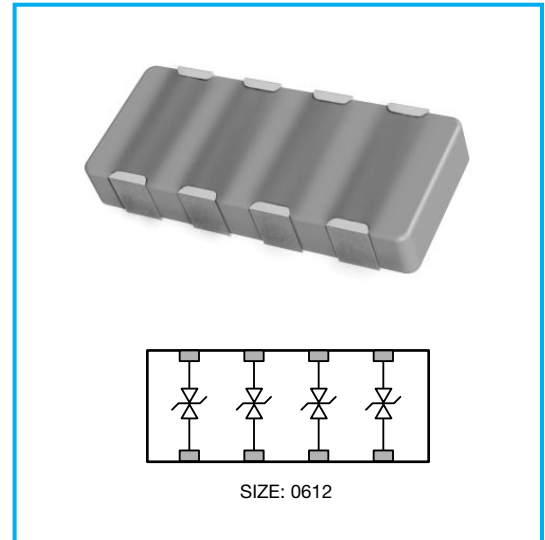


**BI-DIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS**

**GENERAL DESCRIPTION AND COMMENTS:**

AVX's Transient Voltage Suppressor (TVS) Array addresses three key trends in today's electronic circuits: (1) mandatory ESD protection, (2) PCB downsizing, and (3) reduced component placement costs. Our initial product release features a 4-element 0612 chip, but a 2-element 0508 is planned if the market demand supports this configuration. The 4-element MultiGuard array is now available in 5.6, 9, 14 and 18 volts with 0.1 joule energy ratings. The StaticGuard series (low capacitance) is included in this offering with an energy rating of 0.05 Joules.

AVX's 4-element MultiGuard consumes less than half the PCB real estate when compared to four 0603 discrete TransGuards. 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.



**ELECTRICAL CHARACTERISTICS PER ELEMENT**

AVX Part Number	Working Voltage	Breakdown Voltage	Clamping Voltage	Peak Current	Transient Energy	Capacitance	Inductance
Symbol	$V_{WM}$	$V_B$	$V_C$	$I_{peak}$	$E_{trans}$	C	L
Units	Volts (max.)	Volts	Volts (max.)	Amp (max.)	Joules (max.)	pF (typ.)	nH (typ.)
Test Condition	<50 $\mu$ A	1mA DC	8/20 $\mu$ S†	8/20 $\mu$ S	10/1000 $\mu$ S	0.5Vrms @: 1 MHz	di/dt = 100mA/nS
MG064S05A150	5.6	7.6 - 9.3	15.5	30	0.1	825	<1.0
MG064S09A200	9.0	11.0 - 14.0	20	30	0.1	550	<1.0
MG064S14A300	14.0	16.5 - 20.3	30	30	0.1	425	<1.0
MG064S18A400	18.0	22.9 - 28.0	40	30	0.1	225	<1.0
MG064L18X500	$\leq$ 18.0*	N/A	50	20	0.05	<75	<1.0

\*Test Condition = <25 $\mu$ A

$V_{WM}$  —Maximum steady-state DC operating voltage the varistor can maintain and not exceed 50 $\mu$ A leakage current  
 $V_B$  —Voltage across the device measured at 1mA DC current  
 $V_C$  —Maximum peak voltage across the varistor measured at a specified pulse current and waveform

†Transient Energy Rating	Pulse Current & Waveform
.1 Joule	2A 8/20 $\mu$ S
.05 Joule	1A 8/20 $\mu$ S

