

Description

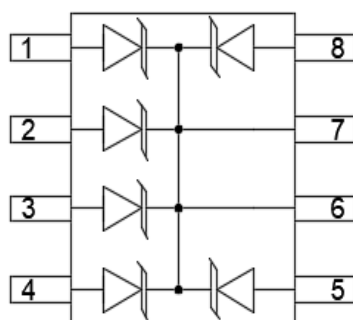
The SMDA15C-5 series of transient voltage suppressors are designed to protect components which are connected to data and transmission lines from voltage surges caused by electrostatic discharge (ESD), electrical fast transients(EFT), and lightning. TVS diodes are characterized by their high surge capability, low operating and clamping voltages, and fast response time. This makes them ideal for use as board level protection of sensitive semiconductor components. The SMDA15C-5 is designed to provide transient suppression on multiple data lines and I/O ports. The low profile SO-8 design allows the user to protect up to five data and I/O lines with one package.

The SMDA15C-5 TVS diode array will meet the surge requirements of IEC 61000-4-2(Formerly IEC 801-2), Level 4, "Human Body Model" for air and contact discharge.

Mechanical Characteristics

- ◆ JEDEC SO-8 package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking: Part number
- ◆ Packaging: Tube or Tape and Reel per EIA 481

Dimensions and Pin Configuration



SO-8 (Top View)

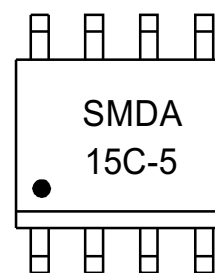
Features

- ◆ Transient protection for data lines to IEC 61000-4-2(ESD) $\pm 30\text{kV}$ (air), $\pm 30\text{kV}$ (contact)
- ◆ IEC 61000-4-4(EFT) 40A(5/50ns)
- ◆ IEC 61000-4-5(Lightning)11A(8/20 μs)
- ◆ Small SO-8 surface mount package
- ◆ Protects five I/O lines
- ◆ Working voltages: 15V
- ◆ Low leakage current
- ◆ Low operating and clamping voltages
- ◆ Solid-state silicon avalanche technology

Applications

- ◆ RS-232 and RS-422 Data Lines
- ◆ Microprocessor based equipment
- ◆ LAN/WAN equipment
- ◆ Notebooks, Desktops, and Servers
- ◆ Instrumentation
- ◆ Peripherals
- ◆ Set Top Box
- ◆ Serial and Parallel Ports

Marking Information



Dot denotes Pin1

Ordering Information

| Part Number | Marking | Packaging | Reel Size |
|-------------|-----------|------------------|-----------|
| SMDA15C-5 | SMDA15C-5 | 2500/Tape & Reel | 13 inch |

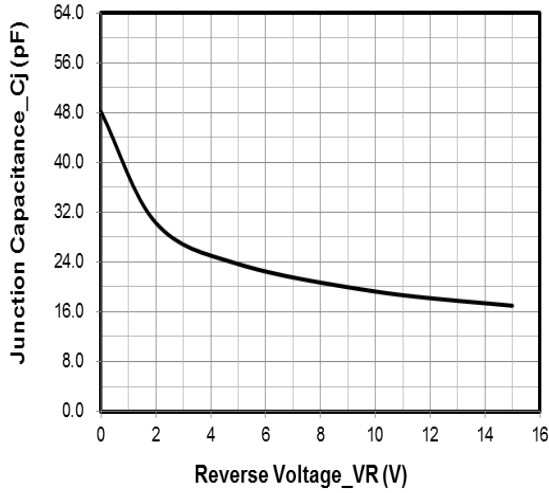
Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|------------------------------------------|------------------|-------------|------------------|
| Peak Pulse Power (8/20 μs) | Ppk | 350 | W |
| Peak Pulse Current (8/20 μs) | I _{PP} | 11 | A |
| ESD per IEC 61000-4-2 (Air) | V _{ESD} | ± 30 | kV |
| ESD per IEC 61000-4-2 (Contact) | | ± 30 | |
| Operating Temperature Range | T _J | -55 to +125 | $^\circ\text{C}$ |
| Storage Temperature Range | T _{stg} | -55 to +150 | $^\circ\text{C}$ |

