

Dual Channel ESD Protection Device

UM1002 SOT23-6

General Description

The UM1002 is a low pass filter array with integrated TVS diodes for ESD protection. It is designed to provide bidirectional filtering of EMI/ RFI signals and electrostatic discharge (ESD) protection in portable electronic equipment. This state-of-the art device utilizes solid-state silicon-avalanche technology for superior clamping performance and DC electrical characteristics. They have been optimized for use on a USB port in cellular phone and other portable electronics.

The UM1002 effectively replaces 10 discrete components in a small SOT23-6 package to provide ESD protection and EMI filtering. This small package will protect and filter up to two lines. This small outline makes the device especially well suited for portable applications.

The TVS diodes are bi-directional for supporting bipolar signals without distortion. The TVS diodes provide effective suppression of ESD voltages in excess of 15kV (air discharge) and 8kV (contact discharge) per IEC61000-4-2, level 4. The device has very low insertion loss in the pass band (to approximately 10MHz) and high attenuation at frequencies ranging from 800MHz to 3GHz. Each line features two stages of TVS diode protection. They feature large cross-sectional area junctions for conducting high transient currents. They offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

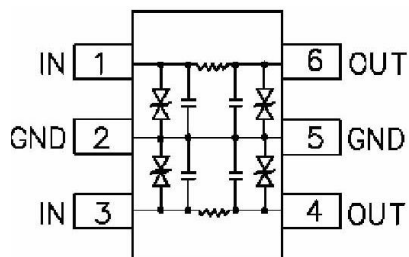
Applications

- Web-Pads & Handhelds
- Notebook
- Portable Instrumentation
- Industrial Interface
- Treadmill

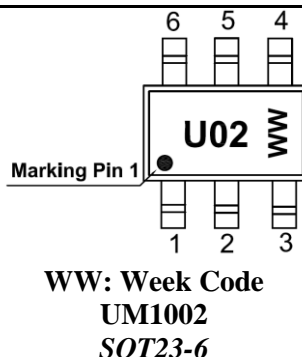
Features

- Transient Protection for Data Lines to IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (Air), $\pm 8\text{kV}$ (Contact)
- Bidirectional EMI/RFI Filter with Integrated ESD Protection
- Protects Two I/O Lines
- Working Voltage: 5V
- Low Leakage Current
- Low Operating and Clamping Voltages
- Solid-State Silicon-Avalanche Technology

Pin Configurations



Top View



Ordering Information

Part Number	Working Voltage	Packaging Type	Channel	Marking Code	Shipping Qty
UM1002	5.0V	SOT23-6	6	U02	3000pcs/7Inch Tape & Reel

Absolute Maximum Ratings

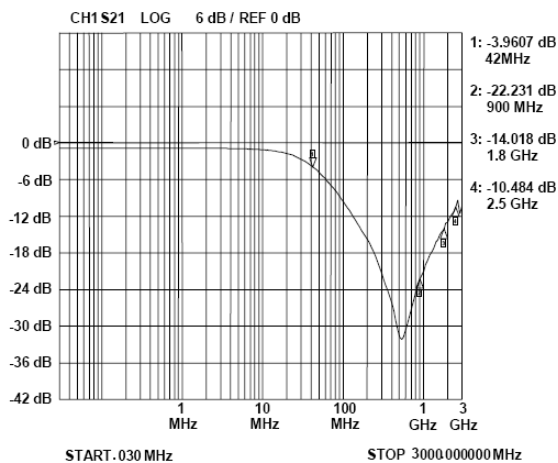
Rating	Symbol	Value	Unit
Steady-State Power	P_{SS}	100	mW
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +125	°C

Electrical Characteristics (T=25°C)

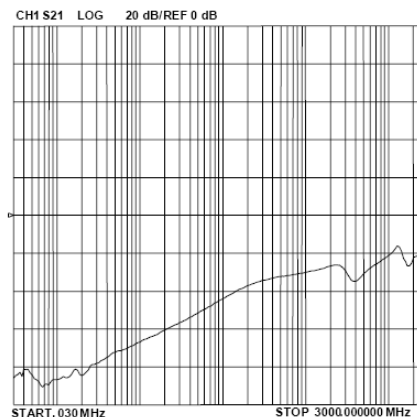
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	$I_T=1mA$	6			V
Reverse Leakage Current	I_R	$V_{RWM}=5V, T=25°C$			5	μA
Series Resistance	R	Each Line	0.8	1	1.5	Ohms
Total Capacitance	C_{TOT}	Any I/O to GND $V_R=0V, f=1MHz$			20	pF