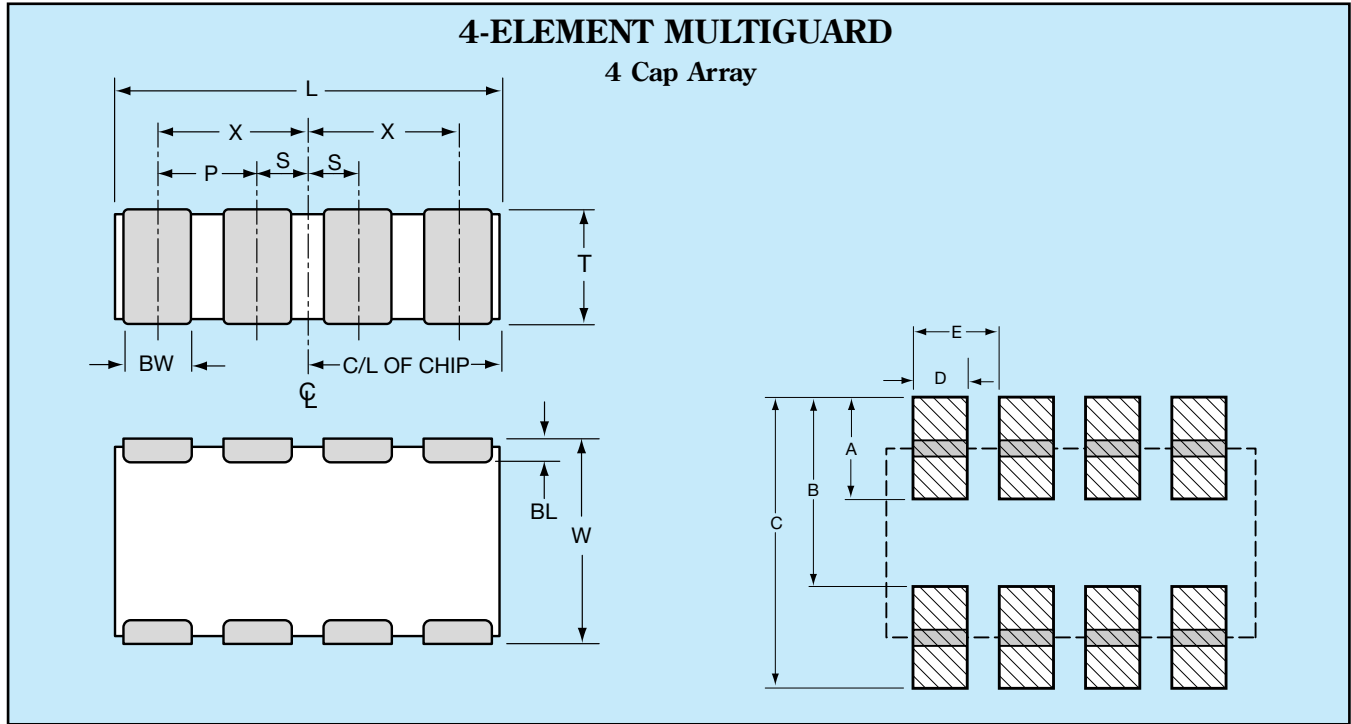
$I_{peak}$  —Maximum peak current which may be applied with the specified waveform without device failure  
 $E_{trans}$  —Maximum energy which may be dissipated with the specified waveform without device failure  
C — Device capacitance measured with zero volt bias 0.5Vrms and 1MHz  
L — Device inductance measured with a current edge rate of 100 mA/nS



