



WS05RXLC

Order Code: WS05RXLC

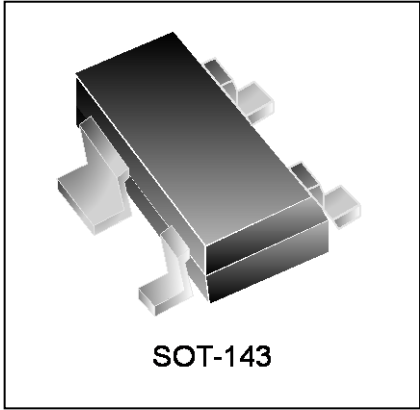
Transient Voltage Suppressor

Features

- 300 Watts Peak Power per Line ($t_p = 8/20\mu s$)
- Protects two I/O lines
- Low operating voltage: 5V
- Low capacitance(<3pF) for high-speed interfaces
- Solid-state technology

IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) $\pm 30kV$ (air), $\pm 30kV$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 13A (8/20 μs)



SOT-143

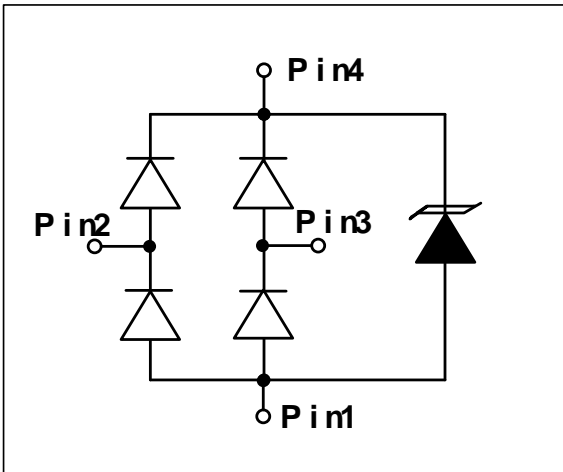
Mechanical Characteristics

- JEDEC SOT-143 package
- Molding compound flammability rating: UL 94V-0
- Marking : Making Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant

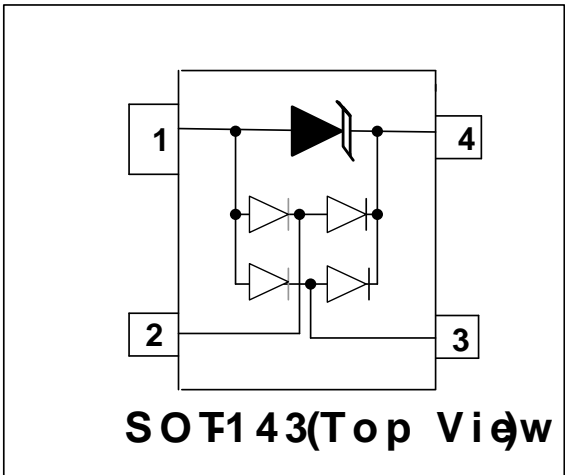
Applications

- 10/100 Ethernet
- FireWire & USB
- Sensitive Analog Inputs
- Portable Electronics
- LAN/WAN equipment
- Video Line Protection
- Microcontroller Input Protection

Circuit Diagram



Schematic & PIN Configuration

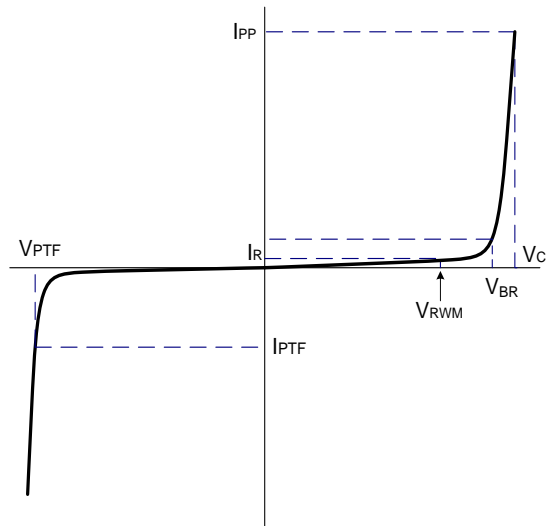


SOT143(Top View)

