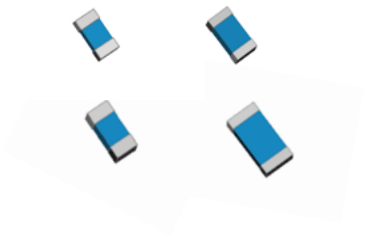
# MLVC

## Multilayer varistor general type ESD suppressor



### Applications

- ESD port protection for mobile/smart phones
- Game console ESD port protection
- Set-top-boxes
- Tablets, notebooks, netbooks, laptops
- Media players
- Medical equipment
- Computers and peripherals ESD port protection
- Consumer electronics
- Industrial: Measuring devices, instruments, controllers

### Product features

- Four compact footprint options 0402 (1005 metric), 0603 (1608 metric), 0805 (2012 metric), 1206 (3216 metric)
- Working voltage: 12 Vdc to 68 Vdc
  8.5 Vac to 48 Vac
- Absorbs high energy transient voltages seen in EFT and inductive load
- Fast response time to protect downstream circuits

### Environmental compliance

Pb HALOGEN HF FREE RoHS

### Ordering part number

**MLVC 04 V012 C150**

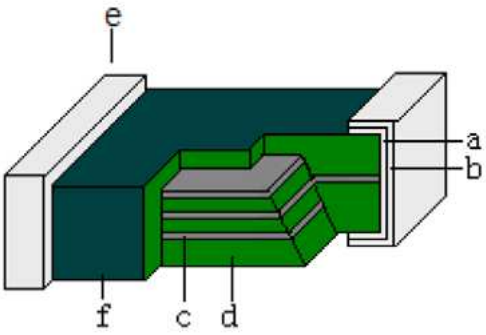
- Family name
- Package size
- Working voltage
- Capacitance code