# MultiGuard (4-Element TVS Array)

## BI-DIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

### PHYSICAL DIMENSIONS AND PAD LAYOUT

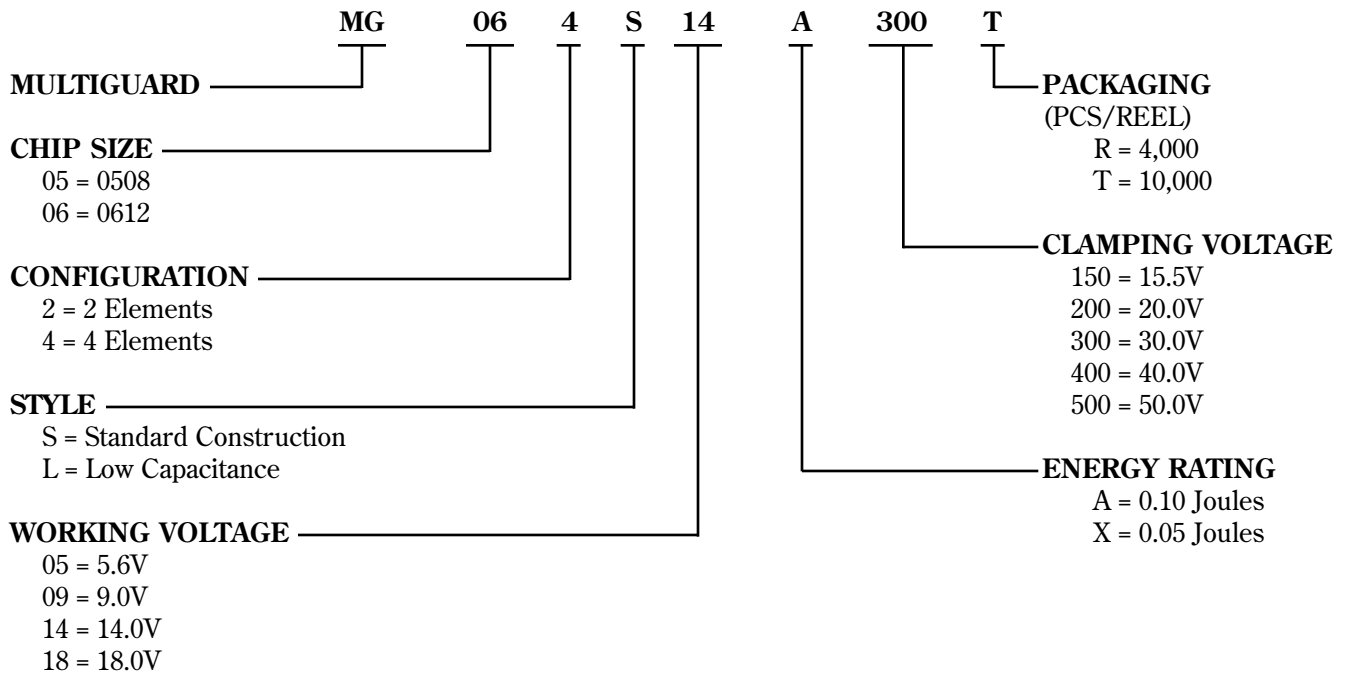


#### Part Dimensions - inches (mm)

	L	W	T	BW	BL	P	X	S	a	b	c	d	e
Inches	.126±.008	.063±.008	.053 MAX	.016±.004	.007 <sup>+0.10</sup> <sub>-.003</sub>	.030 REF	.045±.004	.015±.004	.035	.065	.100	.018	.030
(mm)	(3.20±0.2)	(1.60±0.2)	(1.35 MAX)	(0.41±0.1)	(0.18 <sup>+0.25</sup> <sub>-.008</sub> )	(0.76 REF)	(1.14±0.1)	(0.38±0.1)	(0.89)	(1.65)	(2.54)	(0.46)	(0.79)