Absolute Maximum Rating			
Rating	Symbol	Value	Units
Peak Pulse Power ($t_p=8/20\mu s$)	P_{PP}	300	Watts
Peak Pulse Current ($t_p=8/20\mu s$)	I_{PP}	13	A
Lead Soldering Temperature	T_L	260(10sec)	$^{\circ}C$
Operating Temperature	T_J	-55 to + 125	$^{\circ}C$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}C$

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
V_{PTF}	Forward Punch-through Breakdown Voltage @
I_{PTF}	Forward Test Current



Electrical Characteristics

WS05RXLC						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				5.0	V
Breakdown Voltage	V_{PT}	$I_T=1mA$	6.0		9.0	V
Reverse Leakage Current	I_R	$V_{RWM}=5V, T=25^{\circ}C$			200	nA
Clamping Voltage ^{1,3}	V_C	$I_{PP}=5A, t_p=8/20\mu s$		9.2	10	V
Clamping Voltage ^{1,2}	V_C	$I_{PP}=23A, t_p=8/20\mu s$		12.5	15	V
Junction Capacitance	C_j	Between I/O pins and Ground $V_R=0V, f=1MHz$		2.5	3.5	pF
		Between I/O pins $V_R=0V, f=1MHz$		1.3		pF

Notes:

