

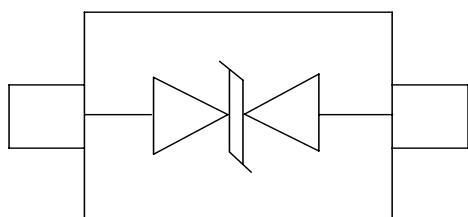
## Description

The DL0521D9L is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data line. The DL0521D9L has an ultra-low capacitance with a typical value at 0.65pF, and complies with the IEC 61000-4-2(ESD) with  $\pm 15\text{kV}$  air and  $\pm 8\text{kV}$  contact discharge. It is assembled into an ultra-small SOD-923 lead-free package. The small size, ultra-low capacitance and high ESD surge protection make DL0521D9L an ideal choice to protect cell phone, digital visual interfaces and other high speed ports.

## Mechanical Characteristics

- ◆ Package: SOD-923
- ◆ Lead Finish: Matte Tin
- ◆ Case Material: "Green" Molding Compound.
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

## Dimensions and Pin Configuration



Circuit and Pin Schematic

## Features

- ◆ Ultra low capacitance: 0.65pF typical
- ◆ Ultra low leakage: nA level
- ◆ Operating voltage: 5V
- ◆ Low clamping voltage
- ◆ Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge:  $\pm 15\text{kV}$   
Contact discharge:  $\pm 8\text{kV}$
  - IEC61000-4-5 (Lightning) 2A (8/20 $\mu\text{s}$ )
- ◆ ROHS Compliant

## Applications

- ◆ Cellular Handsets and Accessories
- ◆ Display Ports
- ◆ MDDI Ports
- ◆ USB Ports
- ◆ Digital Visual Interface(DVI)
- ◆ PCI Express and Serial SATA Ports

## Marking Information



N = Device Marking Code

## Ordering Information

Part Number	Marking	Packaging	Reel Size
DL0521D9L	N	8000/Tape & Reel	7 inch

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

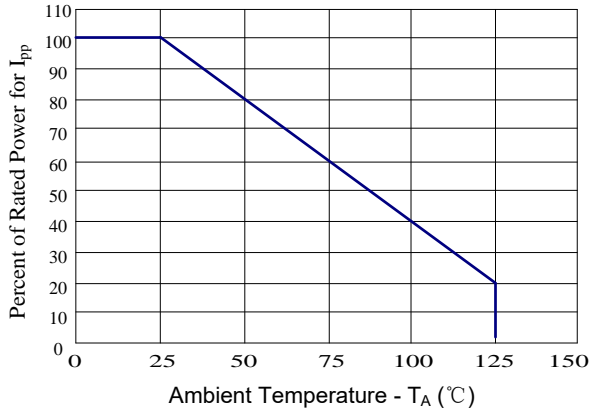
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	35	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	I <sub>PP</sub>	2	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 15$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 8$	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	$^\circ\text{C}$

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			5	V	
Breakdown Voltage	V <sub>BR</sub>	6		9	V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			0.2	$\mu\text{A}$	V <sub>RWM</sub> = 5V
Clamping Voltage	V <sub>C</sub>			9.5	V	I <sub>PP</sub> = 1A (8 x 20 $\mu\text{s}$ pulse)
Clamping Voltage	V <sub>C</sub>			15	V	I <sub>PP</sub> = 2A (8 x 20 $\mu\text{s}$ pulse)
Junction Capacitance	C <sub>J</sub>		0.65	0.9	pF	V <sub>R</sub> = 0V, f = 1MHz

