

**2 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY**
**Features**

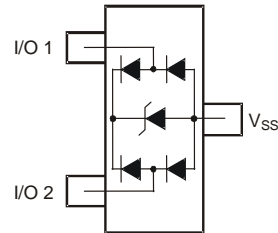
- IEC 61000-4-2 (ESD): Air – ±16kV, Contact – ±16kV
- IEC 61000-4-4 (EFT) Additional Level, 55A (5/50ns)
- IEC 61000-4-5 (Lightning): 12A (8/20µs)
- 2 Channels of ESD protection
- Low Channel Input Capacitance of 1.2pF Typical
- Typically Used at High Speed Ports such as USB 2.0, IEEE1394, Serial ATA, DVI, HDMI, PCI
- **Totally Lead-free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead-free Plating). Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.009 grams (Approximate)



Top View

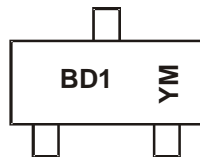


Device Schematic

**Ordering Information (Note 4)**

| Product       | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|------------|---------|--------------------|-----------------|-------------------|
| DT1452-02SO-7 | Standard   | BD1     | 7                  | 8               | 3,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


BD1 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 5 = May)

## Date Code Key

| Year  | 2013 |     | 2014 |     | 2015 |     | 2016 |     | 2017 |     | 2018 |     |
|-------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| Code  | A    |     | B    |     | C    |     | D    |     | E    |     | F    |     |
| Month | Jan  | Feb | Mar  | Apr | May  | Jun | Jul  | Aug | Sep  | Oct | Nov  | Dec |
| Code  | 1    | 2   | 3    | 4   | 5    | 6   | 7    | 8   | 9    | O   | N    | D   |

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                     | Symbol                  | Value    | Unit | Conditions                           |
|------------------------------------|-------------------------|----------|------|--------------------------------------|
| Peak Pulse Current                 | $I_{PP\_I/O}$           | 12       | A    | I/O to $V_{SS}$ , 8/20 $\mu\text{s}$ |
| ESD Protection – Contact Discharge | $V_{ESD\_I/O\_Contact}$ | $\pm 16$ | kV   | I/O to $V_{SS}$ , per IEC 61000-4-2  |
| ESD Protection – Air Discharge     | $V_{ESD\_I/O\_Air}$     | $\pm 16$ | kV   | I/O to $V_{SS}$ , per IEC 61000-4-2  |

**Thermal Characteristics**

| Characteristic                                   | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 5)                       | $P_D$           | 300         | mW                 |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 417         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                         | Symbol           | Min | Typ  | Max | Unit          | Test Conditions  |
|--|------------------|-----|------|-----|---------------|--|
| Reverse Working Voltage                | $V_{RWM}$        | —   | —    | 5.5 | V             | —  |
| Reverse Leakage Current (Note 6)       | $I_R$            | —   | —    | 1.0 | $\mu\text{A}$ | $V_R = 5\text{V}$ , I/O to $V_{SS}$  |
| Reverse Breakdown Voltage              | $V_{BR}$         | 7   | —    | 10  | V             | $I_R = 1\text{mA}$ , I/O to $V_{SS}$   |
| Forward Voltage                        | $V_F$            | —   | 0.85 | 1.1 | V             | $I_F = 15\text{mA}$ , $V_{SS}$ to I/O  |
| Reverse Clamping Voltage (Note 7)      | $V_C$            | —   | 7.5  | —   | V             | $I_{PP} = 5\text{A}$ , I/O to $V_{SS}$ , 8/20 $\mu\text{s}$  |
| Reverse Clamping Voltage (Note 7)      | $V_C$            | —   | 9.5  | —   | V             | $I_{PP} = 12\text{A}$ , I/O to $V_{SS}$ , 8/20 $\mu\text{s}$   |
| ESD Clamping Voltage                   | $V_{ESD}$        | —   | 11   | —   | V             | TLP, 20A, $t_p = 100\text{ns}$ , I/O to $V_{SS}$ , per Figure 7  |
| Dynamic Resistance                     | $R_{DIF}$        | —   | 0.22 | —   | $\Omega$      | TLP, 20A, $t_p = 100\text{ns}$ , I/O to $V_{SS}$ , per Figure 7  |
| Channel Input Capacitance              | $C_{I/O}$        | —   | 1.2  | 1.7 | pF            | $V_R = 2.5\text{V}$ , $f = 1\text{MHz}$  |
| Variation of Channel Input Capacitance | $\Delta C_{I/O}$ | —   | 0.03 | —   | pF            | $V_{SS} = 0\text{V}$ , I/O = 2.5V, $f = 1\text{MHz}$ , $T = +25^\circ\text{C}$ , I/O_x to $V_{SS}$ – I/O_y to $V_{SS}$ |

- Notes:
- Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com>.
  - Short duration pulse test used to minimize self-heating effect.
  - Clamping voltage value is based on an 8x20 $\mu\text{s}$  peak pulse current ( $I_{pp}$ ) waveform.