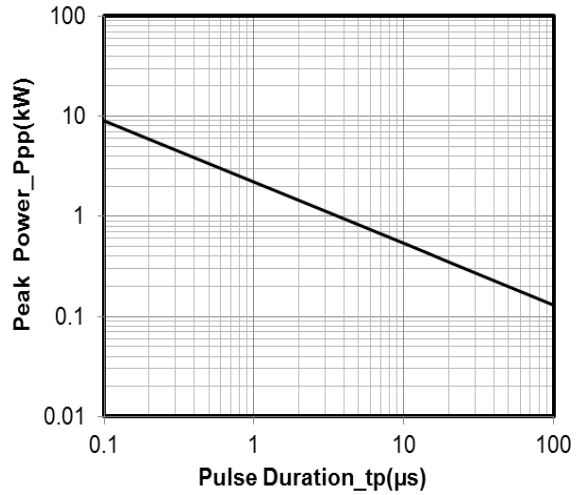
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Min | Typ | Max | Unit | Test Condition |
|---------------------------|------------------|------|-----|-----|---------------|---------------------------------------------------------------------------|
| Reverse Working Voltage | V _{RWM} | | | 15 | V | |
| Reverse Breakdown Voltage | V _{BR} | 16.7 | | | V | I _T = 1mA |
| Reverse Leakage Current | I _R | | | 0.5 | μA | V _{RWM} = 15V, any I/O pin to ground |
| Clamping Voltage | V _C | | | 23 | V | I _{PP} = 1A (8 x 20 μs pulse), any I/O pin to ground |
| Clamping Voltage | V _C | | | 32 | V | I _{PP} = 11A (8 x 20 μs pulse), any I/O pin to ground |
| Junction Capacitance | C _J | | 50 | | pF | V _R = 0V, f = 1MHz, any I/O pin to ground |

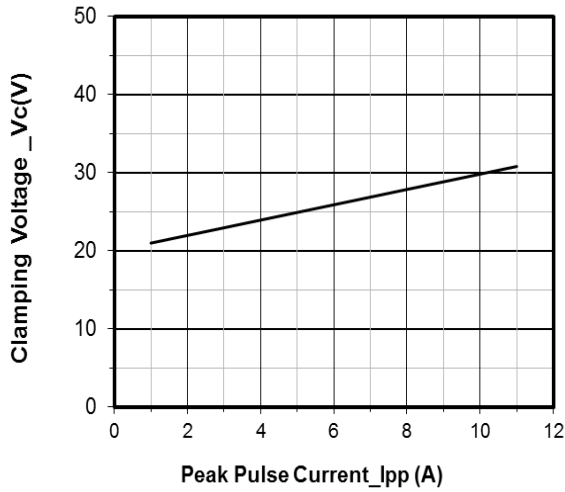
Typical Performance Characteristics (T_A=25°C unless otherwise Specified)



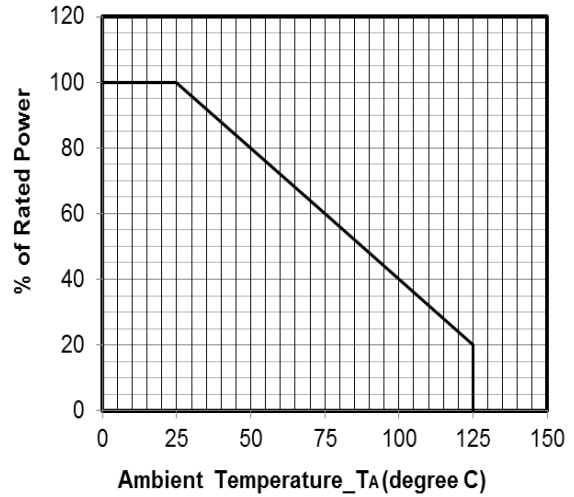
Junction Capacitance vs. Reverse Voltage



