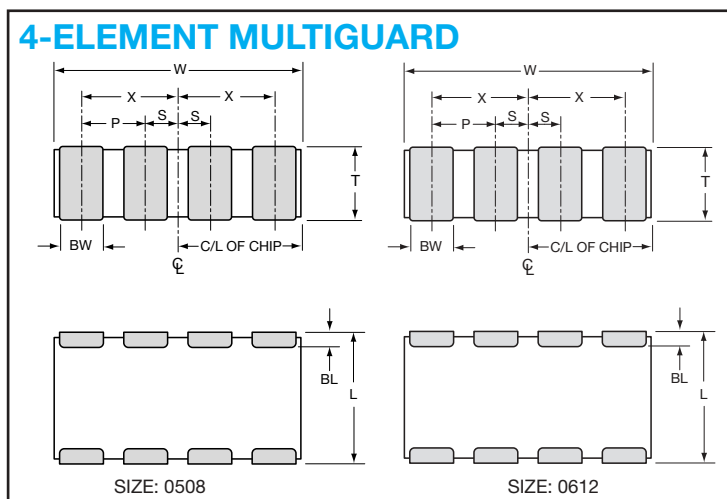
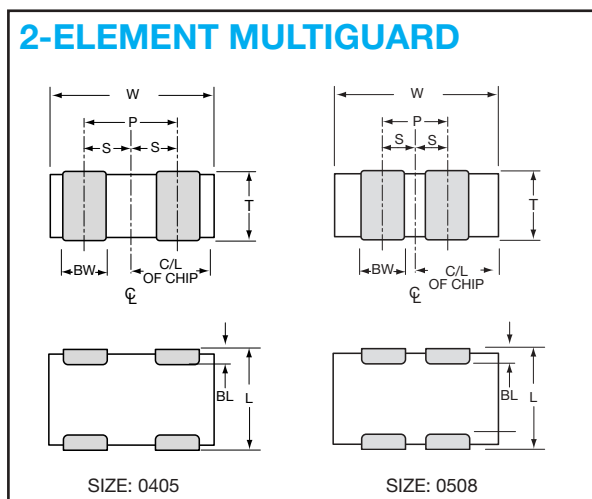
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PHYSICAL DIMENSIONS AND PAD LAYOUT



0405 2 Element Dimensions mm (inches)

L	W	T	BW	BL	P	S
1.00±0.15 (0.039±0.006)	1.37±0.15 (0.054±0.006)	0.66 MAX (0.026 MAX)	0.36±0.10 (0.014±0.004)	0.20±0.10 (0.008±0.004)	0.64 REF (0.025 REF)	0.32±0.10 (0.013±0.004)

0508 4 Element Dimensions mm (inches)

L	W	T	BW	BL	P	X	S
1.27±0.20 (0.050±0.008)	2.03±0.20 (0.080±0.008)	0.965 MAX (0.038 MAX)	0.254±0.10 (0.010±0.004)	0.18 ^{+0.25} _{-0.08} (0.007 ^{+0.010} _{-0.003})	0.50 REF (0.020 REF)	0.75±0.10 (0.030±0.004)	0.25±0.10 (0.010±0.004)

0508 2 Element Dimensions mm (inches)

L	W	T	BW	BL	P	S
1.25±0.20 (0.049±0.008)	2.01±0.20 (0.079±0.008)	1.02 MAX (0.040 MAX)	0.41±0.1 (0.016±0.004)	0.18 ^{+0.25} _{-0.08} (0.007 ^{+0.010} _{-0.003})	0.76 REF (0.030 REF)	0.38±0.10 (0.015±0.004)

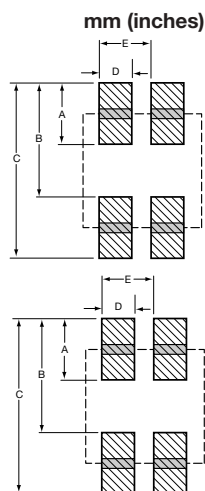
0612 4 Element Dimensions mm (inches)

L	W	T	BW	BL	P	X	S
1.60±0.20 (0.063±0.008)	3.20±0.20 (0.126±0.008)	1.22 MAX (0.048 MAX)	0.41±0.10 (0.016±0.004)	0.18 ^{+0.25} _{-0.08} (0.007 ^{+0.010} _{-0.003})	0.76 REF (0.030 REF)	1.14±0.10 (0.045±0.004)	0.38±0.10 (0.015±0.004)

Pad Layout Dimensions

A	B	C	D	E
0405 2 Element				
0.46 (0.018)	0.74 (0.029)	1.20 (0.047)	0.38 (0.015)	0.64 (0.025)

