

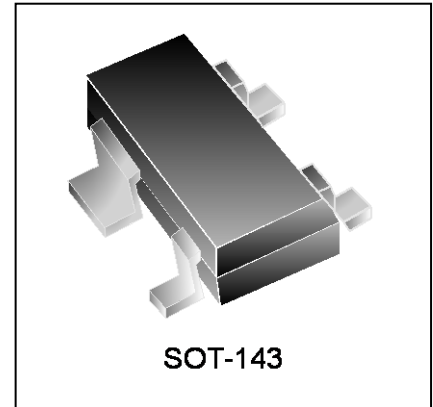


## Features

- 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 $\mu s$ )



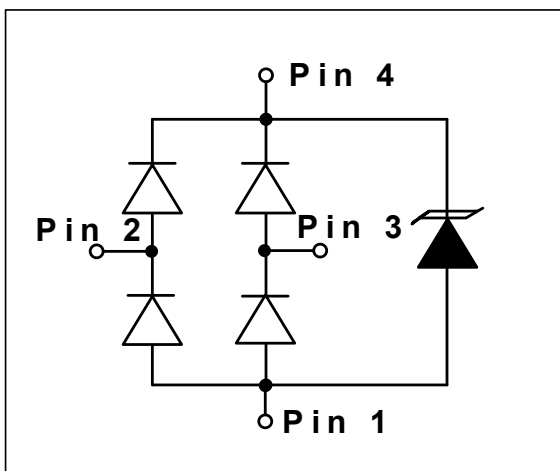
## Mechanical Characteristics

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

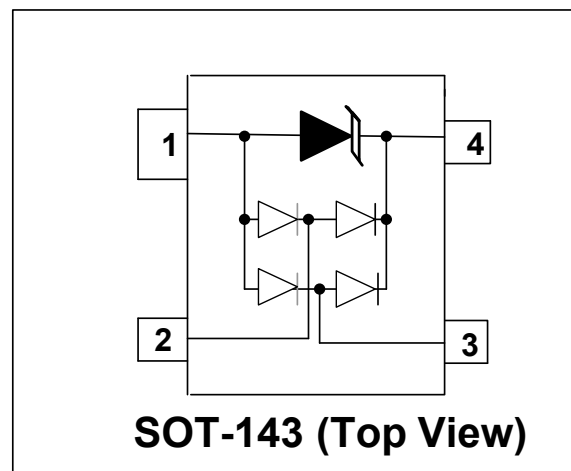
## Applications

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

## Circuit Diagram



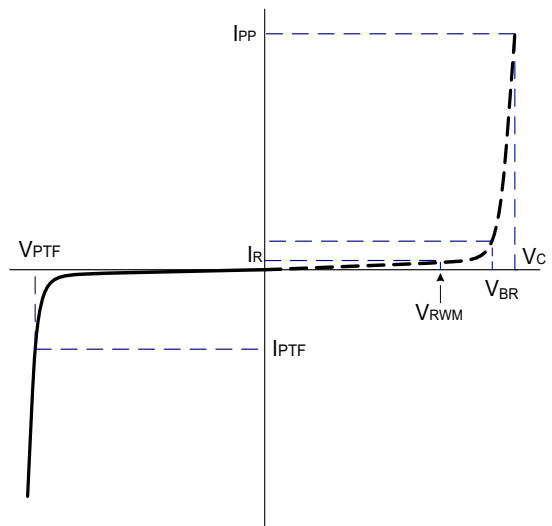
## Schematic & PIN Configuration



<b>Absolute Maximum Rating</b>			
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

<b>DW05RXLC-S</b>						
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 <sup>1,3</sup>	$V_C$	$I_{PP}=5A, t_p=8/20\mu s$		9.2	10	V
Clamping Voltage <sup>1,2</sup>	$V_C$	$I_{PP}=23A, t_p=8/20\mu s$		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

