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.

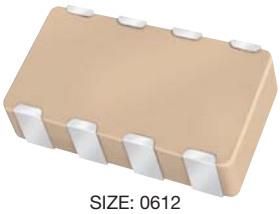
AVX's MultiGuard products offer numerous advantages, which include a faster turn-on-time (<1nS), repetitive strike capability, and space savings. In some cases, MultiGuard consumes less than 75% of the PCB real estate required for the equivalent number of discrete chips. This size advantage, coupled 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 chip is an ideal solution. The 2-element 0405 MultiGuard is the smallest TVS array device available in the market today.

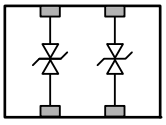
Available with standard working voltage of 5.6V up to 18V with low capacitance in the 3 case sizes, AVX MultiGuard arrays offer a very broad range of integrated TVS solutions to the design community.

SIZE: 0405

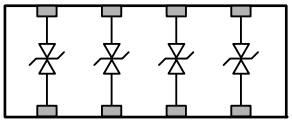
SIZE: 0508



SIZE: 0612



2 Element



4 Element

ELECTRICAL CHARACTERISTICS PER ELEMENT

	AVX Part Number	Working Voltage (DC)	Working Voltage (AC)	Breakdown Voltage	Clamping Voltage	Test Current For V_C	Maximum Leakage Current	Transient Energy Rating	Peak Current Rating	Typical Cap
2 Element 0405 Chip	MG042S05X150 _ _	5.6	4.0	8.5±20%	18	1	35	0.05	15	300
	MG042L14V400 _ _	14.0	10.0	18.5±12%	32	1	15	0.02	15	45
	MG042L18V500 _ _	18.0	14.0	N/A	50	1	10	0.02	15	40
2 Element 0508 Chip	MG052S05A150 _ _	5.6	4.0	8.5±20%	18	1	35	0.10	30	825
	MG052S09A200 _ _	9.0	6.4	12.7±15%	22	1	25	0.10	30	550
	MG052S14A300 _ _	14.0	10.0	19.5±12%	32	1	15	0.10	30	425
	MG052S18A400 _ _	18.0	14.0	25.5±10%	42	1	10	0.10	30	225
	MG052L18X500 _ _	≤18.0	≤14.0	N/A	50	1	10	0.10	20	50
4 Element 0612 Chip	MG064S05A150 _ _	5.6	4.0	8.5±20%	18	1	35	0.10	30	825
	MG064S09A200 _ _	9.0	6.4	12.7±15%	22	1	25	0.10	30	550
	MG064S14A300 _ _	14.0	10.0	19.5±12%	32	1	15	0.10	30	425
	MG064S18A400 _ _	18.0	14.0	25.5±10%	42	1	10	0.05	15	120
	MG064L18X500 _ _	≤18.0	≤14.0	N/A	50	1	10	0.10	20	75

└ Termination Finish Code
└ Packaging Code

V_W(DC)	DC Working Voltage (V)
V_W(AC)	AC Working Voltage (V)
V_B	Typical Breakdown Voltage (V @ 1mA$_{DC}$)
V_B Tol	V_B Tolerance is ± from Typical Value
V_C	Clamping Voltage (V @ I_{VC})
I_{VC}	Test Current for V_C (A, 8x20µS)
I_L	Maximum Leakage Current at the Working Voltage (µA)
E_T	Transient Energy Rating (J, 10x1000µS)
I_P	Peak Current Rating (A, 8x20µS)
Cap	Typical Capacitance (pF) @ 1MHz and 0.5 V_{RMS}

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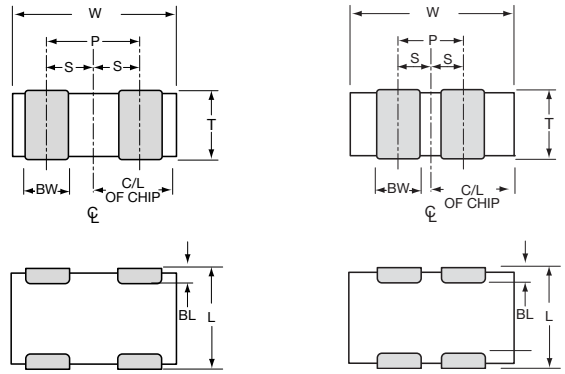
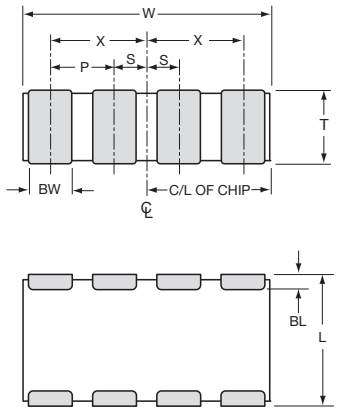
PHYSICAL DIMENSIONS AND PAD LAYOUT

