

# UltraGuard Series

## ESD Protection for Low Leakage Requirements

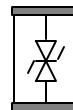


### GENERAL DESCRIPTION

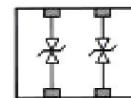
Faster semiconductor clock speeds and an increasing reliance on batteries as power sources have resulted in the need for varistors that exhibit very low leakage current. The UltraGuard (UG) Series of AVX Transient Voltage Suppressors address this problem.

The UG Series is the ideal transient protection solution for high clock speed integrated circuit application, battery-operated device, backlit display, medical/instrument application, low voltage power conversion circuits and power supervisory chip sets. In addition, UltraGuard's low leakage characteristics are also suitable for optic circuits like LDD, SerDes, and laser diodes.

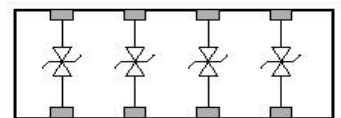
The UG Series is offered as discrete chips (0402, 0603, and 0805), 2-element packages (0405 and 0508), and 4-element packages (0612).



Discrete Chips  
0402, 0603,  
and 0805



2-Element Arrays  
(0405 and 0508)



4-Element Arrays  
(0612)

### HOW TO ORDER (Discrete Chips)

VC VC=Surface Mount Chip	UG Series	04 Case Size	0150 Maximum Working Voltage	L Capacitance	1 # of Elements	D Packaging [pieces per reel]	P Termination Finish
	UG = Low Leakage Series	04 = 0402 06 = 0603 08 = 0805	0003 = 3.0V <sub>DC</sub> 0005 = 5.0V <sub>DC</sub> 0075 = 7.5V <sub>DC</sub> 0100 = 10.0V <sub>DC</sub> 0150 = 15.0V <sub>DC</sub>	L = Low H = High		D = 1,000 (7" reel) R = 4,000 (7" reel) T = 10,000 (13" reel)	P = Plated X = Unplated

### HOW TO ORDER (Array Packages)

MG MG=Array	UG Series	06 Case Size	0150 Maximum Working Voltage	L Capacitance	4 # of Elements	D Packaging [pieces per reel]	P Termination Finish
	UG = Low Leakage Series	04 = 0405 05 = 0508 06 = 0612	0003 = 3.0V <sub>DC</sub> 0005 = 5.0V <sub>DC</sub> 0075 = 7.5V <sub>DC</sub> 0100 = 10.0V <sub>DC</sub> 0150 = 15.0V <sub>DC</sub>	L = Low H = High	2 = 2 Elements 4 = 4 Elements	D = 1,000 (7" reel) R = 4,000 (7" reel) T = 10,000 (13" reel)	P = Plated X = Unplated

# UltraGuard Series

## ESD Protection for Low Leakage Requirements



Circuit Voltage [V]	Case Size	Capacitance Requirement	AVX Part Number <sup>1</sup>	Capacitance <sup>2</sup> [pF]	Inductance <sup>3</sup> [nH]
≤ 15.0 V	0402	Low	VCUG040150L1 __	40	<1.0
	0603	Low	VCUG060150L1 __	160	<1.0
	0805	Low	VCUG080150L1 __	110	<1.5
	0805	Standard	VCUG080150H1 __	190	1.5
	0405 2-Element	Low	MGUG040150L2 __	40	<1.0
	0508 2-Element	Low	MGUG050150L2 __	75	<1.0
	0612 4-Element	Low	MGUG060150L4 __	75	<1.0
≤ 10.0 V	0402	Low	VCUG040100L1 __	90	<1.0
	0603	Low	VCUG060100L1 __	225	<1.0
	0805	Low	VCUG080100L1 __	275	<1.5
	0805	Standard	VCUG080100H1 __	500	1.5
	0405 2-Element	Low	MGUG040100L2 __	40	<1.0
	0508 2-Element	Low	MGUG050100L2 __	225	<1.0
	0612 4-Element	Low	MGUG060100L4 __	225	<1.0
≤ 7.5 V	0402	Low	VCUG040075L1 __	120	<1.0
	0603	Low	VCUG060075L1 __	425	<1.0
	0805	Low	VCUG080075L1 __	280	<1.5
	0805	Standard	VCUG080075H1 __	820	1.5
	0405 2-Element	Low	MGUG040075L2 __	40	<1.0
	0508 2-Element	Low	MGUG050075L2 __	425	<1.0
	0612 4-Element	Low	MGUG060075L4 __	425	<1.0
≤ 5.0 V	0402	Low	VCUG040005L1 __	230	<1.0
	0603	Low	VCUG060005L1 __	550	<1.0
	0805	Low	VCUG080005L1 __	585	<1.5
	0405 2-Element	Low	MGUG040005L2 __	40	<1.0
	0508 2-Element	Low	MGUG050005L2 __	425	<1.0
	0612 4-Element	Low	MGUG060005L4 __	425	<1.0
	≤ 3.0 V	0402	Low	VCUG040003L1 __	360
0603		Low	VCUG060003L1 __	825	<1.0
0805		Low	VCUG080003L1 __	860	<1.5
0805		Standard	VCUG080003H1 __	2400	1.5
0405 2-Element		Low	MGUG040003L2 __	360	<1.0
0508 2-Element		Low	MGUG050003L2 __	425	<1.0
0612 4-Element		Low	MGUG060003L4 __	425	<1.0

