

4 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY
Product Summary

| | | |
|-----------------------------|-----------------------------|----------------------------|
| V_{BR} (min) | I_{PP} (max) | C_T (typ) |
| 6V | 4.7A | 0.55pF |

Description

The DT1446-04V is a high performance device suitable for protecting four high speed I/Os and one V_{CC}. These devices are assembled in SOT563 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 Typical
- ESD Protection for four I/Os and one V_{CC}
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. “Green” Device (Note 3)**

Mechanical Data

- Case: SOT563
- 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 Copper leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method208 Ⓔ3
- Weight: 0.003 grams (approximate)

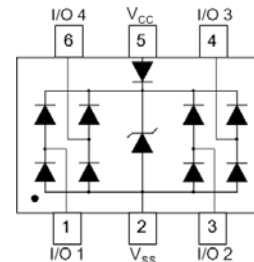
SOT563



Top View



Bottom View

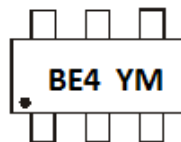


Device Schematic

Ordering Information (Note 4)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|--------------|------------|---------|--------------------|-----------------|-------------------|
| DT1446-04V-7 | Standard | BE4 | 7 | 8 | 3,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - See 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


BE4 = 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_A = +25°C, unless otherwise specified.)

