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SDC36 TVS Diode Array for Proximity Switch Input Protection

PROTECTION PRODUCTS

Description

The SDC36 is a high-surge transient voltage suppressor (TVS) optimized for protection of sensitive digital sensors used in proximity switches and industrial control applications. The SDC36 protects the components from over-voltages caused by **electrostatic discharge** (ESD), **electrical fast transients** (EFT), and tertiary **lightning**.

The unique design of the SDC36 incorporates two TVS diodes in a compact SOT23 package for applications where board space is at a premium. The single package provides protection for the I/O line and power supply rail with high surge capabilities (2 Amps at $t_p=1.2/50\mu s$) and an exceptionally low clamping voltage of <45V.

The SDC36 replaces up to two large discrete diodes providing the designer an easy to implement integrated solution. The features of the SDC36 are ideal for protection of two, three, and four wire DC high-side proximity switches.

Features

- ◆ 350 watts peak pulse power ($t_p = 8/20\mu s$)
- ◆ Transient protection for data & power lines to
IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact)
IEC 61000-4-4 (EFT) 40A (5/50ns)
IEC 61000-4-5 (Lightning) 2A (1.2/50 μs)
- ◆ Replaces two discrete devices
- ◆ Low clamping voltage
- ◆ Low leakage current
- ◆ High surge capability
- ◆ Solid-state silicon avalanche technology

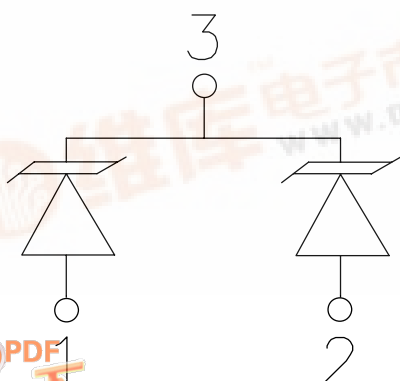
Mechanical Characteristics

- ◆ JEDEC SOT23 package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking : DC36
- ◆ Packaging : Tape and Reel per EIA 481

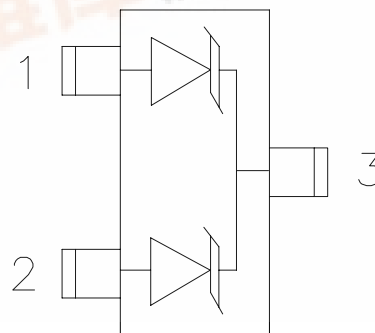
Applications

- ◆ Two, Three, and Four Wire DC High-Side Proximity Switches
- ◆ Digital Sensor Input Protection
- ◆ Industrial Controls
- ◆ 24V - 33V DC Supply Protection

Circuit Diagram



Schematic & PIN Configuration



SOT23 (Top View)



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Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{pk}	350	Watts
Peak Pulse Power ($t_p = 1.2/50\mu s$)	P_{pk}	200	Watts
Peak Pulse Current ($t_p = 1.2/50\mu s$)	I_{pp}	4	A
Non-Repetitive Peak Forward Current ($t_p=100\mu s$)	I_{FSMAX}	4	A
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

