UltraGuard Series

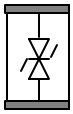
ESD Protection for Low Leakage Requirements

GENERAL DESCRIPTION

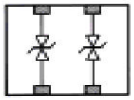
Faster semiconductor clock speeds and an increasing reliance on batteries as power sources have resulted in the need for varistors that exhibit very low leakage current. The UltraGuard (UG) Series of AVX Transient Voltage Suppressors address this problem.

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.

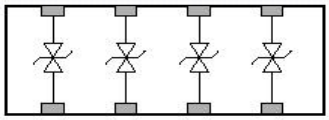
The UG Series is offered as discrete chips (0402, 0603, and 0805), 2-element packages (0405 and 0508), and 4-element packages (0612).



Discrete Chips 0402, 0603, and 0805



2-Element Arrays (0405 and 0508)



4-Element Arrays (0612)

HOW TO ORDER (Discrete Chips)

VC	UG	04	0150	L	1	D	P
VC=Surface Mount Chip	Series	Case Size	Maximum Working Voltage	Capacitance	# of Elements	Packaging [pieces per reel]	Termination Finish
	UG = Low Leakage Series	04 = 0402 06 = 0603 08 = 0805	0003 = 3.0V$_{DC}$ 0005 = 5.0V$_{DC}$ 0075 = 7.5V$_{DC}$ 0100 = 10.0V$_{DC}$ 0150 = 15.0V$_{DC}$	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	UG	06	0150	L	4	D	P
MG=Array	Series	Case Size	Maximum Working Voltage	Capacitance	# of Elements	Packaging [pieces per reel]	Termination Finish
	UG = Low Leakage Series	04 = 0405 05 = 0508 06 = 0612	0003 = 3.0V$_{DC}$ 0005 = 5.0V$_{DC}$ 0075 = 7.5V$_{DC}$ 0100 = 10.0V$_{DC}$ 0150 = 15.0V$_{DC}$	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

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ESD Protection for Low Leakage Requirements

Circuit Voltage [V]	Case Size	Capacitance Requirement	AVX Part Number[1]	Capacitance[2] [pF]	Inductance[3] [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	<1.0
	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

[1] The last two digits represent the termination finish and packaging specifications (see previous page)
[2] Capacitance is measured at $0.5V_{RMS}$ @ 1MHz
[3] Inductance at di/dt = 100mA/Ns

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

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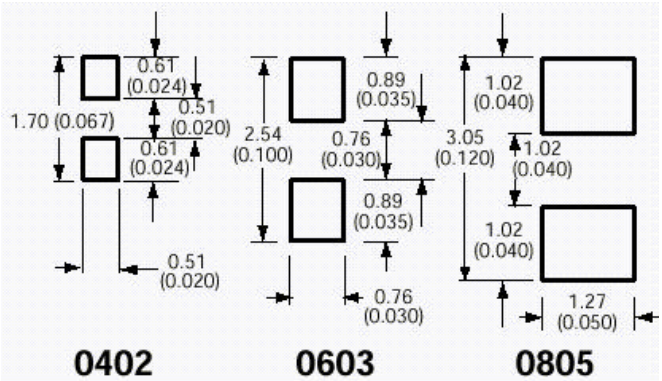
PHYSICAL DIMENSIONS mm (inches)

	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)

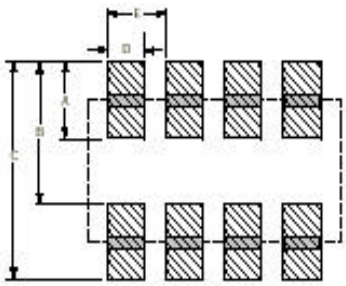


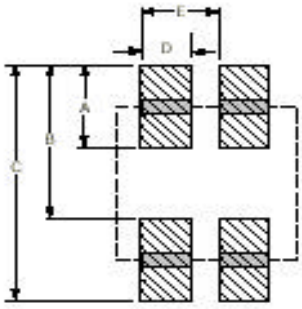
0612 4-Element Array

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)





USA

AVX Myrtle Beach, SC
Corporate Offices
Tel: 843-448-9411
FAX: 843-626-5186

AVX Northwest, WA
Tel: 360-669-8746
FAX: 360-699-8751

AVX North Central, IN
Tel: 317-848-7153
FAX: 317-848-9314

AVX Northeast, MA
Tel: 508-485-8114
FAX: 508-485-8471

AVX Mid Pacific, CA
Tel: 408-436-5400
FAX: 408-437-1500

AVX Southwest, AZ
Tel: 602-539-1496
FAX: 602-539-1501

AVX South Central
Tel: 972-669-1223
FAX: 972-669-2090

AVX Southeast, NC
Tel: 919-878-6223
FAX: 919-878-6462

AVX Canada
Tel: 905-564-8959
FAX: 905-564-9728

EUROPE

AVX Limited, England
European Headquarters
Tel: ++44-1252-770000
FAX: ++44-1252-770001

AVX S.A., France
Tel: ++33-69-18-4600
FAX : ++33-69-28-7387

AVX GmbH, Germany – AVX
Tel: ++49-8131-9004-0
FAX: ++49-8131-9004-44

AVX GmbH, Germany – Elco
Tel: ++49-2741-2990
FAX: ++49-2741-299133

AVX srl, Italy
Tel: ++3902-615-2571
FAX: ++3902-615-2576

AVX sro, Czech Republic
Tel: ++420-467-558340
FAX: ++420-467-558345

ASIA-PACIFIC

AVX/Kyocera, Singapore
Asia-Pacific Headquarters
Tel: (65) 6286-7555
FAX: (65) 6488-9880

AVX/Kyocera, Hong Kong
Tel: (852) 2-363-3303
FAX: (852) 2-765-8185

AVX/Kyocera, Korea
Tel: (82) 2-785-6504
FAX: (82) 2-784-5411

AVX/Kyocera, Taiwan
Tel: (886) 2-2696-4636
FAX: (886) 2-2696-4237

AVX/Kyocera, China
Tel: (86) 21-6249-0314-16
FAX: (86) 21-6249-0313

AVX/Kyocera, Malaysia
Tel: (60) 4-228-1190
FAX: (60) 4-228-1196

Elco, Japan
Tel: 045-943-2906/7
FAX: 045-943-2910

Kyocera, Japan – AVX
Tel: (81) 75-604-3426
FAX: (81) 75-604-3425

Kyocera, Japan – KDP
Tel: (81) 75-604-3424
FAX: (81) 75-604-3425