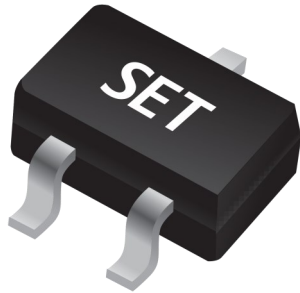


# ESD Protection Diodes

Dual Line CAN Bus ESD and Transient Voltage Protection

SD2403T23L SOT23

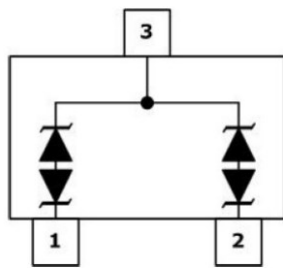


## Description

The SD2403T23L transient voltage suppressor (TVS) diode is designed to protect the CAN transceivers in high speed and fault tolerant networks from ESD and other harmful transient voltage events.

This device provides bidirectional protection for each data line with a single compact SOT23 package. Giving a system designer a low cost option for improving the system reliability and meeting stringent EMI requirements.

## Pinout and Functional Block Diagram



## Applications

- Low and High Speed CAN
- Fault Tolerant CAN
- Industrial Control Networks
- Start Distribution Systems
- Automotive Networks

## Features

- Peak Power Dissipation: 200 W@8 / 20  $\mu$ s
- IEC 61000-4-2 (ESD)  $\pm$  15 kV(Air),  $\pm$  8 kV(Contact)
- IEC 61000-4-4 (FET) 40 A (5 / 50 ns)
- IEC 61000-4-5 (Lightning) 3 A (8 / 20  $\mu$ s)
- Low Clamping Voltage
- Low Leakage Current
- Halogen Free and RoHS Compliant
- High Temperature Soldering Guaranteed: 260  $^{\circ}$ C / 10 sec
- Flammability Rating: UL 94 V-0

## Order Information

Type	Package	Marking Code	Delivery Form	Delivery Quantity
SD2403T23L	SOT23	C24	7" T&R	3000 PCS

## Limiting Values

(T<sub>A</sub> = 25  $^{\circ}$ C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>ESD</sub>	Electrostatic Discharge Voltage	IEC 61000-4-2; Contact Discharge	-	20	kV
		IEC 61000-4-2; Air Discharge	-	30	kV
P <sub>PP</sub>	Peak Pulse Power (8 / 20 $\mu$ s)	-	-	200	W
T <sub>A</sub>	Operating Temperature Range	-	-55	150	$^{\circ}$ C
T <sub>stg</sub>	Storage Temperature Range	-	-55	150	$^{\circ}$ C

## Electrical Characteristics

(T<sub>A</sub> = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>RWM</sub>	Reverse Working Voltage	Pin 1, 2 to Pin 3	-	-	24.0	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 1 mA, Pin 1, 2 to Pin 3	26	-	32	V
V <sub>C1</sub>	Clamping Voltage 1	I <sub>PP</sub> = 1 A, t <sub>p</sub> = 8 / 20 μs Pin 1,2 to Pin 3	-	-	36	V
V <sub>C2</sub>	Clamping Voltage 2	I <sub>PP</sub> = 3 A, t <sub>p</sub> = 8 / 20 μs Pin 1,2 to Pin 3	-	-	50	V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> = 24 V Pin 1,2 to Pin 3	-	-	1	μA
C <sub>J</sub>	Junction Capacitance	V <sub>R</sub> = 0 V, Measured at 1 MHz Pin 1,2 to Pin 3	-	13	17	pF

## Performance Curve for Reference

(T<sub>A</sub>=25 °C unless otherwise noted)

