

MLVA-R

Multilayer varistor ESD suppressor



Applications

- ESD port protection for mobile/smart phones
- Game console ESD port protection
- Set-top-boxes
- Tablets, notebooks, netbooks, laptops
- Media players
- Digital cameras
- Medical equipment
- Computers and peripherals ESD port protection
- Consumer electronics

Product description

- Three compact footprint options 0201 (0603 metric), 0402 (1005 metric), and 0603 (1608 metric)
- Zinc oxide ceramic chip
- Provides Electro Static Discharge (ESD) protection with fast response time (<1 ns) allowing equipment to pass IEC 61000-4-2 Level 4 test
- 0402 and 0603 meet IEC 61000-4-4 and 61000-4-5
- Compact footprint utilizes less board space
- Low and stable leakage current reduces power consumption
- Low clamping voltage
- Wide operating voltage range: 5.5 Vdc to 26 Vdc
- Halogen free, lead free, RoHS compliant

Product specifications

Part number ^a	Package size	Working voltage ^{1,2}		Varistor voltage ³ (V)	Clamping voltage ⁴ (V)	Capacitance ⁵ (pF) typical	Peak current ⁶ (A)	Transient energy ⁷ (J)
		(V _{rms})	(V _{DC})					
MLVA02V05C033-R	0201 (0603 metric)	—	5.5	8–14	30	33	—	—
MLVA02V05C047-R	0201 (0603 metric)	—	5.5	8–14	26	47	—	—
MLVA02V05C064-R	0201 (0603 metric)	—	5.5	8–14	26	64	—	—
MLVA04V05C270-R	0402 (1005 metric)	4	5.5	8–18	28	270	20	0.05
MLVA04V09C130-R	0402 (1005 metric)	7	9	11.5–21.5	41	130	20	0.05
MLVA04V18C085-R	0402 (1005 metric)	14	18	23–33	54	85	20	0.05
MLVA06V05C270-R	0603 (1608 metric)	4	5.5	8–18	31	270	30	0.1
MLVA06V09C210-R	0603 (1608 metric)	7	9	11.5–21.5	41	210	30	0.1
MLVA06V18C150-R	0603 (1608 metric)	14	18	23–33	54	150	30	0.1
MLVA06V26C100-R	0603 (1608 metric)	20	26	32–42	70	100	30	0.1

1. Working voltage V_{rms}: Maximum AC operating voltage the device can maintain and not exceed 10 µA leakage current.

2. Working voltage V_{DC}: Maximum DC operating voltage the device can maintain and not exceed 10 µA leakage current

3. Varistor voltage: Voltage across the device measured at 1 mA DC current

4. Clamping voltage: Maximum peak voltage across the device with 8/20 µs waveform and 1 A pulse current

5. Capacitance test parameters: Zero volt bias, 1.0 MHz, 1.0 Vrms

6. Peak current: Maximum peak current which may be applied with 8/20 µs waveform without device failure.

7. Transient energy: Maximum energy which may be dissipated with 10/1000 µs waveform without device failure.

8. Part Number Definition: MLVAXxVxxCxxx

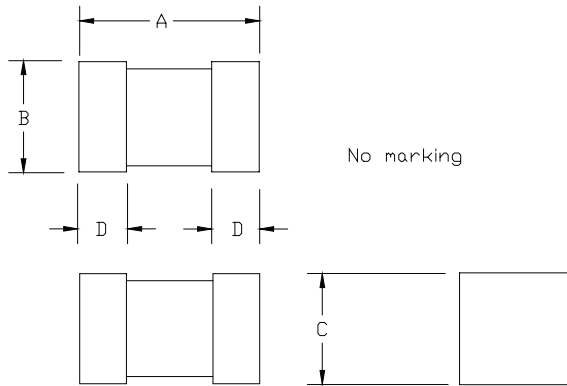
MLVA xx= Product code and size

Vxx= Working DC voltage

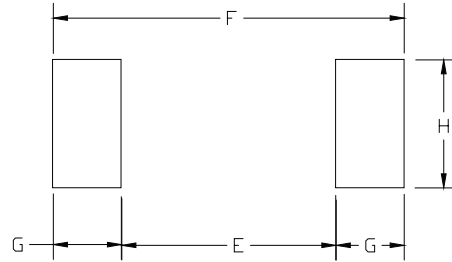
Cxxx= Capacitance value

-R suffix= RoHS compliant.

