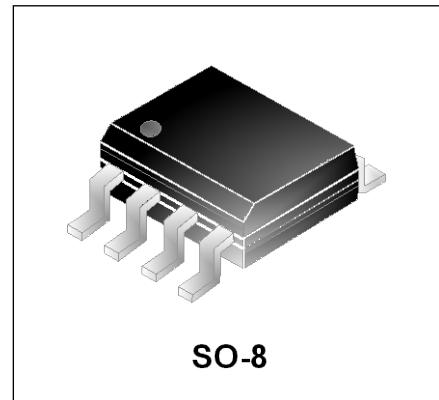


WS05-4RDA

Transient Voltage Suppressor

Features

- Array of surge rated diodes with internal TVS diode
- Protects four I/O lines
- Low operating and clamping voltage
- Low capacitance(<15pF) for high-speed interfaces
- Solid-state technology



IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) $\pm 15\text{kV}$ (air), $\pm 8\text{kV}$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 24A (8/20 μs)

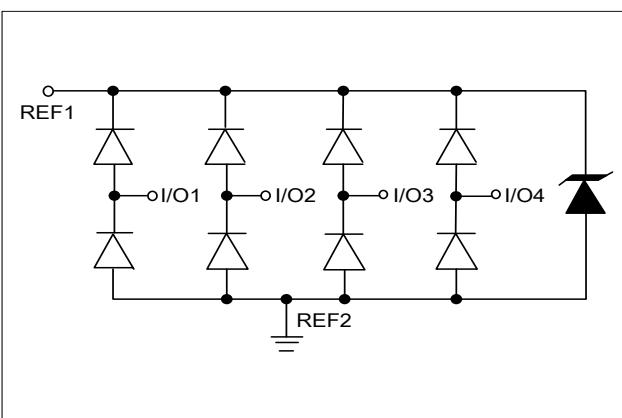
Mechanical Characteristics

- JEDEC SOIC-8 package
- Molding compound flammability rating: UL 94V-0
- Marking : Making Code, logo, date code
- Packaging : Tape and Reel per EIA 481
- Lead Finish: SnPb or Matte Sn
- RoHS/WEEE Compliant

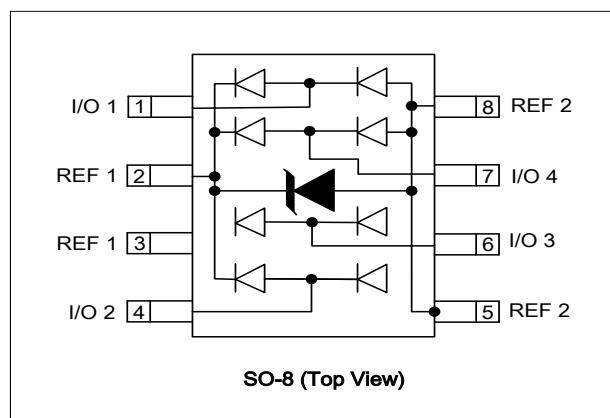
Applications

- USB Power and Data Line Protection
- T1/E1 secondary IC Side Protection
- T3/E3 secondary IC Side Protection
- HDSL, SDSL secondary IC Side Protection
- Video Line Protection
- Microcontroller Input Protection
- Base stations
- I²C Bus Protection