1. See pulse wave form Figure3;
2. From pin4 to pin1.
3. From pin2, 3 to pin1

Typical Characteristics

Figure 1: Peak Pulse Power Vs Pulse Time

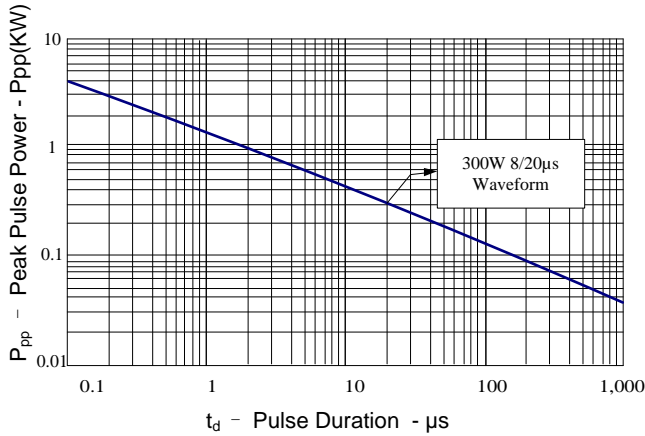


Figure 2: Power Derating Curve

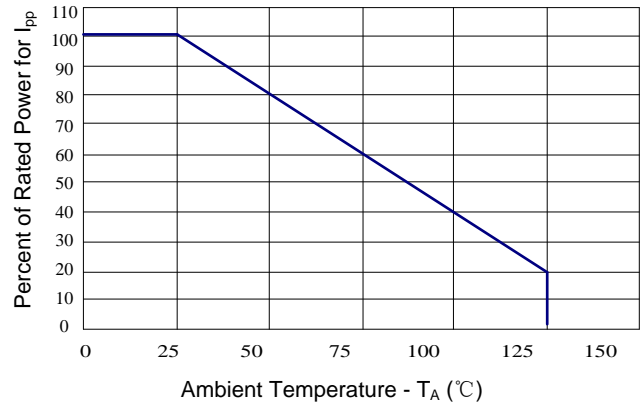


Figure 3: 8/20μs Pulse Waveform

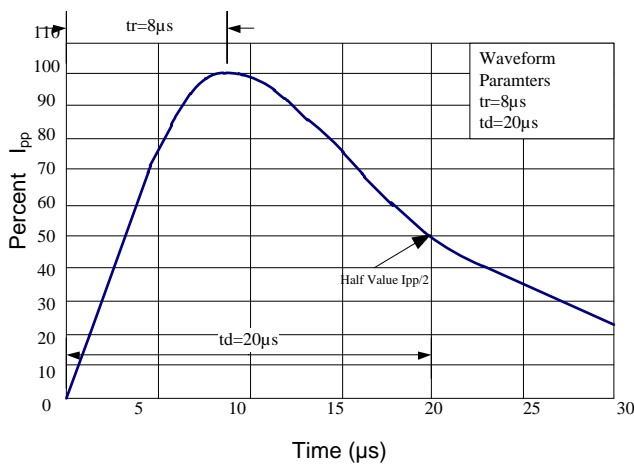


Figure 4: Clamping Voltage vs. Peak Pulse Current

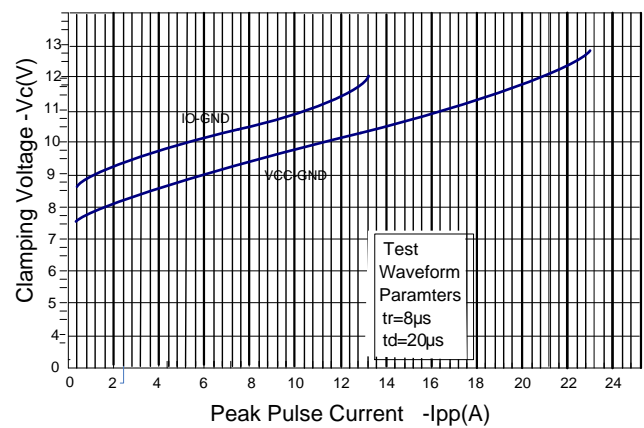


Figure 5: Forward Voltage vs. Forward Current

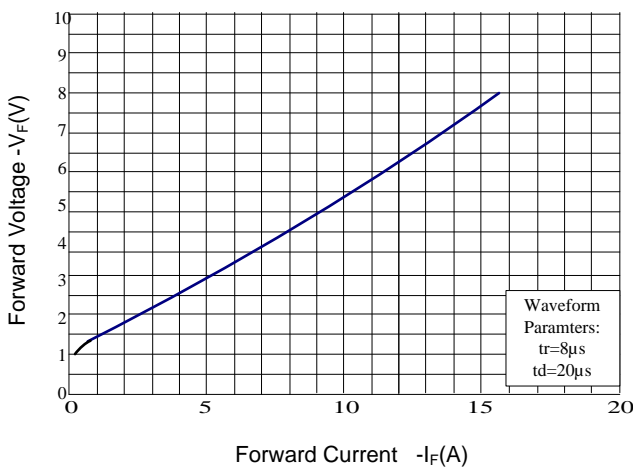
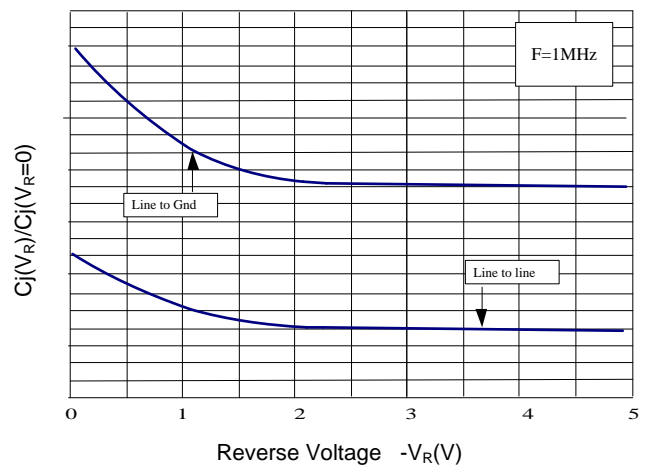


Figure 6: Capacitance vs. Reverse Voltage



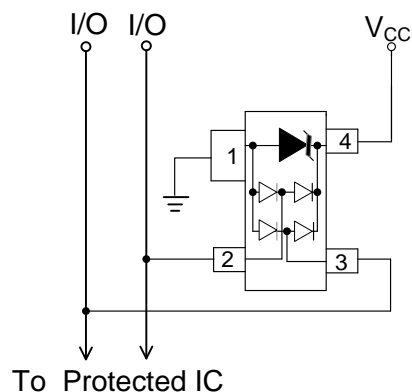
Application Information

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

The WS05RXLC TVS is designed to protect two 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 at pins 2 and 3. The negative reference (REF1) is connected at pin 1. This pin should be connected directly to a ground plane on the board for the best results. The path length is kept as short as possible to minimize parasitic inductance. The reference (REF2) is connected at pin 4. The options for connecting the positive reference are as follows:

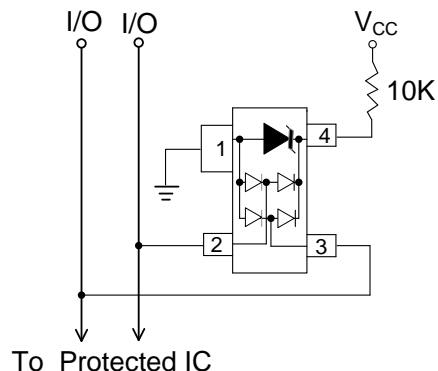
1. To protect data lines and the power line, connect pin 4 directly to the positive supply rail (V_{CC}). In this configuration the data lines are referenced to the supply voltage. The internal TVS diode prevents over-voltage to the supply rail.

Data Line and Power Supply Protection Using V_{CC} as reference



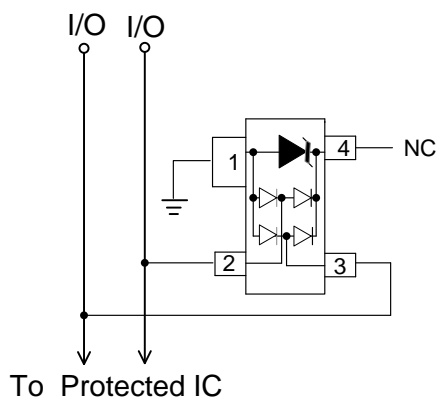
2. The WS05RXLC can be isolated from the power supply by adding a series resistor between pin 4 and V_{CC} . A value of $10k\Omega$ is recommended. The internal TVS and steering diodes remains biased, providing the advantage of lower capacitance.

Data Line Protection with Bias and Power Supply Isolation Resistor



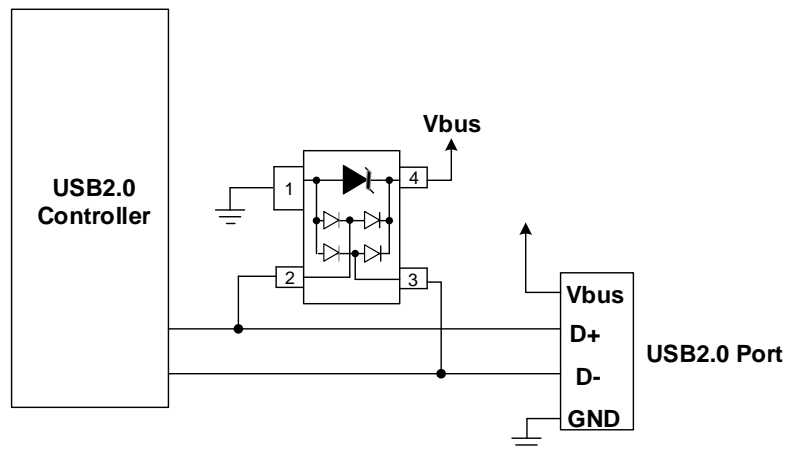
3. In applications where no positive supply reference is available, or complete supply isolation is desired, the internal TVS may be used as the reference. In this case, pin 4 is not connected. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working voltage of the TVS (plus one diode drop).