2-ELEMENT MULTIGUARD



SIZE: 0405 SIZE: 0508

4-ELEMENT MULTIGUARD



SIZE: 0612

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)	064 REF (0.025 REF)	0.32±0.10 (0.013±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 $^{+0.25}_{-0.08}$ ($0.007^{+.010}_{-.003}$)	0.76 REF (0.030 REF)	1.14±0.10 (0.045±0.004)	0.38±0.10 (0.015±0.004)

0508 2 Element Dimensions

mm (inches)

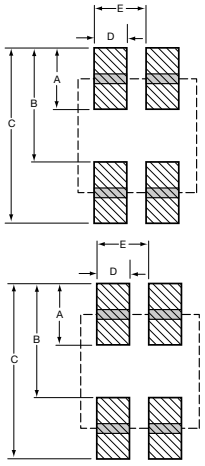
L	W	T	BW	BL	P	S
1.25±0.20 (0.049±0.008)	2.01±0.20 (0.079±0.008)	1.02 MAX (0.040 MAX)	0.41±0.1 (0.016±0.004)	0.18 $^{+0.25}_{-0.08}$ ($0.007^{+.010}_{-.003}$)	0.76 REF (0.030 REF)	0.38±0.10 (0.015±0.004)

Pad Layout Dimensions

mm (inches)

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)

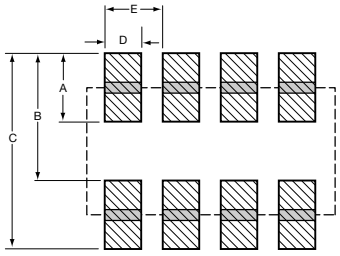
A	B	C	D	E
0508 2 Element				
0.89 (0.035)	1.27 (0.050)	2.16 (0.085)	0.46 (0.018)	0.76 (0.030)



Pad Layout Dimensions

mm (inches)

A	B	C	D	E
0612 4 Element				
0.89 (0.035)	1.65 (0.065)	2.54 (0.100)	0.46 (0.018)	0.76 (0.030)



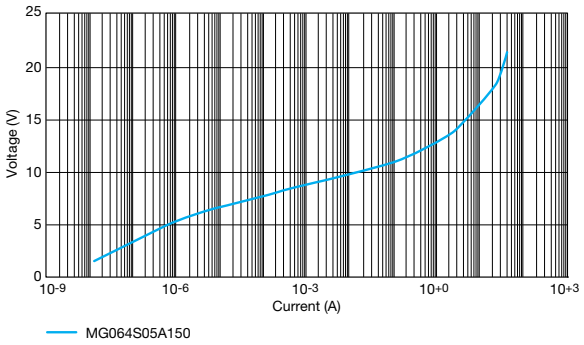
HOW TO ORDER

MG	04	2	L	14	A	300	T	P
MultiGuard	Case Size 04 = 0405 05 = 0508 06 = 0612	Configuration 2 = 2 Elements 4 = 4 Elements	Style S = Standard Construction L = Low Capacitance	Working Voltage 05 = 5.6VDC 09 = 9.0VDC 14 = 14.0VDC 18 = 18.0VDC	Energy Rating A = 0.10 Joules V = 0.02 Joules X = 0.05 Joules	Clamping Voltage 150 = 18V 200 = 22V 300 = 32V 400 = 42V 500 = 50V	Packaging (PCS/REEL) D = 1,000 R = 4,000 T = 10,000	Termination Finish P = Ni/Sn Alloy (Plated) M = Ni/Sn Pb (Plated)

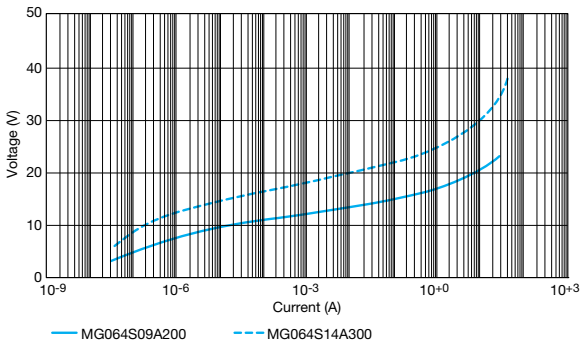
TYPICAL PERFORMANCE CURVES – VOLTAGE/CURRENT CHARACTERISTICS

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.

