

Description

The AR0502S2 is an uni-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 lines. The AR0502S2 has an ultra-low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) standard with $\pm 25\text{kV}$ air and $\pm 20\text{kV}$ contact discharge. It is assembled into a lead-free SOT-23 package. The small size, ultra-low capacitance and high ESD surge protection make AR0502S2 an ideal choice to protect cell phone, digital visual interfaces and other high speed ports.

Features

- Low capacitance: 0.3pF typical (I/O to I/O)
- Ultra low leakage: nA level
- Operating voltage: 5V
- Low clamping voltage
- Up to 2-line 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

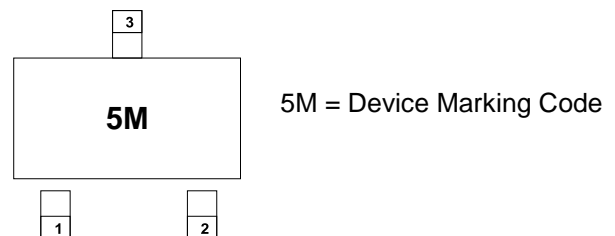
Mechanical Characteristics

- Package: SOT-23
- 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

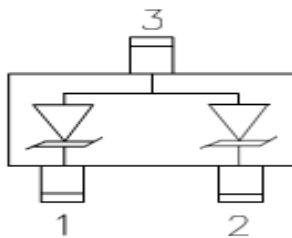
Applications

- Cellular Handsets and Accessories
- Display Ports
- MDDI Ports
- USB 2.0 and 3.0 Ports
- HDMI 1.3 and 1.4
- Digital Visual Interface (DVI)
- PCI Express and Serial SATA Ports
- Notebook Computer

Marking Information



Dimensions and Pin Configuration



Pin Schematic

Ordering Information

| Part Number | Packaging | Reel Size |
|-------------|------------------|-----------|
| AR0502S2 | 3000/Tape & Reel | 7 inch |

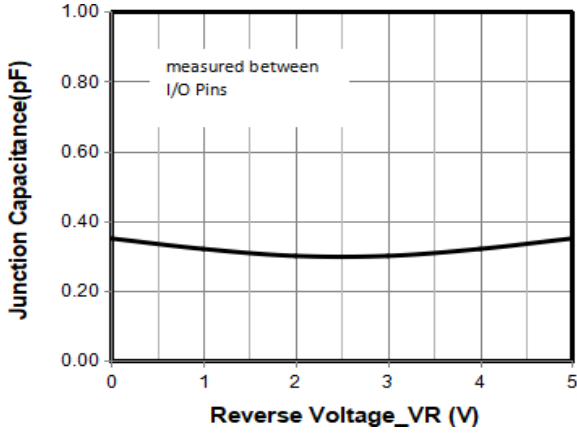
Absolute Maximum Ratings (TA=25°C unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|--|--------|-------------|------|
| Peak Pulse Power (8/20μs) | Ppk | 80 | W |
| Peak Pulse Current (8/20μs) | IPP | 5 | A |
| ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact) | VESD | ±25 ±20 | kV |
| Operating Temperature Range | TJ | -55 to +125 | °C |
| Storage Temperature Range | Tstg | -55 to +150 | °C |

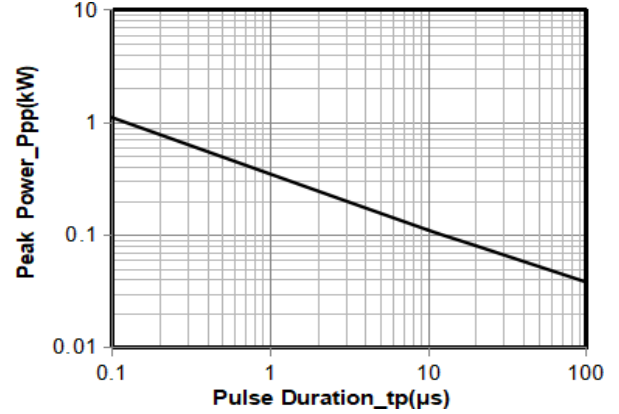
Electrical Characteristics (TA=25°C unless otherwise specified)