**Typical Performance Characteristics (TA=25°C unless otherwise Specified)**

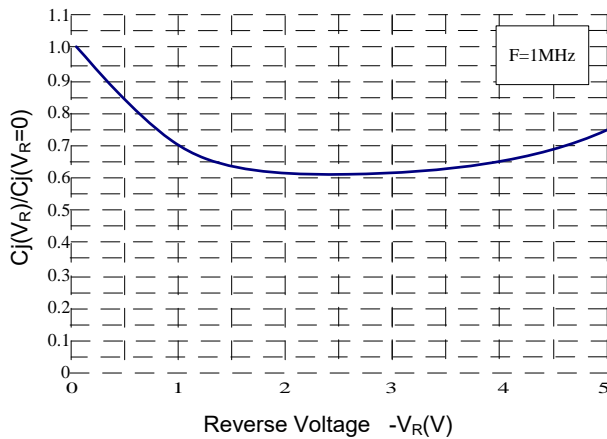
**Figure 1: Power Derating Curve**



**Figure 2: Insertion Loss**



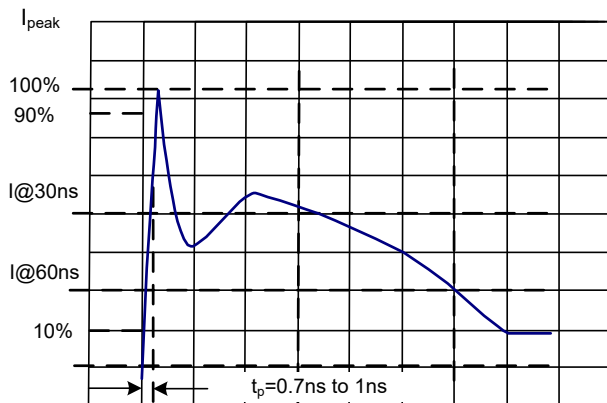
**Figure 3: Normalized Junction Capacitance vs. Reverse Voltage**



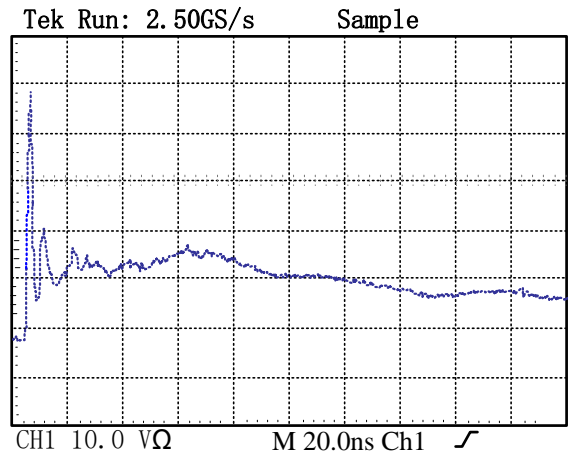
**Table 1. IEC 61000-4-2 Discharge Parameters**

Level	First Peak Current (A)	Peak Current at 30 ns (A)	Peak Current at 60 ns (A)	Test Voltage (Contact Discharge) (kV)	Test Voltage (Air Discharge) (kV)
1	7.5	4	2	2	2
2	15	8	4	4	4
3	22.5	12	6	6	8
4	30	16	8	8	15

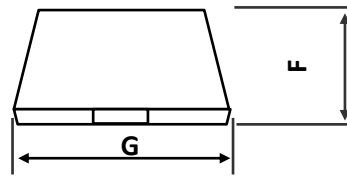
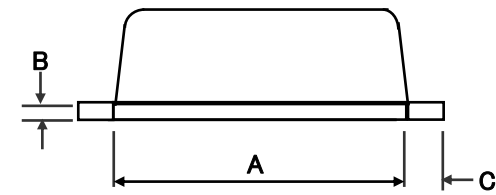
**Figure 4. IEC 61000-4-2 Waveform**



**Figure 5: ESD Clamping( 8kV Contact per IEC 61000-4-2)**



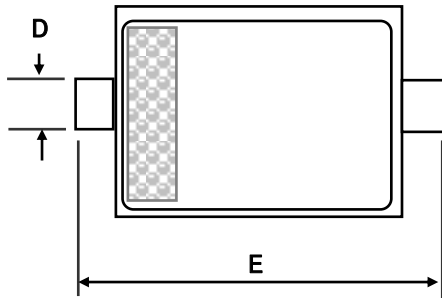
## SOD-923 Package Outline Drawing



### Dimensions

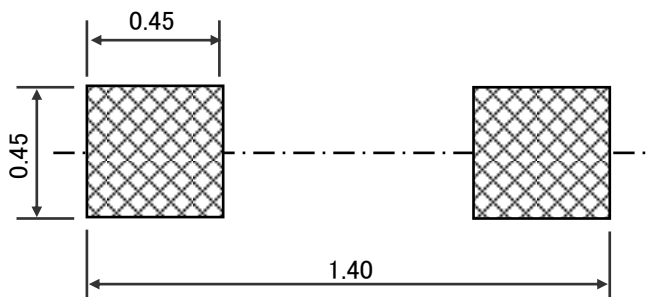
Unit	A	B	C	D	E	F	G
Max.	0.90	0.20	0.15	0.30	1.10	0.45	0.65
Min.	0.70	0.05	0.05	0.15	0.90	0.39	0.55

Unit: mm



SOD923 \* Package Outline

## Suggested Land Pattern



## Contact Information

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