

**4 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY**
**Product Summary**

|                             |                             |                            |
|-----------------------------|-----------------------------|----------------------------|
| <b>V<sub>BR</sub> (min)</b> | <b>I<sub>PP</sub> (max)</b> | <b>C<sub>T</sub> (typ)</b> |
| 6V                          | 4.7A                        | 0.55pF                     |

**Description**

The DT1446-04S is a high performance device suitable for protecting four high speed I/Os and one V<sub>CC</sub>. These devices are assembled in SOT363 package. They have high ESD surge capability and low capacitance.

**Applications**

Typically Used for High Speed Ports such as:

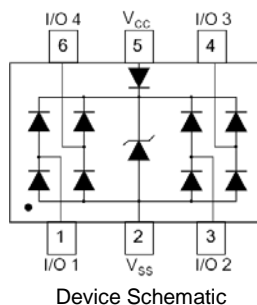
- USB 2.0
- IEEE1394
- HDMI
- Laptop and Personal Computers
- Flat Panel Displays
- Video Graphics Displays
- SIM Ports


**Features**

- IEC 61000-4-2 (ESD): Air – ±19kV, Contact – ±16kV
- Low Channel Input Capacitance of 0.55pF Max
- ESD Protection for four I/Os and one V<sub>CC</sub>
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

**Mechanical Data**

- Case: SOT363
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020 (Lead Free Plating). Solderable per MIL-STD-202, Method 208③
- Weight: 0.006 grams (approximate)


**Ordering Information (Note 4)**

| Product      | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|--------------|------------|---------|--------------------|-----------------|-------------------|
| DT1446-04S-7 | Standard   | BE3     | 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**


BE3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

**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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                    | Symbol               | Value | Unit | Conditions   |
|---|----------------------|-------|------|--|
| Peak Pulse Current ,per IEC 61000-4-5             | I <sub>PP_I/O</sub>  | 4.7   | A    | I/O to V <sub>SS</sub> , 8/20μs                        |
| Operating Voltage (DC)                            | V <sub>DC</sub>      | 6     | V    | V <sub>CC</sub> to V <sub>SS</sub>                     |
| ESD Protection – Contact Discharge                | V <sub>ESD_I/O</sub> | ±16   | kV   | I/O to V <sub>SS</sub> , per IEC 61000-4-2             |
|   | V <sub>ESD_VCC</sub> | ±30   | kV   | V <sub>CC</sub> to V <sub>SS</sub> , per IEC 61000-4-2 |
| ESD Protection – Air Discharge, per IEC 61000-4-2 | V <sub>ESD_I/O</sub> | ±19   | kV   | I/O to V <sub>SS</sub> , per IEC 61000-4-2             |
|   | V <sub>ESD_VCC</sub> | ±30   | kV   | V <sub>CC</sub> to V <sub>SS</sub> , per IEC 61000-4-2 |

