

Description

The AR0502S5 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 AR0502S5 has very low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) with $\pm 25\text{kV}$ air and $\pm 20\text{kV}$ contact discharge. It is assembled into a 3-pin lead-free SOT-523 package. The combination of small size, low capacitance and high level of ESD protection makes it ideal for HDMI, MDDI, antenna circuits, USB 2.0, and Infiniband circuits.

Features

- Ultra low capacitance: 0.3pF typical (I/O to I/O)
- Ultra low leakage: nA level
- Operating voltage: 5V
- Low clamping voltage
- Up to 2 data lines protects
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
Air discharge: $\pm 25\text{kV}$
Contact discharge: $\pm 20\text{kV}$
 - IEC61000-4-5 (Lightning) 5A (8/20 μs)
- RoHS Compliant

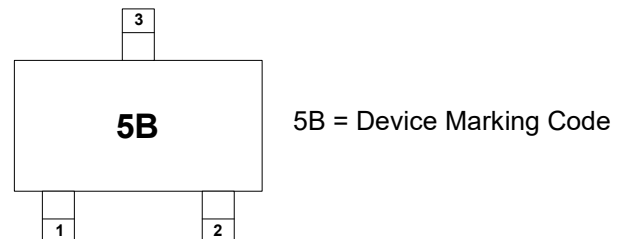
Mechanical Characteristics

- Package: SOT-523
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- Terminal Connections: See Diagram Below
- Marking Information: See Below

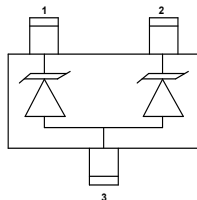
Applications

- Mobile Display Digital Interface (MDDI)
- USB 2.0
- Photodetector Protection
- HBT Power Amplifier Protection
- Infiniband Transceiver Protection
- Firewire Ports

Marking Information



Equivalent Circuit and Pin Configuration



Circuit and Pin Schematic

Ordering Information

| Part Number | Packaging | Reel Size |
|-------------|------------------|-----------|
| AR0502S5 | 3000/Tape & Reel | 7 inch |

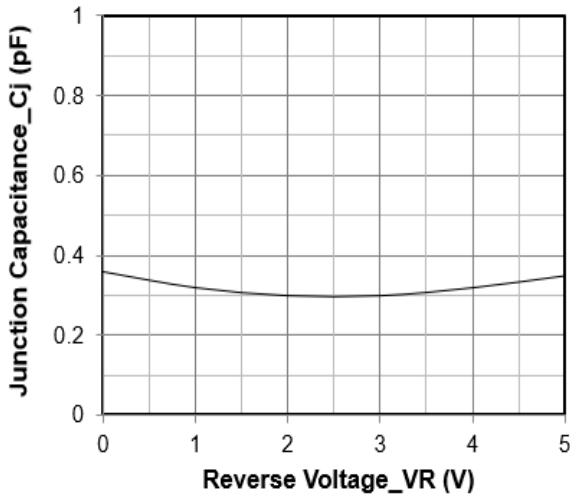
Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|--|------------------|----------------------|------------------|
| Peak Pulse Power (8/20 μs) | Ppk | 80 | W |
| Peak Pulse Current (8/20 μs) | I _{PP} | 5 | A |
| ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact) | V _{ESD} | ± 25 ± 20 | kV |
| Operating Temperature Range | T _J | -55 to +125 | $^\circ\text{C}$ |
| Storage Temperature Range | T _{stg} | -55 to +150 | $^\circ\text{C}$ |

