

Low Capacitance Bidirectional Single Line TVS Protection Diode

UM5080 DFN2 1.0×0.6

General Description

The UM5080 TVS 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 UM5080 TVS protection diode protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The UM5080 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, ±15kV air, ±15kV contact discharge.

Applications

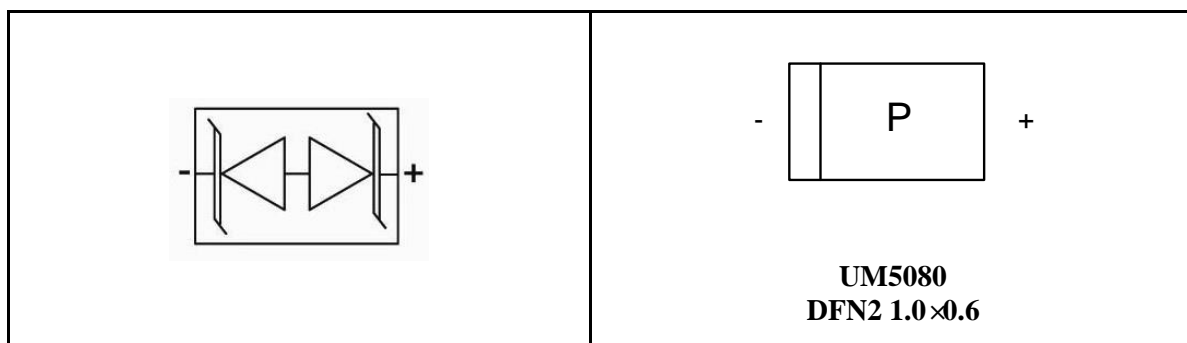
- Cell Phone Handsets and Accessories
- Personal Digital Assistants (PDA's)
- Notebooks, Desktops and Servers
- Portable Instrumentation
- Cordless Phones
- Smart Card
- Digital Cameras
- MP3 Players

Features

- Transient Protection for Data Lines to IEC 61000-4-2 (ESD) ±15kV (Air), ±15kV (Contact)
- IEC 61000-4-4 (EFT) 40A ($t_p=5/50ns$)
- 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



Ordering Information

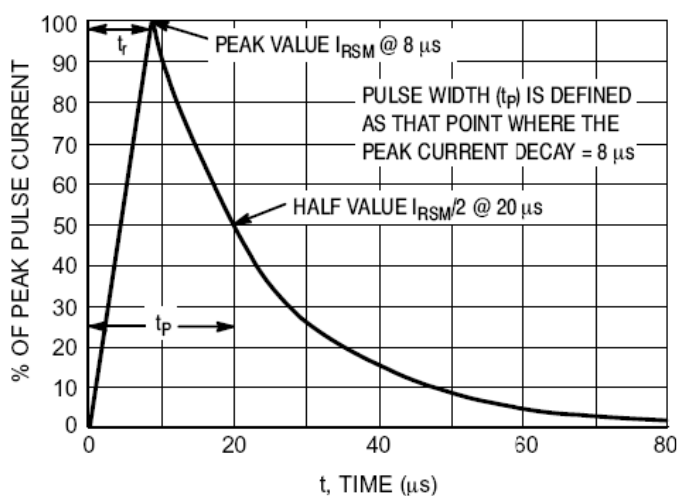
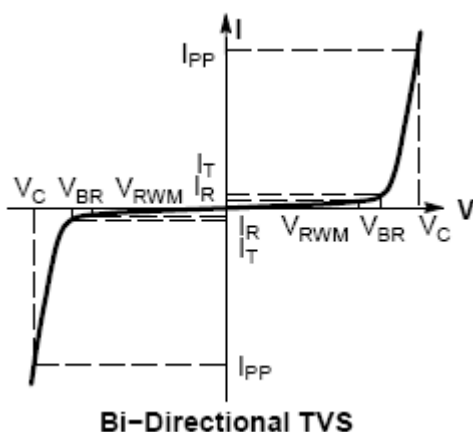
Part Number	Working Voltage	Packaging Type	Channel	Marking Code	Shipping Qty
UM5080	5.0V	DFN2 1.0×0.6	1	P	10000pcs/7 Inch Tape & Reel

