

Single Line ESD Protection Diode Array

UM5075 SOD523 1.2×0.8

UM5079 DFN2/FBP2 1.0×0.6

General Description

The UM5075/5079 ESD protection diode is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. They feature large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for board level protection, such as fast response time, lower operating voltage, lower clamping voltage and no device degradation when compared to MLVs.

The UM5075/5079 ESD protection diode protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The UM5075 is available in SOD523 1.2×0.8mm² package and the UM5079 is available in DFN2/FBP2 1.0×0.6mm² (compatible with SOD882/SOD923) package, both with working voltage of 7 volt.

It gives designer the flexibility to protect one unidirectional line in applications where arrays are not practical. Additionally, it may be "sprinkled" around the board in applications where board space is at a premium. It may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

Applications

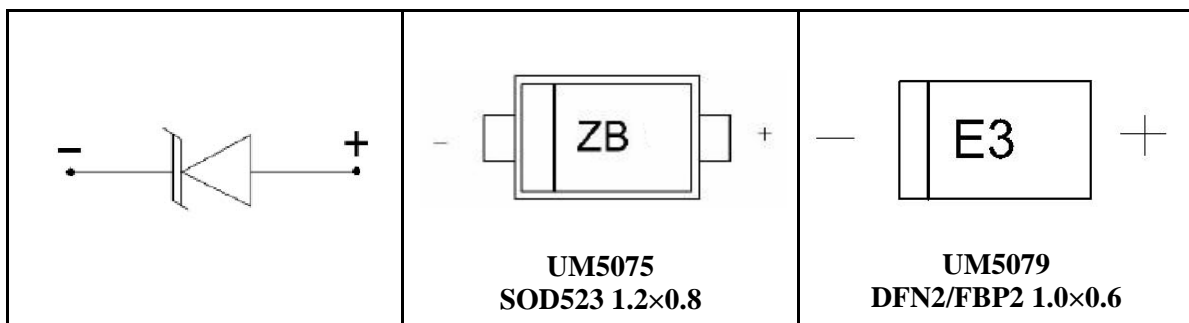
- Cell Phone Handsets and Accessories
- Personal Digital Assistants (PDA's)
- Notebooks, Desktops, and Servers
- Portable Instrumentation
- Cordless Phones
- Digital Cameras
- Peripherals
- MP3 Players

Features

- Transient protection for data lines to IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- Small package for use in portable electronics
- Suitable replacement for MLV's in ESD protection applications
- Protect one I/O or power line
- Low clamping voltage
- Stand off voltage: 7V
- Low leakage current
- Solid-state silicon-avalanche technology

Pin Configurations

Top View



Ordering Information

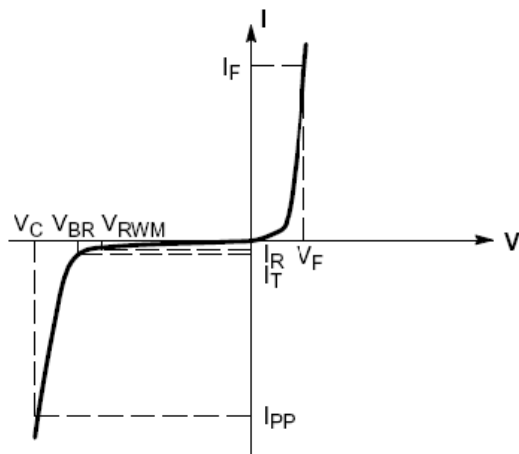
| Part Number | Working Voltage | Packaging Type | Channel | Marking Code | Shipping Qty |
|-------------|-----------------|-------------------------------|---------|--------------|--------------------|
| UM5075 | 7.0V | SOD523 1.2×0.8mm ² | 1 | ZB | 3000pcs/7Inch Reel |
| UM5079 | | DFN2 1.0×0.6mm ² | | E3 | 5000pcs/7Inch Reel |
| UM5079 | | FBP2 1.0×0.6mm ² | | E3 | |

