

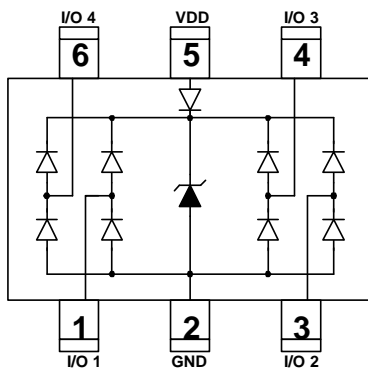
Description

The DL0504S2-D is an ultra low capacitance TVS array, 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 lines. The DL0504S2-D has an ultra-low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) standard with $\pm 26\text{kV}$ air and $\pm 23\text{kV}$ contact discharge. It is assembled into a 6-pin lead-free SOT23-6 package. The low capacitance array make it ideal for four high speed data and transmission line. This device is optimized for ESD protection of portable electronics.

Mechanical Characteristics

- ◆ Package: SOT23-6
- ◆ Lead Finish: Matte Tin
- ◆ 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

Dimensions and Pin Configuration



Circuit and Pin Schematic

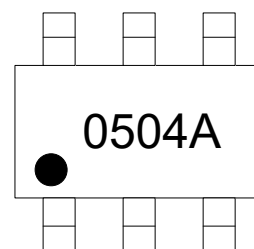
Features

- ◆ Ultra low capacitance: 0.3pF typical (I/O to I/O)
- ◆ Ultra low leakage: nA level
- ◆ Low operating voltage: 5V
- ◆ Low clamping voltage
- ◆ Up to 4 data lines and one power line protects
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
Air discharge: $\pm 26\text{kV}$
Contact discharge: $\pm 23\text{kV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - IEC61000-4-5 (Lightning) : 5A(8/20 μs)
- ◆ ROHS Compliant

Applications

- ◆ USB 2.0 and USB 3.0 Ports
- ◆ USB OTG
- ◆ Digital video interface(DVI)
- ◆ Monitor and Flat Panel Displays
- ◆ PCI Express and Serial SATA Ports
- ◆ Gigabit Ethernet
- ◆ IEEE 1394 firewire ports
- ◆ Consumer products (STB, DVD, DSC, DVC...)

Marking Information



0504A = Device Code

Ordering Information

| Part Number | Marking | Packaging | Reel Size |
|-------------|---------|------------------|-----------|
| DL0504S2-D | .0504A | 3000/Tape & Reel | 7 inch |

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

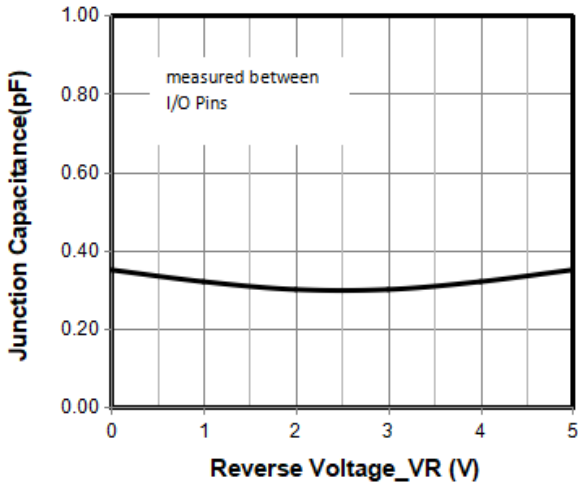
| Parameter | Symbol | Value | Unit |
|---------------------------------|------------------|-------------|------|
| Peak Pulse Power (tp=8/20μs) | PPP | 100 | W |
| Peak Pulse Current (tp=8/20μs) | I _{PP} | 5 | A |
| ESD per IEC 61000-4-2 (Air) | V _{ESD} | ±26 | kV |
| ESD per IEC 61000-4-2 (Contact) | | ±23 | |
| Operating Temperature Range | T _J | -55 to +125 | °C |
| Storage Temperature Range | T _{stg} | -55 to +150 | °C |