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------|--------|-----|------|-----|------|--|
| Reverse Working Voltage | VRWM | | | 5 | V | Pin 1 or pin 2 to pin 3 and between pin 1 and pin 2 |
| Breakdown Voltage | VBR | 6 | | | V | IT = 1mA, pin 1 or pin 2 to pin 3 and between pin 1 and pin 2 |
| Reverse Leakage Current | IR | | 0.01 | 0.5 | μA | VRWM = 5V, Pin 1 or pin 2 to pin 3 and between pin 1 and pin 2 |
| Clamping Voltage | VC | | | 9 | V | IPP = 1A (8 x 20μs pulse), pin 1 or pin 2 to pin 3 |
| Clamping Voltage | VC | | | 16 | V | IPP = 5A (8 x 20μs pulse), pin 1 or pin 2 to pin 3 |
| Junction Capacitance | CJ | | 0.3 | 0.4 | pF | VR = 0V, f = 1MHz, between pin 1 and pin 2 |
| Junction Capacitance | CJ | | | 0.8 | pF | VR = 0V, f = 1MHz, pin 1 or pin 2 to pin 3 |

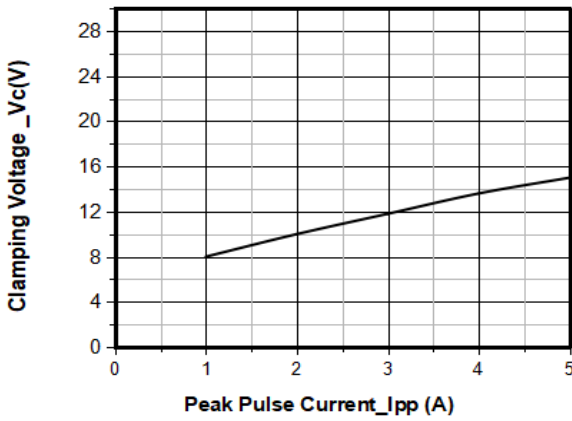
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



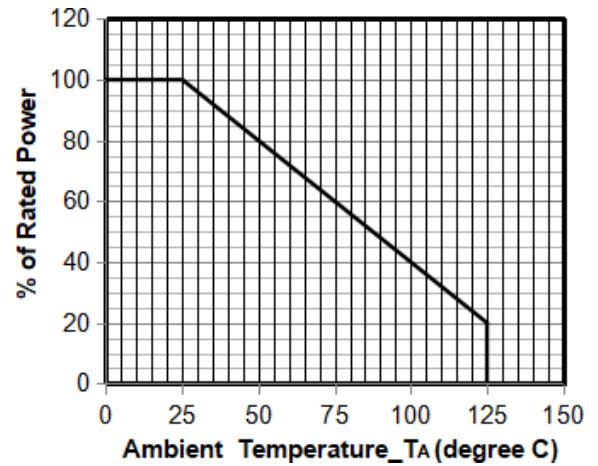
Junction Capacitance vs. Reverse Voltage



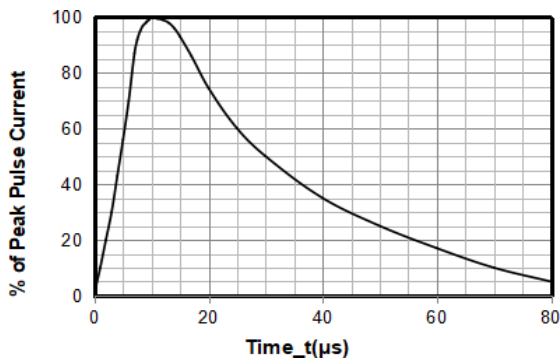
Peak Pulse Power vs. Pulse Time



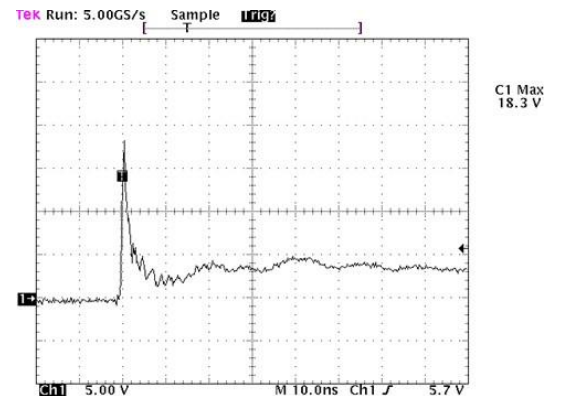
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve