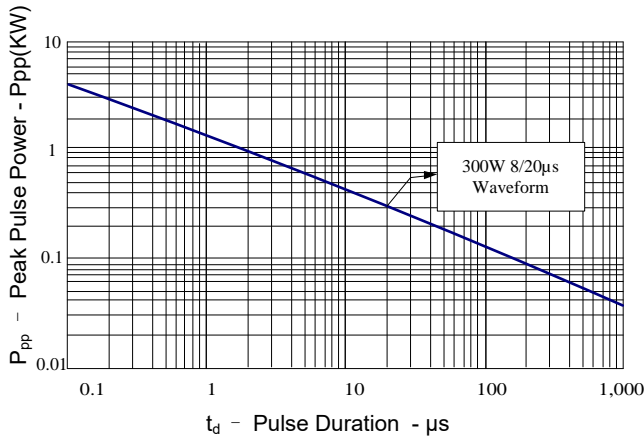


Figure 2: Power Derating Curve

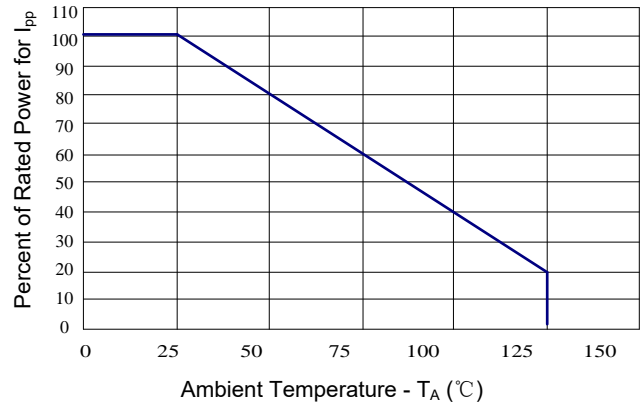


Figure 3: 8/20μs Pulse Waveform

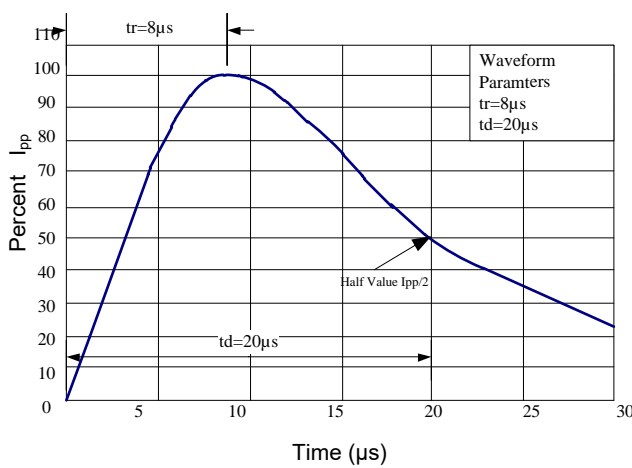


Figure 4: Clamping Voltage vs. Peak Pulse Current

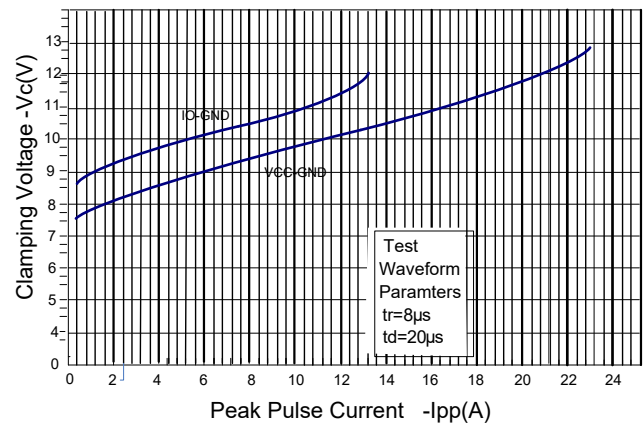


Figure 5: Forward Voltage vs. Forward Current

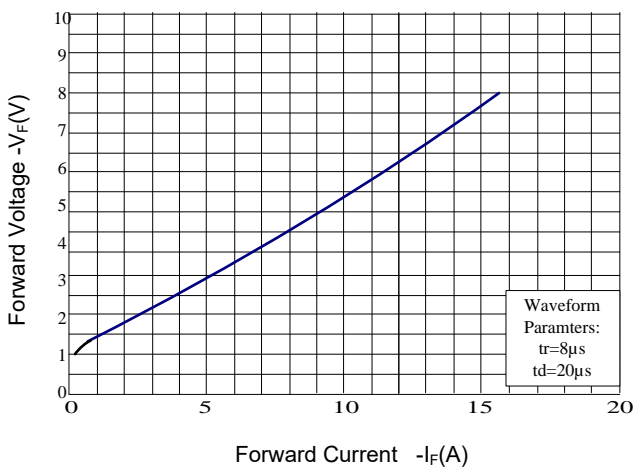
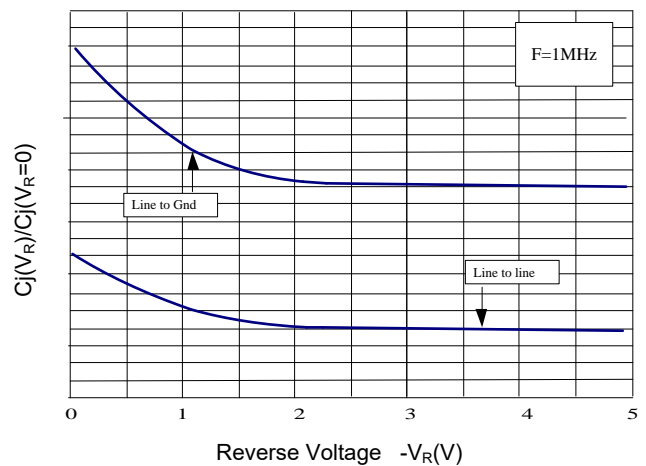


Figure 6: Capacitance vs. Reverse Voltage



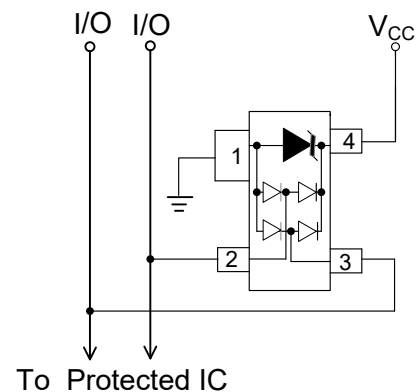
## Application Information

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

