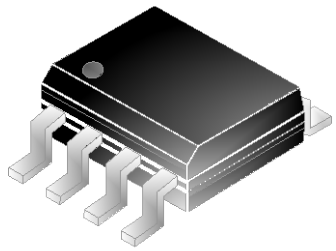
WS3.3-4RDA

Transient Voltage Suppressor

Features

- Array of surge rated diodes with internal TVS diode
- Protects four I/O lines
- Low operating voltage(3.3V)and clamping voltage
- Low capacitance(<15pF) for high-speed interfaces
- Solid-state technology



SO-8

IEC COMPATIBILITY (EN61000-4)

- **IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)**
- **IEC 61000-4-4 (EFT) 40A (5/50ns)**
- **IEC 61000-4-5 (Lightning) 24A (8/20µs)**

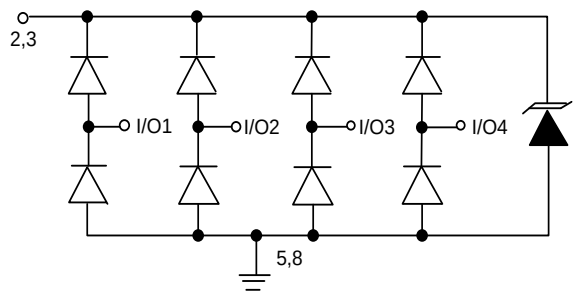
Mechanical Characteristics

- JEDEC SOIC-8 package
- Molding compound flammability rating: UL 94V-0
- Marking : Making Code
- Packaging : Tape and Reel per EIA 481
- Lead Finish: SnPb or Matte Sn

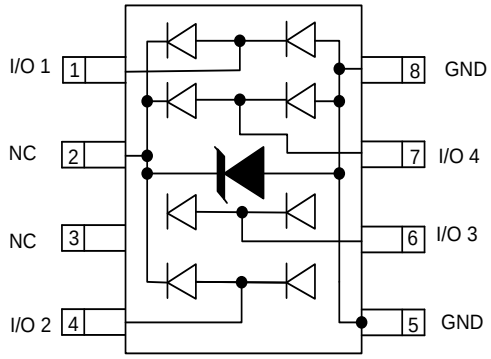
Applications

- T1/E1 secondary IC Side Protection
- T3/E3 secondary IC Side Protection
- Analog Video Protection
- Microcontroller Input Protection
- Base stations
- I^2C Bus Protection

Circuit diagram



Schematic and PIN Configuration



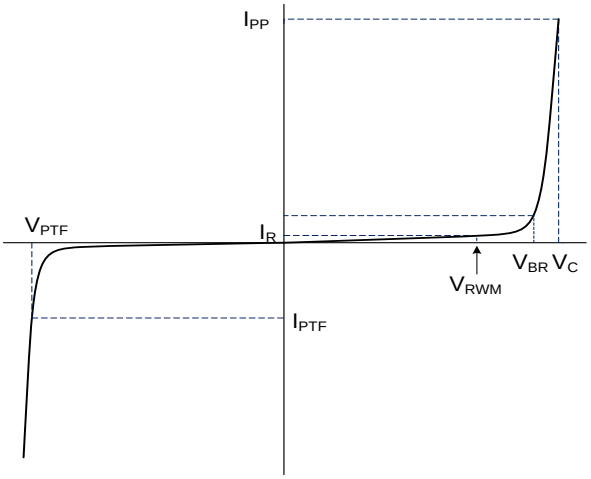
SO-8 (Top View)

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (t_p=8/20μs)	P_{PP}	500	Watts
Peak Forward Current (t_p=8/20μs)	I_{PP}	25	A
Lead Soldering Temperature	T_L	260(10 sec.)	°C
Operating Temperature	T_J	-40 to + 85	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Parameters (T=25°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



Electrical Characteristics

WS3.3-4RDA

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				3.3	V
Punch-Though Voltage	V_{PT}	I_{PT} =2μA	3.5			V
Snap-Back Voltage	V_{SB}	I_{SB}=50mA	2.8			V
Reverse Leakage Current	I_R	V_{RWM}=3.3V,T =25°C			1	μA
Clamping Voltage	V_C	I_{PP}=1A, t_p =8/20μs			5.3	V
Clamping Voltage	V_C	I_{PP}=10A, t_p =8/20μs			10	V
Clamping Voltage	V_C	I_{PP}=25A, t_p =8/20μs			15	V
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