Circuit diagram



Schematic and PIN Configuration

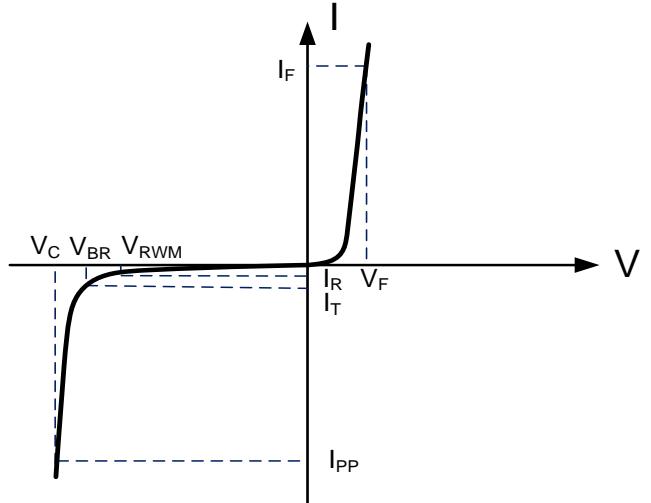


Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p=8/20\mu s$)	P_{PP}	500	Watts
Peak Forward Voltage ($I_F=1A$, $t_p=8/20\mu s$)	V_{FP}	1.5	V
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

Electrical Parameters ($T=25^\circ C$)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ I_F

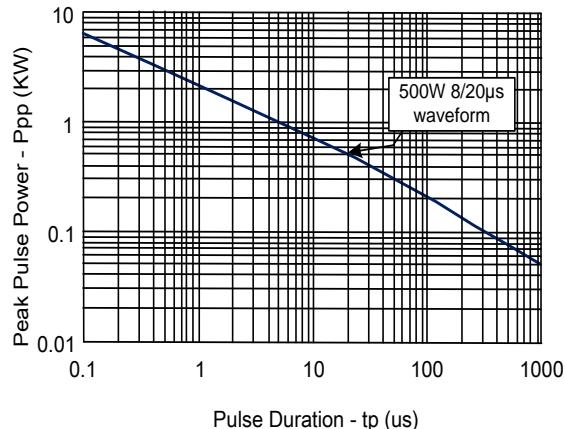


Electrical Characteristics

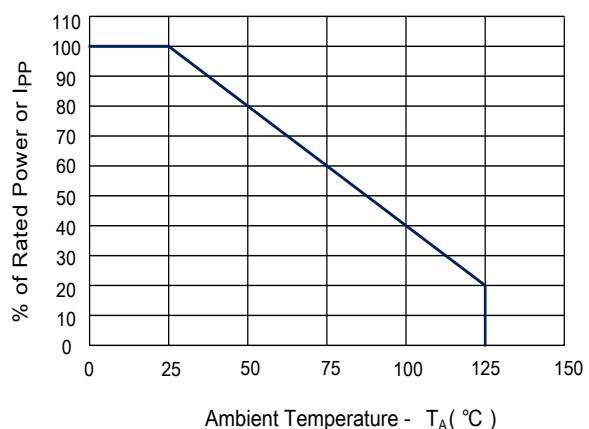
WS05-4RDA						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$	6			V
Reverse Leakage Current	I_R	$V_{RWM}=5V, T=25^\circ C$			8	μA
Clamping Voltage	V_C	$I_{PP}=1A, t_p=8/20\mu s$			9.8	V
Clamping Voltage	V_C	$I_{PP}=10A, t_p=8/20\mu s$			12	V
Clamping Voltage	V_C	$I_{PP}=25A, t_p=8/20\mu s$			20	V
Peak Pulse Current	I_{PP}	$t_p=8/20\mu s$			25	A
Junction Capacitance	C_j	Between I/O pins and Ground, $V_R=0V$, $f=1MHz$		8	15	pF
		Between I/O pins $V_R=0V$, $f=1MHz$		4		pF

Typical Characteristics

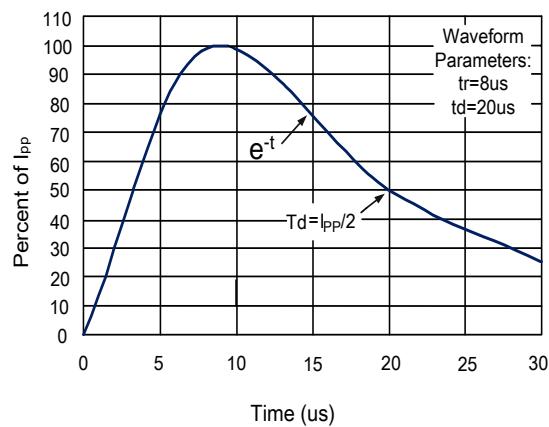
Non-Repetitive Peak Pulse Power vs. Pulse Time