#### Pad Layout Dimensions

### PART NUMBERING SYSTEM





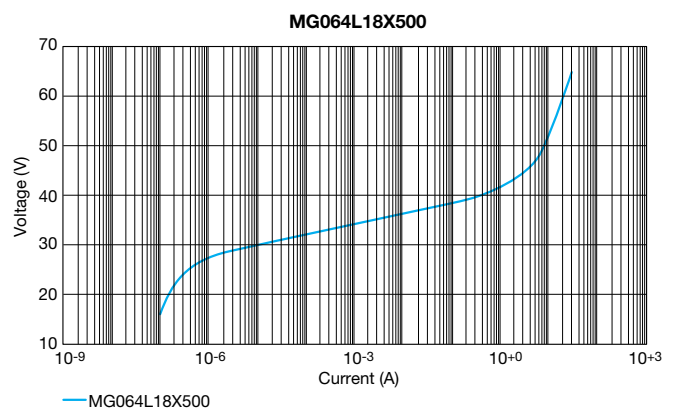
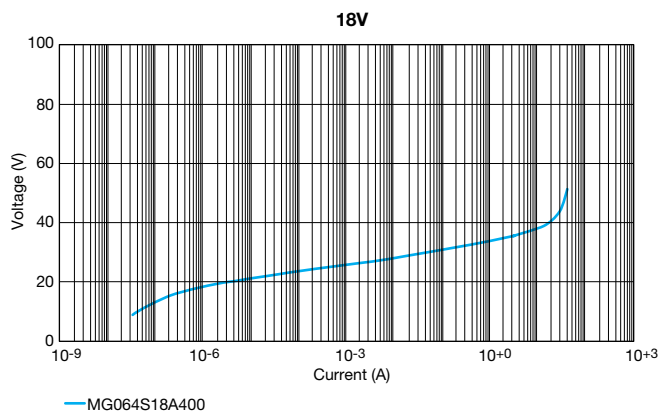
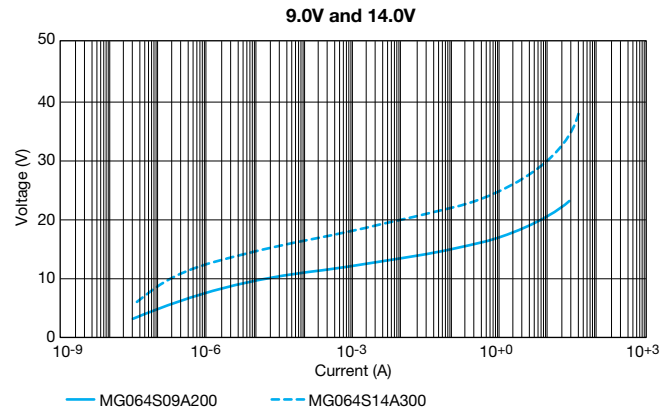
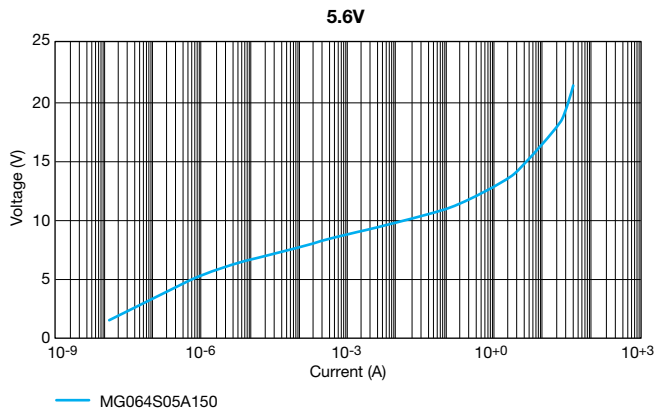
# MultiGuard (4-Element TVS Array)

