UltraGuard Series

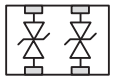
ESD Protection for Low Leakage Requirements

GENERAL DESCRIPTION

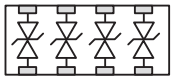
Faster semiconductor clock speeds and an increasing reliance on batteries as power sources have resulted in the need for varistors that exhibit very low leakage current. The UltraGuard (UG) Series of AVX Transient Voltage Suppressors address this problem.

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.

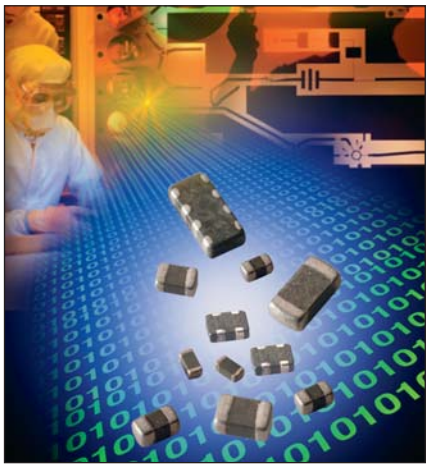
Discrete Chips 0402, 0603, and 0805



2-Element Arrays (0405 and 0508)



4-Element Arrays (0612)



GENERAL CHARACTERISTICS

- Operting Teperature: -55°C to +125°C
- Working Voltage: 3.0dc - 32Vdc
- Case Size: 0402-1206
  0405 2xArray, 0508 2xArray
  0612 4xArray
- Leakage: 1µA Max
- Energy: 0.02-1.2J
- Peak Current: 80-200A
- Typ Cap: 30-5000pF

FEATURES

- Bi-Directional protection
- Ultra low leakage 1uA max
- Multi-strike capability
- Single, 2 and 4 element components
- Compact footprint
- EMI/RFI filtering

APPLICATIONS

- Battery operated devices
- High clock speed IC
- Low voltage power conversion
- Power supervisory chip sets
- Optic circuits (LDD, SerDes
- Laser diodes
- Any circuit with low leakage requirements

HOW TO ORDER

VC	UG	04	0180	L	1	W	P
Surface Mount Chip	**Series** Low Leakage Series	**Case Size** 04 = 0402 06 = 0603 08 = 0805 12 = 1206	**Maximum Working Voltage** 0030 = 3.0VDC 0050 = 5.0VDC 0075 = 7.5VDC 0100 = 10.0VDC 0150 = 15.0VDC 0180 = 18.0VDC 0320 = 32.0VDC	**Capacitance** L = Low H = High	**No. of Elements**	**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)	**Termination Finish** P = Ni/Sn (Plated)

MG	UG	06	0150	L	4	W	P
Array	**Series** Low Leakage Series	**Case Size** 04 = 0405 05 = 0508 06 = 0612	**Maximum Working Voltage** 0030 = 3.0VDC 0050 = 5.0VDC 0075 = 7.5VDC 0100 = 10.0VDC 0150 = 15.0VDC	**Capacitance** L = Low H = High	**No. of Elements** 2 = 2 Elements 4 = 4 Elements	**Packaging (pieces per reel)** D = 1,000 (7" reel) R = 4,000 (7" reel) T = 10,000 (13" reel)	**Termination Finish** P = Ni/Sn (Plated)

