

SOT-23, LOW CAPACITANCE, TVS DIODE**PRODUCT DESCRIPTION**

The UMD05L is Low Capacitance Transient Voltage Suppressor for High Speed Data Interface that designed to protect sensitive electronics from damage or latch-up due to ESD, lightning, and other voltage induced transient events.

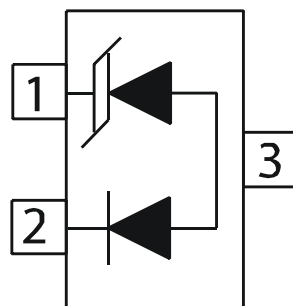
All pins are rated to withstand 20kv ESD pulses using the IEC 61000-4-2 contact discharge method, which can meet the requirement of Level 4.

FEATURES

- ※ 500 Watts peak pulse power ($t_p=8/20\mu s$)
- ※ Low clamping voltage
- ※ Working voltages: 5V
- ※ ESD Protection > 40 kilovolts
- ※ Complies with
61000-4-2(ESD):Air-15kV, Contact-8kV
61000-4-4(EFT):40A-5/50ns
61000-4-5(Surge):24A, 8/20 μs
- ※ Low Capacitance-3pF

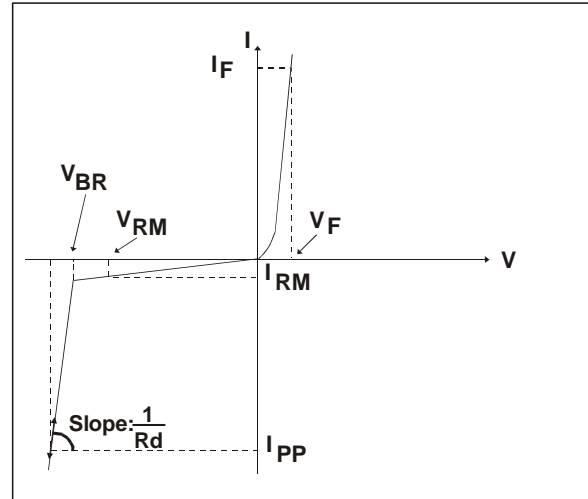
APPLICATIONS

- ※ Cellular Handsets and Accessories
- ※ Portable Electronics
- ※ FireWire
- ※ LAN / WAN equipment
- ※ High-Speed data lines

ELECTRICAL SCHEMATIC & PIN CONFIGURATION

SOT-23, LOW CAPACITANCE, TVS DIODE
ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$)

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
C	Capacitance
R_d	Dynamic resistance
V_F	Forward voltage drop


ABSOLUTE MAXIMUM RATING @ 25°C

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{pp}	500	Watts
Operating Temperature	T_J	-55 to +150	$^{\circ}C$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}C$

ELECTRICAL CHARACTERISTICS

UMD05L	Marking	05L				
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RM}				5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$	6			V
Reverse Leakage Current	I_{RM}	$V_{RM} = 5V, T=25^{\circ}C$			20	μA
Clamping Voltage	V_C	$I_{PP} = 1A, t_p = 8/20\mu s$			9.8	V
Clamping Voltage	V_C	$I_{PP} = 42A, t_p = 8/20\mu s$			13.5	V
Junction Capacitance	C_j	$V_R = 0V, f = 1MHz$			3	pF

SOT-23, LOW CAPACITANCE, TVS DIODE

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

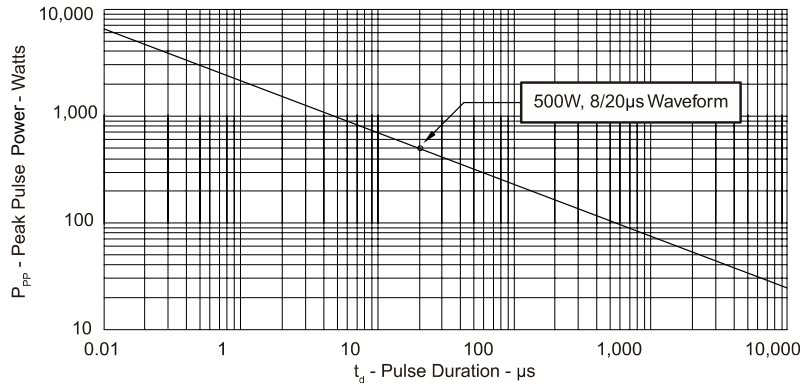


FIGURE 2
PULSE WAVE FORM

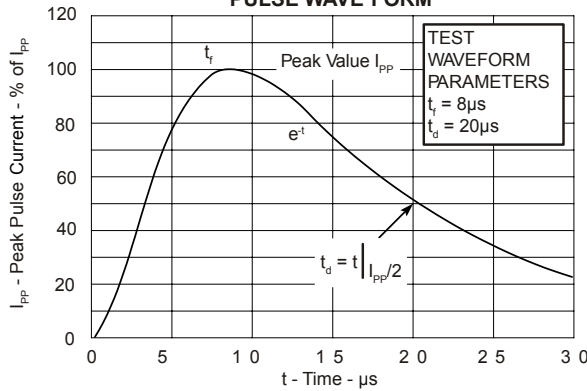
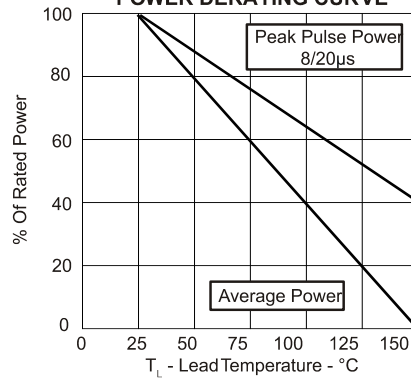