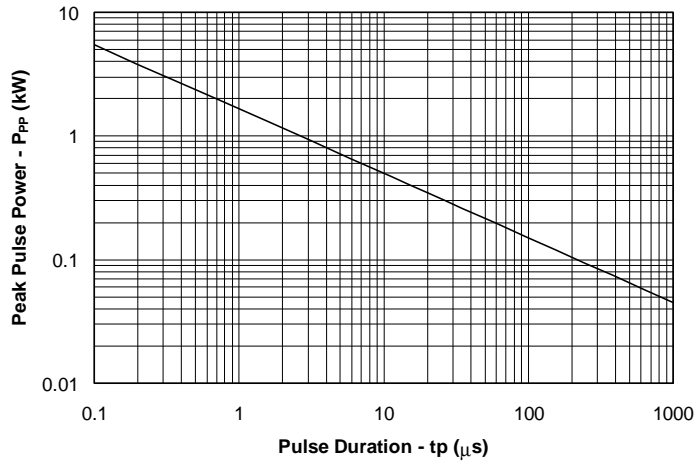
Electrical Characteristics

SDC36						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 3 to 1 or Pin 2 to 1			33	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$,	36			V
Reverse Leakage Current	I_R	$V_{RWM} = 33V$, $T=25^\circ C$			5	μA
Reverse Leakage Current	$I_{R(HOT)}$	$V_{RWM} = 33V$, $T=85^\circ C$			25	μA
Forward Voltage	V_F	$I_F = 100mA$,			1.3	V
Clamping Voltage	V_C	$I_{pp} = 2A$, $t_p = 1.2/50\mu s$			45	V
Junction Capacitance	C_J	$V_R = 0V$, $f = 1MHz$			45	pF

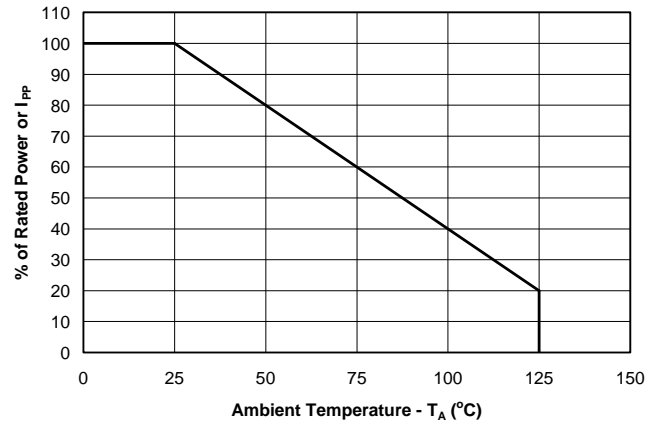
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Typical Characteristics

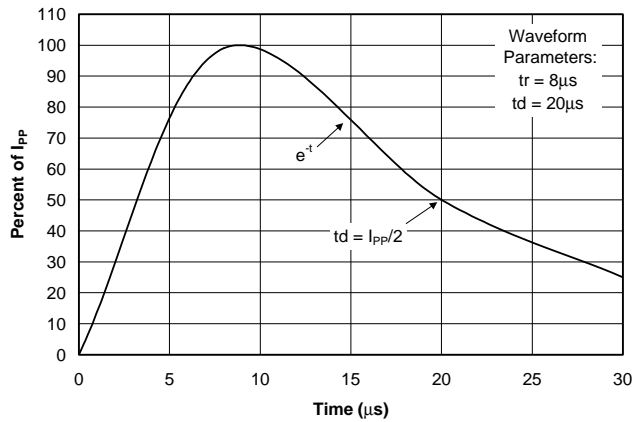
Non-Repetitive Peak Pulse Power vs. Pulse Time