Absolute Maximum Ratings

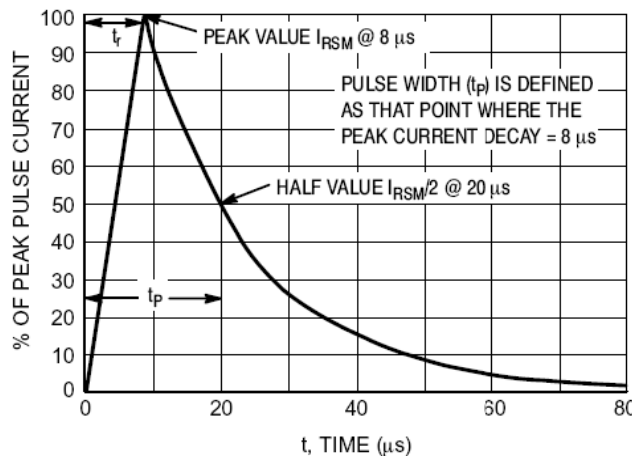
| Rating | Symbol | Value | Units |
|---------------------------------------|------------------|---------------|-------|
| Peak Pulse Power (tp = 8/20μs) | P _{PK} | 200 | Watts |
| Maximum Peak Pulse Current (t=8/20μs) | I _{PP} | 12 | Amps |
| Lead Soldering Temperature | T _L | 260 (10 sec.) | °C |
| Operating Temperature | T _J | -55 to +125 | °C |
| Storage Temperature | T _{STG} | -55 to +150 | °C |

Symbol Definition

| Parameter | Symbol |
|--|------------------|
| Maximum Reverse Peak Pulse Current | I _{PP} |
| Clamping Voltage @ I _{PP} | V _C |
| Working Peak Reverse Voltage | V _{RWM} |
| Maximum Reverse Leakage Current @ V _{RWM} | I _R |
| Breakdown Voltage @ I _t | V _{BR} |
| Test Current | I _t |
| Forward Current | I _F |
| Forward Voltage @ I _F | V _F |
| Peak Power Dissipation | P _{PK} |
| Max. Capacitance @ V _R = 0V, f = 1MHz | C |



Uni-Directional TVS



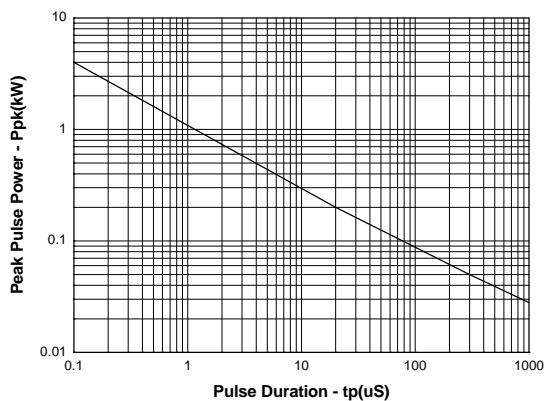
Electrical Characteristics

(T=25°C, Device for 7.0V Reverse Stand-off Voltage)

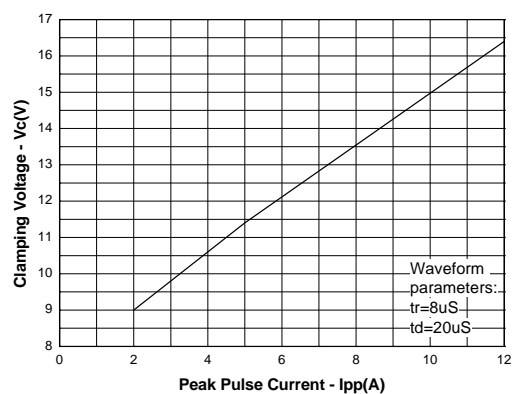
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------|-----------|---------------------------------|-----|-------|------|---------|
| Reverse Stand-Off Voltage | V_{RWM} | | | | 7 | V |
| Reverse Breakdown Voltage | V_{BR} | $I_t = 1mA$ | 7.3 | 7.6 | 8.0 | V |
| Reverse Leakage Current | I_R | $V_{RWM} = 7V, T=25^\circ C$ | | 0.005 | 1 | μA |
| Clamping Voltage | V_C | $I_{PP} = 5A, t_p = 8/20\mu S$ | | | 11.4 | V |
| | | $I_{PP} = 12A, t_p = 8/20\mu S$ | | | 16.4 | |
| Forward Voltage | V_F | $I_F = 10mA$ | | 0.8 | | V |
| Junction Capacitance | C_J | $V_R = 0V, f = 1MHz$ | | 40 | 50 | pF |
| Junction Capacitance | C_J | $V_R = 2.5V, f = 1MHz$ | | 30 | 40 | pF |

