

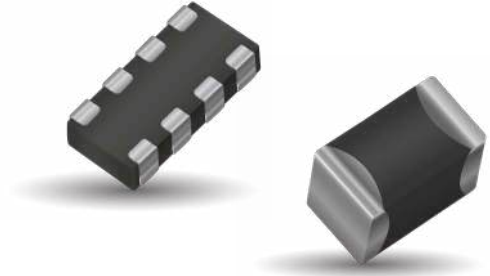
# UltraGuard® Series

## ESD Protection for Low Leakage Requirements

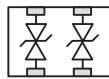
### GENERAL DESCRIPTION

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.

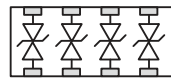
The UG® Series is the ideal transient protection solution for high clock speed integrated circuit application, battery-operated device, backlit display, medical/instrument application, low voltage power conversion circuits and power supervisory chip sets. In addition, UltraGuard® has low leakage characteristics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

- Operating Temperature: -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

<b>VC</b> ┆ <b>Surface Mount Chip</b>	<b>UG</b> ┆ <b>Series</b> Low Leakage Series	<b>04</b> ┆ <b>Case Size</b> 04 = 0402 06 = 0603 08 = 0805 12 = 1206	<b>0180</b> ┆ <b>Maximum Working Voltage</b> 0030 = 3.0VDC 0050 = 5.0VDC 0075 = 7.5VDC 0100 = 10.0VDC 0150 = 15.0VDC 0180 = 18.0VDC 0320 = 32.0VDC	<b>L</b> ┆ <b>Capacitance</b> L = Low H = High	<b>1</b> ┆ <b>No. of Elements</b>	<b>W</b> ┆ <b>Packaging (pieces per reel)</b> D = 1,000 (7" reel) R = 4,000 (7" reel) T = 10,000 (13" reel) W = 10,000 (7" reel, 0402 only)	<b>P</b> ┆ <b>Termination Finish</b> P = Ni/Sn (Plated)
<b>MG</b> ┆ <b>Array</b>	<b>UG</b> ┆ <b>Series</b> Low Leakage Series	<b>06</b> ┆ <b>Case Size</b> 04 = 0405 05 = 0508 06 = 0612	<b>0150</b> ┆ <b>Maximum Working Voltage</b> 0030 = 3.0VDC 0050 = 5.0VDC 0075 = 7.5VDC 0100 = 10.0VDC 0150 = 15.0VDC	<b>L</b> ┆ <b>Capacitance</b> L = Low H = High	<b>4</b> ┆ <b>No. of Elements</b> 2 = 2 Elements 4 = 4 Elements	<b>W</b> ┆ <b>Packaging (pieces per reel)</b> D = 1,000 (7" reel) R = 4,000 (7" reel) T = 10,000 (13" reel)	<b>P</b> ┆ <b>Termination Finish</b> P = Ni/Sn (Plated)

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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<sub>CIR</sub> (DC) DC Circuit Voltage (V)
- V<sub>CIR</sub> (AC) AC Circuit Voltage (V)
- Cap Req Standard or Low
- I<sub>L</sub> 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)

# UltraGuard® Series

## ESD Protection for Low Leakage Requirements

### PHYSICAL DIMENSIONS

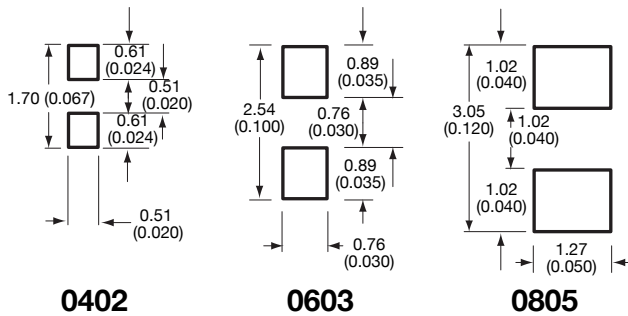
mm (inches)

	0402 Discrete	0603 Discrete	0805 Discrete
<b>Length</b>	1.00 ±0.10 (0.040 ±0.004)	1.60 ±0.15 (0.063 ±0.006)	2.01 ±0.20 (0.079 ±0.008)
<b>Width</b>	0.50 ±0.10 (0.020 ±0.004)	0.80 ±0.15 (0.032 ±0.006)	1.25 ±0.20 (0.049 ±0.008)
<b>Thickness</b>	0.60 Max. (0.024 Max.)	0.90 Max. (0.035 Max.)	1.02 Max. (0.040 Max.)
<b>Term Band Width</b>	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
<b>Length</b>	1.00 ±0.15 (0.039 ±0.006)	1.25 ±0.20 (0.049 ±0.008)	1.60 ±0.20 (0.063 ±0.008)
<b>Width</b>	1.37 ±0.15 (0.054 ±0.006)	2.01 ±0.20 (0.079 ±0.008)	3.20 ±0.20 (0.126 ±0.008)
<b>Thickness</b>	0.66 Max. (0.026 Max.)	1.02 Max. (0.040 Max.)	1.22 Max. (0.048 Max.)
<b>Term Band Width</b>	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
<b>0405</b>	0.46 (0.018)	0.74 (0.029)	1.20 (0.047)	0.38 (0.015)	0.64 (0.025)
<b>0508</b>	0.89 (0.035)	1.27 (0.050)	2.16 (0.085)	0.46 (0.018)	0.76 (0.030)