Data Line Protection Using Internal TVS Diode as Reference

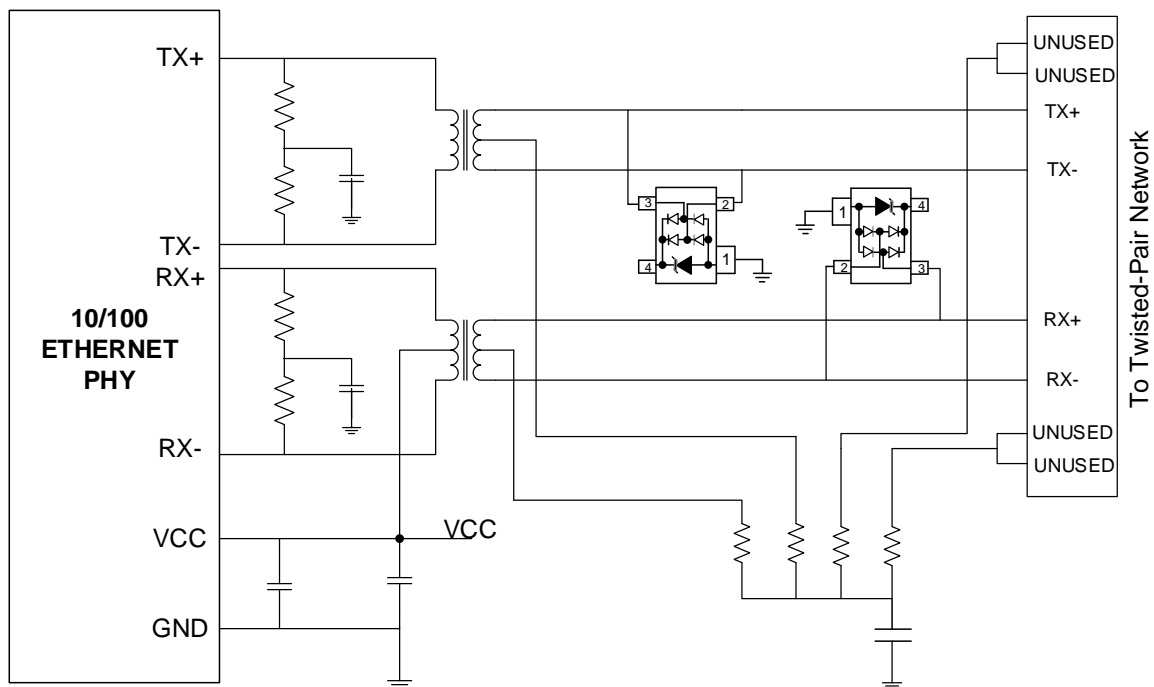


Typical Applications

WS05RXLC on USB2.0 Port Application



The WS05RXLC can also be used to protect USB2.0 ports on monitors, computers, peripherals or portable systems. Each device is able to protect single USB2.0 port. When the voltage on the data lines exceed the bus voltage (plus one diode drop), the internal diodes are forward biased conducting the transient current away from the protected controller chip. The TVS diode directs the surge to ground. The TVS diode also acts to suppress ESD strikes directly on the voltage bus. Thus, both power and data lines are protected.



WS05RXLC on 10/100 Ethernet Application

Outline Drawing – SOT-143

PACKAGE OUTLINE

NOTES:

- CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
- DATUMS AND TO BE DETERMINED AT DATUM PLANE
- DIMENSIONS "E1" AND "D" DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
- REFERENCE JEDEC STD TO-253,VARIATION D.

SOT-143

DIMENSIONS				
SYMBOL	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
b1	0.750	0.900	0.030	0.035
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
e	1.800	2.000	0.071	0.079
e1	0.200TYP		0.008TYP	
E	2.250	2.550	0.089	0.100
E1	1.200	1.400	0.047	0.055
L1	0.550REF		0.022REF	
L	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	.087	2.20
E1	.076	1.92
E2	.068	1.72
G	.031	0.80
X1	.039	1.00
X2	.047	1.20
y	.055	1.40
z	.141	3.60

Notes

- This land pattern is for reference purposes only consult your manufacturing group to ensure your company's manufacturing guidelines are met.
- Reference IPC-SM-782A.

Marking Codes

Part Number	WS05RX	Marking Code	R05
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Package Information

Qty: 3k/Reel

CONTACT INFORMATION

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WAYON website: <http://www.way-on.com>

For additional information, please contact your local Sales Representative.

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Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.