

Description

The DL0502S2-5L is a low capacitance TVS arrays, utilizing leading monolithic silicon technology to provide fast re-sponse time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The DL0502S2-5L complies with the IEC 61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 25\text{kV}$ contact discharge. It is assembled into a 6-lead SOT23-6 lead-free package. The leads are finished with lead-free matte tin. Each device will protect up to four high-speed lines. The combination of small size, low capacitance, and high surge capability makes them ideal for use in applications such as Ethernet, USB 2.0, and video inter-faces.

Features

- ◆ Low capacitance: 0.8pF typical (I/O to I/O)
- ◆ Low operating voltage: 5V
- ◆ Fast turn-on and Low clamping voltage
- ◆ Array of surge rated diodes with internal equivalent TVS diode
- ◆ ESD Protect for 2 high-speed I/O channels
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
Air discharge: $\pm 30\text{kV}$
Contact discharge: $\pm 25\text{kV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - IEC61000-4-5 (Lightning) : 8A(8/20 μs)
- ◆ ROHS Compliant

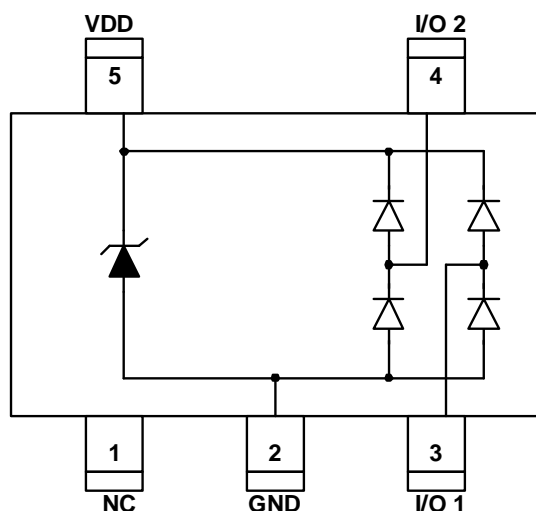
Mechanical Characteristics

- ◆ Package: SOT23-5L
- ◆ UL Flammability Classification Rating 94V-0
- ◆ Case Material: "Green" Molding Compound
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

Applications

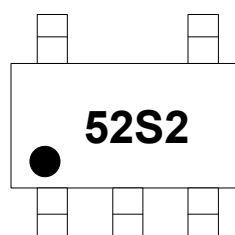
- ◆ USB 2.0 power and data line
- ◆ Notebook and PC Computers
- ◆ Monitors and Flat Panel Displays
- ◆ IEEE 1394 Firewire Ports
- ◆ Video Graphics Cards
- ◆ SIM Ports

Dimensions and Pin Configuration



Circuit and Pin Schematic

Marking Information



52S2 = Device Marking Code
Dot denotes Pin 1

Ordering Information

| Part Number | Marking | Packaging | Reel Size |
|-------------|---------|------------------|-----------|
| DL0502S2-5L | 52S2 | 3000/Tape & Reel | 7 inch |

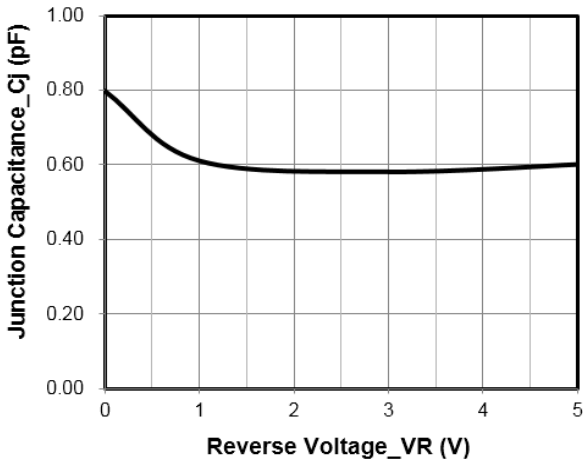
Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|--|------------------|-------------|--------------------|
| Peak Pulse Power (8/20 μs) | Ppk | 160 | W |
| Peak Pulse Current (8/20 μs) | I _{PP} | 8 | A |
| ESD per IEC 61000-4-2 (Air) | VESD | ± 30 | kV |
| ESD per IEC 61000-4-2 (Contact) | | ± 25 | |
| Operating Temperature Range | T _J | -55 to +125 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T _{stg} | -55 to +150 | $^{\circ}\text{C}$ |