Typical Operating Characteristics

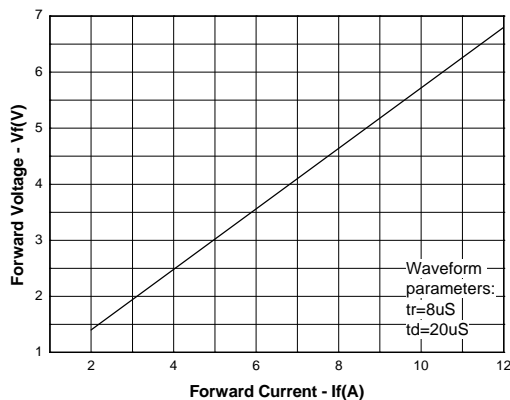
Non-Repetitive Peak Pulse Power vs. Pulse Time



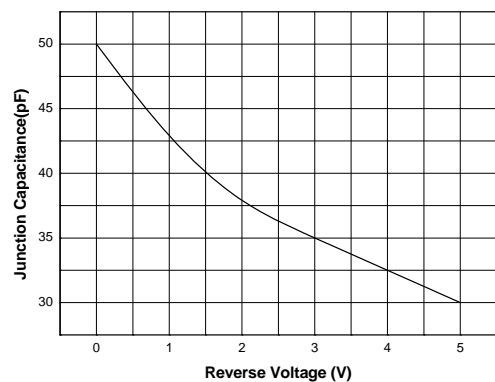
Clamping Voltage vs. Peak Pulse Current



Forward Voltage vs. Forward Current



Junction Capacitance vs. Reverse Voltage



Applications Information

Device Connection Options

UM5075/5079 ESD protection diode is designed to protect one data, I/O, or power supply line. The device is unidirectional and may be used on lines where the signal polarity is above ground. The cathode band should be placed towards the line that is to be protected.

Circuit Board Layout Recommendations for Suppression of ESD

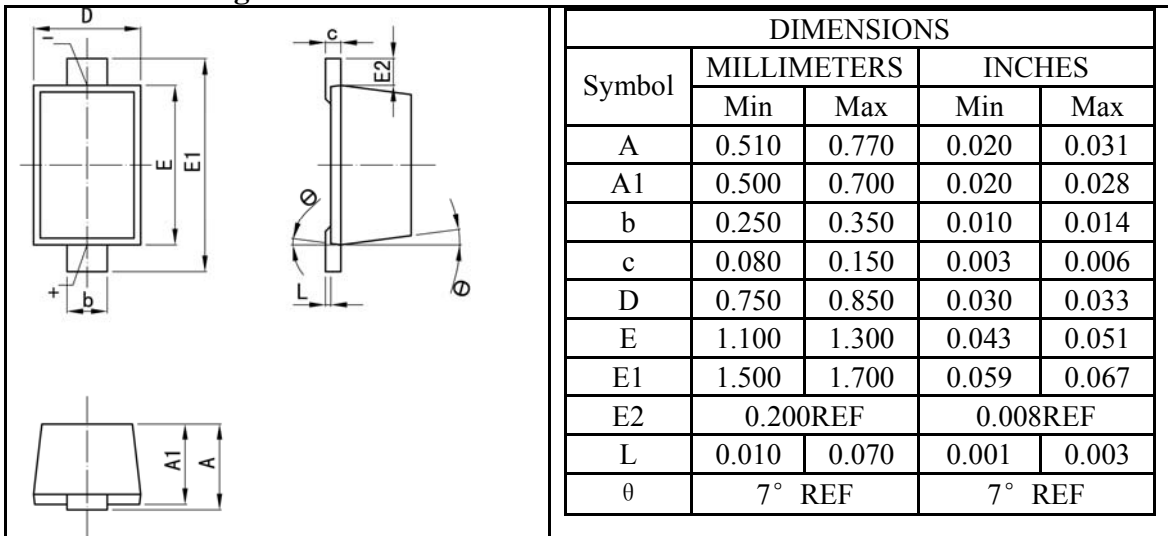
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

1. Place the TVS near the input terminals or connectors to restrict transient coupling.
2. Minimize the path length between the TVS and the protected line.
3. Minimize all conductive loops including power and ground loops.
4. The ESD transient return path to ground should be kept as short as possible.
5. Never run critical signals near board edges.
6. Use ground planes whenever possible. For multilayer printed-circuit boards, use ground vias.
7. Keep parallel signal paths to a minimum.
8. Avoid running protection conductors in parallel with unprotected conductor.
9. Minimize all printed-circuit board conductive loops including power and ground loops.
10. Avoid using shared transient return paths to a common ground point.