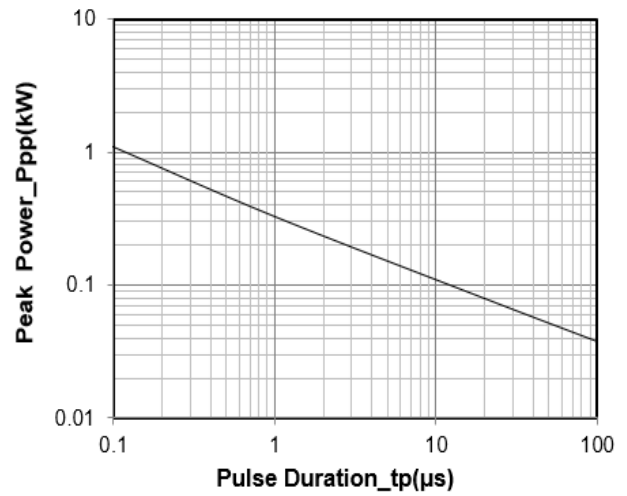
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------|------------------|-----|-----|-----|---------------|--|
| Reverse Working Voltage | V _{RWM} | | | 5 | V | Pin 1 or pin 2 to pin 3 and between pin 1 and pin 2 |
| Breakdown Voltage | V _{BR} | 6 | | | V | I _T = 1mA, pin 1 or pin 2 to pin 3 |
| Reverse Leakage Current | I _R | | | 0.5 | μA | V _{RWM} = 5V, pin 1 or pin 2 to pin 3 and between pin 1 and pin 2 |
| Clamping Voltage | V _C | | | 9 | V | I _{PP} = 1A (8 x 20 μs pulse), pin 1 or pin 2 to pin 3 |
| Clamping Voltage | V _C | | | 16 | V | I _{PP} = 5A (8 x 20 μs pulse), pin 1 or pin 2 to pin 3 |
| Junction Capacitance | C _J | | 0.3 | | pF | V _R = 0V, f = 1MHz, pin 1 to pin 2 |
| Junction Capacitance | C _J | | 0.6 | 0.8 | pF | V _R = 0V, f = 1MHz, pin 1 or pin 2 to pin 3 |

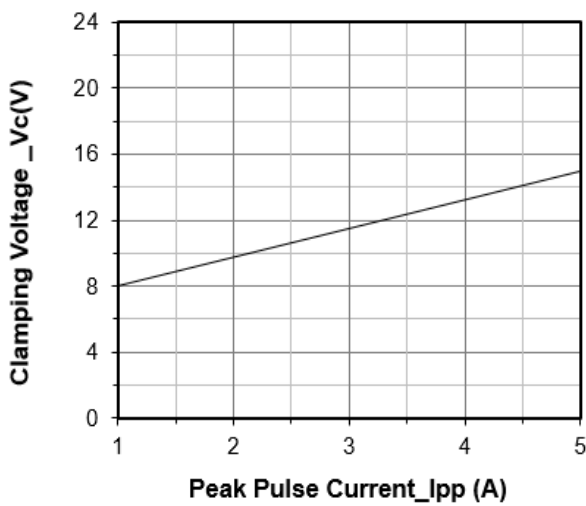
Typical Performance Characteristics ($T_A=25^\circ\text{C}$ unless otherwise Specified)



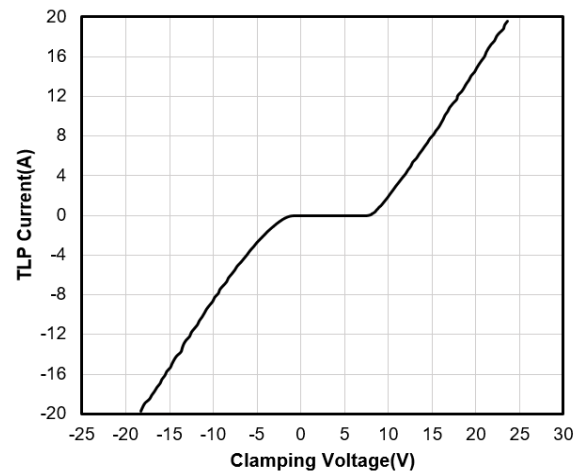
Junction Capacitance vs. Reverse Voltage