Figure 1: Non-Repetitive Peak Pulse Power vs. Pulse Time

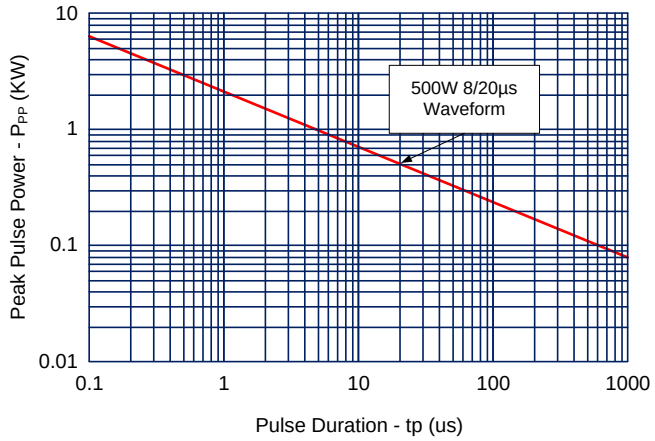


Figure 2: Power Derating Curve

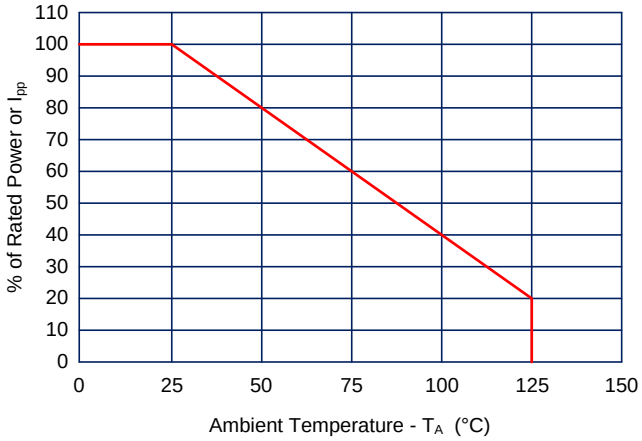


Figure 3: Pulse Waveform

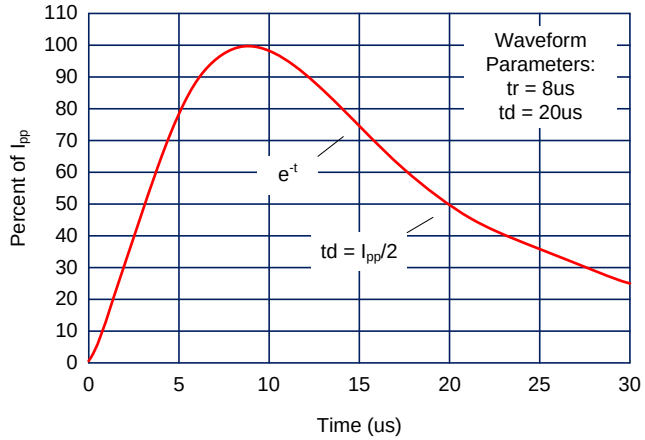


Figure 4: Clamping Voltage vs. Peak Pulse Current

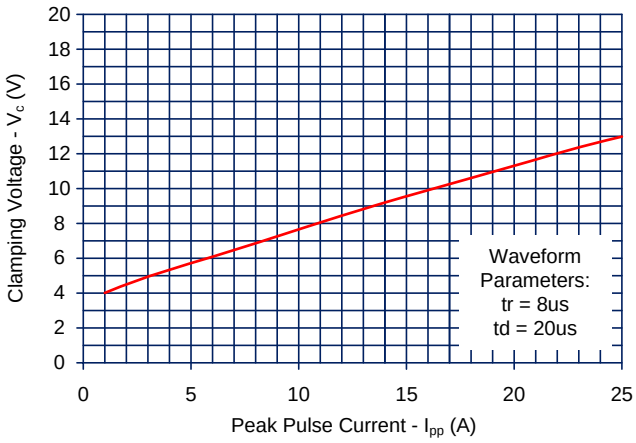
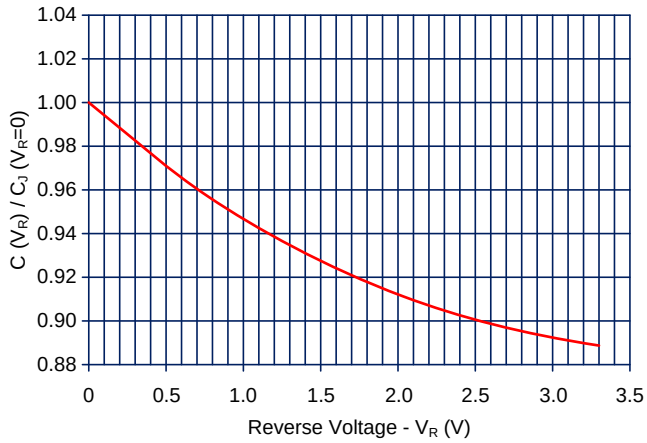


Figure 5: Variation of Capacitance vs. Reverse Voltage



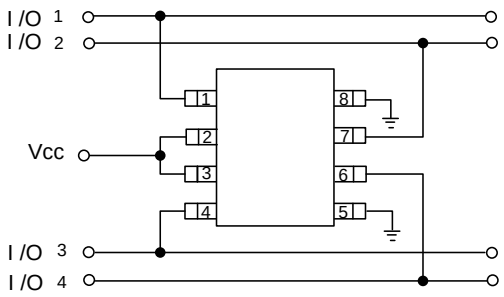
Application Information

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

The WS3.3-4RDA 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:

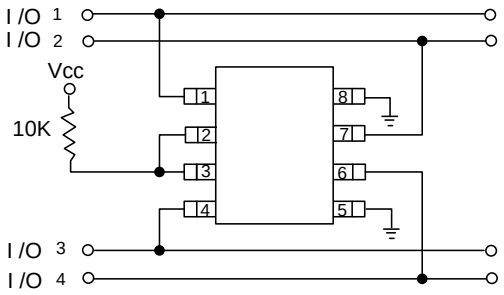
1. To protect data lines and the power line, connect pins 2 & 3 directly to the positive supply rail (V_{CC}). In this configuration the data lines are referenced to the supply voltage. The internal TVS diode prevents over-voltage on the supply rail.

Data Line and Power Supply Protection
Using Vcc as reference



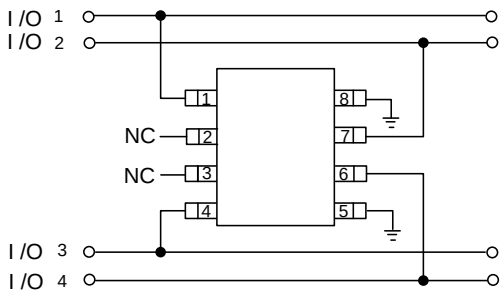
2. The WS3.3-4RDA can be isolated from the power supply by adding a series resistor between pins 2 and 3 and V_{CC}. A value of 10kΩ is recommended. The internal TVS and steering diodes remain biased, providing the advantage of lower capacitance.

Data Line Protection with Bias and Power
Supply Isolation Resistor



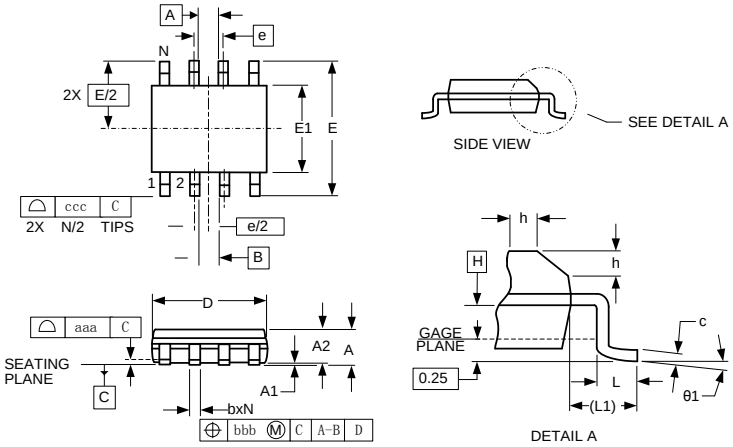
3. In applications where no positive supply reference is available, or complete supply isolation is desired, the internal TVS may be used as the reference. In this case, pins 2 and 3 are not connected. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working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

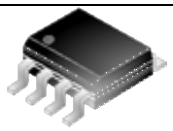
Data Line Protection Using Internal TVS
Diode as Reference



Outline Drawing – SO-8

PACKAGE OUTLINE



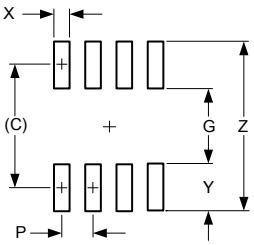


SO-8

DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.053	-	.069	1.35	-	1.75
A1	.004	-	.010	0.10	-	0.25
A2	.049	-	.065	1.25	-	1.65
b	.012	-	.020	0.31	-	0.51
c	.007	-	.010	0.17	-	0.25
D	.189	.193	.197	4.80	4.90	5.00
E1	.150	.154	.157	3.80	3.90	4.00
E	.236BSC			6.00BSC		
e	.050 BSC			1.27 BSC		
h	.010	-	.020	0.25	-	0.50
L	.016	.028	.041	0.40	0.72	1.04
θ1	0°	-	8°	0°	-	8°
L1	(.041)			(1.04)		
N	8			8		
aaa	.004			0.10		
bbb	.010			0.25		
ccc	.008			0.20		

NOTES:

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,VARITION AA.

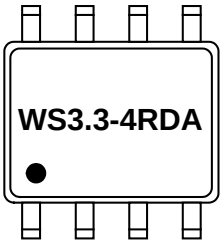


DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.205)	(5.20)
G	.118	3.00
P	.050	1.27
X	.024	0.60
Y	.087	2.20
Z	.291	7.40

Notes

1. This Land Pattern Is For Reference Purposes Only.Consult Your Manufacturing Group To Ensure Your Company's Manufacturing Guidelines Are Met.

Marking Codes



XX=Reverse Stand-Off Voltage