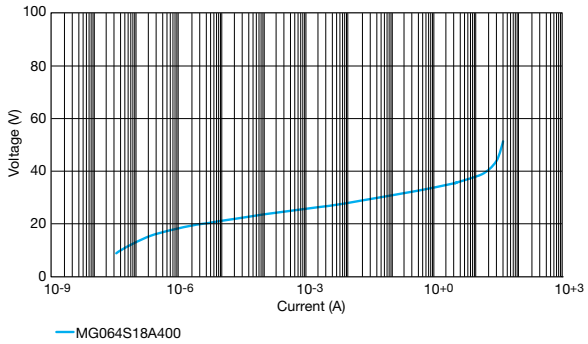
5.6V



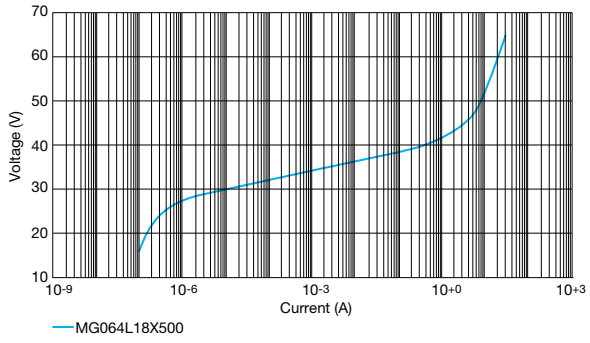
9.0V and 14.0V



18V



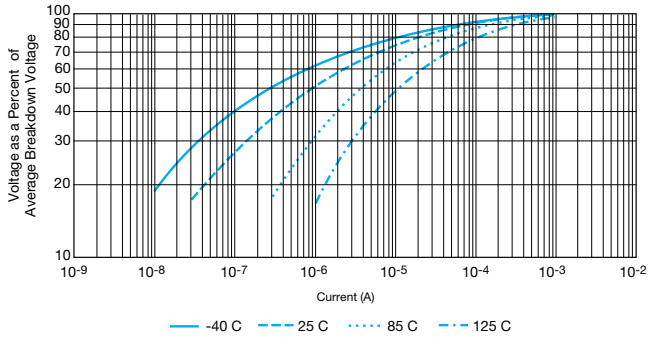
MG064L18X500



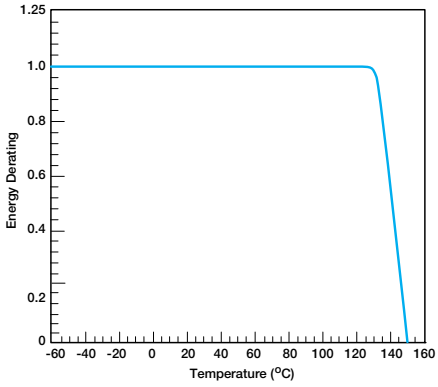
TYPICAL PERFORMANCE CURVES – TEMPERATURE CHARACTERISTICS

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

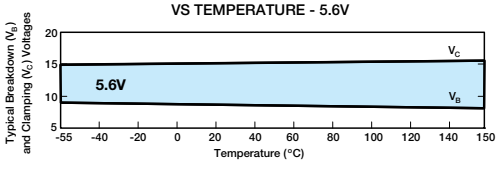
Temperature Dependence of Voltage



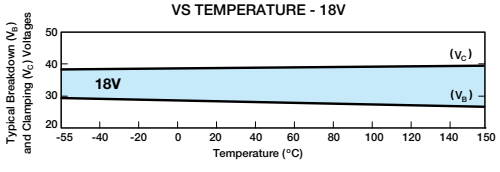
TYPICAL ENERGY DERATING VS TEMPERATURE



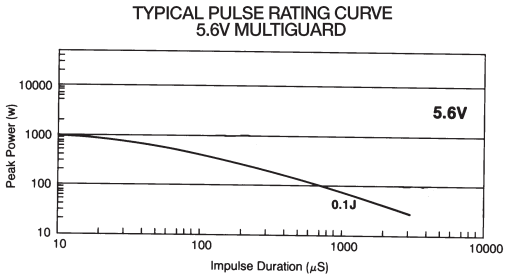
TYPICAL BREAKDOWN AND CLAMPING VOLTAGES VS TEMPERATURE - 5.6V

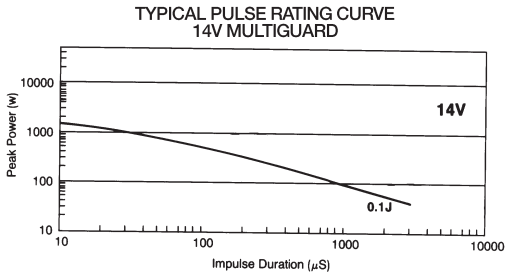


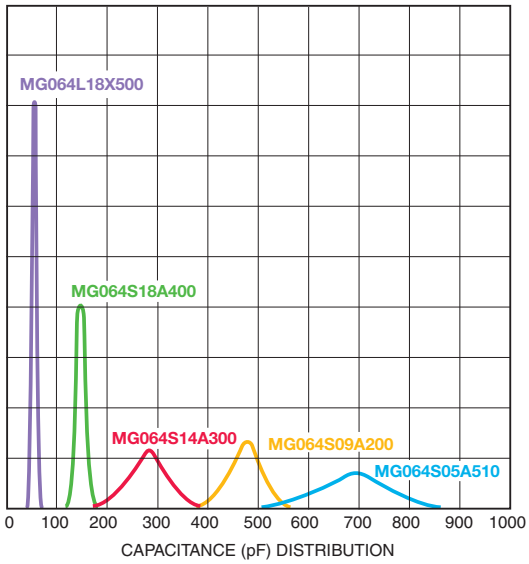
TYPICAL BREAKDOWN AND CLAMPING VOLTAGES VS TEMPERATURE - 18V



TRANSIENT VOLTAGE SUPPRESSORS – TYPICAL PERFORMANCE CURVES







APPLICATION