FIGURE 3
POWER DERATING CURVE



SOT-23, LOW CAPACITANCE, TVS DIODE

PACKAGE OUTLINE

PACKAGE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.04	0.1102	0.1197
B	1.20	1.40	0.0472	0.0551
C	0.89	1.11	0.0350	0.0440
D	0.37	0.50	0.0150	0.0200
G	1.78	2.04	0.0701	0.0807
H	0.013	0.100	0.0005	0.0040
J	0.085	0.177	0.0034	0.0070
K	0.45	0.60	0.0180	0.0236
L	0.89	1.02	0.0350	0.0401
S	2.10	2.50	0.0830	0.0984
V	0.45	0.60	0.0177	0.0236

MOUNTING PAD

NOTES

1. Dimensioning and tolerances per ANSI Y14.5M, 1985.
2. Controlling Dimension: Inches
3. Pin 3 is the cathode (Unidirectional Only).

ORDERING INFORMATION

Ordering Part Number	Package	T & P
UMD05L	SOT - 23	EIA - 481

TAPE & REEL SPECIFICATIONS

Ordering Part Number	Diode Size (in mm)	Qty Per Reel
UMD05L	2.92mm± 0.12 x 2.30 ± 0.2	3000 pcs/Reel

APPLICATION NOTE

The UMD05L is low capacitance TVS designed to protect I/O or data lines from the damaging effects of ESD or EFT. This product provides unidirectional & bidirectional protection, with a surge capability of 500 Watts P_{PP} per line for an 8/20µs waveform and ESD protection >40 kilovolts.

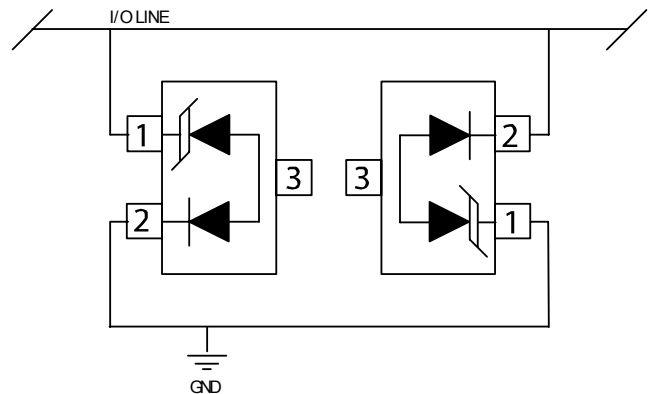
BIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 1)

Two UMD05L devices, when used in parallel, provide protection in a common-mode configuration as depicted in Figure 1

Circuit connectivity is as follows:

- I/O Line is connected to Device 1, Pin 1.
- I/O Line is connect to Device 2, Pin 2.
- Device 1, Pin 2 is connected to ground.
- Device 2, Pin 1 is connected to ground.
- Device 1 & 2, Pin 3 is not connected.

Figure 1 - Common-Mode I/O Port Protection



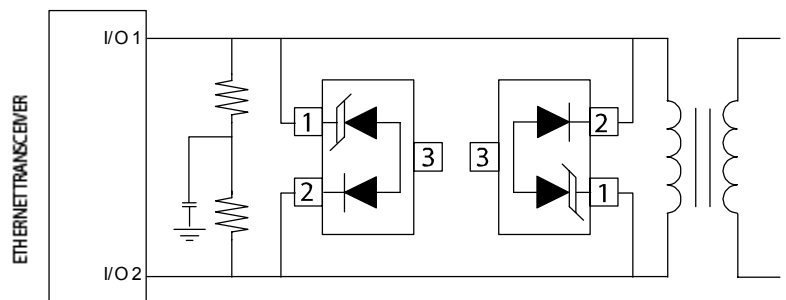
BIDIRECTIONAL DIFFERENTIAL-MODE CONFIGURATION (Figure 1)

In addition, two UMD05L devices, when used in parallel, provide protection in a differential-mode configuration for Ethernet applications as depicted in Figure 2.

Circuit connectivity is as follows:

- I/O Line 1 is connected to Device 1, Pin 1.
- I/O Line 1 is connect to Device 2, Pin 2.
- I/O Line 2 is connected to Device 1, Pin 1.
- I/O Line 2 is connect to Device 2, Pin 2.
- Device 1 & 2, Pin 3 is not connected.

Figure 2 - Differential-Mode Ethernet Protection



CIRCUIT BOARD LAYOUT RECOMMENDATIONS

Circuit board layout is critical for Electromagnetic Compatibility (EMC) protection. The following guidelines are recommended:

- The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- The path length between the TVS device and the protected line should be minimized.
- All conductive loops including power and ground loops should be minimized.
- The transient current return path to ground should be kept as short as possible to reduce parasitic inductance.
- Ground planes should be used when ever possible. For multilayer PCBs, use ground vias.