

Low Capacitance Bidirectional Single Line TVS Protection Diode

UM5080T DFN2 1.0×0.6

General Description

The UM5080T TVS protection diode is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. The device features 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 UM5080T TVS protection diode protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The UM5080T is available in DFN2 1.0×0.6 (compatible with SOD923/SOD882/CSP 1.0×0.6) package with working voltages of 5 volt. It gives designer the flexibility to protect bidirectional single 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, ±30kV air, ±30kV contact discharge.

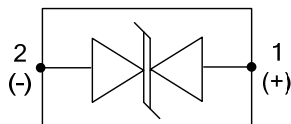
Applications

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

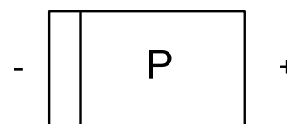
Features

- Transient Protection for Data Lines to IEC 61000-4-2 (ESD) ±30kV (Air), ±30kV (Contact)
- Small Package for Use in Portable Electronics
- Suitable Replacement for MLV's in ESD Protection Applications
- Bidirectional TVS Protection
- Stand-off Voltages: 5V
- Low Leakage Current
- Low Diode Capacitance
- Small Body Outline Dimensions: 1.0mm×0.6mm

Pin Configurations



Top View



**UM5080T
DFN2 1.0×0.6**

Ordering Information

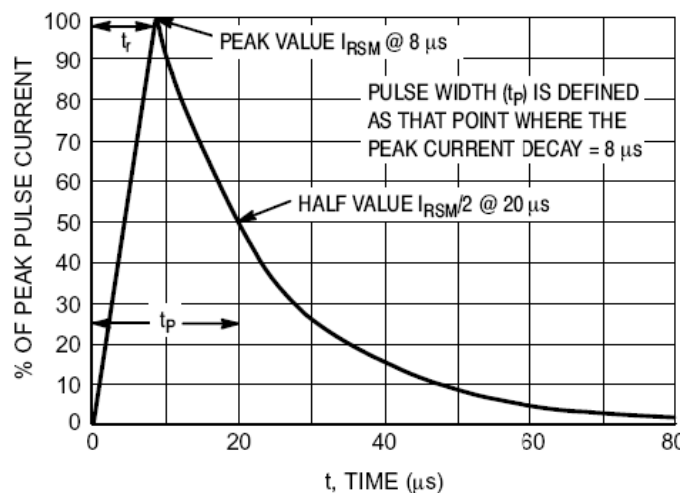
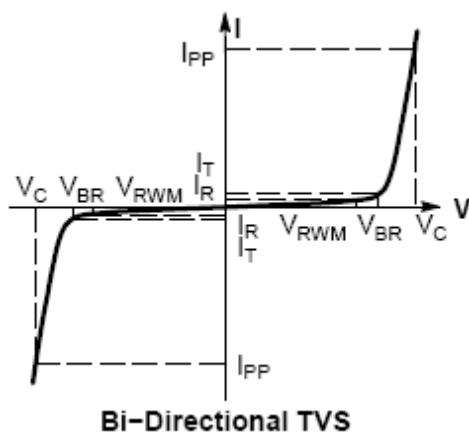
| Part Number | Working Voltage | Packaging Type | Channel | Marking Code | Shipping Qty |
|-------------|-----------------|----------------|---------|--------------|-----------------------------|
| UM5080T | 5.0V | DFN2 1.0×0.6 | 1 | P | 10000pcs/7 Inch Tape & Reel |

Absolute Maximum Ratings

| Rating | Symbol | Value | Unit |
|--|-----------|---------------|-------------|
| Peak Pulse Power ($t_p=8/20\mu s$) | P_{PK} | 140 | Watts |
| Maximum Peak Pulse Current ($t_p=8/20\mu s$) | I_{PP} | 11 | Amps |
| Lead Soldering Temperature | T_L | 260 (10 sec.) | $^{\circ}C$ |
| Operating Temperature | T_J | -55 to +125 | $^{\circ}C$ |
| Storage Temperature | T_{STG} | -55 to +150 | $^{\circ}C$ |

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 |
| Peak Power Dissipation | P_{PK} |
| Max. Capacitance @ $V_R=0V, f=1MHz$ | C_J |



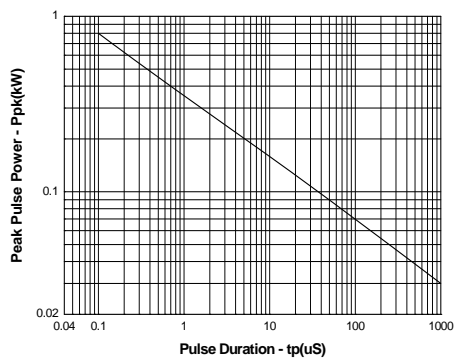
Electrical Characteristics

(T=25°C, Device for 5.0V Reverse Stand-off Voltage)

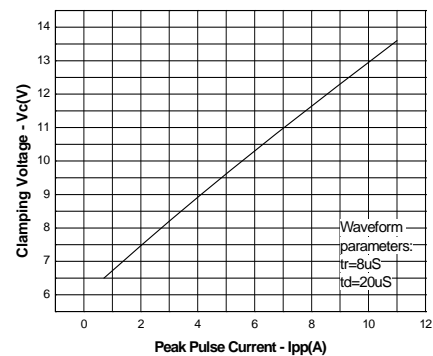
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------|-----------|-----------------------------|-----|-----|------|---------|
| Reverse Stand-Off Voltage | V_{RWM} | | | | 5 | V |
| Reverse Breakdown Voltage | V_{BR} | $I_T=1mA$ | 6.5 | | 8.5 | V |
| Reverse Leakage Current | I_R | $V_{RWM}=5V, T=25^\circ C$ | | | 1 | μA |
| Clamping Voltage | V_C | $I_{PP}=5A, t_p=8/20\mu s$ | | | 9.7 | V |
| | | $I_{PP}=11A, t_p=8/20\mu s$ | | | 13.6 | |
| Junction Capacitance | C_J | $V_R=0V, f=1MHz$ | | 45 | 59 | pF |
| Junction Capacitance | C_J | $V_R=2.5V, f=1MHz$ | | 35 | 45 | pF |