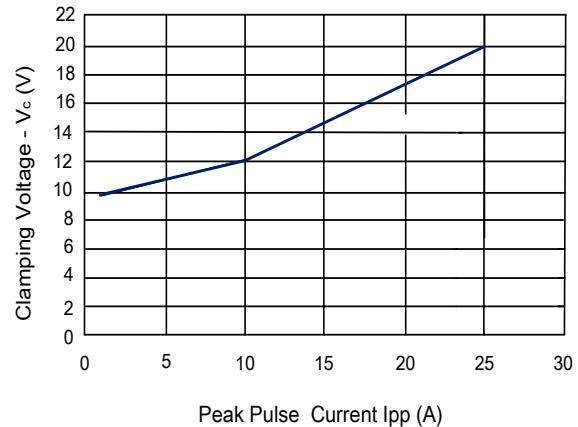
Power Derating curve



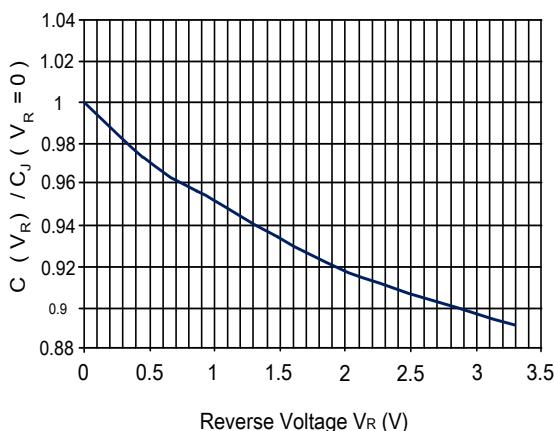
Pulse Waveform



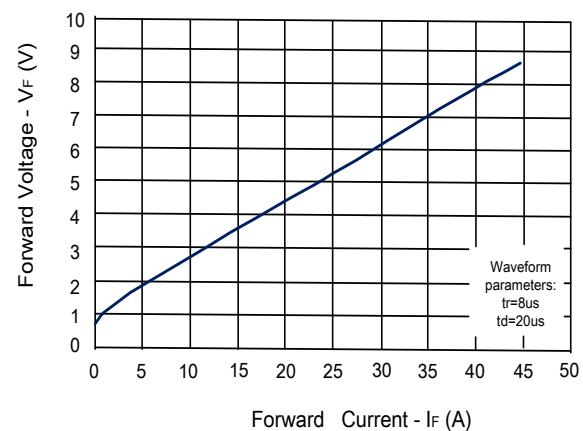
Clamping Voltage vs. Peak Pulse Current



Variation of Capacitance vs. Reverse Voltage



Forward Voltage vs. Forward Current



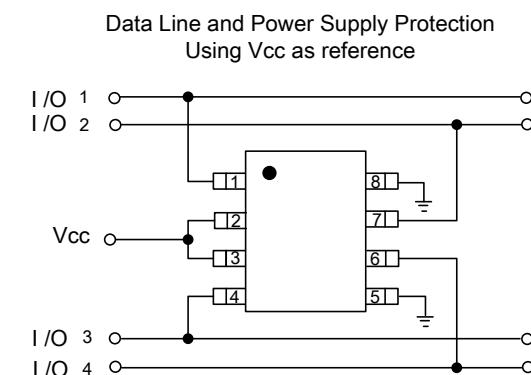
Application Information

Device Connection Options for Protection of four High-Speed Data Lines

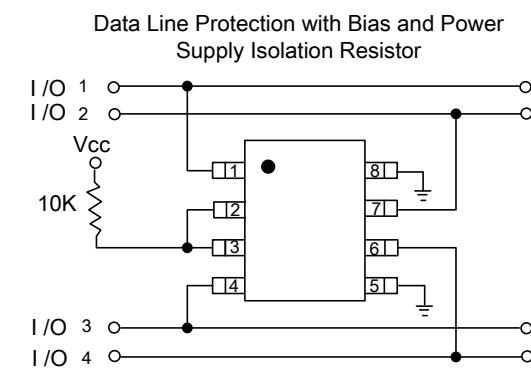
The WS05-4RDA TVS is designed to protect four data lines from transient over voltages by clamping them to a fixed reference. When the voltage on the protected line exceeds the reference voltage (plus diode V_F) the steering diodes are forward biased, conducting the transient current away from the sensitive circuitry. Data lines are connected at pins 1, 4, 6 and 7. The negative reference is connected at pins 5 and 8. These pins should be connected directly to a ground plane on the board for best results. The path length is kept as short as possible to minimize parasitic inductance.

The positive reference is connected at pins 2 and 3. The options for connecting the positive reference are as follows:

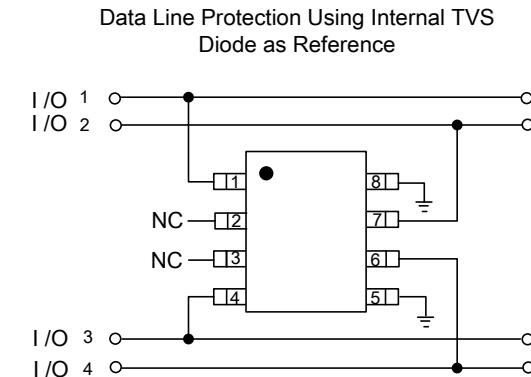
1. To protect data lines and the power line, connect pins 2 & 3 directly to the positive supply rail (V_{CC}). In this configuration the data lines are referenced to the supply voltage. The internal TVS diode prevents over-voltage on the supply rail.