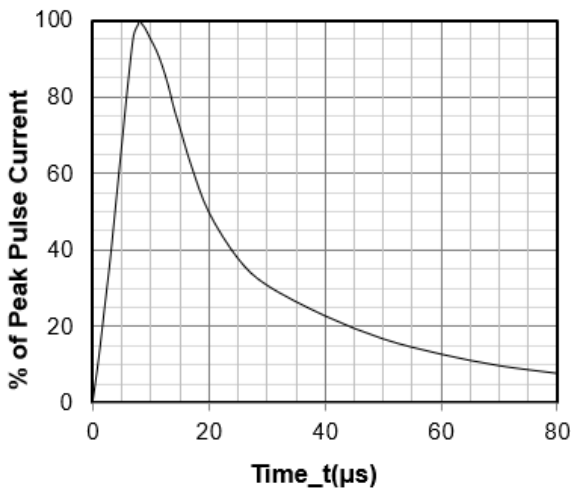
Peak Pulse Power vs. Pulse Time



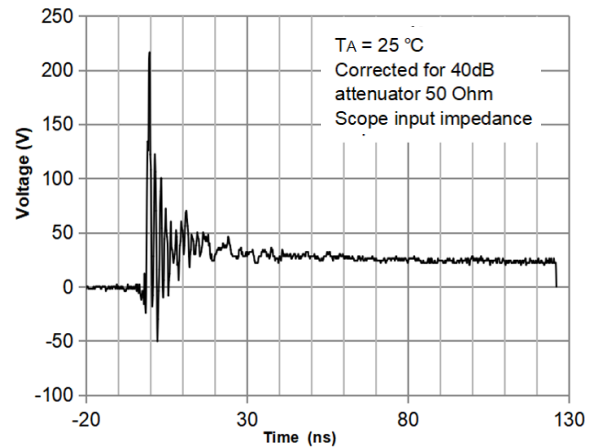
Clamping Voltage vs. Peak Pulse Current ($t_p = 8/20\mu\text{s}$)



TLP Measurement

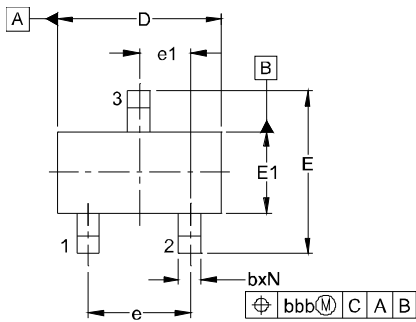


8 X 20μs Pulse Waveform

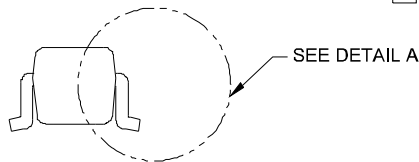
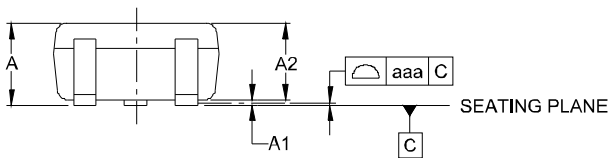


ESD Clamping Voltage
8 kV Contact per IEC61000-4-2

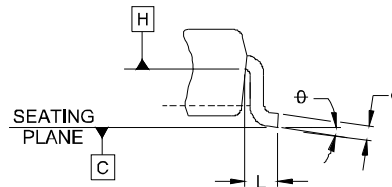
SOT-523 Package Outline Drawing



| DIM | INCHES | | | MILLIMETERS | | |
|----------|----------|------|------|-------------|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | .023 | - | .035 | 0.60 | - | 0.90 |
| A1 | .000 | - | .004 | 0.00 | - | 0.10 |
| A2 | .023 | .030 | .031 | 0.60 | 0.75 | 0.80 |
| b | .005 | - | .012 | 0.15 | - | 0.30 |
| c | .003 | - | .008 | 0.10 | - | 0.20 |
| D | .059 | .063 | .067 | 1.50 | 1.60 | 1.70 |
| E | .057 | .063 | .069 | 1.45 | 1.60 | 1.75 |
| E1 | .029 | .031 | .033 | 0.75 | 0.80 | 0.85 |
| e | .039 BSC | | | 1.00 BSC | | |
| e1 | .020 BSC | | | 0.50 BSC | | |
| L | (.009) | | | (0.22) | | |
| N | 3 | | | 3 | | |
| θ | 0° | - | 8° | 0° | - | 8° |
| aaa | .004 | | | 0.10 | | |
| bbb | .008 | | | 0.20 | | |

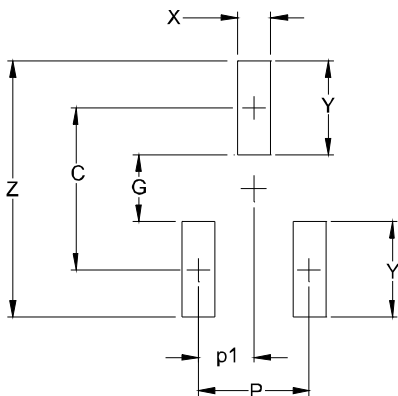


SIDE VIEW



DETAIL A

Suggested Land Pattern



| SYM | DIMENSIONS | |
|-----|------------|-------------|
| | INCHES | MILLIMETERS |
| C | (.055) | (1.40) |
| P | .039 | 1.00 |
| P1 | .020 | 0.50 |
| G | .024 | 0.60 |
| X | .016 | 0.40 |
| Y | .031 | 0.80 |
| Z | .087 | 2.20 |

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