Dimensions—mm



Recommended Pad Layout



Part number	A	B	C	D	E	F	G	H
MLVA02V05C033-R	0.60 ±0.05	0.30 ±0.05	0.30 ±0.05	0.20± 0.10	0.30	0.80	0.25	0.30
MLVA02V05C047-R	0.60 ±0.05	0.30 ±0.05	0.30 ±0.05	0.20± 0.10	0.30	0.80	0.25	0.30
MLVA02V05C064-R	0.60 ±0.05	0.30 ±0.05	0.30 ±0.05	0.20± 0.10	0.30	0.80	0.25	0.30
MLVA04V05C270-R	0.95 ±0.15	0.50 ±0.10	0.50 ±0.10	0.25± 0.15	0.51	1.73	0.61	0.51
MLVA04V09C130-R	0.95 ±0.15	0.50 ±0.10	0.50 ±0.10	0.25± 0.15	0.51	1.73	0.61	0.51
MLVA04V18C085-R	0.95 ±0.15	0.50 ±0.10	0.50 ±0.10	0.25± 0.15	0.51	1.73	0.61	0.51
MLVA06V05C270-R	1.60 ±0.15	0.80 ±0.10	0.80 ±0.10	0.30± 0.20	0.50	2.54	1.02	0.76
MLVA06V09C210-R	1.60 ±0.15	0.80 ±0.10	0.80 ±0.10	0.30± 0.20	0.50	2.54	1.02	0.76
MLVA06V18C150-R	1.60 ±0.15	0.80 ±0.10	0.80 ±0.10	0.30± 0.20	0.50	2.54	1.02	0.76
MLVA06V26C100-R	1.60 ±0.15	0.80 ±0.10	0.80 ±0.10	0.30± 0.20	0.50	2.54	1.02	0.76

Environmental data

Operating temperature: - 40 °C to +85 °C

Storage temperature (component): +5 °C to +40 °C

Full load voltage: +85 °C at working voltage for 1000 hours
Varistor voltage typical < 10% change

Thermal shock: 5 cycles, - 40 °C to +85 °C, 30 minute dwell time
Varistor voltage typical < 10% change

Humidity bias: +40 °C, 90% relative humidity, at working voltage for 1000 hours
Varistor voltage typical < 10% change

Resistance to solder heat: 260 °C ± 5 °C for 10 seconds ± 1 second

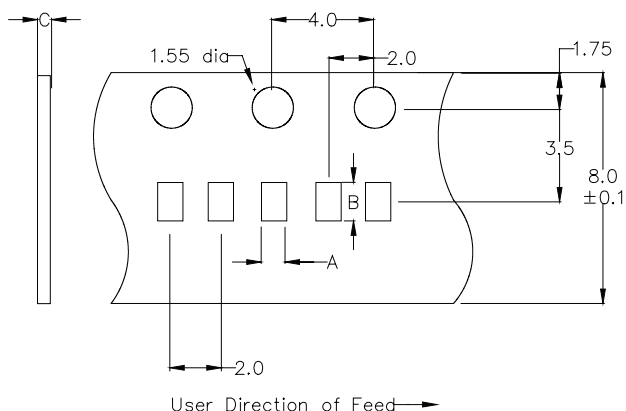
Packaging information—mm

(Drawing not to scale)

Supplied in tape and reel packaging

15 000 parts per 7.0" diameter reel: MLVA02V05C033-R, MLVA02V05C047-R, MLVA02V05C064-R

10 000 parts per 7.0" diameter reel: MLVA04V05C270-R, MLVA04V09C130-R, MLVA04V18C085-R

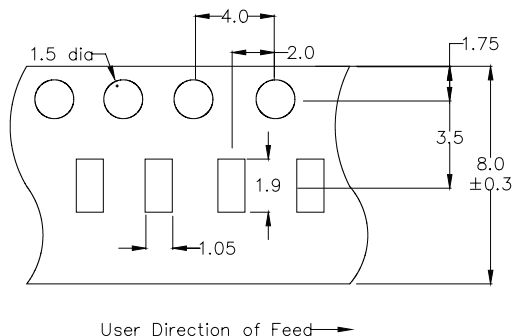


Part number	A	B	C
MLVA02V05C033-R	0.37	0.69	0.42
MLVA02V05C047-R	0.37	0.69	0.42
MLVA02V05C064-R	0.37	0.69	0.42
MLVA04V05C270-R	0.58	1.20	0.60
MLVA04V09C130-R	0.58	1.20	0.60
MLVA04V18C085-R	0.58	1.20	0.60

