

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

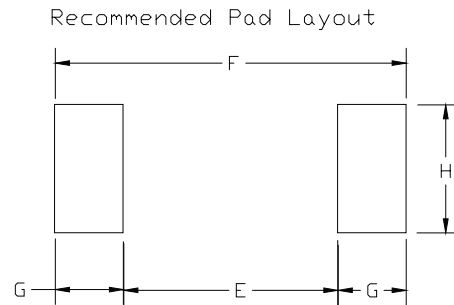
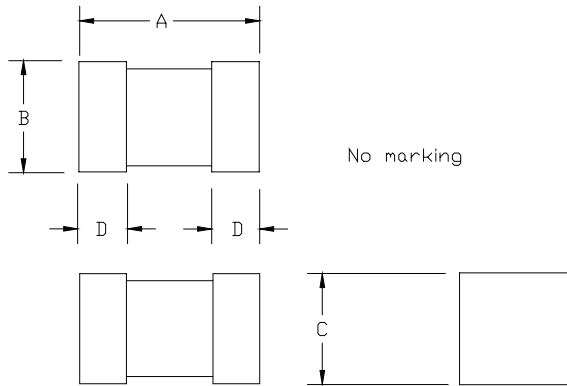
MLVA xx= Product code and size

Vxx= Working DC voltage

Cxxx= Capacitance value

-R suffix= RoHS compliant.

Dimensions—mm



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

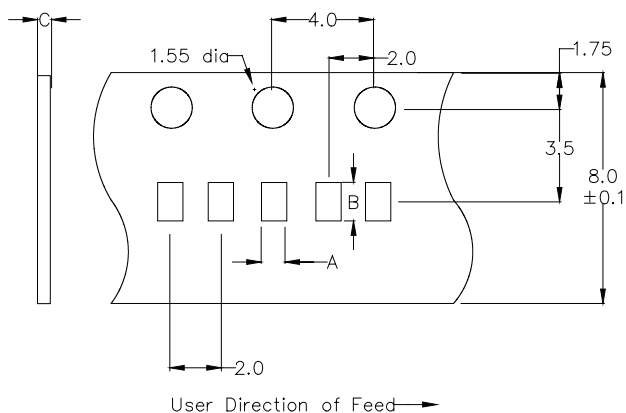
Packaging information—mm

(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

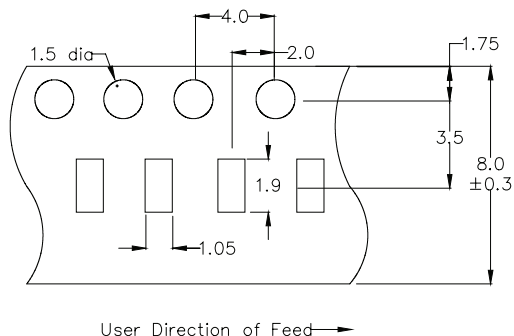


Part number	A	B	C
MLVA02V05C033-R	0.37	0.69	0.42
MLVA02V05C047-R	0.37	0.69	0.42
MLVA02V05C064-R	0.37	0.69	0.42
MLVA04V05C270-R	0.58	1.20	0.60
MLVA04V09C130-R	0.58	1.20	0.60
MLVA04V18C085-R	0.58	1.20	0.60

Supplied in tape and reel packaging

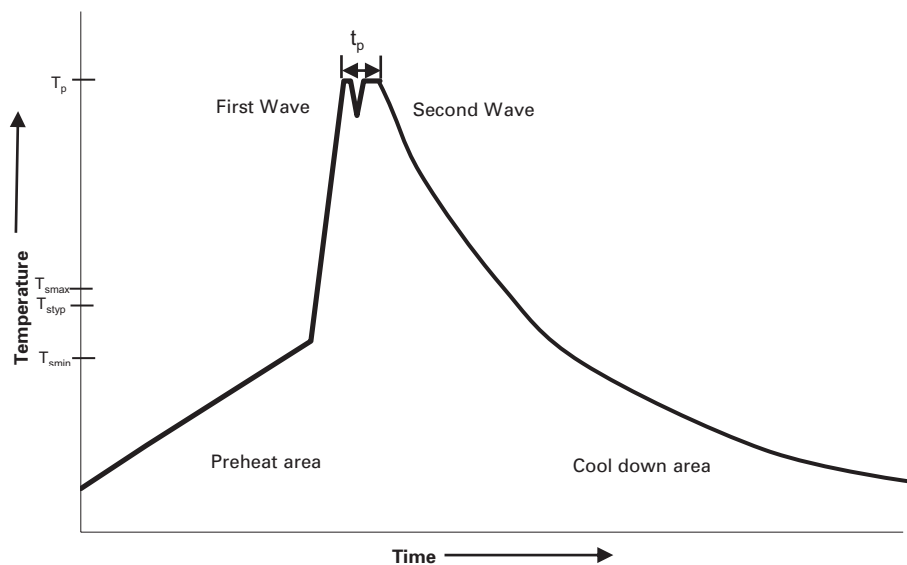
4 000 parts per 7.0" diameter reel

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

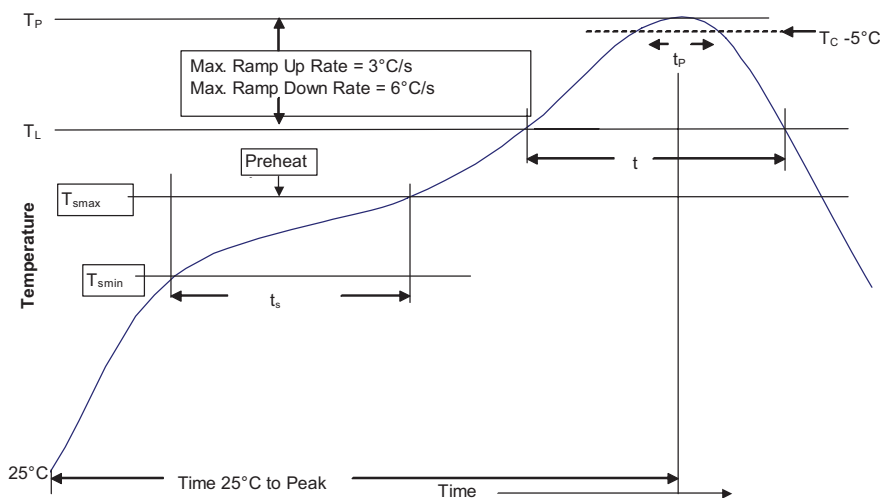


Table 1 - Standard SnPb Solder (T_C)

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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

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

© 2016 Eaton
All Rights Reserved
Printed in USA
Publication No. 10493 BU-MC16005
February 2016