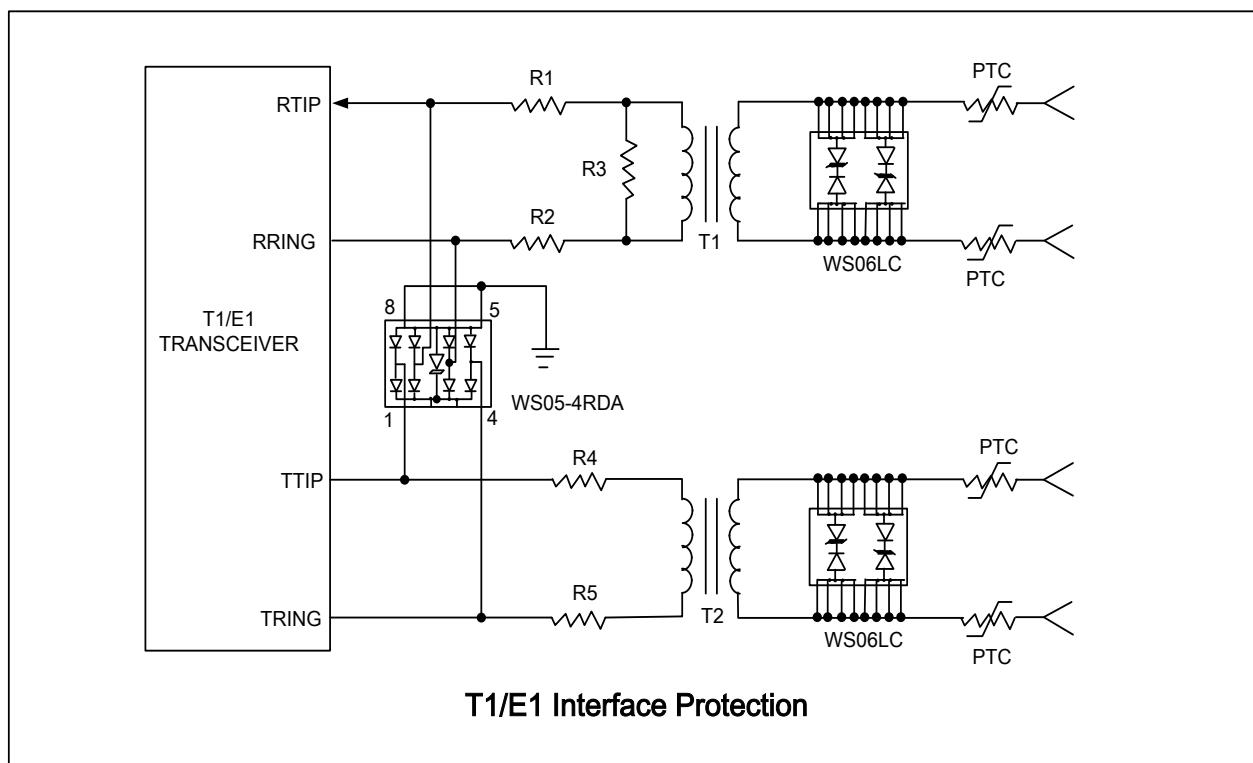
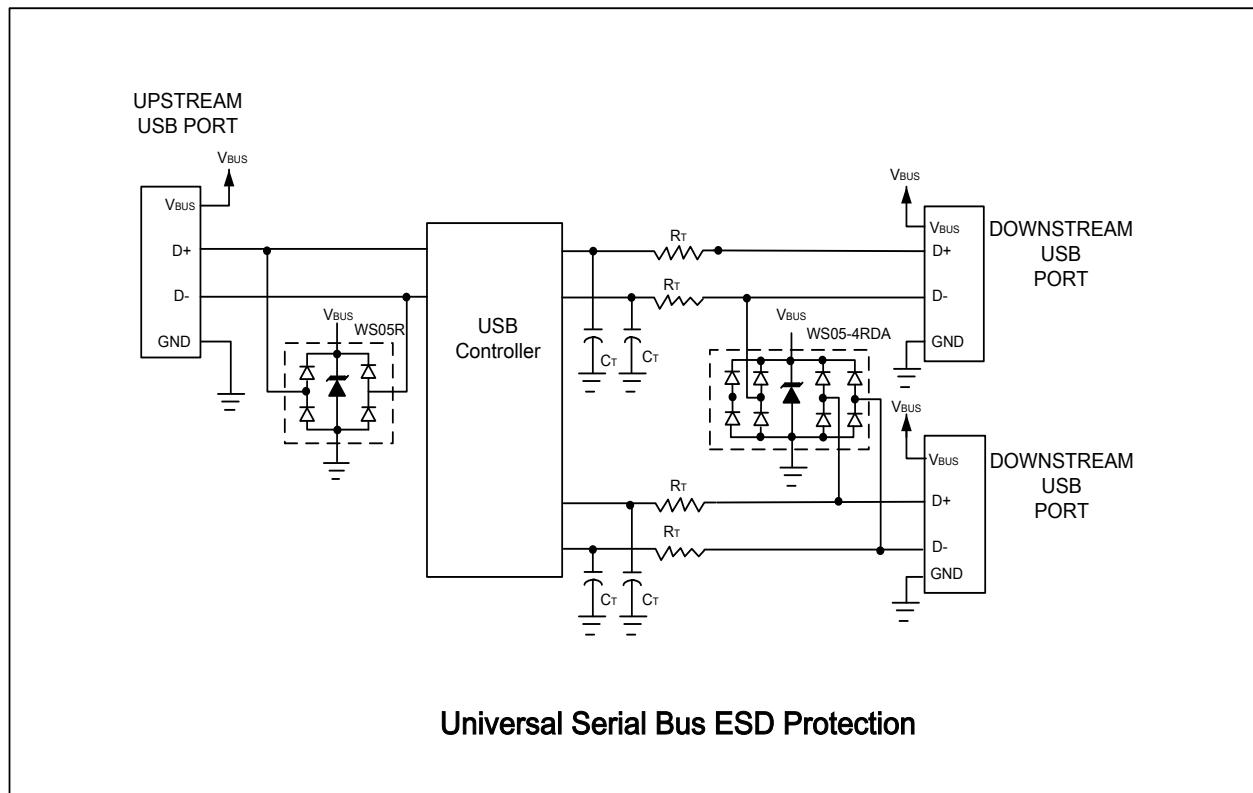
2. The WS05-4RDA can be isolated from the power supply by adding a series resistor between pins 2 and 3 and V_{CC} . A value of 10kΩ is recommended. The internal TVS and steering diodes remain biased, providing the advantage of lower capacitance.