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

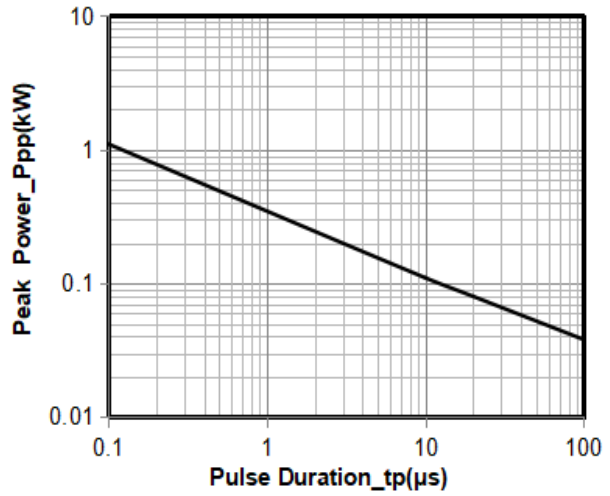
| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------|------------------|-----|-----|-----|------|---|
| Reverse Working Voltage | V _{RWM} | | | 5 | V | Any I/O pin to ground |
| Breakdown Voltage | V _{BR} | 6 | | | V | I _T = 1mA, any I/O pin to ground |
| Reverse Leakage Current | I _R | | | 0.5 | μA | V _{RWM} = 5V, any I/O pin to ground |
| Clamping Voltage | V _C | | | 15 | V | I _{PP} = 1A (8 x 20μs pulse) any I/O pin to ground |
| Clamping Voltage | V _C | | | 20 | V | I _{PP} = 5A (8 x 20μs pulse) any I/O pin to ground |
| Junction Capacitance | C _J | | 0.3 | 0.4 | pF | V _R = 0V, f = 1MHz, between I/O pins |
| Junction Capacitance | C _J | | | 0.8 | pF | V _R = 0V, f = 1MHz, any I/O pin to ground |

Note 1: I/O pins are Pin 1, 3, 4 and 6

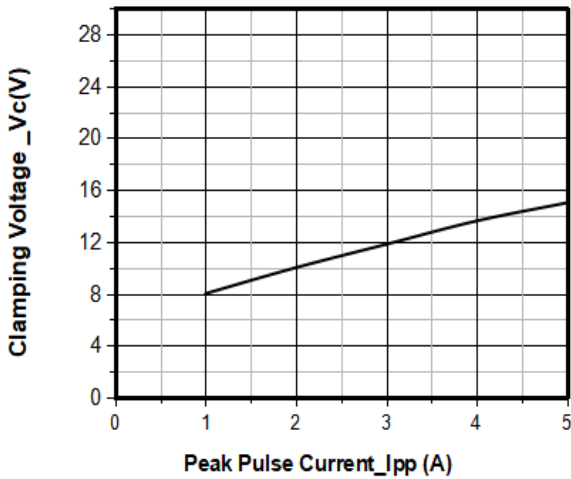
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



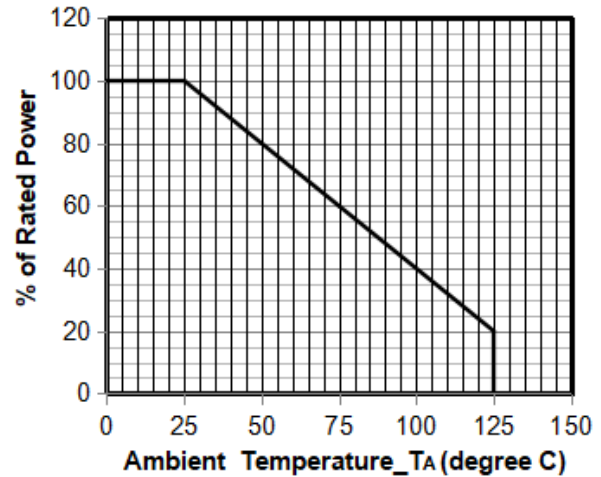
Junction Capacitance vs. Reverse Voltage