Powering Business Worldwide

## Product specifications

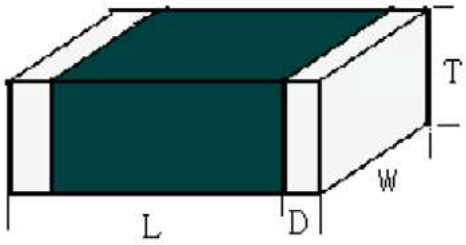
| Part number | Working voltage (Vdc) | Working voltage (Vac) | Varistor voltage @ 1 mAdc (V) | Varistor voltage @ 1 mAdc ($\Delta V_B$) | Maximum clamping voltage 8/20 µs (V) | Energy Absorption 10/1000 µs (J) | Peak current 8/20 µs (A) | Typical capacitance @ 1 MHz (pF) |
|---|---|---|---|---|---|---|---|---|
| MLVC04V012C150 | 12 | 8.5 | 18 | ±15% | 34 @ 1 A | 0.05 | 20 | 150 |
| MLVC04V014C120 | 14 | 10 | 20 | ±10% | 35 @ 1 A | 0.05 | 20 | 120 |
| MLVC04V016C100 | 16 | 11.3 | 22 | ±10% | 39 @ 1 A | 0.05 | 20 | 100 |
| MLVC04V018C090 | 18 | 12.7 | 25 | ±10% | 44 @ 1 A | 0.05 | 20 | 90 |
| MLVC06V012C210 | 12 | 8.5 | 18 | ±15% | 34 @1 A | 0.1 | 30 | 210 |
| MLVC06V014C190 | 14 | 10 | 20 | ±10% | 35 @ 1 A | 0.1 | 30 | 190 |
| MLVC06V016C180 | 16 | 11.3 | 22 | ±10% | 39 @ 1 A | 0.1 | 30 | 180 |
| MLVC06V018C170 | 18 | 12.7 | 25 | ±10% | 44 @ 1 A | 0.1 | 30 | 170 |
| MLVC06V022C150 | 22 | 15.6 | 30 | ±10% | 53 @ 1 A | 0.1 | 30 | 150 |
| MLVC06V024C140 | 24 | 17 | 33 | ±10% | 58 @ 1 A | 0.1 | 30 | 140 |
| MLVC06V026C120 | 26 | 18.4 | 36 | ±10% | 63 @ 1 A | 0.1 | 30 | 120 |
| MLVC06V030C100 | 30 | 21.2 | 42 | ±10% | 74 @ 1 A | 0.1 | 30 | 100 |
| MLVC06V033C080 | 33 | 23.3 | 45 | ±10% | 79 @ 1 A | 0.1 | 35 | 80 |
| MLVC08V012C220 | 12 | 8.5 | 18 | ±15% | 34 @ 1 A | 0.1 | 35 | 220 |
| MLVC08V014C200 | 14 | 10 | 20 | ±10% | 35 @ 1 A | 0.1 | 35 | 200 |
| MLVC08V016C190 | 16 | 11.3 | 22 | ±10% | 39 @ 1 A | 0.1 | 35 | 190 |
| MLVC08V018C180 | 18 | 12.7 | 25 | ±10% | 44 @ 1 A | 0.1 | 35 | 180 |
| MLVC08V022C175 | 22 | 15.6 | 30 | ±10% | 53 @ 1 A | 0.1 | 35 | 175 |
| MLVC08V024C170 | 24 | 17 | 33 | ±10% | 58 @ 1 A | 0.1 | 35 | 170 |
| MLVC08V026C165 | 26 | 18.4 | 36 | ±10% | 63 @ 1 A | 0.1 | 35 | 165 |
| MLVC08V030C150 | 30 | 21.2 | 42 | ±10% | 74 @ 1 A | 0.1 | 35 | 150 |
| MLVC08V033C120 | 33 | 23.3 | 45 | ±10% | 79 @ 1 A | 0.1 | 35 | 120 |
| MLVC08V038C110 | 38 | 27 | 51 | ±10% | 90 @ 1 A | 0.1 | 35 | 110 |
| MLVC08V042C100 | 42 | 30 | 56 | ±10% | 99 @ 1 A | 0.1 | 35 | 100 |
| MLVC08V048C080 | 48 | 34 | 62 | ±10% | 110 @ 1 A | 0.1 | 35 | 80 |
| MLVC12V012C450 | 12 | 8.5 | 18 | ±15% | 34 @ 1 A | 0.1 | 35 | 450 |
| MLVC12V014C350 | 14 | 10 | 20 | ±10% | 35 @ 1 A | 0.1 | 35 | 350 |
| MLVC12V016C300 | 16 | 11.3 | 22 | ±10% | 39 @ 1 A | 0.1 | 35 | 300 |
| MLVC12V018C270 | 18 | 12.7 | 25 | ±10% | 44 @ 1 A | 0.1 | 35 | 270 |
| MLVC12V022C250 | 22 | 15.6 | 30 | ±10% | 53 @ 1 A | 0.1 | 35 | 250 |
| MLVC12V024C230 | 24 | 17 | 33 | ±10% | 58 @ 1 A | 0.1 | 35 | 230 |
| MLVC12V026C220 | 26 | 18.4 | 36 | ±10% | 63 @ 1 A | 0.1 | 35 | 220 |
| MLVC12V030C200 | 30 | 21.2 | 42 | ±10% | 74 @ 1 A | 0.1 | 35 | 200 |
| MLVC12V033C180 | 33 | 23.3 | 45 | ±10% | 79 @ 1 A | 0.1 | 35 | 180 |
| MLVC12V038C170 | 38 | 27 | 51 | ±10% | 90 @ 1 A | 0.1 | 35 | 170 |
| MLVC12V042C160 | 42 | 30 | 56 | ±10% | 99 @ 1 A | 0.1 | 35 | 160 |
| MLVC12V048C150 | 48 | 34 | 62 | ±10% | 110 @ 1 A | 0.1 | 35 | 150 |
| MLVC12V056C140 | 56 | 40 | 72 | ±10% | 127 @ 1 A | 0.1 | 35 | 140 |
| MLVC12V060C120 | 60 | 45 | 76 | ±10% | 134 @ 1 A | 0.1 | 35 | 120 |
| MLVC12V065C100 | 65 | 46 | 82 | ±10% | 144 @ 1 A | 0.1 | 35 | 100 |
| MLVC12V068C090 | 68 | 48 | 86 | ±10% | 151 @ 1 A | 0.1 | 35 | 90 |

## Construction




| Component | Material |
|---|---|
| a. Ag layer | Ag |
| b. Ni/Sn plating | Ni-Sn |
| c. Inner electrode | Pd/Ag |
| d. Body | ZnO |
| e. Terminal electrode | Ag layer and Ni/Sn plating |
| f. Glass layer | Si-Bi |