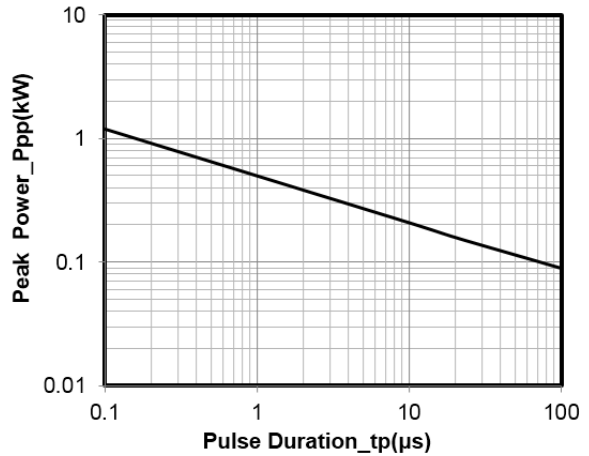
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------|------------------|-----|-----|-----|---------------|--|
| Reverse Working Voltage | V _{RWM} | | | 5 | V | Pin 5 to Pin 2 |
| Breakdown Voltage | V _{BR} | 6 | | | V | I _T = 1mA, Pin 5 to Pin 2 |
| Reverse Leakage Current | I _R | | | 0.5 | μA | V _{RWM} = 5V, Pin 5 to Pin 2 |
| Forward Voltage | V _F | | | 1.2 | V | I _F = 15mA |
| Clamping Voltage | V _C | | | 12 | V | I _{PP} = 1A (8 x 20 μs pulse), any I/O pin to ground |
| Clamping Voltage | V _C | | | 20 | V | I _{PP} = 8A (8 x 20 μs pulse), any I/O pin to ground |
| Junction Capacitance | C _J | | | 0.8 | pF | V _R = 0V, f = 1MHz, between I/O pins |
| Junction Capacitance | C _J | | | 1.5 | pF | V _R = 0V, f = 1MHz, any I/O pin to ground |

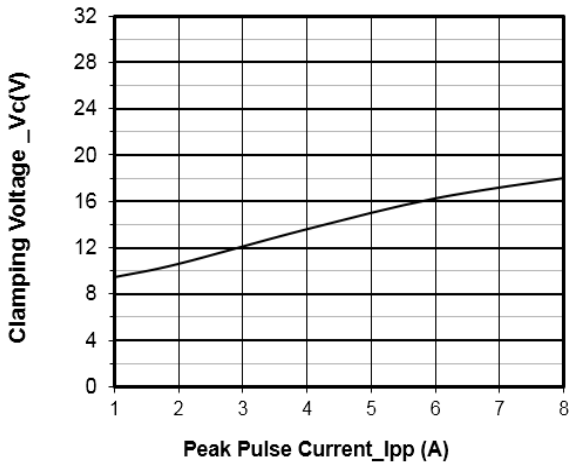
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



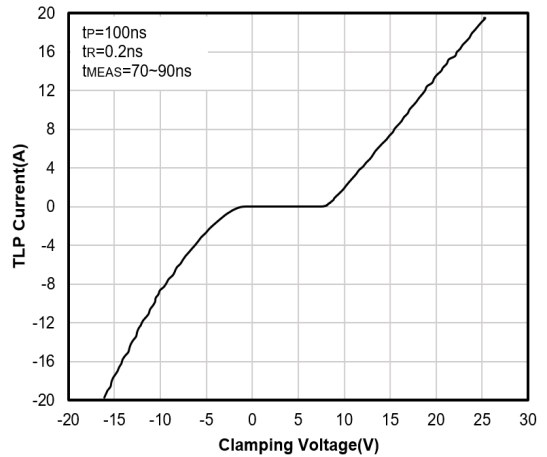
Junction Capacitance vs. Reverse Voltage



