# 0603ESDA-MLP

## ESD suppressor



### Product description

- Ultra-low capacitance (0.05 pF) ideal for high speed data applications
- Provides Electro Static Discharge (ESD) protection with fast response time (<1 ns) allowing equipment to pass IEC 61000-4-2 Level 4 test
- Single–line, bi-directional device
- 0603 (1608 metric) compact design utilizes less board space
- Lead free, RoHS compliant

### Applications

- ESD port protection for mobile/smart phones
- Game console ESD port protection
- High speed ESD data port protection
- Set-top-boxes
- Tablets, notebooks, netbooks, laptops
- High definition television (HDTV)
- Media players
- Digital cameras
- Medical equipment
- Computers and peripherals ESD port protection
- Consumer electronics

### Ordering

- Specify part number and packaging suffix (e.g. 0603ESDA-MLP7) 0603ESDA-MLP = part number, 7 = packaging suffix)

### Packaging suffixes

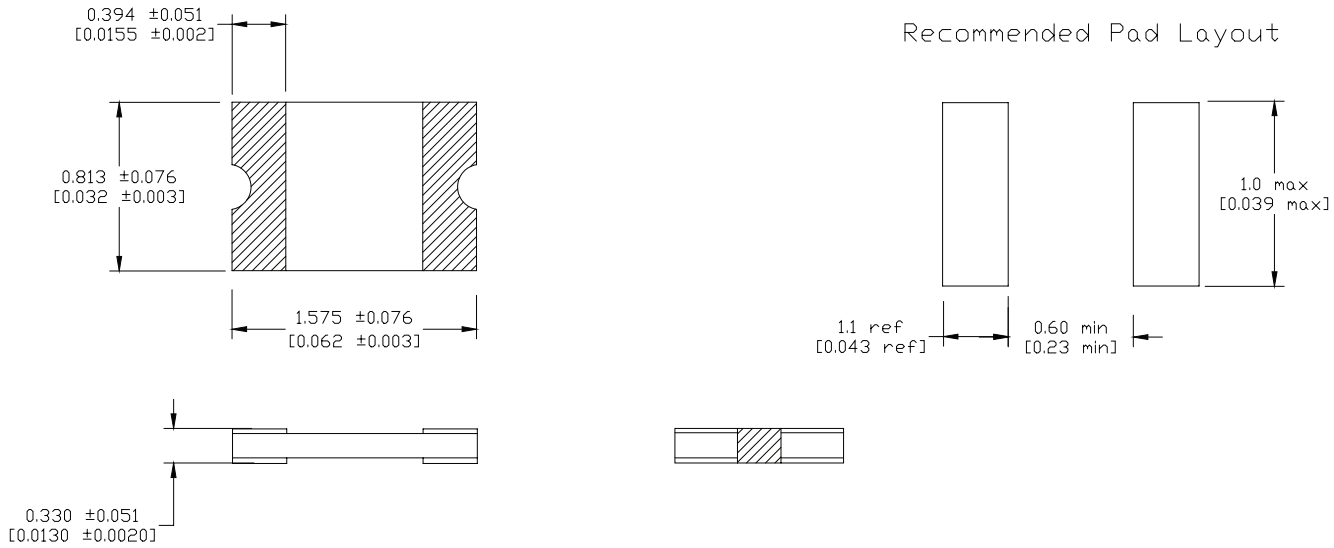
- 7 (Tape and reel, 5 000 parts per 7" diameter reel)

## Product specifications

| Part number[4] | Rated voltage ($V_{DC}$) maximum | Clamping voltage[1] (V) typical | Trigger voltage[2] (V) typical | Capacitance @ 1 MHz (pF) typical | Capacitance @ 1 MHz (pF) maximum | Attenuation change (0–6 GHz) (dB) typical | Leakage current @ 12 $V_{DC}$ (nA) typical | ESD capability IEC61000-4-2 Direct discharge (kV) typical | ESD capability IEC61000-4-2 Air discharge (kV) typical | ESD pulse withstand[3] typical |
|---|---|---|---|---|---|---|---|---|---|---|
| 0603ESDA-MLP | 30 | 35 | 300 | 0.05 | 0.15 | -0.2 | <0.1 | 8 | 15 | >1000 |

1. Clamping voltage: Per IEC61000-4-2, Level 4 waveform (8 kV direct 30 A) measured 30 ns after initial pulse.
2. Trigger voltage: Trigger measurement made using Transmission Line Pulse (TLP) method.
3. Minor shifting in characteristics may be observed over multiple ESD pulses at very rapid rate.
4. Part Number Definition: 0603ESDA-MLP
   0603ESDA= Product code and size
   -MLP= Form designation