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
Maximum Peak Pulse Current ($t_p=5/50ns$)	I_{PP}	40	Amps
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 15	kV
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	± 15	kV
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



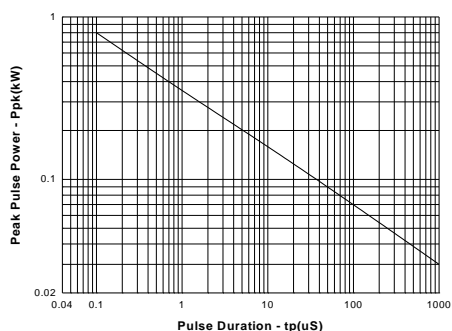
Electrical Characteristics

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

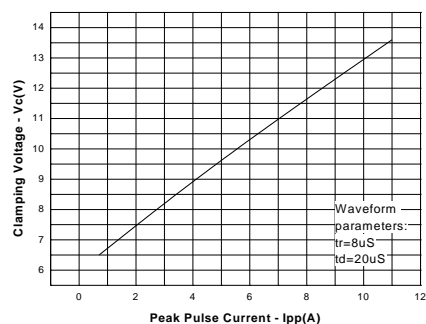
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	$I_T=1mA$	6.5		8.5	V
Reverse Leakage Current	I_R	$V_{RWM}=5V, T=25\text{ }^{\circ}C$			1	μA
Clamping Voltage	V_C	$I_{PP}=5A, t_p=8/20\mu s$			9.7	V
		$I_{PP}=11A, t_p=8/20\mu s$			13.6	
Junction Capacitance	C_J	$V_R=0V, f=1MHz$		25	40	pF
Junction Capacitance	C_J	$V_R=2.5V, f=1MHz$		20	30	pF
Reverse Dynamic Resistance	$R_{DYN,REV}$	$I_{PP} > 2A$		0.55		Ω
Forward Dynamic Resistance	$R_{DYN,FWD}$			0.35		

Typical Operating Characteristics

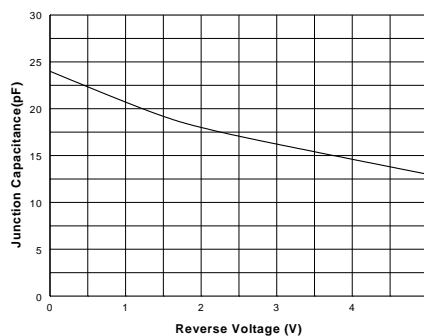
Non-Repetitive Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