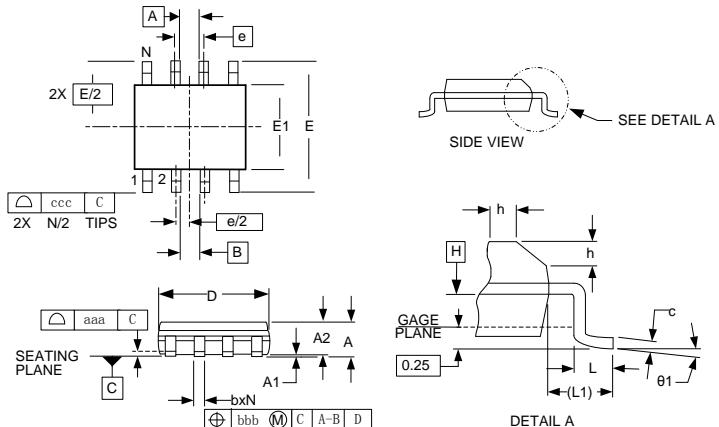
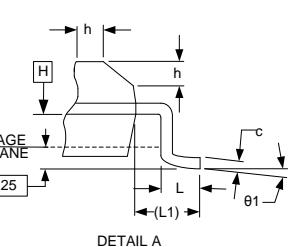
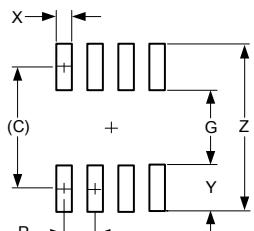
3. In applications where no positive supply reference is available, or complete supply isolation is desired, the internal TVS may be used as the reference. In this case, pins 2 and 3 are not connected. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working voltage of the TVS (plus one diode drop).



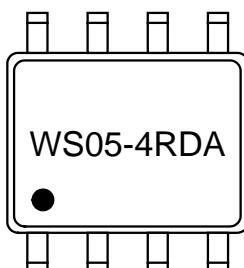
Typical Applications



Outline Drawing – SO-8

PACKAGE OUTLINE									
				SEE DETAIL A					
				DETAIL A					
NOTES: <ul style="list-style-type: none"> 1. Controlling Dimensions Are In Millimeters (Angles In Degrees). 2. Datums A- And B- To Be Determined At Datum Plane H. 3. Dimensions "E1" And "D" Do Not Include Mold Flash, Protrusions Or Gate Burrs. 4. Reference JEDEC STD MS-012, VARIATION AA. 									
									
DIMENSIONS									
DIM	INCHES	MILLIMETERS							
C	.205	(5.20)							
G	.118	3.00							
P	.050	1.27							
X	.024	0.60							
Y	.087	2.20							
Z	.291	7.40							

Marking Codes



Notes

1. This Land Pattern Is For Reference Purposes Only. Consult Your Manufacturing Group To Ensure Your Company's Manufacturing Guidelines Are Met.
2. Reference IPC-SM-782A, RLP NO. 300A.