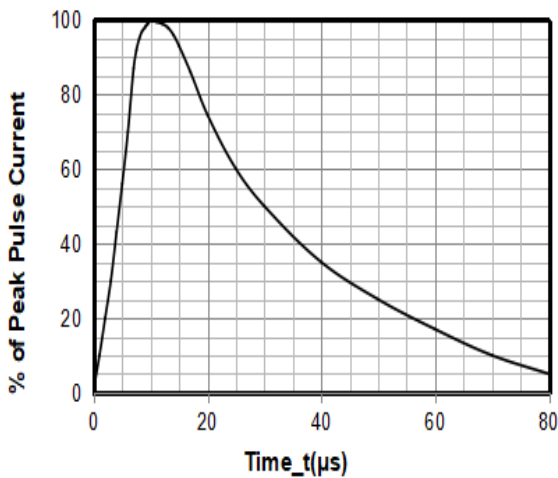
Peak Pulse Power vs. Pulse Time



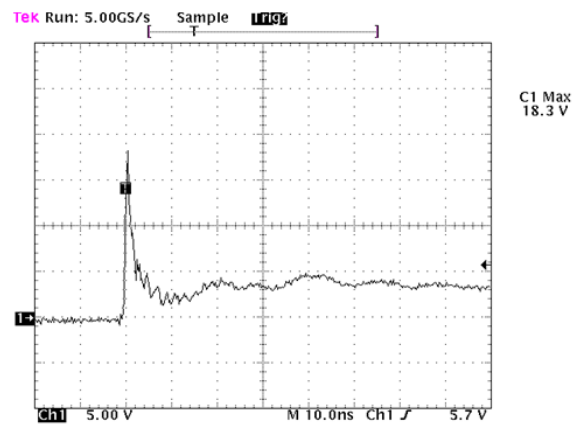
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve

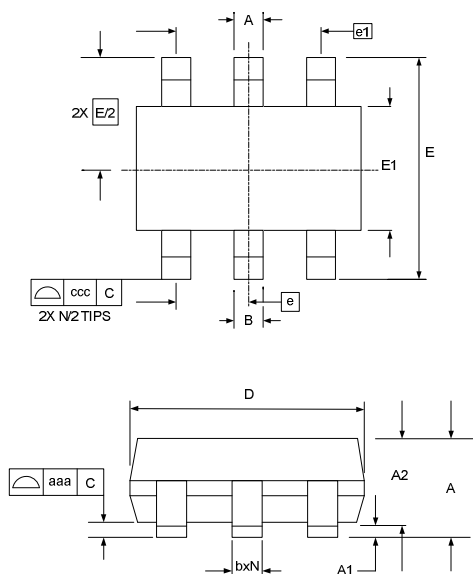


8 X 20μs Pulse Waveform



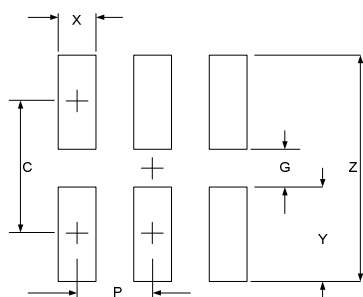
Note: Data is taken with a 10x attenuator
ESD Clamping Voltage
8 kV Contact per IEC61000-4-2

SOT23-6 Package Outline Drawing



| SYM | DIMENSIONS | | | | | |
|-----|-------------|------|------|-----------|-------|-------|
| | MILLIMETERS | | | INCHES | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.90 | | 1.45 | 0.035 | | 0.057 |
| A1 | 0.00 | | 0.15 | 0.000 | | 0.006 |
| A2 | 0.90 | 1.15 | 1.30 | 0.035 | 0.045 | 0.051 |
| b | 0.25 | | 0.50 | 0.010 | | 0.020 |
| c | 0.08 | | 0.22 | 0.003 | | 0.009 |
| D | 2.80 | 2.90 | 3.10 | 0.110 | 0.114 | 0.122 |
| E1 | 1.50 | 1.60 | 1.75 | 0.060 | 0.063 | 0.069 |
| E | 2.80 BSC | | | 0.110 BSC | | |
| e | 0.95 BSC | | | 0.037 BSC | | |
| e1 | 1.90 BSC | | | 0.075 BSC | | |
| N | 6 | | | 6 | | |
| aaa | 0.10 | | | 0.004 | | |
| ccc | 0.20 | | | 0.008 | | |

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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