Junction Capacitance vs. Reverse Voltage



Applications Information

Device Connection Options

UM5080 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

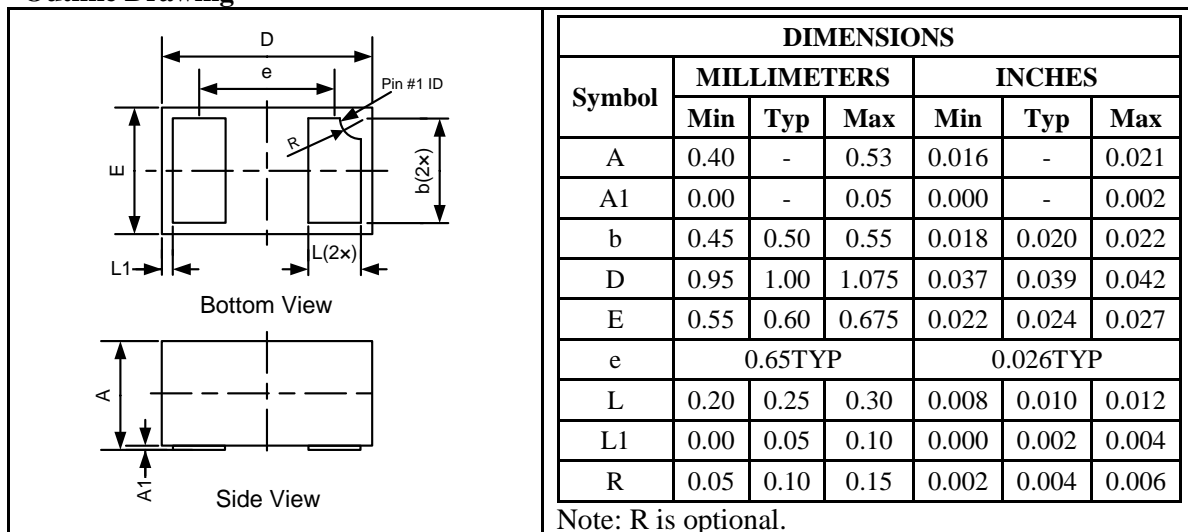
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

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.

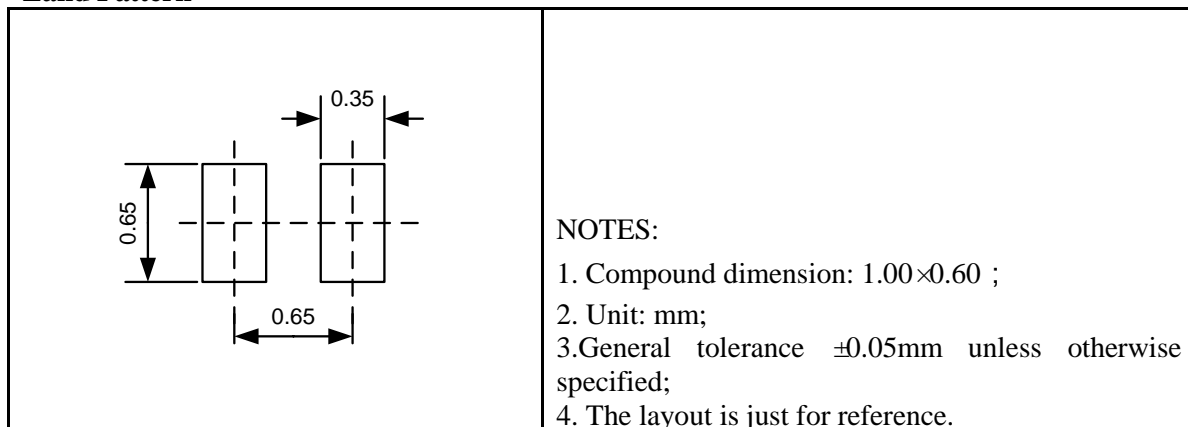
Package Information

UM5080 DFN2 1.0×0.6

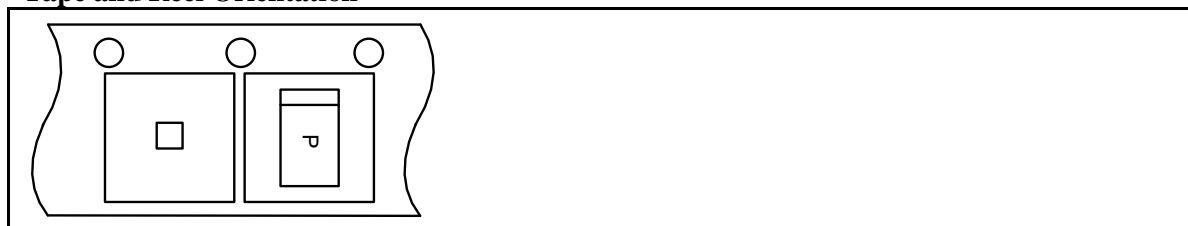
Outline Drawing



Land Pattern



Tape and Reel Orientation



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