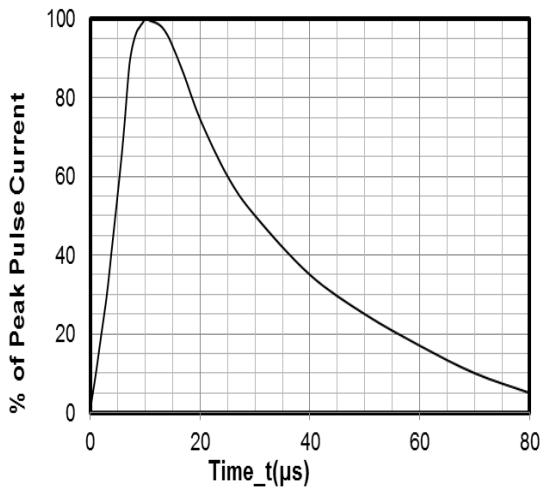
Peak Pulse Power vs. Pulse Time



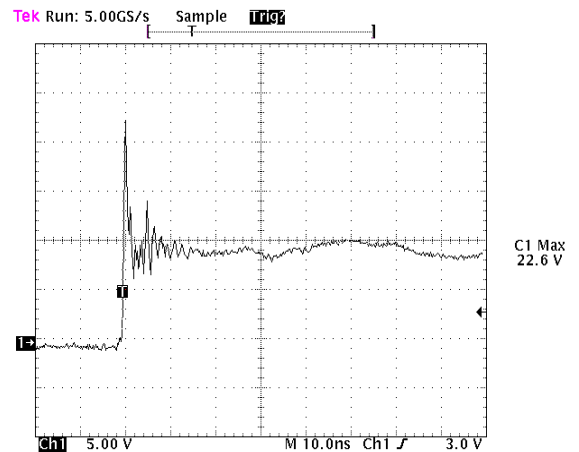
Clamping Voltage vs. Peak Pulse Current



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

Applications Information

Device Connection for Protection of Five Data Lines

The SMDAxxC-5 is designed to protect up to 5 data or I/O lines. They are bidirectional devices and may be used on lines where the signal polarities are above and below ground.

The SMDAxxC-5 TVS arrays employs a monolithic structure. Therefore, the working voltage (VRWM) and breakdown voltage (VBR) specifications apply to the differential voltage between any two data line pins. For example, the SMDA24C-5 is designed for a maximum voltage excursion of $\pm 12\text{V}$ between any two data lines.

The device is connected as follows:

- ◆ Pins 1, 2, 3, 4 and 5 are connected to the lines that are to be protected. Pin 8 is connected to ground. The ground connections should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces. Pins 6 and 7 are not connected.

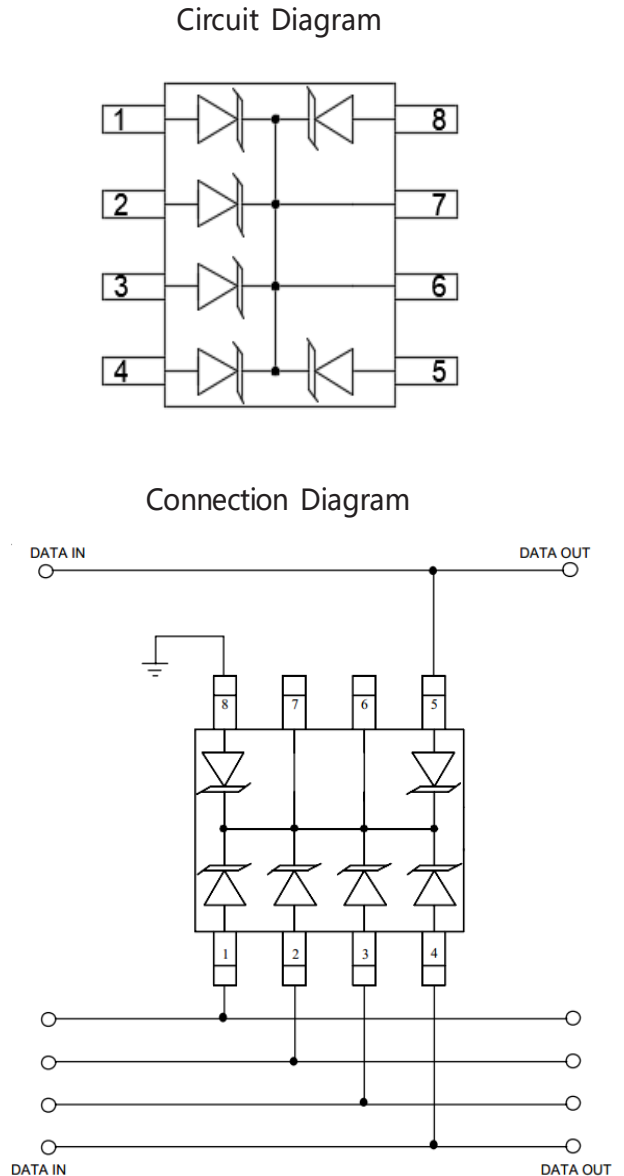
Circuit Board Layout Recommendations for Suppression of ESD.