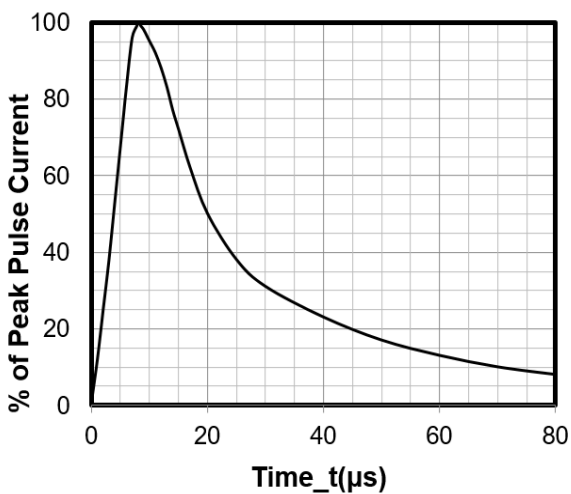
Peak Pulse Power vs. Pulse Time



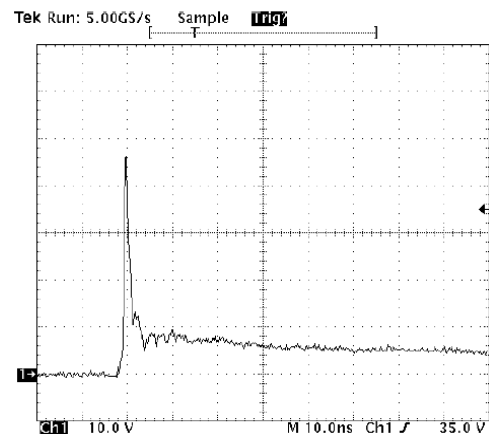
Clamping Voltage vs. Peak Pulse Current



TLP Curve



8 X 20μs Pulse Waveform

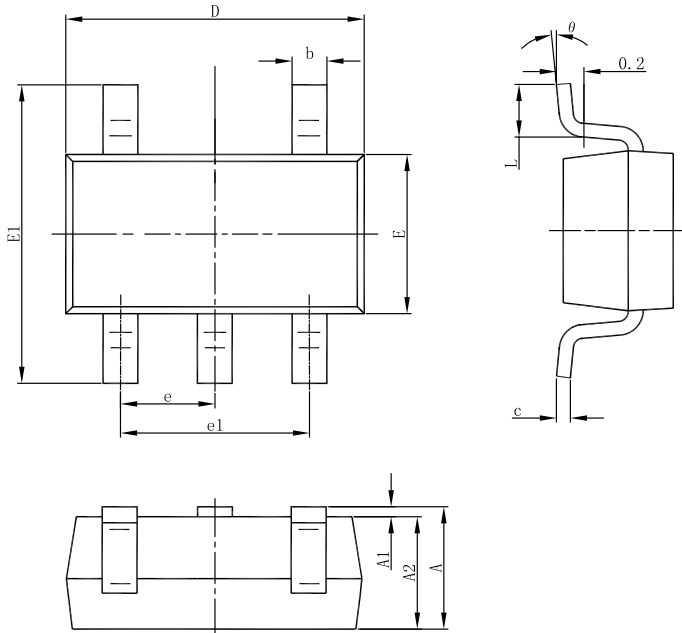


Note: Data is taken with a 10x attenuator

ESD Clamping Voltage

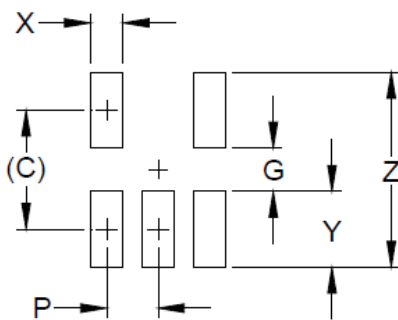
8 kV Contact per IEC61000-4-2

SOT23-5L Package Outline Drawing



| Symbol | Dimensions | | | |
|--------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| theta | 0° | 8° | 0° | 8° |

Suggested Land Pattern



| SYM | DIMENSIONS | |
|-----|-------------|--------|
| | MILLIMETERS | INCHES |
| C | 2.50 | 0.098 |
| G | 1.40 | 0.055 |
| P | 0.95 | 0.037 |
| X | 0.60 | 0.024 |
| Y | 1.10 | 0.043 |
| Z | 3.60 | 0.141 |

Contact Information

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