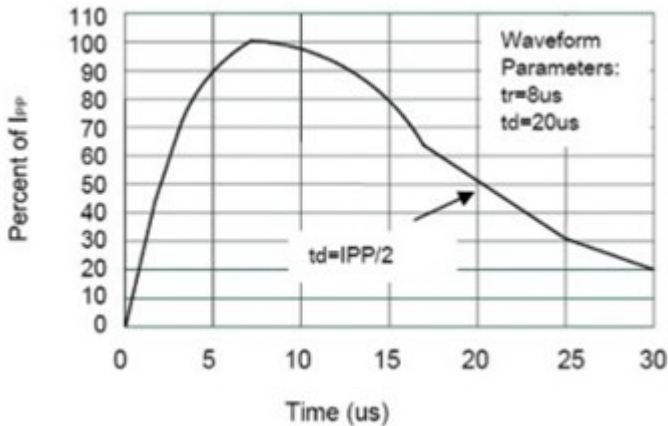


FIGURE 1  
Pulse Waveform

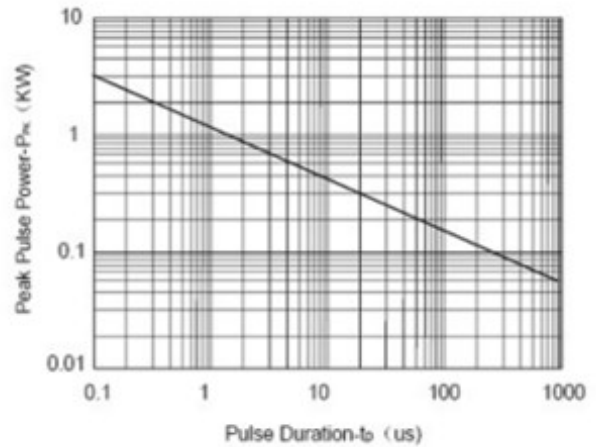


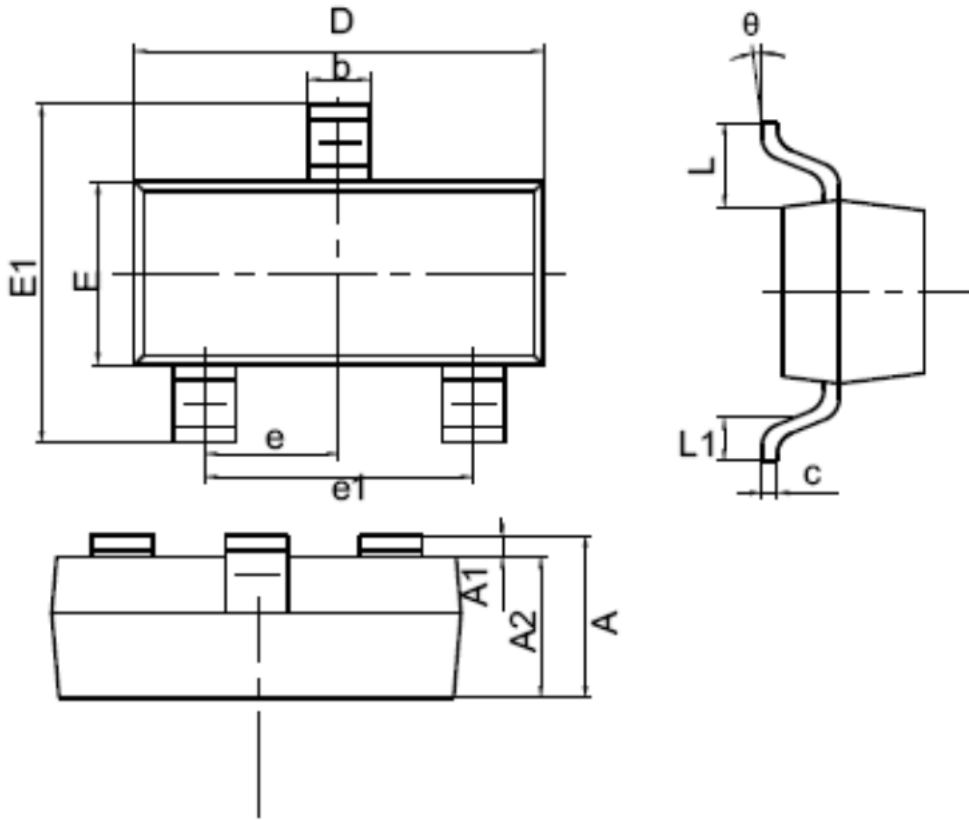
FIGURE 2  
Non-Repetitive Peak Pulse Power VS. Pulse Time