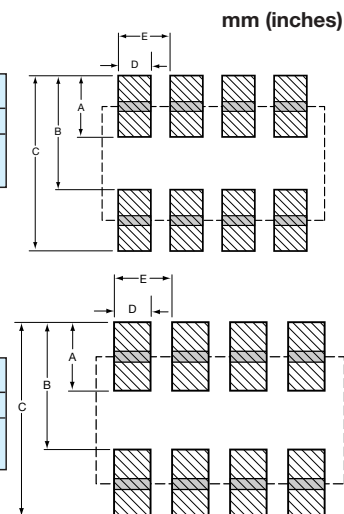
A	B	C	D	E
0508 2 Element				
0.89 (0.035)	1.27 (0.050)	2.16 (0.085)	0.46 (0.018)	0.76 (0.030)



Pad Layout Dimensions

A	B	C	D	E
0508 4 Element				
0.64 (0.025)	1.27 (0.050)	1.91 (0.075)	0.28 (0.011)	0.51 (0.020)

A	B	C	D	E
0612 4 Element				
0.89 (0.035)	1.65 (0.065)	2.54 (0.100)	0.46 (0.018)	0.79 (0.030)



HOW TO ORDER

MG	04	2	L	14	A	300	T	X
MultiGuard	Case Size	Configuration	Style	Working Voltage	Energy Rating	Clamping Voltage	Packaging (PCS/REEL)	Termination Finish
	04 = 0405 05 = 0508 06 = 0612	2 = 2 Elements 4 = 4 Elements	S = Standard Construction L = Low Capacitance	05 = 5.6V 09 = 9.0V 14 = 14.0V 18 = 18.0V	A = 0.10 Joules V = 0.02 Joules X = 0.05 Joules	150 = 15.5V 200 = 20V 300 = 30V 400 = 40V 500 = 50V	D = 1,000 R = 4,000 T = 10,000	X = Pt/Pd/Ag (Non-Plated) P = Ni/Sn Alloy (Plated) Contact Factory for Availability Q = 100% Sn



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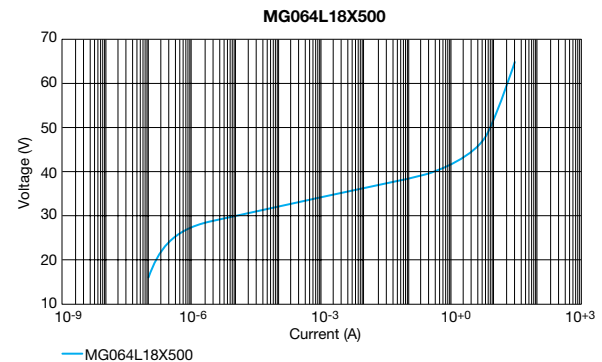
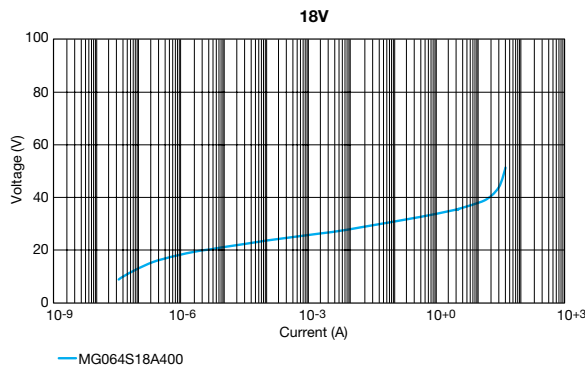
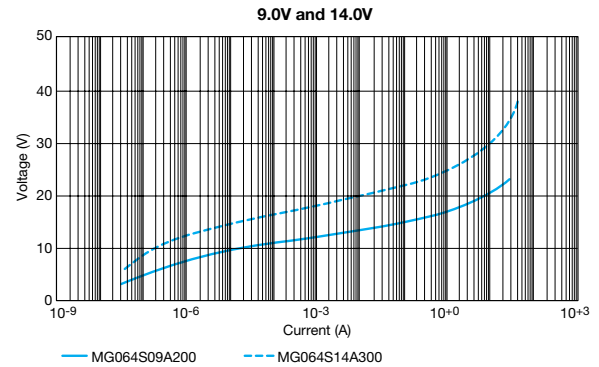
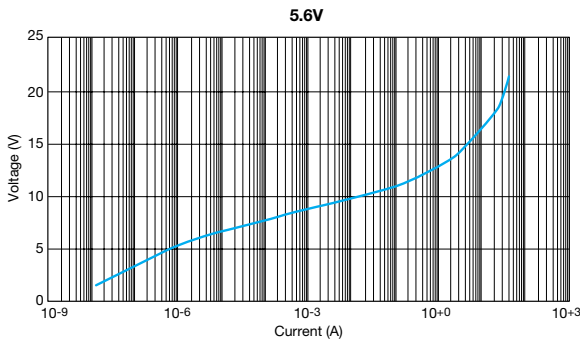
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TYPICAL PERFORMANCE CURVES – VOLTAGE/CURRENT CHARACTERISTICS