## BI-DIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

### 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.





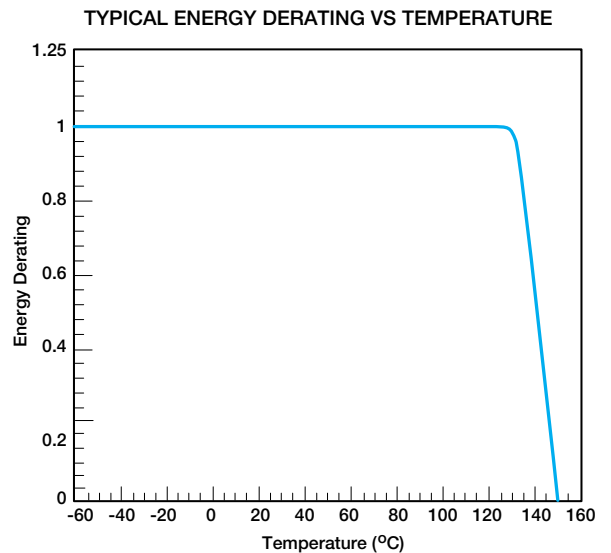
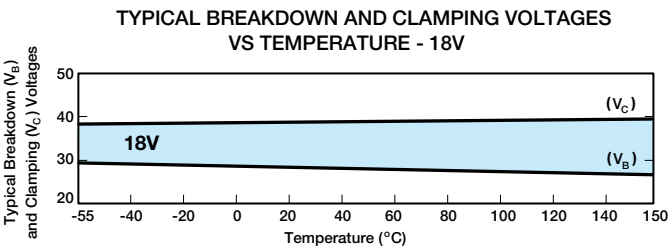
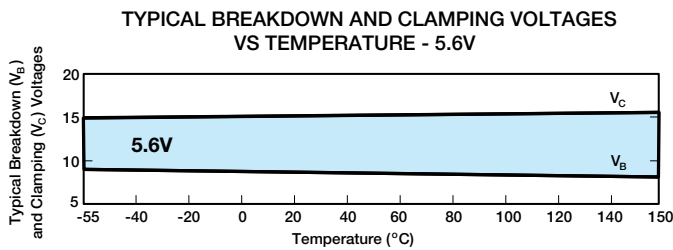
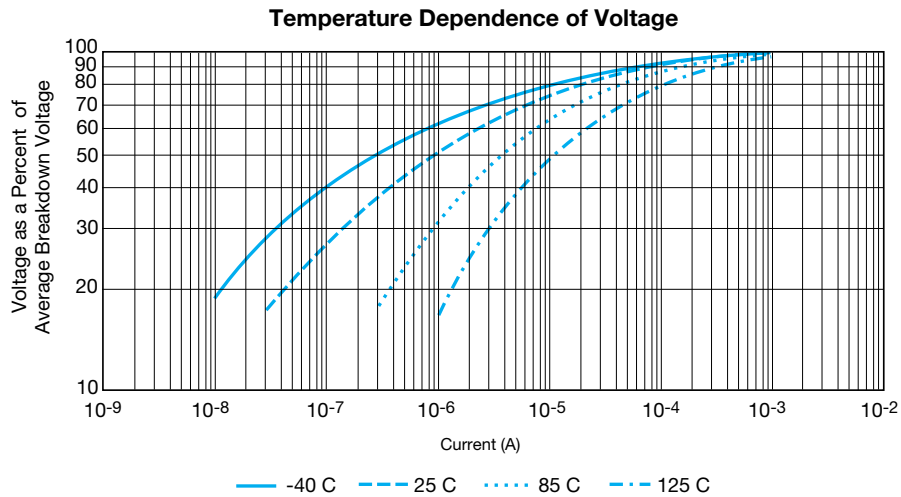
# MultiGuard (4-Element TVS Array)

