

ESD Protection for Low Leakage Requirements

GENERAL DESCRIPTION

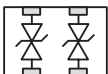
Faster semiconductor clock speeds and an increasing reliance on batteries as power sources have resulted in the need for varistors that exhibit very low leakage current. The UltraGuard (UG) Series of AVX Transient Voltage Suppressors address this problem.

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.

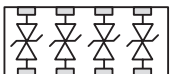
The UG Series is offered as discrete chips (0402, 0603, and 0805), 2-element packages (0405 and 0508), and 4-element packages (0612).



Discrete Chips
0402, 0603,
and 0805



2-Element Arrays
(0405 and 0508)



4-Element Arrays
(0612)

HOW TO ORDER

VC

VC=Surface
Mount Chip

UG

Series
UG = Low
Leakage
Series

04

Case Size
04 = 0402
06 = 0603
08 = 0805

0150

**Maximum
Working
Voltage**
0030 = 3.0V_{dc}
0050 = 5.0V_{dc}
0075 = 7.5V_{dc}
0100 = 10.0V_{dc}
0150 = 15.0V_{dc}

L

Capacitance
L = Low
H = High

1

**No. of
Elements**

W

**Packaging
(pieces per
reel)**
D = 1,000
(7" reel)
R = 4,000
(7" reel)
T = 10,000
(13" reel)
W = 10,000
(7" reel,
0402 only)