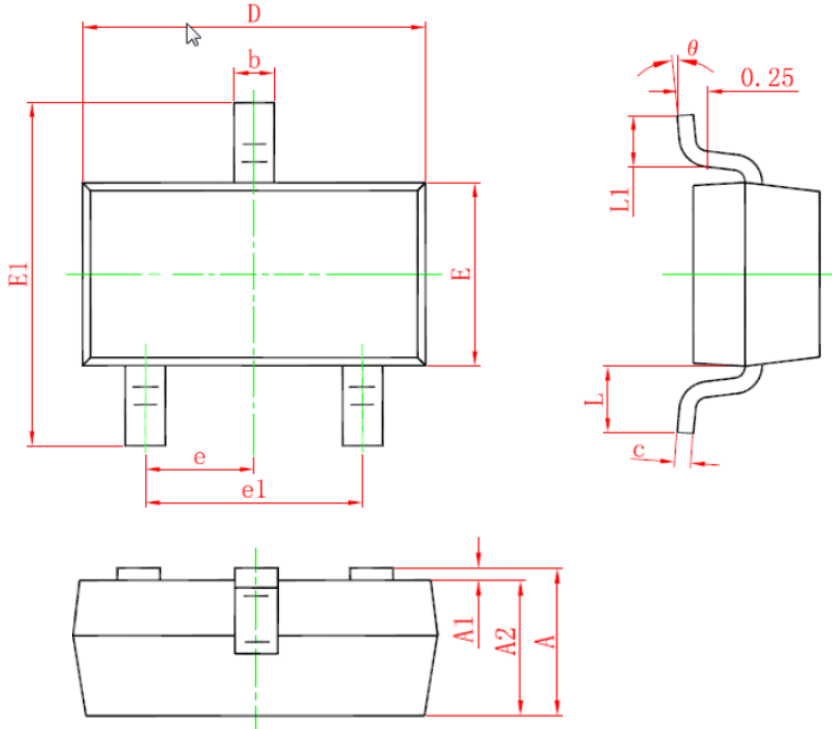


8 X 20μs Pulse Waveform



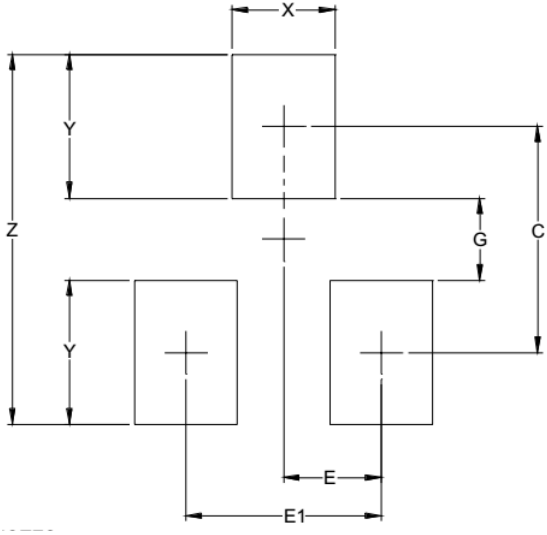
Note: Data is taken with a 10x attenuator
ESD Clamping Voltage 8 kV Contact per IEC61000-4-2

SOT-23 Package Outline Drawing



| SYM | DIMENSIONS | | | | | |
|-----|-------------|-----|------|----------|-----|-------|
| | MILLIMETERS | | | INCHES | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.90 | -- | 1.15 | 0.035 | -- | 0.045 |
| A1 | 0.00 | -- | 0.10 | 0.000 | -- | 0.004 |
| A2 | 0.90 | -- | 1.05 | 0.035 | -- | 0.041 |
| b | 0.30 | -- | 0.50 | 0.012 | -- | 0.020 |
| c | 0.08 | -- | 0.15 | 0.003 | -- | 0.006 |
| D | 2.80 | -- | 3.00 | 0.110 | -- | 0.118 |
| E | 1.20 | -- | 1.40 | 0.047 | -- | 0.055 |
| E1 | 2.25 | -- | 2.55 | 0.089 | | 0.100 |
| e | 0.95TYP | | | 0.037TYP | | |
| e1 | 1.80 | -- | 2.00 | 0.071 | -- | 0.079 |
| L | 0.55REF | | | 0.022REF | | |
| L1 | 0.30 | -- | 0.50 | 0.012 | -- | 0.020 |
| θ | 0° | -- | 8° | 0° | -- | 8° |

Suggested Land Pattern



| SYM | DIMENSIONS | |
|-----|------------|-------------|
| | INCHES | MILLIMETERS |
| C | (.087) | (2.20) |
| E | .037 | 0.95 |
| E1 | .075 | 1.90 |
| G | .031 | 0.80 |
| X | .039 | 1.00 |
| Y | .055 | 1.40 |
| Z | .141 | 3.60 |