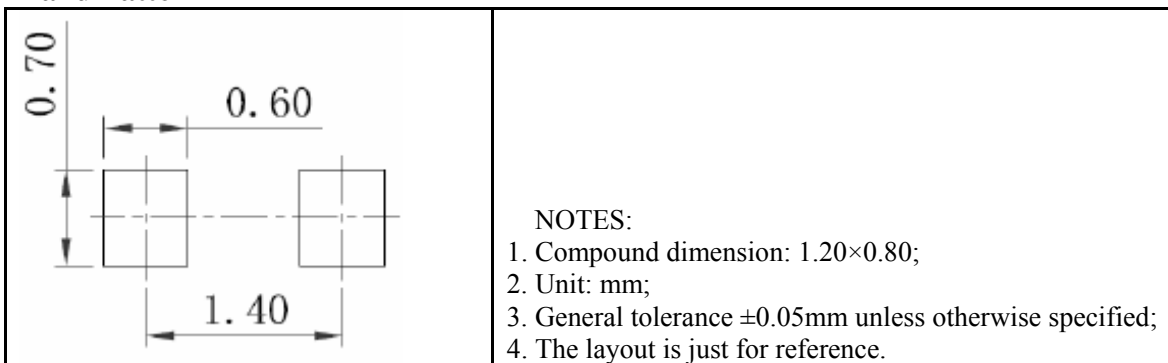
Package Information

UM5075 SOD523 1.2×0.8

Outline Drawing



Land Pattern



Tape and Reel Orientation

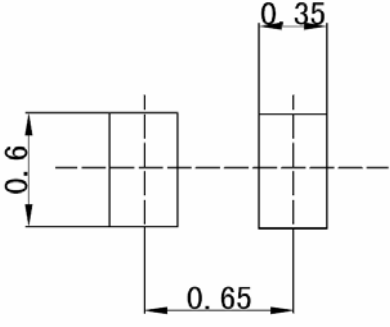


UM5079 DFN2 1.0×0.6

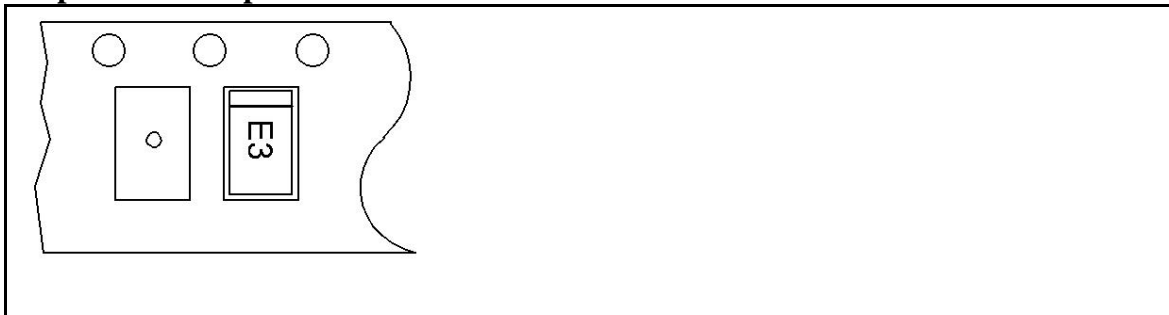
Outline Drawing

| DIMENSIONS | | | | |
|------------|-------------|-------|--------|-------|
| Symbol | MILLIMETERS | | INCHES | |
| | Min | Max | Min | Max |
| A | 0.470 | 0.530 | 0.019 | 0.021 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| b | 0.200 | 0.300 | 0.008 | 0.012 |
| D | 0.950 | 1.075 | 0.037 | 0.042 |
| E | 0.550 | 0.675 | 0.022 | 0.027 |
| E1 | 0.450 | 0.550 | 0.018 | 0.022 |
| e | 0.400 | | 0.016 | |
| R | 0.050 | 0.150 | 0.002 | 0.006 |