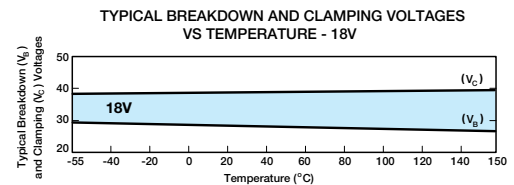
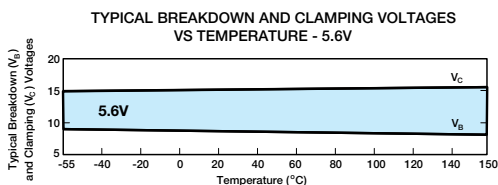
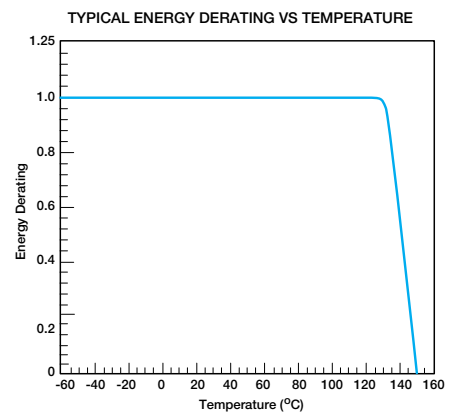
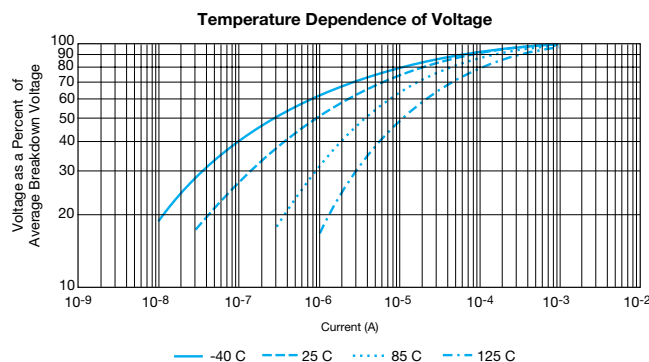
Multilayer construction and improved grain structure result in excellent transient clamping characteristics in excess of 30 amps (20 amps on MG064L18X500) peak current while maintaining very low leakage currents under DC operating

conditions. The VI curves below show the voltage/current characteristics for the 5.6V, 9V, 14V and 18V parts with currents ranging from fractions of a micro amp to tens of amps.



TYPICAL PERFORMANCE CURVES – TEMPERATURE CHARACTERISTICS

MultiGuard suppressors are designed to operate over the full temperature range from -55°C to +125°C.



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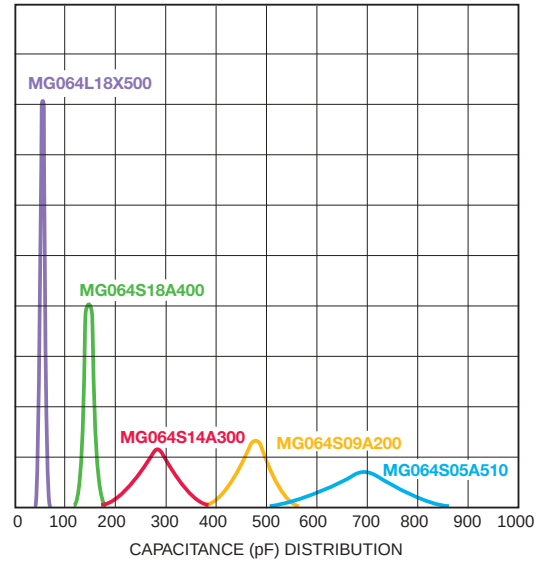
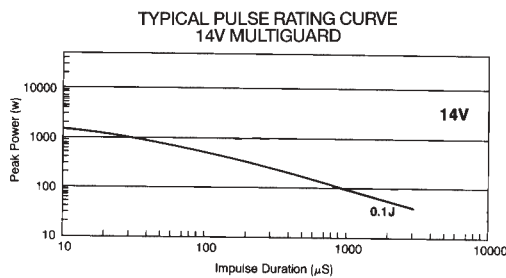
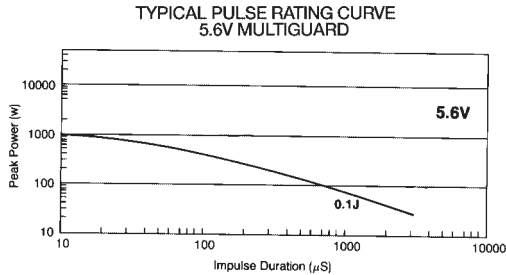
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TRANSIENT VOLTAGE SUPPRESSORS – TYPICAL PERFORMANCE CURVES



APPLICATION