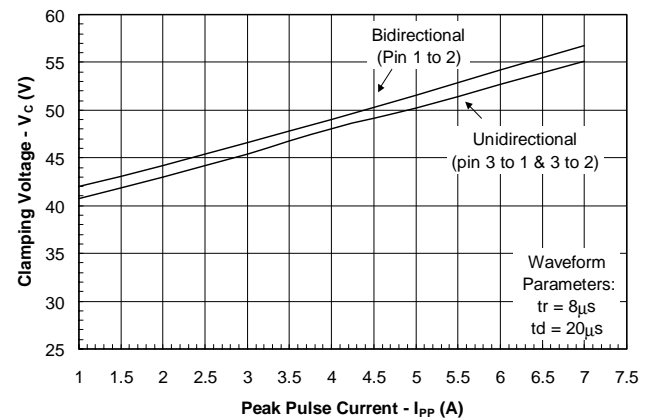
Power Derating Curve



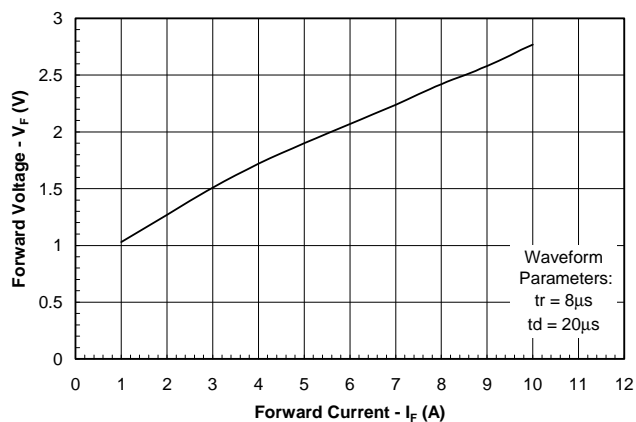
Pulse Waveform



Clamping Voltage vs. Peak Pulse Current



Forward Voltage vs. Forward Current



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Applications Information

Device Connection for Protection of Two, Three, and Four Wire Proximity Switches

Digital sensors help to bridge the gap between the physical world and the digital world in applications such as computer controlled factory automation. In such environments, transient voltages can easily disrupt or damage sensitive sensor inputs. The SDC36 provides transient voltage protection for the digital sensors to ensure their operation is not disrupted by the physical world.

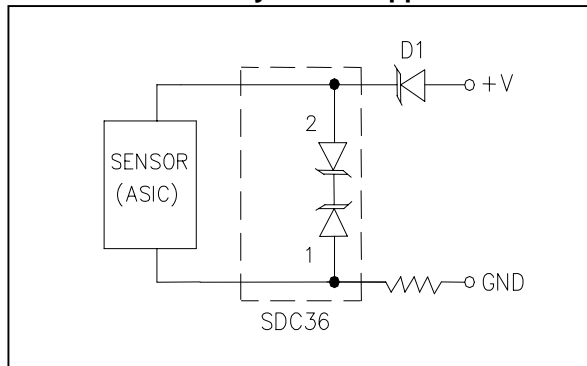
The SDC36 is designed to meet the high surge capability and low clamping voltage needed to protect the ASIC and control logic used in proximity switches. The SDC36 provides protection for the power and I/O lines. Typical configurations for the protection of two, three, and four wire switches are as follows:

1. Two-Wire Switch: Connect pin 1 to the I/O line and pin 2 to the DC supply (since the device is symmetrical, these connections can be reversed). Pin 3 is not connected.

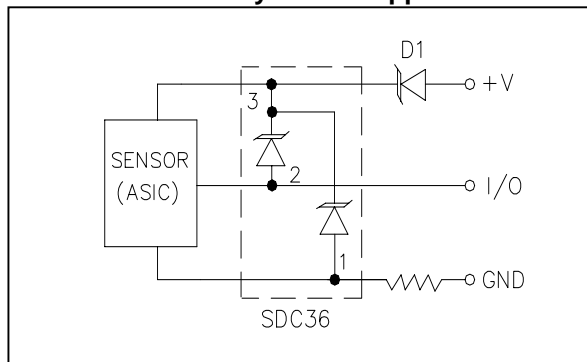
2. Three-Wire Switch: Either pin 1 or pin 2 is connected to the I/O line with the other connected to ground. Pin 3 must be connected to the DC supply.

3. Four-Wire Switch: Two devices are required to protect four wire switches. Pin 3 of each device is connected to the DC supply line. Pins 1 & 2 are connected to the I/O lines & ground as shown.