Typical Operating Characteristics

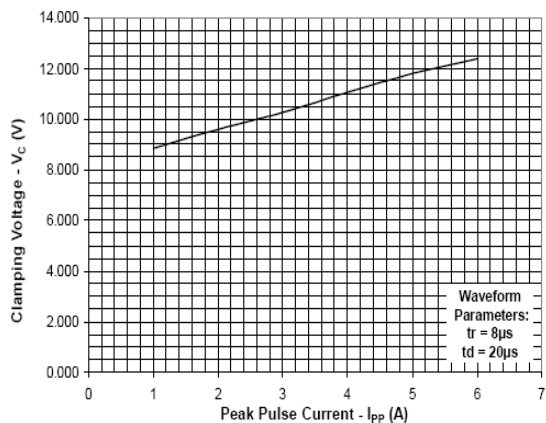
Typical Insertion Loss



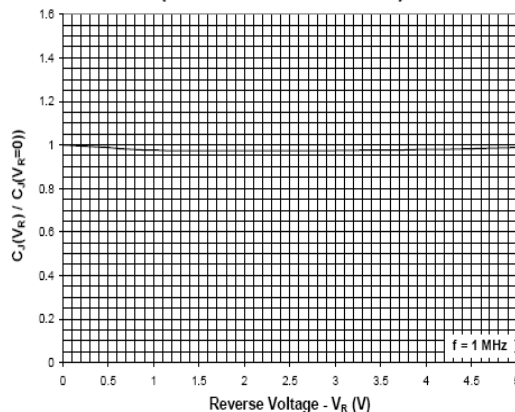
Analog Crosstalk



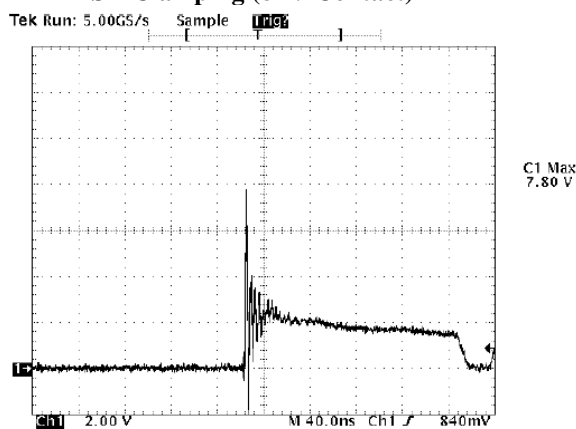
Forward Voltage vs. Peaking Pulse Current



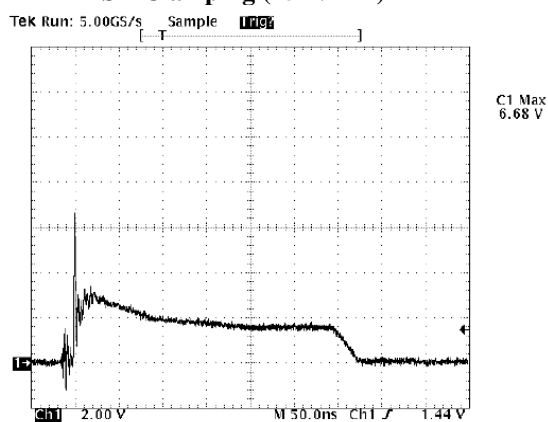
Junction Capacitance vs. Reverse Voltage



ESD Clamping (8kV Contact)



ESD Clamping (15kV Air)



Application Information

Device Connection for Protection of Quad Data Lines

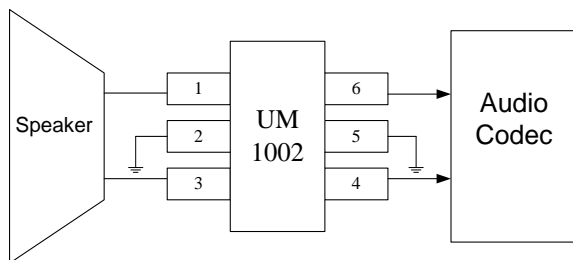
The UM1002 provides EMI filtering and ESD protection in a small SOT23-6 package for dual line data port applications. The layout of the device is designed such that the data lines can be routed through the device. The first line pair enters at pin 1 and exits at pin 6. The second line pair enters at pin 3 and exits at pin 4. The device is symmetrical so the above connections may be reversed.

Circuit Board Layout Recommendations for Suppression of ESD

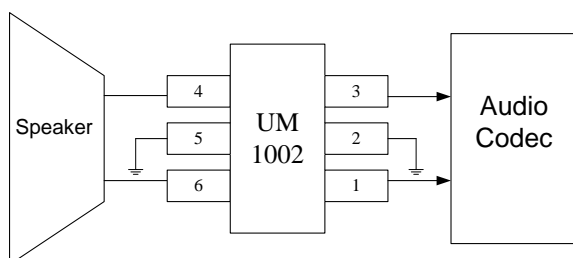
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

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.