## Dimensions—mm (in)

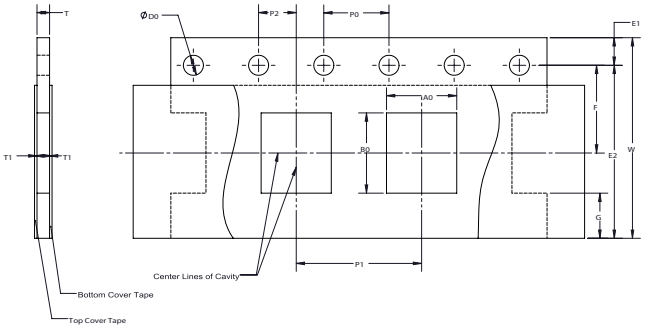



| Part size | L | W | T | D |
|---|---|---|---|---|
| MLVC04 | 1.0 ± 0.15<br>(0.04 ± 0.006) | 0.5 ± 0.15<br>(0.02 ± 0.006) | 0.5 ± 0.15<br>(0.02 ± 0.006) | 0.25 ± 0.1<br>(0.01 ± 0.004) |
| MLVC06 | 1.6 ± 0.2<br>(0.063 ± 0.008) | 0.8 ± 0.2<br>(0.031 ± 0.008) | 0.8 ± 0.2<br>(0.031 ± 0.008) | 0.3 ± 0.2<br>(0.01 ± 0.008) |
| MLVC08 | 2.0 ± 0.2<br>(0.079 ± 0.008) | 1.2 ± 0.2<br>(0.047 ± 0.008) | 0.9 ± 0.2<br>(0.035 ± 0.008) | 0.5 ± 0.3<br>(0.02 ± 0.012) |
| MLVC12 | 3.2 ± 0.2<br>(0.126 ± 0.008) | 1.6 ± 0.2<br>(0.063 ± 0.008) | 1.1 ± 0.2<br>(0.043 ± 0.008) | 0.5 ± 0.3<br>(0.02 ± 0.012) |

## General specifications

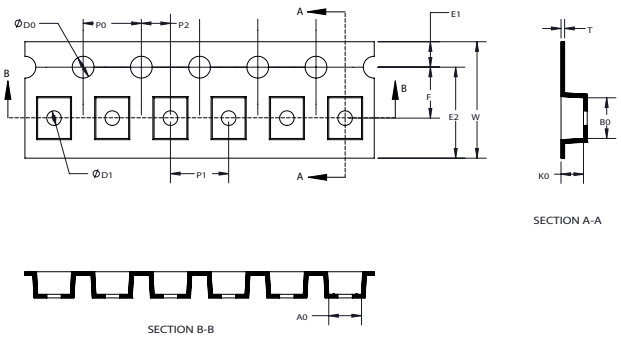
| |
|---|
| Operating temperature: - 55 °C to +125 °C |
| Solderability: +245 ± 5 °C, 5 ± 1 s |
| Resistance to soldering: +260 ± 5 °C, 10 ± 1 s |
| Low temperature resistance: -55 ± 2 °C, 1000 hours |
| Vibration: 1.5 mm, A period of 2 hours in each of 3 mutually perpendicular directions, 10 Hz to 55 Hz to 10 Hz for 1 minute |
| High temperature resistance: 1000 hours, +125 ± 2 °C. |
| High temperature load: Applied voltage: Working voltage, Testing time: 1000 hours, +85 ± 2 °C. |
| Static humidity: 90% to 95% RH, +60 °C ± 2 °C, 1000 hours |
| Thermal shock: -55 °C, 30 ± 3 minutes, +125 °C, 30 ± 3 minutes, 32 cycles |