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AVX Part Number	V_W	V_W	V_B (Min)	V_C	I_{VC}	I_L	E_T	I_P	Cap	Freq	Case	Elements
MGUG040030L2 _ _	3.0	2.3	6.8	18	1	1	0.05	15	300	M	0405	2
MGUG050030L2 _ _	3.0	2.3	17.2	32	1	1	0.1	30	425	M	0508	2
MGUG060030L4 _ _	3.0	2.3	17.2	32	1	1	0.1	30	425	M	0612	4
VCUG040030L1 _ _	3.0	2.3	6.8	18	1	1	0.05	20	175	M	0402	1
VCUG060030L1 _ _	3.0	2.3	6.8	18	1	1	0.1	30	750	K	0603	1
VCUG080030H1 _ _	3.0	2.3	6.8	18	1	1	0.3	120	3000	K	0805	1
VCUG080030L1 _ _	3.0	2.3	6.8	18	1	1	0.1	40	1100	K	0805	1
VCUG120030H1 _ _	3.0	2.3	6.8	18	1	1	0.4	150	3000	K	1206	1
VCUG120030L1 _ _	3.0	2.3	6.8	18	1	1	0.1	40	1200	K	1206	1
MGUG040050L2 _ _	5.0	3.5	20	50	1	1	0.02	15	40	M	0405	2
MGUG050050L2 _ _	5.0	3.5	17.2	32	1	1	0.1	30	425	M	0508	2
MGUG060050L4 _ _	5.0	3.5	17.2	32	1	1	0.1	30	425	M	0612	4
VCUG040050L1 _ _	5.0	3.5	10.8	22	1	1	0.05	20	175	M	0402	1
VCUG060050L1 _ _	5.0	3.5	10.8	22	1	1	0.1	30	550	K	0603	1
VCUG080050L1 _ _	5.0	3.5	10.8	22	1	1	0.1	40	750	K	0805	1
VCUG120050H1 _ _	5.0	3.5	16.3	32	1	1	0.4	150	1050	K	1206	1
VCUG120050L1 _ _	5.0	3.5	16.3	32	1	1	0.1	40	600	K	1206	1
MGUG040075L2 _ _	7.5	5.3	20	50	1	1	0.02	15	40	M	0405	2
MGUG050075L2 _ _	7.5	5.3	17.2	32	1	1	0.1	30	425	M	0508	2
MGUG060075L4 _ _	7.5	5.3	17.2	32	1	1	0.1	30	425	M	0612	4
VCUG040075L1 _ _	7.5	5.3	16.3	32	1	1	0.05	20	85	M	0402	1
VCUG060075L1 _ _	7.5	5.3	16.3	32	1	1	0.1	30	350	K	0603	1
VCUG080075H1 _ _	7.5	5.3	16.3	32	1	1	0.3	120	900	K	0805	1
VCUG080075L1 _ _	7.5	5.3	16.3	32	1	1	0.1	40	325	K	0805	1
VCUG120075H1 _ _	7.5	5.3	16.3	32	1	1	0.4	150	1050	K	1206	1
VCUG120075L1 _ _	7.5	5.3	16.3	32	1	1	0.1	40	600	K	1206	1
MGUG040100L2 _ _	10	7.1	20	50	1	1	0.02	15	40	M	0405	2
MGUG050100L2 _ _	10	7.1	23	42	1	1	0.1	30	225	M	0508	2
MGUG060100L4 _ _	10	7.1	23	42	1	1	0.1	15	120	M	0612	4
VCUG040100L1 _ _	10	7.1	23	42	1	1	0.05	20	65	M	0402	1
VCUG060100L1 _ _	10	7.1	23	42	1	1	0.1	30	150	K	0603	1
VCUG080100H1 _ _	10	7.1	23	42	1	1	0.3	100	550	K	0805	1
VCUG080100L1 _ _	10	7.1	23	42	1	1	0.1	30	225	K	0805	1
VCUG120100H1 _ _	10	7.1	23	42	1	1	0.4	150	900	K	1206	1
VCUG120100L1 _ _	10	7.1	23	42	1	1	0.1	30	350	K	1206	1
MGUG040150L2 _ _	15	11	20	50	1	1	0.02	15	50	M	0405	2
MGUG050150L2 _ _	15	11	20	50	1	1	0.1	20	50	M	0508	2
MGUG060150L4 _ _	15	11	20	50	1	1	0.05	20	75	M	0612	4
VCUG040150L1 _ _	15	11	25	50	1	1	0.02	15	40	M	0402	1
VCUG060150L1 _ _	15	11	31.1	60	1	1	0.1	30	155	K	0603	1
VCUG080150H1 _ _	15	11	31.1	60	1	1	0.3	100	250	K	0805	1
VCUG080150L1 _ _	15	11	31.1	60	1	1	0.1	30	120	K	0805	1
VCUG120150H1 _ _	15	11	31.1	60	1	1	0.4	120	500	K	1206	1
VCUG040180L1 _ _	18	14	28	55	1	1	0.05	10	30	M	0402	1
VCUG080320L1 _ _	32	22	42.3	77	1	1	0.1	40	50	M	0805	1

└ 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)

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PHYSICAL DIMENSIONS

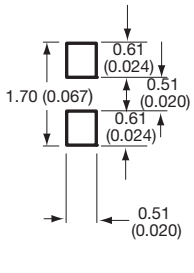
mm (inches)

	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.)