Good circuit board layout is critical for the suppression of ESD induces transients. The following guidelines are recommended:

- ◆ Place the TVS near the input terminals or connectors to restrict transient coupling.
- ◆ Minimize the path length between the TVS and the protected line.
- ◆ Minimize all conductive loops including power and ground loops.
- ◆ The ESD transient return path to ground should be kept as short as possible.
- ◆ Never run critical signals near board edges.
- ◆ Use ground planes whenever possible.

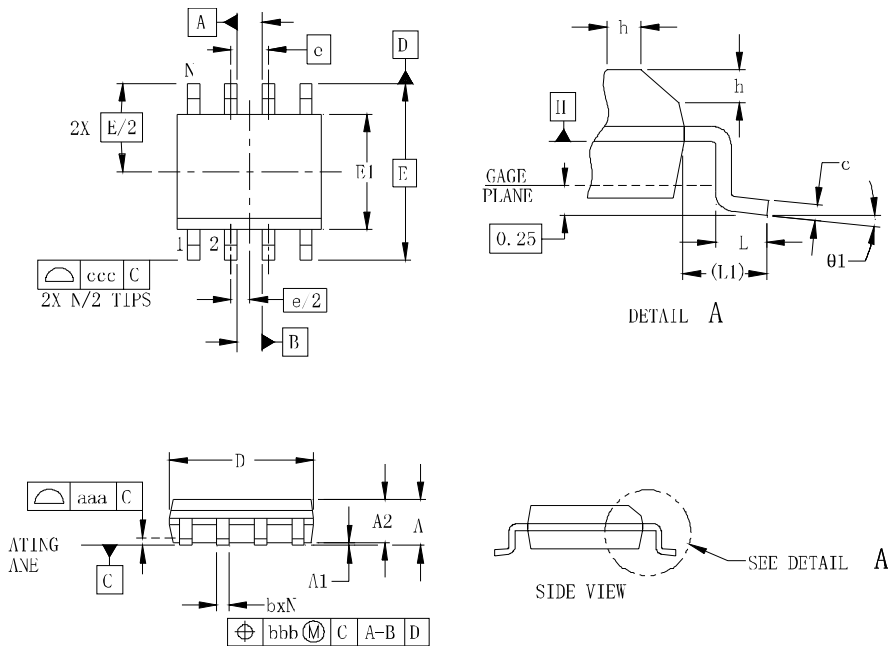
Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of



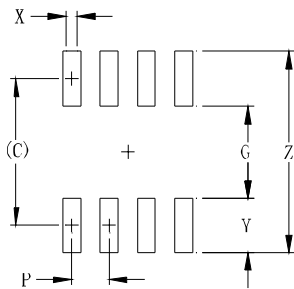
the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. In addition, unlike other lead-free compositions, matte tin does not have any added alloys that can cause degradation of the solder joint.

SO-8 Package Outline Drawing



| SYM | DIMENSIONS | | | | | |
|-----|-------------|------|------|-----------|-------|-------|
| | MILLIMETERS | | | INCHES | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.35 | | 1.75 | 0.053 | | 0.069 |
| A1 | 0.10 | | 0.25 | 0.004 | | 0.010 |
| A2 | 1.25 | | 1.65 | 0.049 | | 0.065 |
| b | 0.31 | | 0.51 | 0.012 | | 0.020 |
| c | 0.17 | | 0.25 | 0.007 | | 0.010 |
| D | 4.80 | 4.90 | 5.00 | 0.189 | 0.193 | 0.197 |
| E1 | 3.80 | 3.90 | 4.00 | 0.150 | 0.154 | 0.157 |
| E | 6.00 BSC | | | 0.236 BSC | | |
| e | 1.27 BSC | | | 0.050 BSC | | |
| h | 0.25 | | 0.50 | 0.010 | | 0.020 |
| L | 0.40 | 0.72 | 1.04 | 0.016 | 0.028 | 0.041 |
| L1 | (1.04) | | | (0.041) | | |
| N | 8 | | | 8 | | |
| θ1 | 0° | | 8° | 0° | | 8° |
| aaa | 0.10 | | | 0.004 | | |
| bbb | 0.25 | | | 0.010 | | |
| ccc | 0.20 | | | 0.008 | | |

Suggested Land Pattern



| SYM | DIMENSIONS | |
|-----|-------------|--------|
| | MILLIMETERS | INCHES |
| C | (5.20) | 0.205 |
| G | 3.00 | 0.118 |
| P | 1.27 | 0.050 |
| X | 0.60 | 0.024 |
| Y | 2.20 | 0.087 |
| Z | 7.40 | 0.291 |

Contact Information

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