Layout Example



Pin	Identification
1	Line 1 In (From Speaker)
6	Line 1 Out (To Audio Circuit)
3	Line 2 In (From Speaker)
4	Line 2 Out (To Audio Circuit)
2, 5	Ground

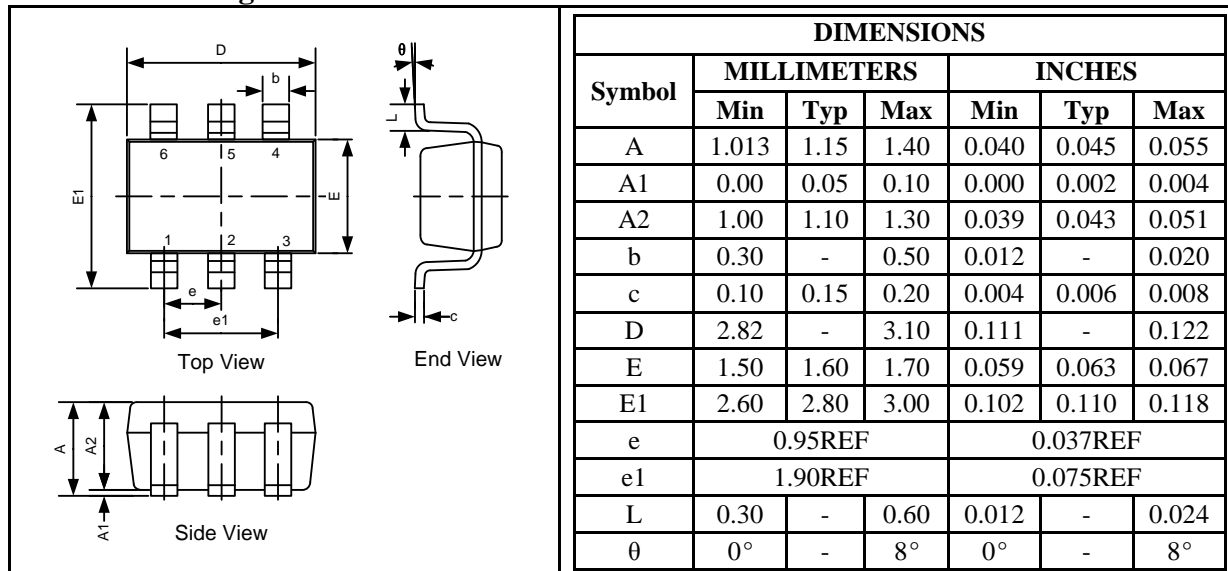


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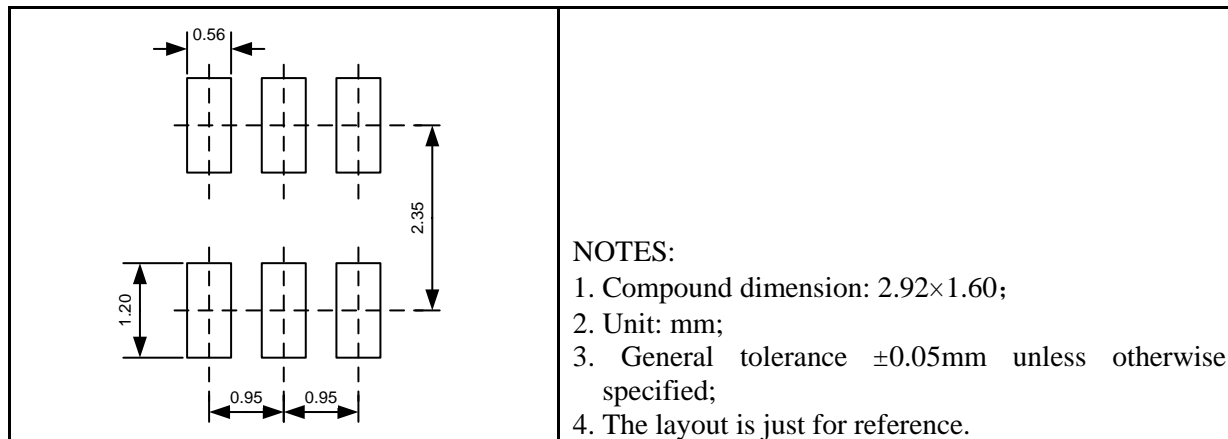
Package Information

UM1002 SOT23-6

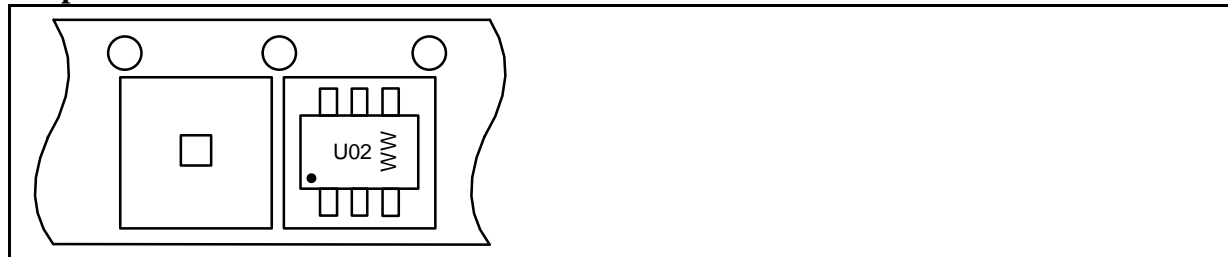
Outline Drawing



Land Pattern



Tape and Reel Orientation



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