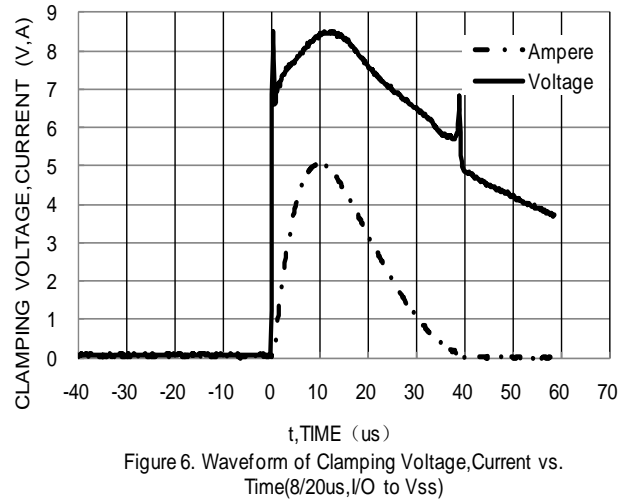
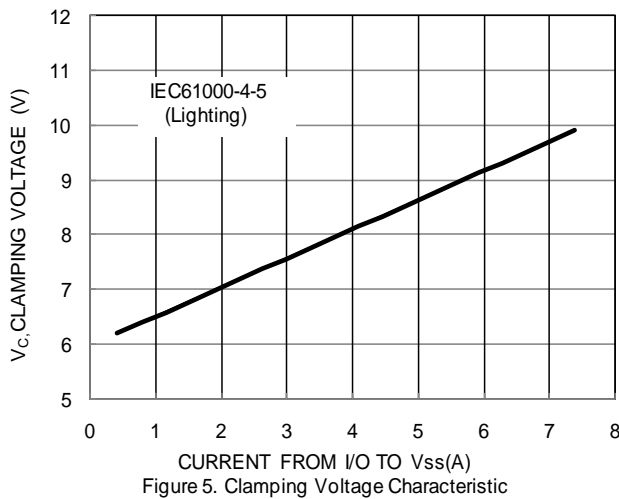
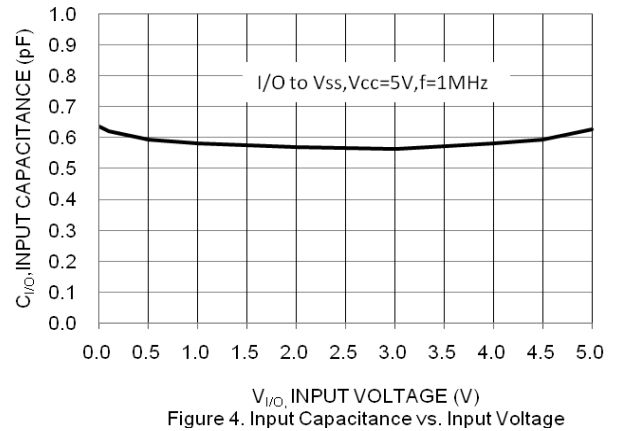
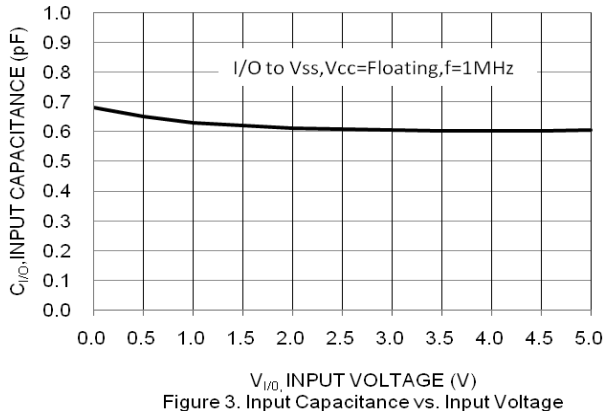
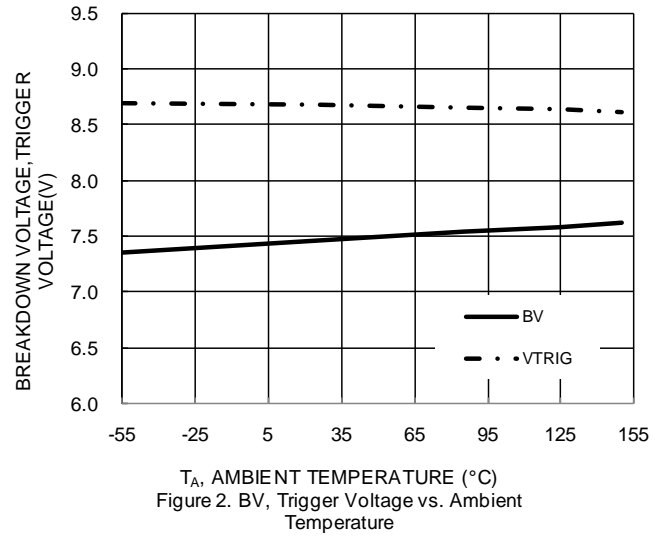
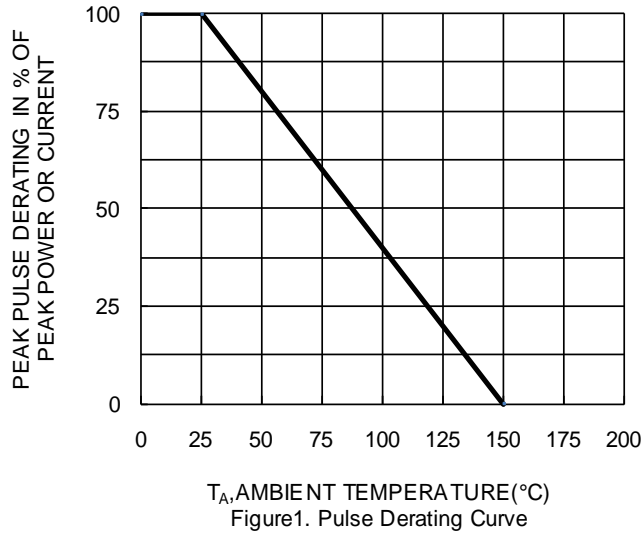
**Thermal Characteristics**