The DW05RXLC-S 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:

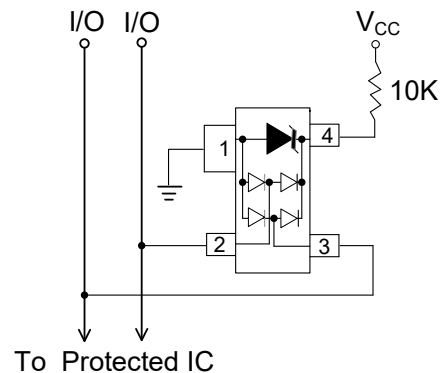
#### Data Line and Power Supply Protection Using $V_{CC}$ as reference

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.



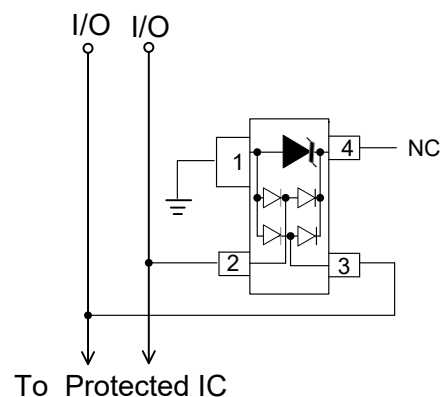
2. The DW05RXLC-S can be isolated from the power supply by adding a series resistor between pin 4 and  $V_{CC}$ . A value of  $10k\Omega$  is recommended. The internal TVS and steering diodes remains biased, providing the advantage of lower capacitance.