# ESD Protection Diodes

Dual Line CAN Bus ESD and Transient Voltage Protection

SD2403T23L SOT23

## Package Dimensions - SOT23

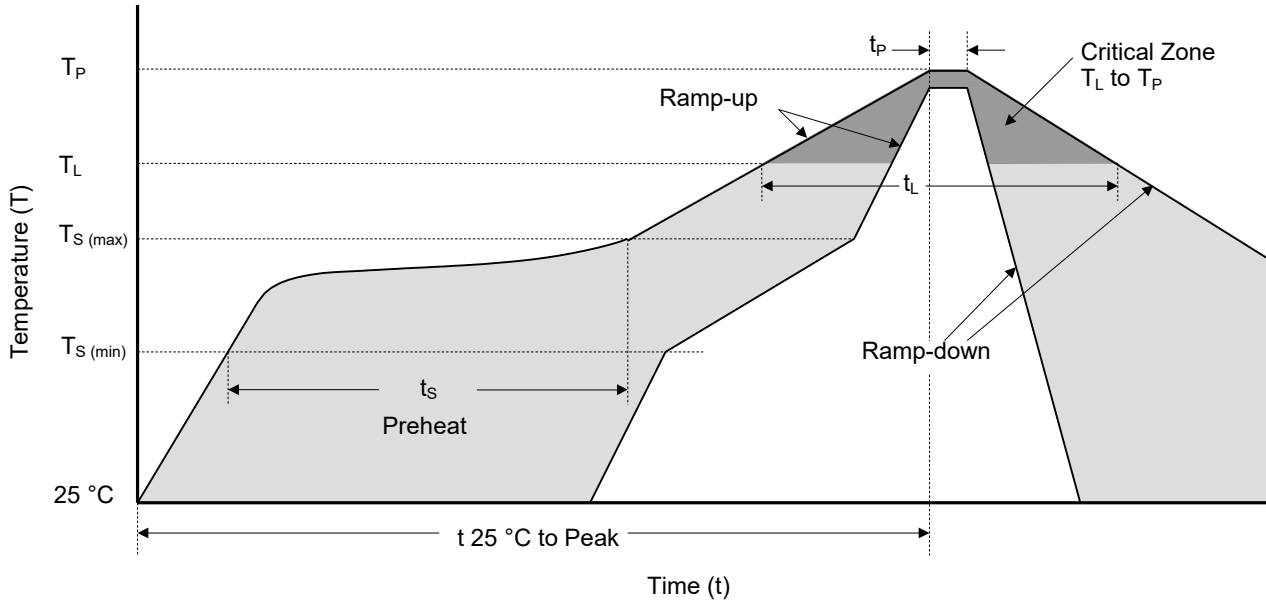


ESD TVS

ESD TVS

Symbol	Millimeters		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
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 Ref.		0.037 Ref.	
e1	1.800	2.000	0.071	0.079
L	0.550 Ref.		0.022 Ref.	
L1	0.300	0.500	0.012	0.020
θ	0 °	8 °	0 °	8 °

## Soldering Parameters



Reflowing Condition

Reflow Soldering Parameters		Lead-Free Assembly
Pre-heat	Temperature Min ( $T_{S (min)}$ )	150 °C
	Temperature Max ( $T_{S (max)}$ )	200 °C
	Time (min to max) ( $t_s$ )	60 ~ 120 seconds
Average Ramp Up Rate (Liquidus Temp ( $T_L$ ) to Peak)		3 °C / second max.
$T_{S (max)}$ to $T_L$ Ramp-up Rate		3 °C / second max.
Reflow	Temperature ( $T_L$ ) (Liquidus)	217 °C
	Time (min to max) ( $t_L$ )	60 ~ 150 seconds
Peak Temperature ( $T_P$ )		260 <sup>+0/-5</sup> °C
Time of within 5 °C of Actual Peak Temperature ( $t_p$ )		20 ~ 40 seconds
Ramp-down Rate		6 °C / second max.
Time from 25 °C to Peak Temperature		8 Minutes max.
Do Not Exceed		260 °C

ESD TVS

ESD TVS



# ATTENTION

## Usage

1. TVS must be operated in the specified ambient temp.
2. Do not clean the TVS with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon, to avoid damaging the encapsulating layer.
3. Please do not apply severe vibration, shock or pressure to TVS, to avoid element cracking.

## Replacement

1. If TVS is visually damaged, please replace it.
2. TVS is a non-repairable product. For safety sake, please use equivalent TVS for replacement.

## Storage

1. Storage Temp. Range: (-55 to 150) °C.
2. Do not store the TVS at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder- ability of the lead wires. The product shall be used up within 1 year after receiving the goods.

## Environmental Conditions

1. TVS should not be exposed to the open air, nor direct sunshine.
2. TVS should avoid rain, water vapor or other condition of high temp. and high humidity.
3. TVS should avoid sand dust, salt mist, or other harmful gases.

## Max. Typical Capacitance of TVS

1. The typical capacitance of TVS is listed in the specifications. Designers may refer to it when designing TVS in High frequency circuit.

## Installation Mechanical Stress

1. Do not knock TVS when installing, to avoid mechanical damage.
2. Please do not apply severe vibration, shock or pressure to TVS, to avoid surface resin or element cracking.