| Characteristic   | Symbol                            | Value      | Unit |
|--|-----------------------------------|------------|------|
| Power Dissipation Typical (Note 5)                       | P <sub>D</sub>                    | 200        | mW   |
| Thermal Resistance, Junction to Ambient Typical (Note 5) | R <sub>θJA</sub>                  | 625        | °C/W |
| Operating and Storage Temperature Range                  | T <sub>J</sub> , T <sub>STG</sub> | -55 to 150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                         | Symbol                                   | Min | Typ  | Max  | Unit | Test Conditions  |
|--|--|-----|------|------|------|--|
| Reverse Working Voltage                | V <sub>RWM</sub>                         | —   | —    | 5.0  | V    | V <sub>CC</sub> to V <sub>SS</sub>   |
| Reverse Current (Note 6)               | I <sub>R(VCC to VSS)</sub>               | —   | —    | 5.0  | μA   | V <sub>R</sub> = V <sub>RWM</sub> = 5V, V <sub>CC</sub> to V <sub>SS</sub>   |
| Reverse Current (Note 6)               | I <sub>R(I/O to VSS)</sub>               | —   | —    | 1.0  | μA   | V <sub>R</sub> = V <sub>RWM</sub> = 5V, any I/O to V <sub>SS</sub>   |
| Reverse Breakdown Voltage              | V <sub>BR</sub>                          | 6.0 | —    | 9.0  | V    | I <sub>R</sub> = 1mA, V <sub>CC</sub> to V <sub>SS</sub>   |
| Forward Clamping Voltage               | V <sub>F</sub>                           | —   | 0.8  | 1.0  | V    | I <sub>F</sub> = 15mA, V <sub>SS</sub> to V <sub>CC</sub>  |
| Reverse Clamping Voltage (Note 7)      | V <sub>C_I/O</sub>                       | —   | 8.5  | —    | V    | I <sub>PP</sub> = 4.7A, I/O to V <sub>SS</sub> , 8/20μs  |
| ESD Clamping Voltage                   | V <sub>ESD_VCC</sub>                     | —   | 10   | —    | V    | TLP, 20A, tp = 100ns, V <sub>CC</sub> to V <sub>SS</sub>   |
|  | V <sub>ESD_I/O</sub>                     | —   | 12   | —    | V    | TLP, 20A, tp = 100ns, I/O to V <sub>SS</sub>   |
| Dynamic Resistance                     | R <sub>DIF_VCC</sub>                     | —   | 0.14 | —    | Ω    | TLP, 20A, tp = 100ns, V <sub>CC</sub> to V <sub>SS</sub>   |
|  | R <sub>DIF_I/O</sub>                     | —   | 0.3  | —    | Ω    | TLP, 20A, tp = 100ns, I/O to V <sub>SS</sub>   |
| Channel Input Capacitance              | C <sub>I/O to VSS</sub>                  | —   | 0.55 | 0.65 | pF   | V <sub>R</sub> = 2.5V, V <sub>CC</sub> = 5V, f = 1MHz  |
| Channel Input Capacitance              | C <sub>I/O to VSS</sub>                  | —   | 0.65 | —    | pF   | V <sub>R</sub> = 2.5V, V <sub>CC</sub> = floating, f = 1MHz  |
| Variation of Channel Input Capacitance | C <sub>I/OMAX</sub> -C <sub>I/OMIN</sub> | —   | 0.03 | —    | pF   | V <sub>CC</sub> = 5V, V <sub>SS</sub> = 0V, I/O = 2.5V, f = 1MHz, T = +25°C, C <sub>I/OMAX</sub> - C <sub>I/OMIN</sub>       |
| Variation of Channel Input Capacitance | C <sub>I/OMAX</sub> -C <sub>I/OMIN</sub> | —   | 0.05 | —    | pF   | V <sub>CC</sub> = floating, V <sub>SS</sub> = 0V, I/O = 2.5V, f = 1MHz, T = +25°C, C <sub>I/OMAX</sub> - C <sub>I/OMIN</sub> |

- 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 8x20μs peak pulse current (I<sub>pp</sub>) waveform.