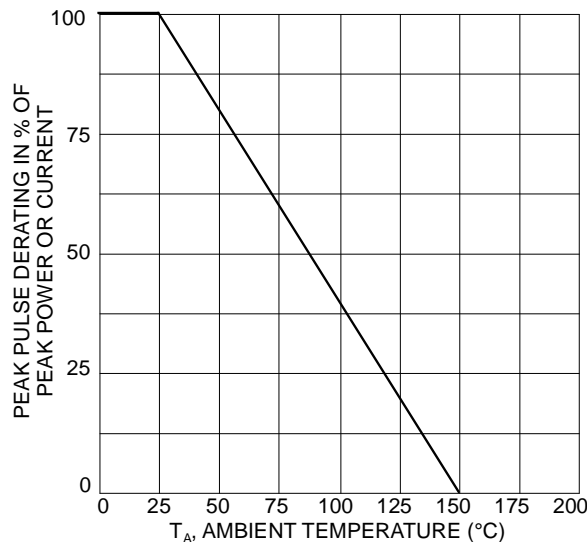


Figure 1 Pulse Derating Curve

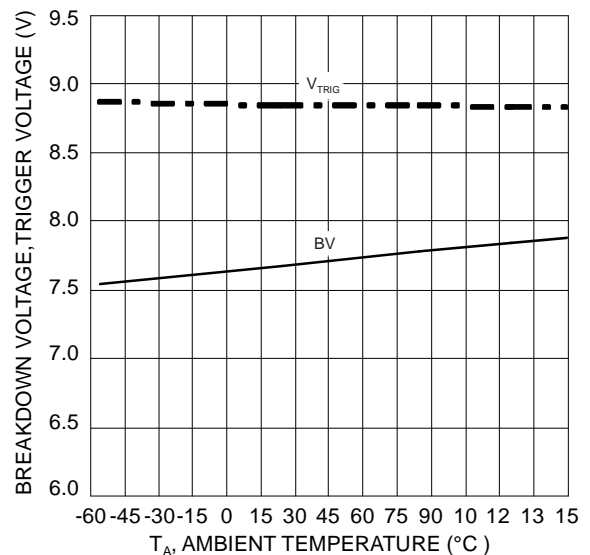


Figure 2 BV, Trigger Voltage vs. Ambient Temperature

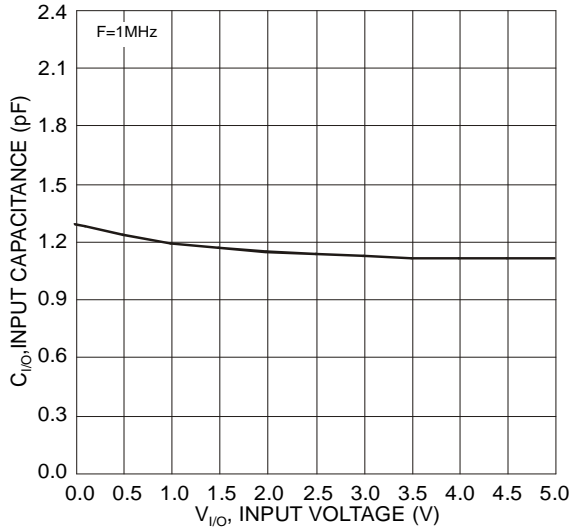


Figure 3 Input Capacitance vs. Input Voltage

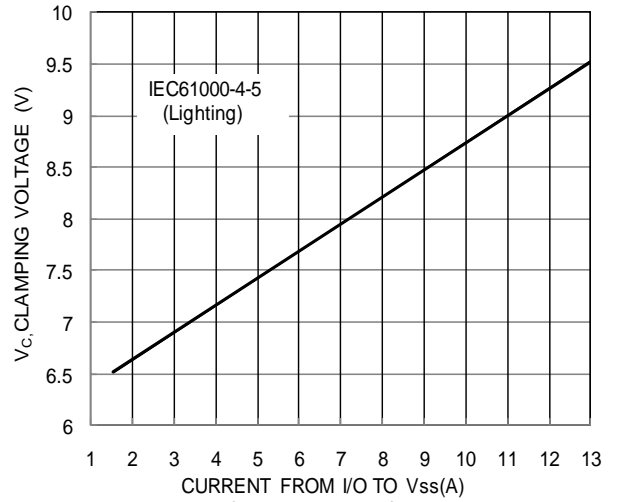


Figure 4. Clamping Voltage Characteristic

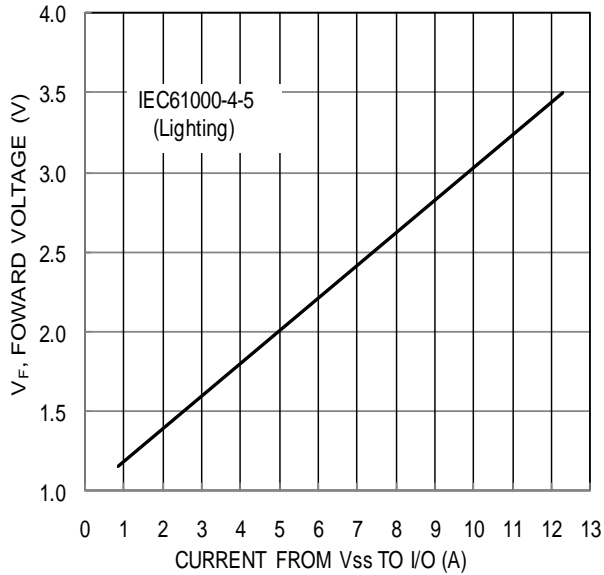


Figure 5. Forward Voltage Characteristic

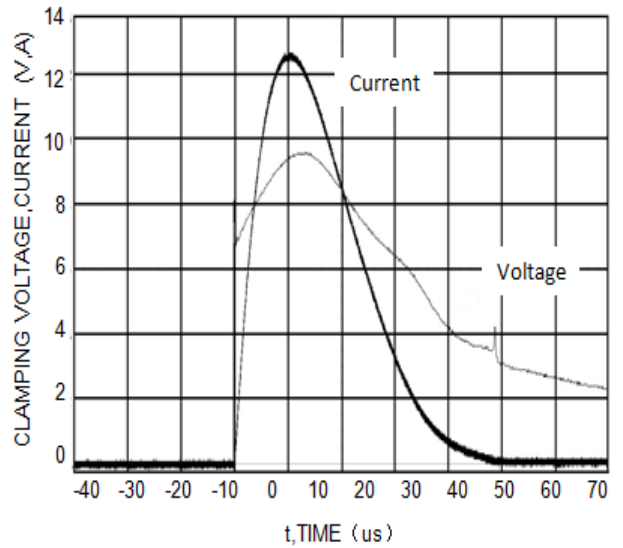