Land Pattern

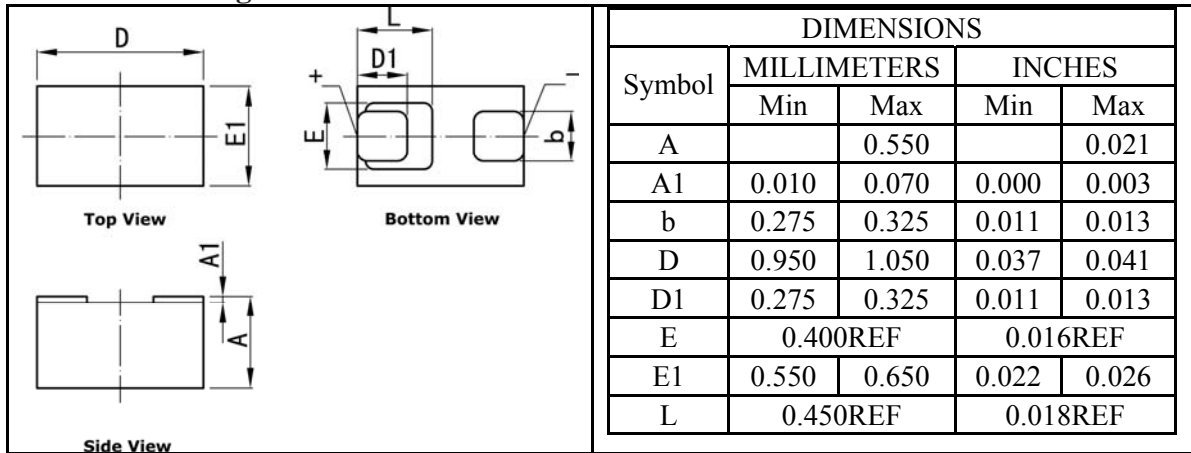
| | |
|---|--|
|  <p>The diagram shows a top-down view of the land pattern for the UM5079 DFN2 1.0x0.6 package. It features two rectangular pads. The left pad has a width of 0.6 mm. The right pad has a width of 0.35 mm. The distance between the centerlines of the two pads is 0.65 mm.</p> | <p>NOTES:</p> <ol style="list-style-type: none"> 1. Compound dimension: 1.00×0.60; 2. Unit: mm; 3. General tolerance ±0.025mm unless otherwise specified; 4. The layout is just for reference. |
|---|--|

Tape and Reel Specification

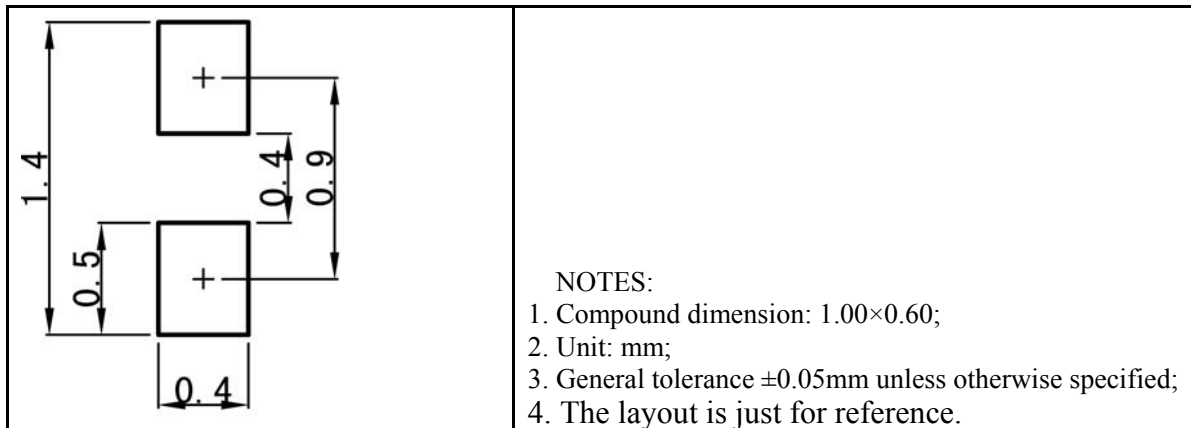


UM5079 FBP2 1.0×0.6

Outline Drawing



Land Pattern



Tape and Reel Specification



IMPORTANT NOTICE

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