## Dimensions—mm [in]




## Design considerations

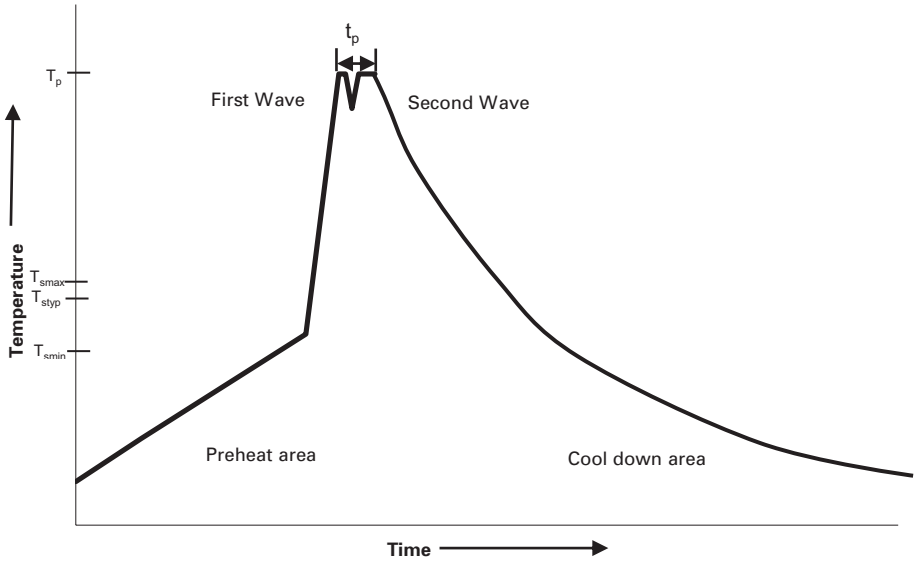
The location in the circuit for the 0603ESDA-MLP has to be carefully determined. For better performance, the device should be placed as close to the signal input as possible and ahead of any other component. Due to the high current associated with an ESD event, it is recommended to use a "0-stub" pad design (pad directly on the signal/data line and second pad directly on common ground).

## Environmental data

| |
|---|
| Operating temperature: - 55 °C to +125 °C |
| Storage temperature (component): - 55 °C to +125 °C |
| Load humidity: 12 VDC per EIA/IS- 722 +85 °C, 85% relative humidity for 1 000 hours |
| Thermal shock: 10 cycles, - 55 °C to +125 °C, 30 minute dwell time |
| Moisture resistance: MIL-STD-202G, method 106G, 10 cycles |
| Mechanical shock: EIA/IS- 722 paragraph 4.9 |
| Mechanical vibration: EIA/IS- 722 paragraph 4.10 |
| Resistance to solvent: EIA/IS- 722 paragraph 4.11 |

### 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 |
| $\Delta$ 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<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 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

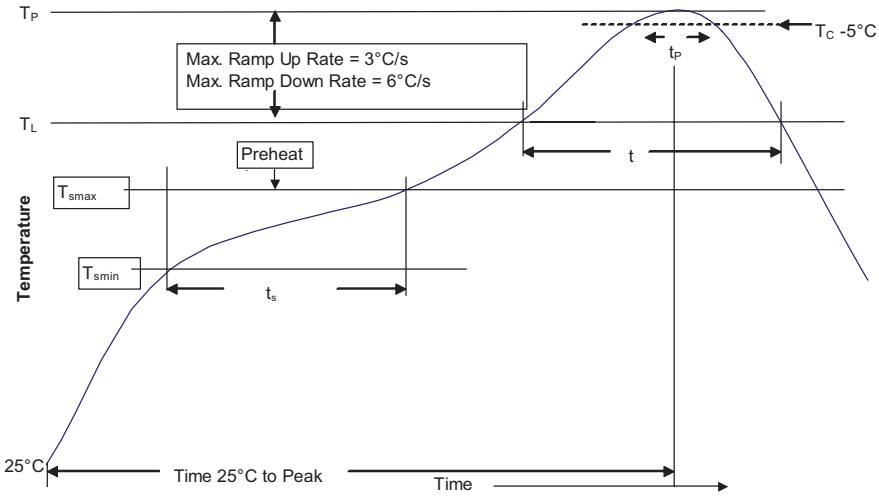



**Table 1 - Standard SnPb Solder ($T_C$)**

| Package Thickness | Volume mm3 <350 | Volume mm3 ≥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 JDEC 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 ($T_L$)<br>Time at liquidous ($t_L$) | | 183°C<br>60-150 Seconds | 217°C<br>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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