Supplied in tape and reel packaging

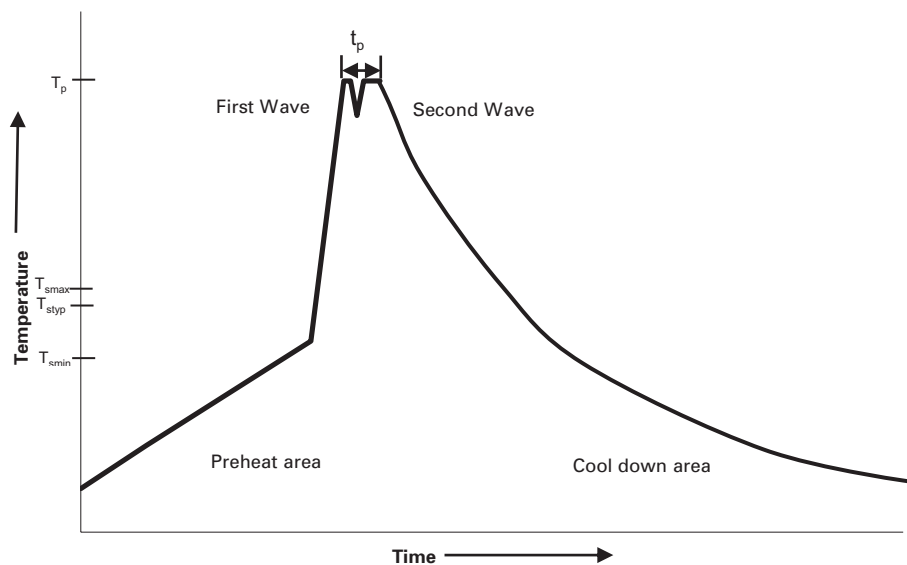
4 000 parts per 7.0" diameter reel

MLVA06V05C270-R, MLVA06V09C210-R, MLVA06V18C150-R, MLVA06V26C100-R



Wave solder profile

Reflow soldering not recommended



Reference EN 61760-1:2006

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat		
• Temperature min. (T_{smin})	100°C	100°C
• Temperature typ. (T_{styp})	120°C	120°C
• Temperature max. (T_{smax})	130°C	130°C
• Time (T_{smin} to T_{smax}) (t_s)	70 seconds	70 seconds
Δ preheat to max Temperature	150°C max.	150°C max.
Peak temperature (T_p)*	235°C – 260°C	250°C – 260°C
Time at peak temperature (t_p)	10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate	~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25°C to 25°C	4 minutes	4 minutes

Manual solder

350°C, 4-5 seconds (by soldering iron), generally manual hand soldering is not recommended.

Solder reflow profile

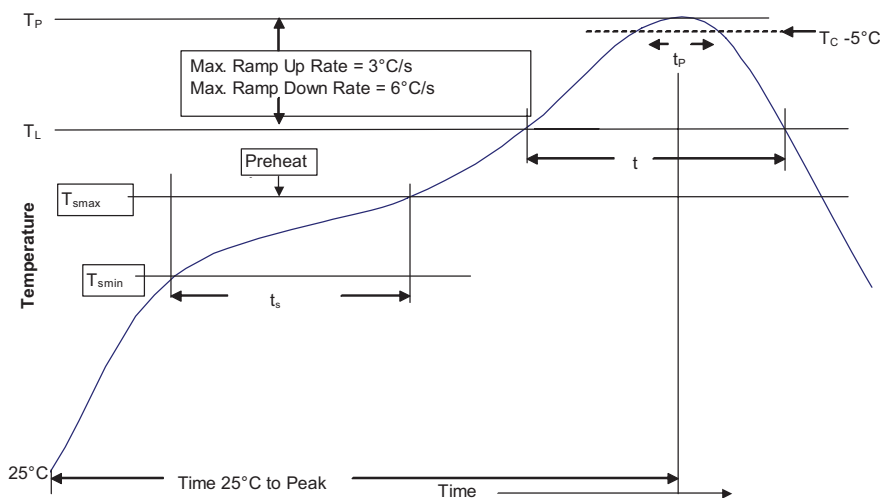


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350 - 2000	Volume mm ³ >2000
<1.6mm	260°C	260°C	260°C
1.6 – 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Reference JEDEC J-STD-020D

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak		
• Temperature min. (T_{smin})	100°C	150°C
• Temperature max. (T_{smax})	150°C	200°C
• Time (T_{smin} to T_{smax}) (t_s)	60-120 Seconds	60-120 Seconds
Average ramp up rate T_{smax} to T_P	3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60-150 Seconds	60-150 Seconds
Peak package body temperature (T_P)*	Table 1	Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_C)	20 Seconds**	30 Seconds**
Average ramp-down rate (T_P to T_{smax})	6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature	6 Minutes Max.	8 Minutes Max.

* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/elx

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