P

**Termination
Finish**
P = Ni/Sn Alloy
(Plated)
M = Ni/Sn Pb (Plated)

HOW TO ORDER

MG

MG=Array

UG

Series
UG = Low
Leakage
Series

06

Case Size
04 = 0405
05 = 0508
06 = 0612

0150

**Maximum
Working
Voltage**
0030 = 3.0V_{dc}
0050 = 5.0V_{dc}
0075 = 7.5V_{dc}
0100 = 10.0V_{dc}
0150 = 15.0V_{dc}

L

Capacitance
L = Low
H = High

4

**No. of
Elements**
2 = 2 Elements
4 = 4 Elements

D

**Packaging
(pieces per
reel)**
D = 1,000
(7" reel)
R = 4,000
(7" reel)
T = 10,000
(13" reel)

P

**Termination
Finish**
P = Ni/Sn Alloy
(Plated)
M = Ni/Sn Pb (Plated)

ESD Protection for Low Leakage Requirements

AVX Part Number	V _{CIR} (DC)	V _{CIR} (AC)	Cap Required	Cap	Freq	I _L	Case Size	Elements
MGUG040030L2 __	≤3.0	≤2.3	Low	300	M	2	0405	2
MGUG050030L2 __	≤3.0	≤2.3	Low	425	M	2	0508	2
MGUG060030L4 __	≤3.0	≤2.3	Low	425	M	2	0612	4
VCUG040030L1 __	≤3.0	≤2.3	Low	175	M	2	0402	1
VCUG060030L1 __	≤3.0	≤2.3	Low	750	K	2	0603	1
VCUG080030H1 __	≤3.0	≤2.3	High	3000	K	2	0805	1
VCUG080030L1 __	≤3.0	≤2.3	Low	1100	K	2	0805	1
VCUG120030H1 __	≤3.0	≤2.3	High	3000	K	2	1206	1
VCUG120030L1 __	≤3.0	≤2.3	Low	1200	K	2	1206	1
MGUG040050L2 __	≤5.0	≤3.5	Low	40	M	2	0405	2
MGUG050050L2 __	≤5.0	≤3.5	Low	425	M	2	0508	2
MGUG060050L4 __	≤5.0	≤3.5	Low	425	M	2	0612	4
VCUG040050L1 __	≤5.0	≤3.5	Low	175	M	2	0402	1
VCUG060050L1 __	≤5.0	≤3.5	Low	550	K	2	0603	1
VCUG080050L1 __	≤5.0	≤3.5	Low	750	K	2	0805	1
VCUG120050H1 __	≤5.0	≤3.5	High	1050	K	2	1206	1
VCUG120050L1 __	≤5.0	≤3.5	Low	600	K	2	1206	1
MGUG040075L2 __	≤7.5	≤5.3	Low	40	M	2	0405	2
MGUG050075L2 __	≤7.5	≤5.3	Low	425	M	2	0508	2
MGUG060075L4 __	≤7.5	≤5.3	Low	425	M	2	0612	4
VCUG040075L1 __	≤7.5	≤5.3	Low	100	M	2	0402	1
VCUG060075L1 __	≤7.5	≤5.3	Low	425	K	2	0603	1
VCUG080075H1 __	≤7.5	≤5.3	High	900	K	2	0805	1
VCUG080075L1 __	≤7.5	≤5.3	Low	325	K	2	0805	1
VCUG120075H1 __	≤7.5	≤5.3	High	1050	K	2	1206	1
VCUG120075L1 __	≤7.5	≤5.3	Low	600	K	2	1206	1
MGUG040100L2 __	≤10.0	≤7.1	Low	40	M	2	0405	2
MGUG050100L2 __	≤10.0	≤7.1	Low	225	M	2	0508	2
MGUG060100L4 __	≤10.0	≤7.1	Low	225	M	2	0612	4
VCUG040100L1 __	≤10.0	≤7.1	Low	65	M	2	0402	1
VCUG060100L1 __	≤10.0	≤7.1	Low	250	K	2	0603	1
VCUG080100H1 __	≤10.0	≤7.1	High	550	K	2	0805	1
VCUG080100L1 __	≤10.0	≤7.1	Low	225	K	2	0805	1
VCUG120100H1 __	≤10.0	≤7.1	High	900	K	2	1206	1
VCUG120100L1 __	≤10.0	≤7.1	Low	350	K	2	1206	1
MGUG040150L2 __	≤15.0	≤11	Low	50	M	2	0405	2
MGUG050150L2 __	≤15.0	≤11	Low	50	M	2	0508	2
MGUG060150L4 __	≤15.0	≤11	Low	75	M	2	0612	4
VCUG040150L1 __	≤15.0	≤11	Low	40	M	2	0402	1
VCUG060150L1 __	≤15.0	≤11	Low	155	K	2	0603	1
VCUG080150H1 __	≤15.0	≤11	High	250	K	2	0805	1
VCUG080150L1 __	≤15.0	≤11	Low	120	K	2	0805	1
VCUG120150H1 __	≤15.0	≤11	High	500	K	2	1206	1

L Termination Finish Code
 — Packaging Code

V_{CIR}(DC) DC Circuit Voltage (V)
 V_{CIR}(AC) AC Circuit Voltage (V)
 Cap Req Standard or Low
 I_L Maximum Leakage Current at the Circuit Voltage (μA)
 Cap Typical Capacitance (pF) @ frequency specified and 0.5 Vrms
 Freq Frequency at which capacitance is measured (K = 1kHz, M = 1MHz)

ESD Protection for Low Leakage Requirements

PHYSICAL DIMENSIONS

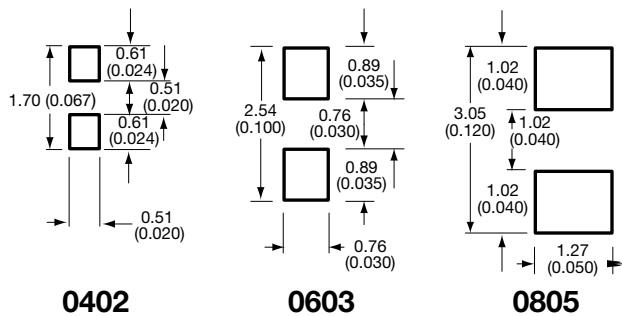
mm (inches)

	0402 Discrete	0603 Discrete	0805 Discrete
Length	1.00 ±0.10 (0.040 ±0.004)	1.60 ±0.15 (0.063 ±0.006)	2.01 ±0.20 (0.079 ±0.008)
Width	0.50 ±0.10 (0.020 ±0.004)	0.80 ±0.15 (0.032 ±0.006)	1.25 ±0.20 (0.049 ±0.008)
Thickness	0.60 Max. (0.024 Max.)	0.90 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.)

	0405 Array	0508 Array	0612 Array
Length	1.00 ±0.15 (0.039 ±0.006)	1.25 ±0.20 (0.049 ±0.008)	1.60 ±0.20 (0.063 ±0.008)
Width	1.37 ±0.15 (0.054 ±0.006)	2.01 ±0.20 (0.079 ±0.008)	3.20 ±0.20 (0.126 ±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 ±0.004)

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)	0.76 (0.030)

2-Element Arrays

	A	B	C	D	E
0405	0.46 (0.018)	0.74 (0.029)	1.20 (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)