Typical Operating Characteristics

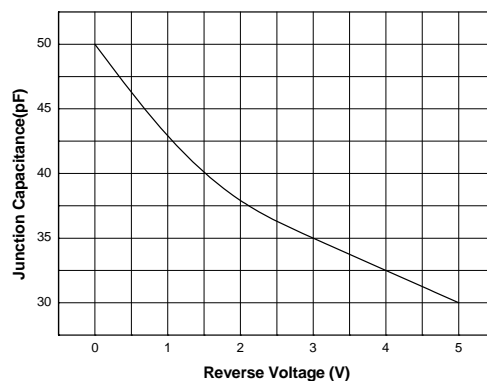
Non-Repetitive Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



Junction Capacitance vs. Reverse Voltage



Applications Information

Device Connection Options

UM5080T ESD protection diode is designed to protect one bidirectional data, I/O or power supply line from the damage caused by ESD and surge pulses. The device is bidirectional and may be used on lines where the signal polarity is above ground and below ground.

Circuit Board Layout Recommendations for Suppression of ESD

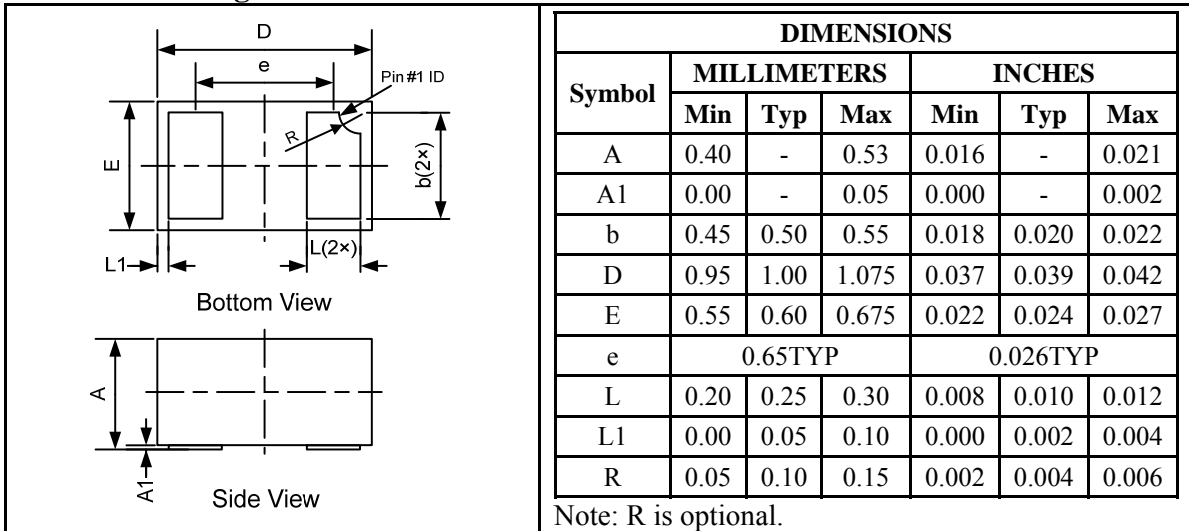
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

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. Avoid using shared transient return paths to a common ground point.

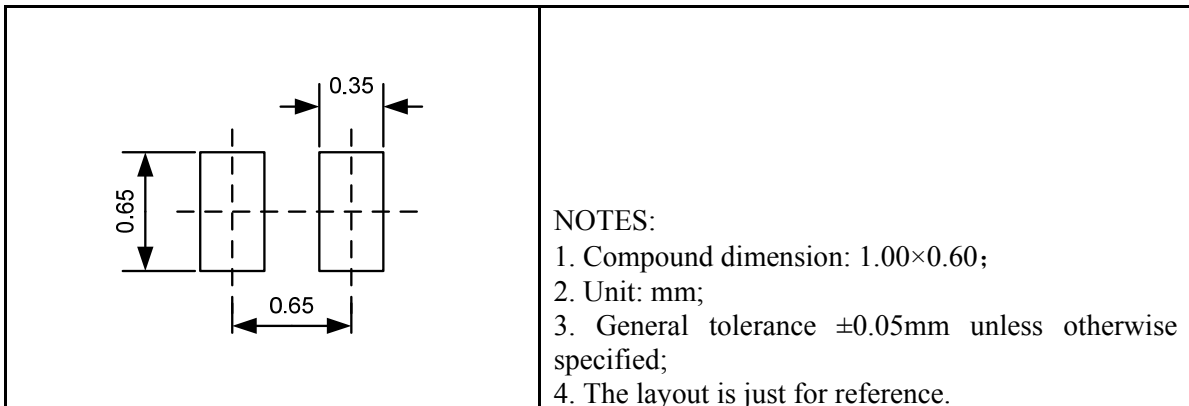
Package Information

UM5080T DFN2 1.0×0.6

Outline Drawing



Land Pattern



Tape and Reel Orientation



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