#### Data Line Protection with Bias and Power Supply Isolation Resistor



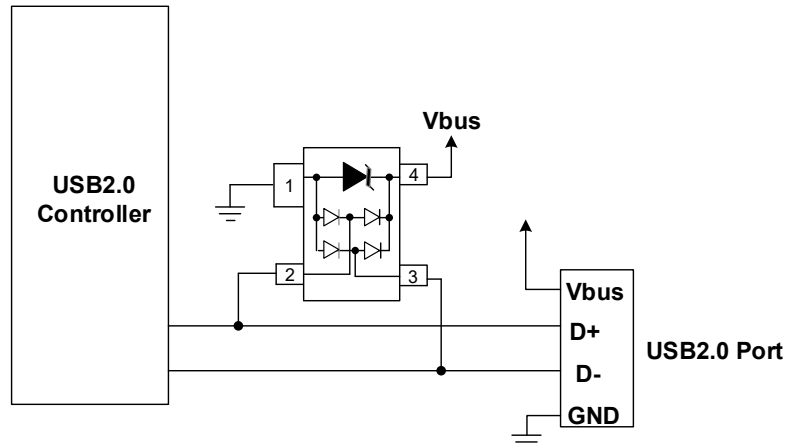
3. In applications where no positive supply reference is available, or complete supply isolation is desired, the internal TVS may be used as the reference. In this case, pin 4 is not connected. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working voltage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

