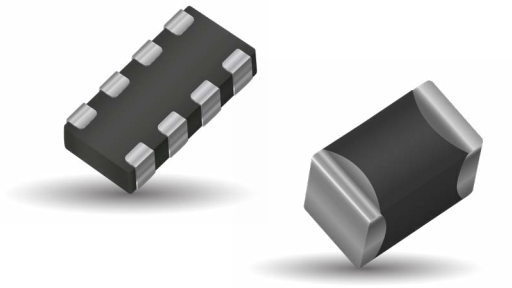
UltraGuard® Series

ESD Protection for Low Leakage Requirements

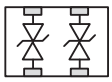
GENERAL DESCRIPTION

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 KYOCERA AVX Transient Voltage Suppressors address this problem.

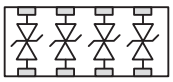
The UG® Series is the ideal transient protection solution for high clock speed integrated circuit application, battery-operated device, backlit display, medical/instrument application, low voltage power conversion circuits and power supervisory chip sets. In addition, UltraGuard® has low leakage characteristics that 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)

Part Number	VW	VW	VB (Min)	VC	IVC	IL	ET	IP	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)

PHYSICAL DIMENSIONS

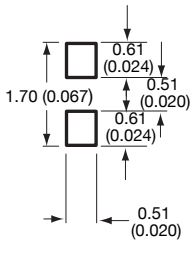
mm (inches)

	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.)

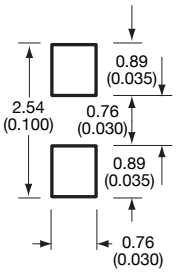
	0405 Array	0508 Array	0612 Array
Length	1.00 ±0.15 (0.039 ±0.006)	1.25 ±0.20 (0.049 ±0.008)	1.60 ±0.20 (0.063 ±0.008)
Width	1.37 ±0.15 (0.054 ±0.006)	2.01 ±0.20 (0.079 ±0.008)	3.20 ±0.20 (0.126 ±0.008)
Thickness	0.66 Max. (0.026 Max.)	1.02 Max. (0.040 Max.)	1.22 Max. (0.048 Max.)
Term Band Width	0.36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

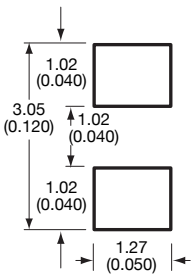
mm (inches)



0402



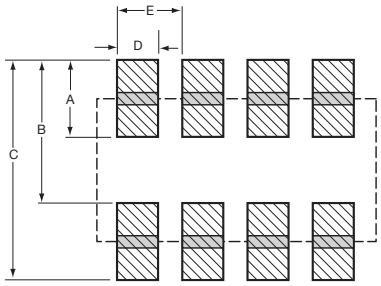
0603

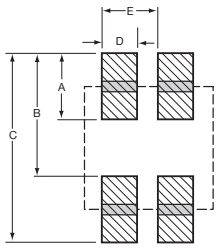


0805

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)