Figure 6. Waveform of Clamping Voltage, Current vs. Time(8/20us, I/O to Vss)

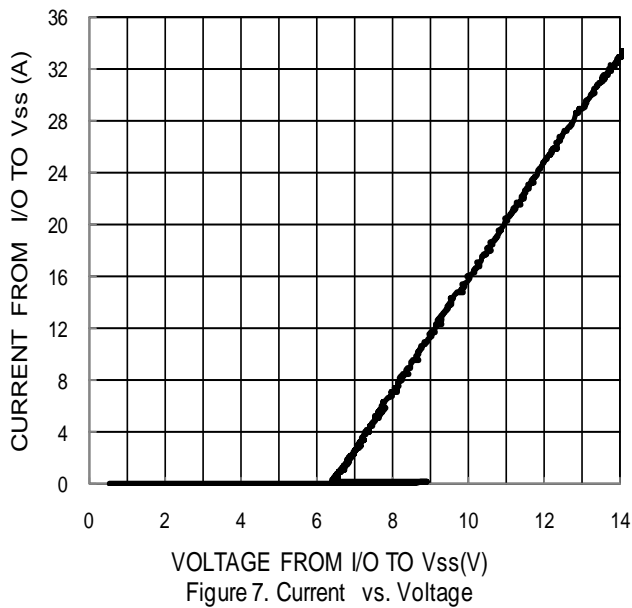
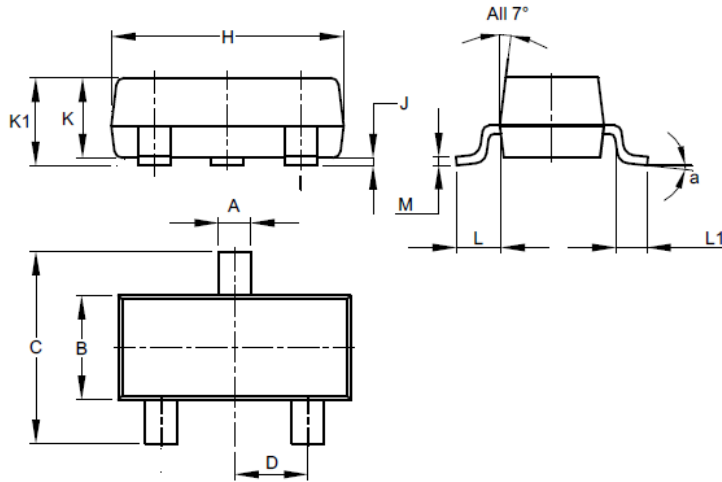


Figure 7. Current vs. Voltage

**Package Outline Dimensions**

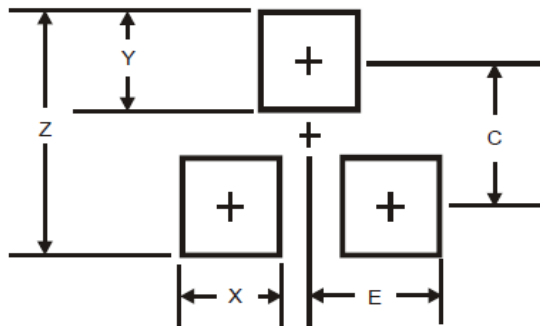
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| α                    | 8°    |       |       |
| All Dimensions in mm |       |       |       |

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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