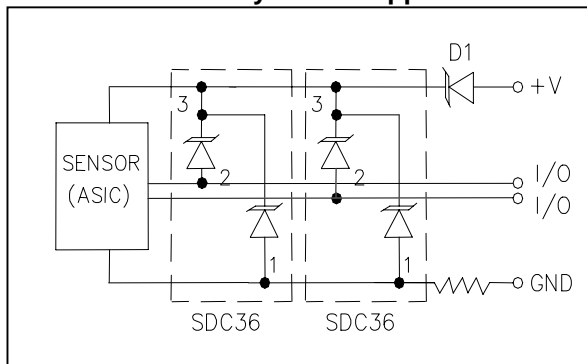
2-Wire DC Proximity Switch Application

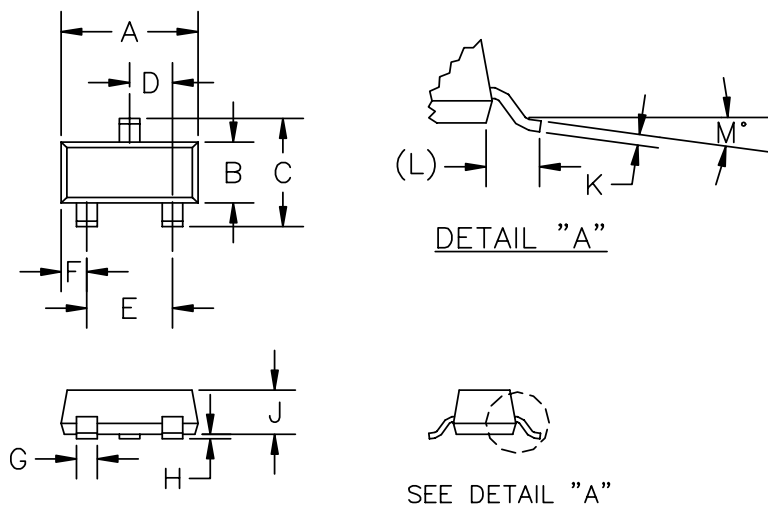


3-Wire DC Proximity Switch Application

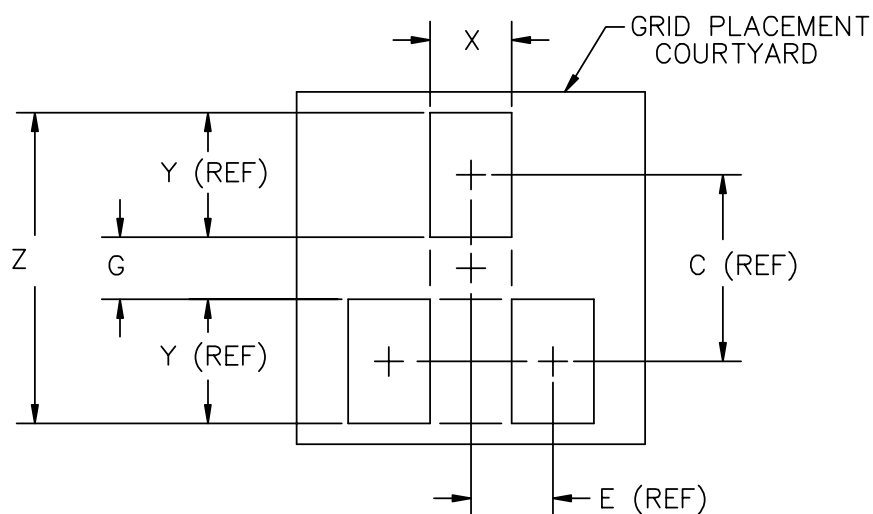


4-Wire DC Proximity Switch Application



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Outline Drawing - SOT23


DIMENSIONS [1]					NOTE
DIM ^N	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	.110	.119	2.8	3.04	—
B	.047	.055	1.20	1.40	—
C	.083	.104	2.10	2.64	—
D	.035	.040	0.88	1.02	—
E	.070	.081	1.78	2.05	—
F	.017	.024	.44	.60	—
G	.014	.020	.37	.51	—
H	.0005	.004	.013	0.10	—
J	.034	.040	.87	1.02	—
K	.003	.007	.085	.180	—
L	—	.022	—	0.55	REF
M	0	8°	0	8°	—

Land Pattern - SOT23


DIMENSIONS					
DIM ^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
C	—	.09	—	2.20	—
E	—	.04	—	.95	—
G	.03	.04	.80	1.00	—
X	.03	.04	.80	1.00	—
Y	—	.06	—	1.40	—
Z	.14	.15	3.40	3.60	—

Note 1 : Grid placement courtyard is 8 x 8 elements (4mm x 4mm) in accordance with the international grid detailed in IEC Publication 97.



SDC36

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Ordering Information

Part Number	Working Voltage	Qty per Reel	Reel Size
SDC36.TC	33V	3,000	7 Inch
SDC36.TG	33V	10,000	13 Inch

Contact Information

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