#### Data Line Protection Using Internal TVS Diode as Reference

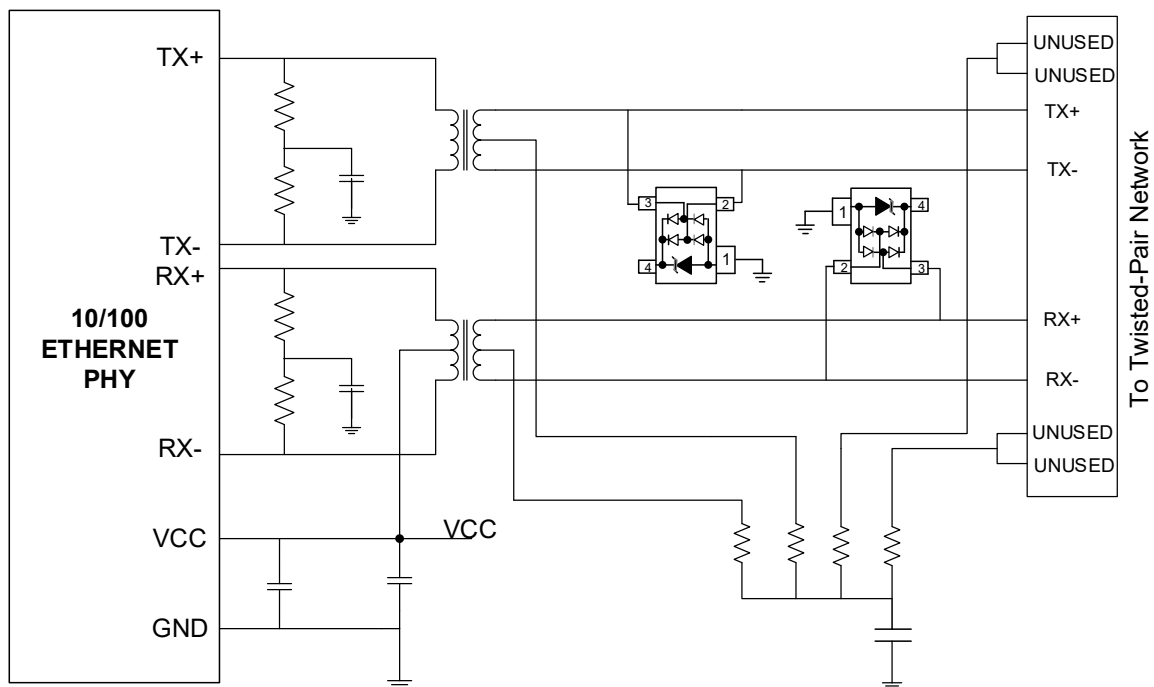


## Typical Applications

DW05RXLC-S on USB2.0 Port Application

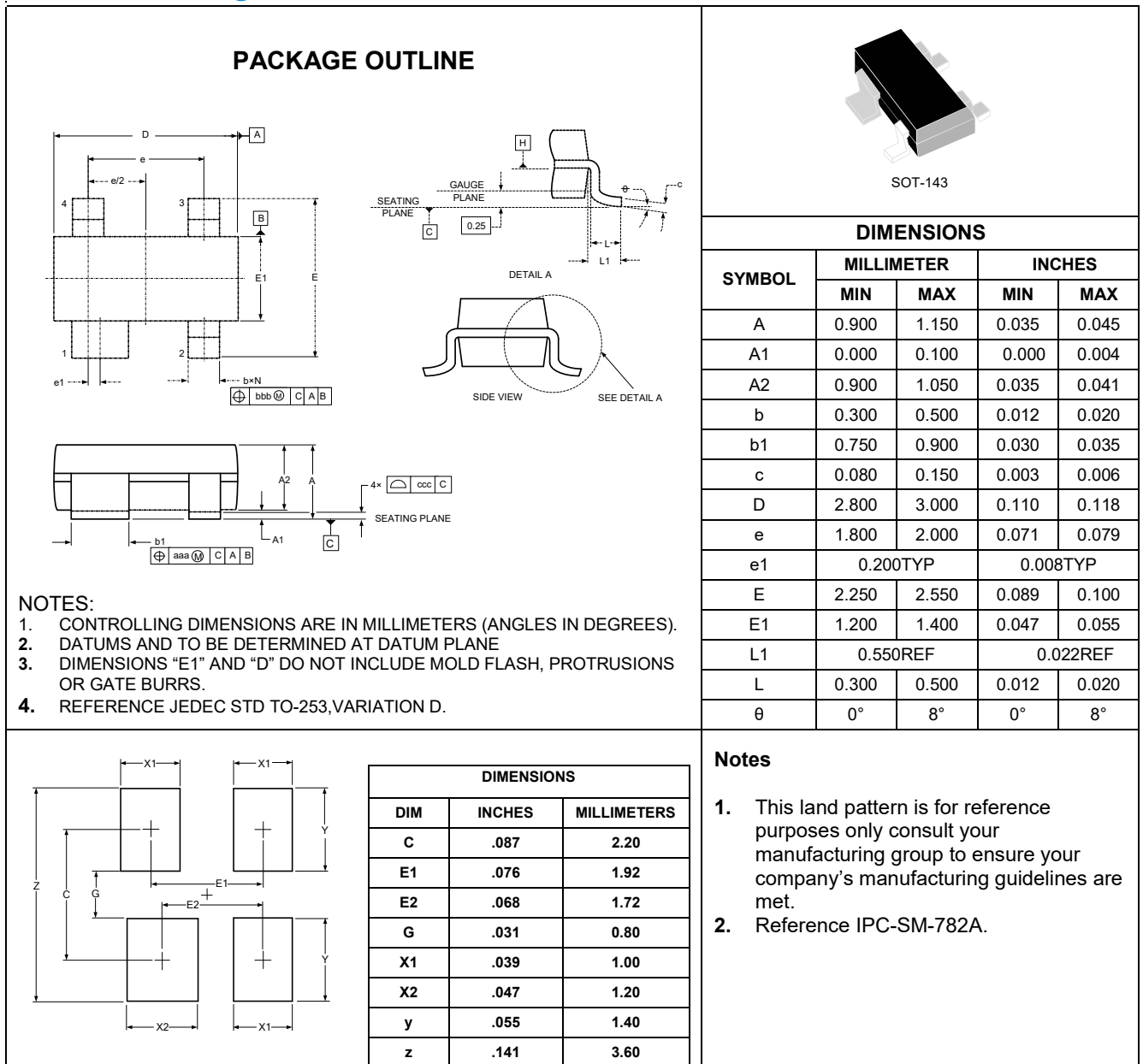


The DW05RXLC-S can also be used to protect USB2.0 ports on monitors, computers, peripherals or portable systems. Each device is able to protect single USB2.0 port. When the voltage on the data lines exceed the bus voltage (plus one diode drop), the internal diodes are forward biased conducting the transient 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.



DW05RXLC-S on 10/100 Ethernet Application

## Outline Drawing – SOT-143



## Marking Codes

Part Number	DW05RXLC-S	Marking Code	R05
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## Package Information

Qty: 3k/Reel