<sup>1</sup> The last two digits represent the termination finish and packaging specifications (see previous page)

<sup>2</sup> Capacitance is measured at 0.5V<sub>RMS</sub> @ 1MHz

<sup>3</sup> Inductance at di/dt = 100mA/Ns

**Note: Typical leakage current for each part is ≤2μA.**

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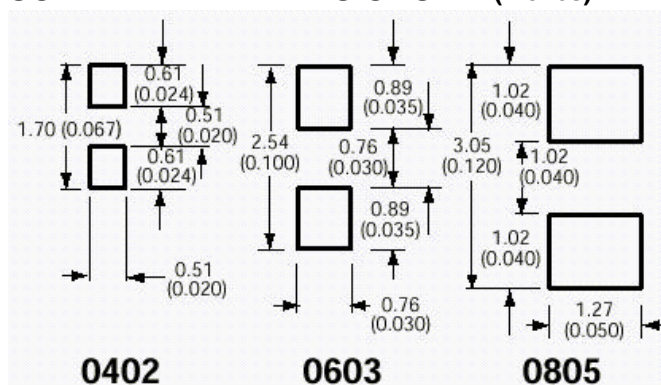


### PHYSICAL DIMENSIONS mm (inches)

	0402 Discrete	0603 Discrete	0805 Discrete
Length	1.0 ± 0.10 (0.040 ± 0.004)	1.6 ± 0.15 (0.063 ± 0.006)	2.01 ± 0.2 (0.079 ± 0.008)
Width	0.5 ± 0.10 (0.020 ± 0.004)	0.8 ± 0.15 (0.032 ± 0.006)	1.25 ± 0.2 (0.049 ± 0.008)
Thickness	0.6 MAX (0.024 MAX)	0.9 MAX (0.035 MAX)	1.02 MAX (0.040 MAX)
Term Band Width	0.25 ± 0.15 (0.010 ± 0.006)	0.35 ± 0.15 (0.014 ± 0.006)	0.71 MAX (0.028 MAX)
Term Separation	0.3 (0.012)	0.7 (0.028)	

	0405 Array	0508 Array	0612 Array
Length	1.00 ± 0.15 (0.039 ± 0.006)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.2 (0.126 ± 0.008)
Width	1.37 ± 0.15 (0.054 ± 0.006)	1.25 ± 0.20 (0.049 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)
Thickness	0.66 MAX (0.026 MAX)	1.02 MAX (0.040 MAX)	1.22 MAX (0.048 MAX)
Term Band Width	0.36 ± 0.10 (0.014 ± 0.004)	0.41 ± 0.10 (0.016 ± 0.004)	0.41 ± 0.10 (0.016 ± 0.010)
Term Separation	0.32 ± 0.10 (0.013 ± 0.004)		

### SOLDER PAD DIMENSIONS mm (inches)

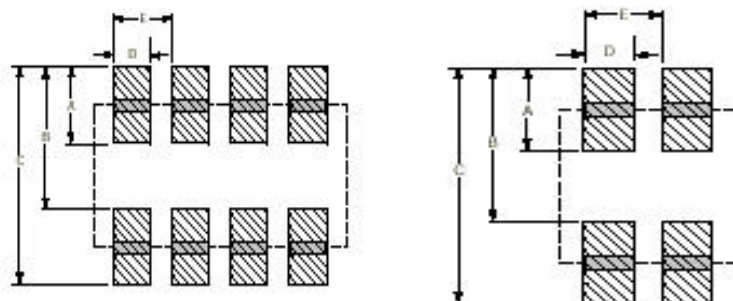


### 0612 4-Element Array

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

### 2-Element Arrays

	A	B	C	D	E
0405	0.46 (0.018)	0.74 (0.029)	1.2 (0.047)	0.38 (0.015)	0.64 (0.025)
0508	0.89 (0.035)	1.27 (0.050)	2.16 (0.085)	0.46 (0.018)	0.76 (0.030)



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