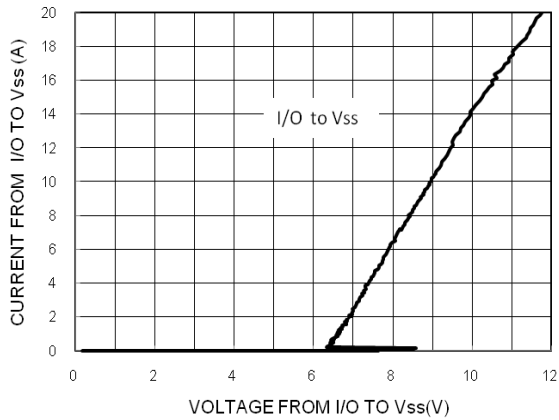


Figure 7. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

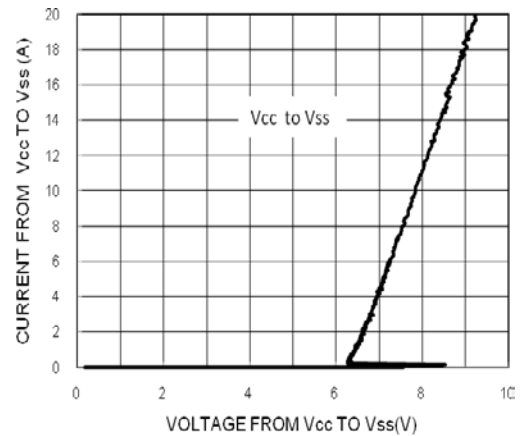
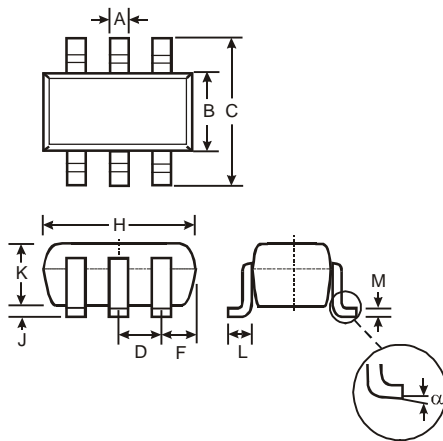


Figure 8. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

## Package Outline Dimensions

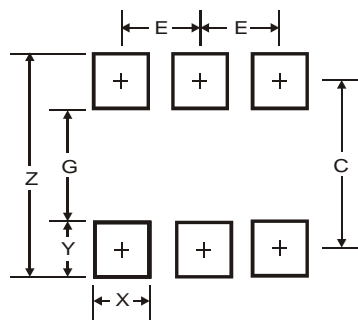
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT363                      |          |      |       |
|-----------------------------|----------|------|-------|
| Dim                         | Min      | Max  | Typ   |
| A                           | 0.10     | 0.30 | 0.25  |
| B                           | 1.15     | 1.35 | 1.30  |
| C                           | 2.00     | 2.20 | 2.10  |
| D                           | 0.65 Typ |      |       |
| F                           | 0.40     | 0.45 | 0.425 |
| H                           | 1.80     | 2.20 | 2.15  |
| J                           | 0        | 0.10 | 0.05  |
| K                           | 0.90     | 1.00 | 1.00  |
| L                           | 0.25     | 0.40 | 0.30  |
| M                           | 0.10     | 0.22 | 0.11  |
| $\alpha$                    | 0°       | 8°   | -     |
| <b>All Dimensions in mm</b> |          |      |       |

## Suggested Pad Layout

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



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C          | 1.9           |
| E          | 0.65          |

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