Paper tape: MLVC04, MLVC06, MLVC08



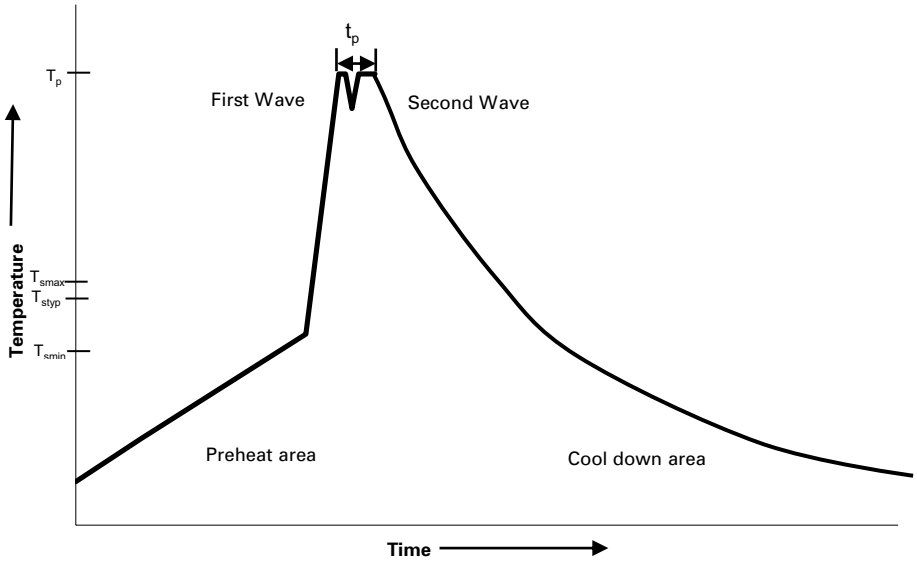

| Dimension | MLVC04 | MLVC06 | MLVC08 |
|---|---|---|---|
| W | 8 ± 0.3 | 8 ± 0.3 | 8 ± 0.3 |
| F | 3.5 ± 0.05 | 3.5 ± 0.05 | 3.5 ± 0.05 |
| E1 | 1.75 ± 0.1 | 1.75 ± 0.1 | 1.75 ± 0.1 |
| P0 | 4 ± 0.1 | 4 ± 0.1 | 4 ± 0.1 |
| P1 | 2.0 ± 0.05 | 4.0 ± 0.2 | 4.0 ± 0.2 |
| P2 | 2.0 ± 0.1 | 2.0 ± 0.1 | 2.0 ± 0.1 |
| D0 | 1.5 + 0.1/-0 | 1.5 + 0.1/-0 | 1.5 + 0.1/-0 |
| A0 | 0.65 ± 0.1 | 1.1 ± 0.2 | 1.5 ± 0.2 |
| B0 | 1.15 ± 0.1 | 1.9 ± 0.2 | 2.3 ± 0.2 |
| T | 0.8 max | 1.1 max | 1.1 max |
| Qty | 10,000 parts per 7" reel | 4000 parts per 7" reel | 4000 parts per 7" reel |

Embossed tape: MLVC12




| Dimension | MLVC12 |
|---|---|
| W | 8.1 +/- 0.2 |
| P1 | 4.0 +/- 0.10 |
| E1 | 1.75 +/- 0.10 |
| E2 | 6.25 min |
| F | 3.50 +/- 0.10 |
| D0 | 1.55 +/- 0.05 |
| D1 | 1.00 +/- 0.10 |
| $P_0$ | 4.0 +/- 0.10 |
| P2 | 2.0 +/- 0.05 |
| $A_0$ | 1.90 +/- 0.10 |
| $B_0$ | 3.51 +/- 0.10 |
| T | 0.23 +/- 0.10 |
| $K_0$ | 1.27 +/- 0.10 |
| Qty | 3000 parts per 7" reel |

### Wave solder profile



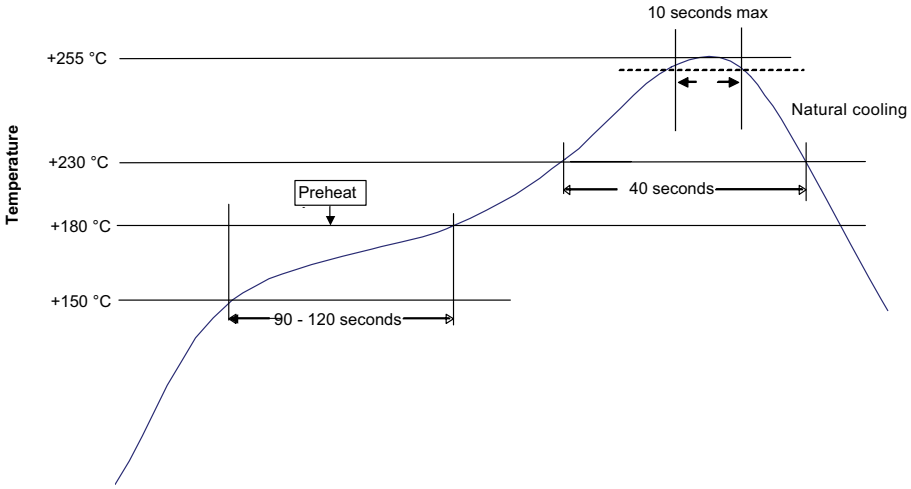

### Reference EN 61760-1:2006

| 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 |
| $\Delta$preheat to max Temperature | | 150 °C max. | 150 °C max. |
| Peak temperature (Tp)* | | 235 °C – 260 °C | 250 °C – 260 °C |
| Time at peak temperature ($t_p$) | | 10 seconds max<br>5 seconds max each wave | 10 seconds max<br>5 seconds max each wave |
| Ramp-down rate | | ~ 2 K/s min<br>~3.5 K/s typ<br>~5 K/s max | ~ 2 K/s min<br>~3.5 K/s typ<br>~5 K/s max |
| Time 25 °C to peak temperature | | 4 minutes | 4 minutes |

### Manual solder

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

## Solder reflow profile




| Profile feature | | Parameters |
|---|---|---|
| Preheat and soak | • Temperature min. | +150 °C |
| | • Temperature max. | +180 °C |
| | • Time | 60-120 seconds |
| Liquidous temperature<br>Time at liquidous | | +230 °C<br>40 seconds |
| Peak package body temperature<br>Time | | +255 °C<br>10 seconds max |

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**Eaton**
**Electronics Division**
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

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