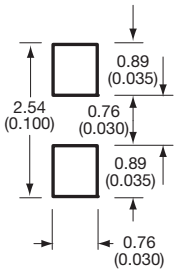
	0405 Array	0508 Array	0612 Array
Length	1.00 ±0.15 (0.039 ±0.006)	1.25 ±0.20 (0.049 ±0.008)	1.60 ±0.20 (0.063 ±0.008)
Width	1.37 ±0.15 (0.054 ±0.006)	2.01 ±0.20 (0.079 ±0.008)	3.20 ±0.20 (0.126 ±0.008)
Thickness	0.66 Max. (0.026 Max.)	1.02 Max. (0.040 Max.)	1.22 Max. (0.048 Max.)
Term Band Width	0.36 ±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

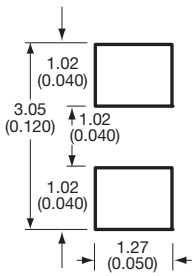
mm (inches)



0402



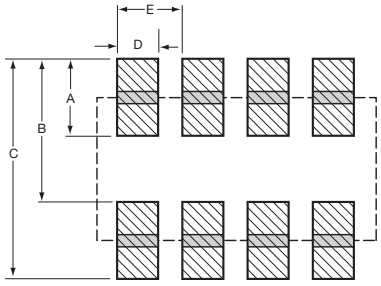
0603



0805

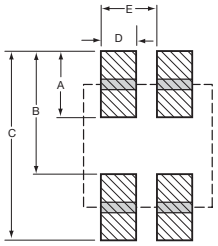
0612 4-Element Array

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)



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AVX:

MGUG040030L2DP MGUG040050L2DP MGUG040150L2DP MGUG060030L4DP MGUG060150L4DP MGUG040050L2RP MGUG050050L2DP MGUG050050L2RP MGUG050050L2TP VCUG040050L1WP VCUG040150L1WP VCUG040030L1WP VCUG060050L1DP VCUG060050L1RP VCUG060050L1TP VCUG080050L1DP VCUG080050L1RP VCUG080050L1TP VCUG080075L1DP MGUG040150L2RP VCUG080150L1DP VCUG060100L1DP MGUG040150L2TP VCUG060075L1DP VCUG040180L1WP MGUG060100L4DP MGUG060100L4TP VCUG060100L1TP VCUG080150L1RP VCUG080150L1TP VCUG040150L1TP VCUG080320L1DP VCUG120050L1TP VCUG120030L1TP VCUG120030H1TP VCUG060030L1RP VCUG120075L1TP VCUG080100L1TP VCUG120050H1RP VCUG080030L1DP VCUG080100H1DP VCUG120030L1RP VCUG120100H1DP VCUG080030H1DP VCUG060030L1DP VCUG060150L1TP VCUG080150H1RP VCUG120030H1RP VCUG080100H1TP VCUG120075H1RP VCUG120050L1DP VCUG040075L1WP VCUG080150H1TP VCUG080320L1TP VCUG060075L1TP VCUG120030L1DP VCUG120075L1DP VCUG080030H1RP VCUG040100L1WP VCUG120030H1DP VCUG120100H1TP VCUG120100L1TP VCUG080100L1RP VCUG060150L1DP VCUG120150H1DP VCUG120100L1DP VCUG120075H1TP VCUG120050L1RP VCUG080150H1DP VCUG120050H1TP VCUG080100L1DP VCUG120050H1DP VCUG120150H1TP VCUG080075H1TP VCUG080075H1DP VCUG080030L1TP VCUG080075L1TP VCUG120075H1DP VCUG060150L1RP VCUG080030H1TP VCUG080030L1RP VCUG060030L1TP