## BI-DIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

### Typical Performance Curves

#### TEMPERATURE CHARACTERISTICS

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

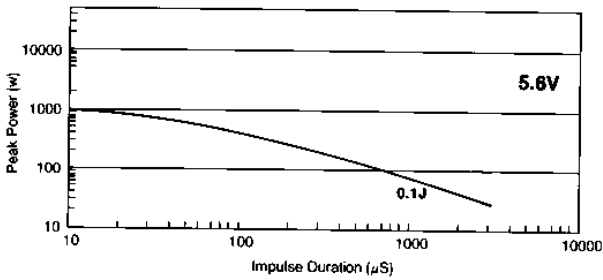


## BI-DIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

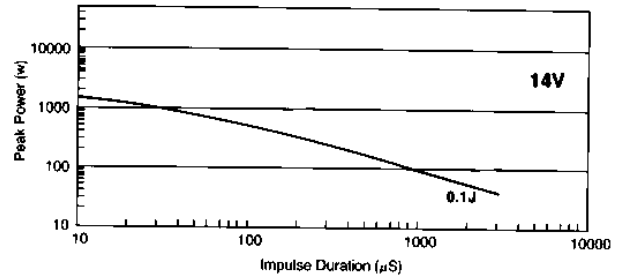
### Transient Voltage Suppressors

#### TYPICAL PERFORMANCE CURVES

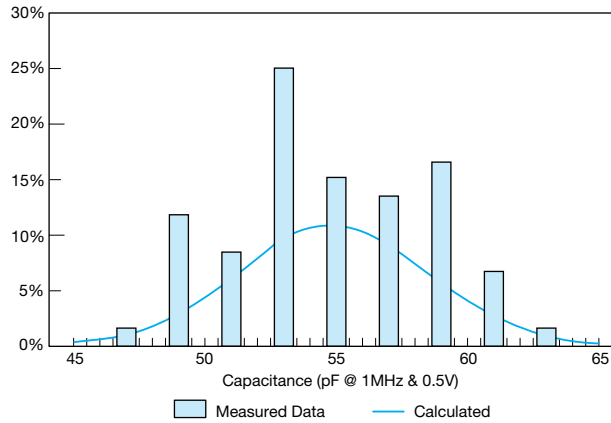
TYPICAL PULSE RATING CURVE  
5.6V MULTIGUARD



TYPICAL PULSE RATING CURVE  
14V MULTIGUARD



MG064L18X500 Capacitance Distribution





# MultiGuard (4-Element TVS Array)

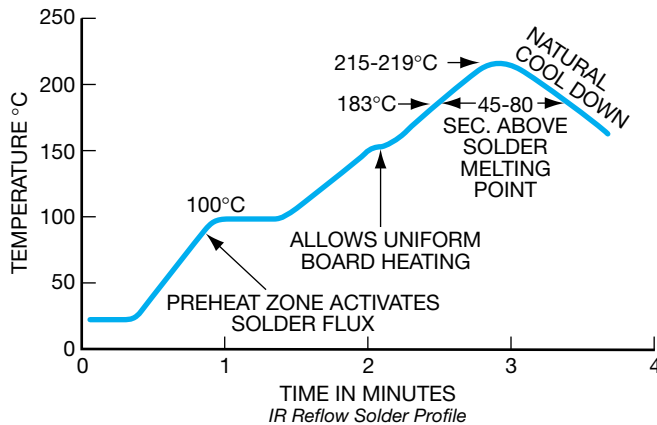
## BI-DIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

### SMT APPLICATIONS

AVX MultiGuard® voltage suppressors are easy to process with less restrictions than MLC capacitors, chip resistors and other surface mount components. The following solderability profiles are suggested for the different soldering techniques.

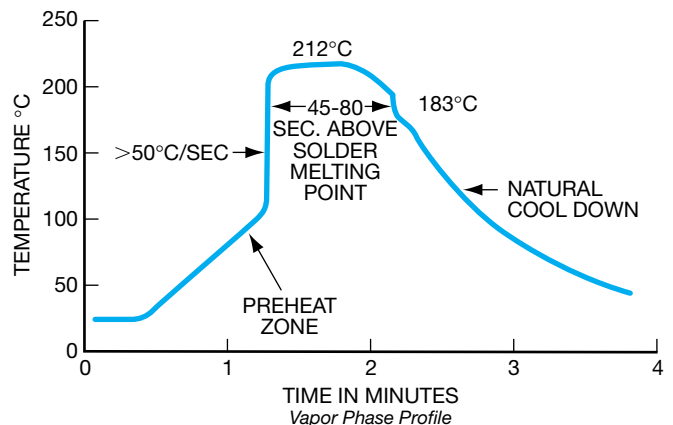
#### INFRARED REFLOW SOLDERING (IR)

Soldering with IR has the highest yields due to controlled heating rates and solder liquidus times. Only the dwell time and peak temperature limitations of resin-molded components need to be considered. Typical recommended solder paste wet laydown is approximately 8 mils.



#### VAPOR PHASE REFLOW SOLDERING

Vapor phase soldering has the second highest heat transfer rate so care must be used. Preheating the assembly and minimizing the dwell time above the solder liquidus temperature are needed to help reduce defects.



#### ASSEMBLY NOTES

AVX recommends a minimum spacing of 0.020" between parts when placing them end to end on assembly boards. The purpose of this spacing is to facilitate post assembly board cleaning and inaccuracies in pick and placement, due to machine placement tolerances.

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