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

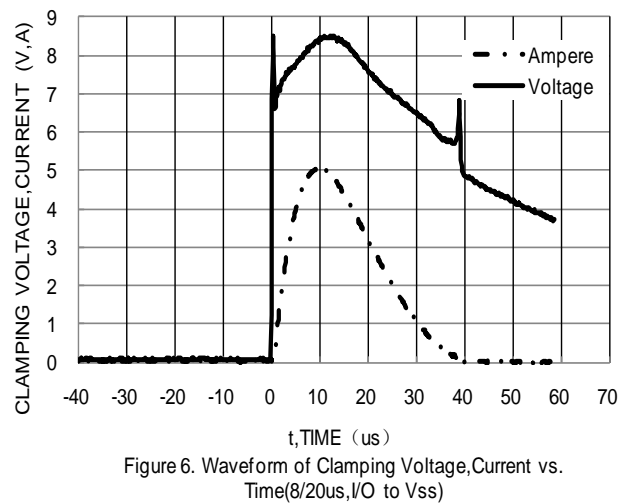
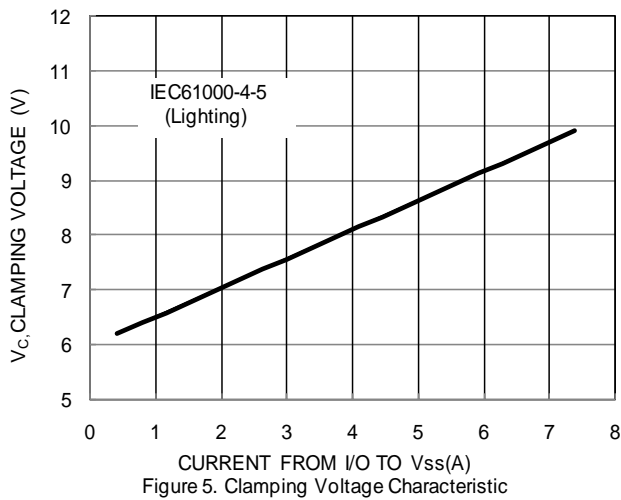
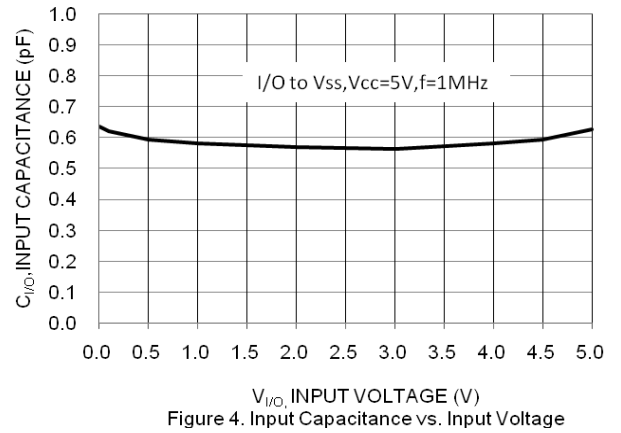
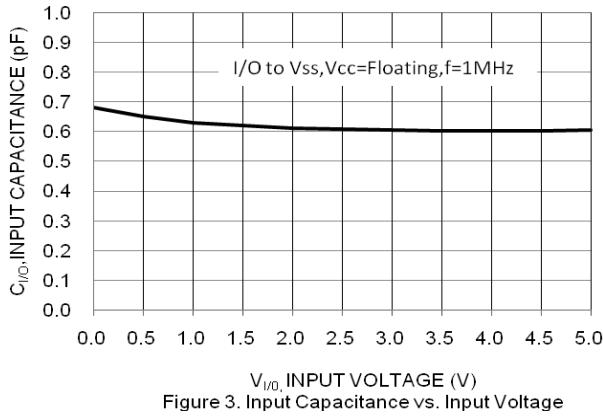
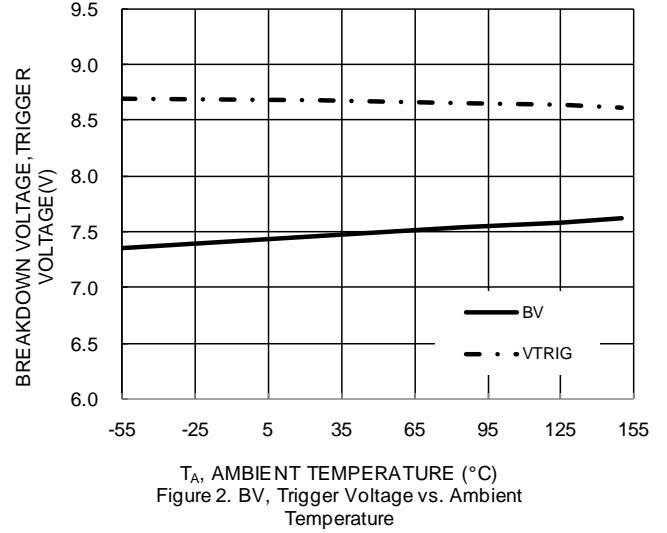
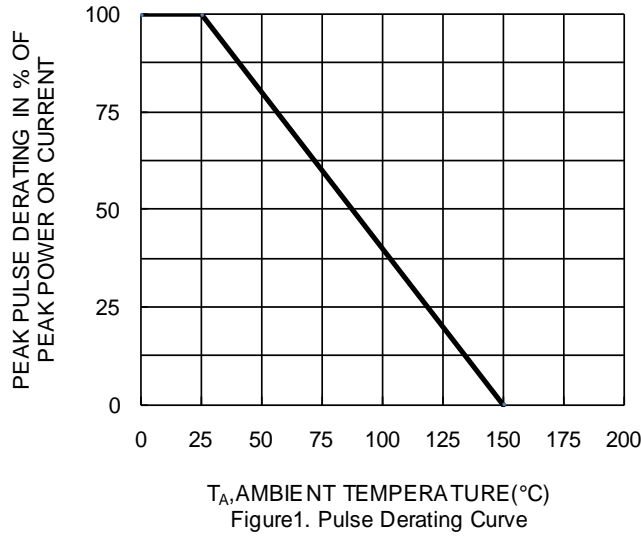
Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation Typical (Note 5) | P _D | 380 | mW |
| Thermal Resistance, Junction to Ambient Typical (Note 5) | R _{θJA} | 327 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|--|-----|------|------|------|---|
| Reverse Working Voltage | V _{RWM} | — | — | 5.5 | V | V _{CC} to V _{SS} |
| Reverse Current (Note 6) | I _{R(VCC to VSS)} | — | — | 5.0 | μA | V _R = 5V, V _{CC} to V _{SS} |
| Reverse Current (Note 6) | I _{R(I/O to VSS)} | — | — | 1.0 | μA | V _R = 5V, any I/O to V _{SS} |
| Reverse Breakdown Voltage | V _{BR} | 6.0 | — | 9.0 | V | I _R = 1mA, V _{CC} to V _{SS} |
| Forward Clamping Voltage | V _F | — | 0.8 | 1.0 | V | I _F = 15mA, V _{SS} to V _{CC} |
| Reverse Clamping Voltage (Note 7) | V _{C_I/O} | — | 8.5 | — | V | I _{PP} = 4.7A, I/O to V _{SS} , 8/20μs |
| ESD Clamping Voltage | V _{ESD_VCC} | — | 10 | — | V | TLP, 20A, tp = 100 ns, V _{CC} to V _{SS} |
| | V _{ESD_I/O} | — | 12 | — | V | TLP, 20A, tp = 100 ns, I/O to V _{SS} |
| Dynamic Resistance | R _{DIF_VCC} | — | 0.2 | — | Ω | TLP, 20A, tp = 100 ns, V _{CC} to V _{SS} |
| | R _{DIF_I/O} | — | 0.3 | — | Ω | TLP, 20A, tp = 100 ns, I/O to V _{SS} |
| Channel Input Capacitance | C _{I/O to VSS} | — | 0.55 | 0.65 | pF | V _R = 2.5V, V _{CC} = 5V, f = 1MHz |
| Channel Input Capacitance | C _{I/O to VSS} | — | 0.65 | — | pF | V _R = 2.5V, V _{CC} = floating, f = 1MHz |
| Variation of Channel Input Capacitance | C _{I/OMAX-C_{I/OMIN}} | — | 0.03 | — | pF | V _{CC} = 5V, V _{SS} = 0V, I/O = 2.5V, f = 1MHz, T = 25 °C, C _{I/OMAX-C_{I/OMIN}} |
| Variation of Channel Input Capacitance | C _{I/OMAX-C_{I/OMIN}} | — | 0.05 | — | pF | V _{CC} = floating, V _{SS} = 0V, I/O = 2.5V, f = 1MHz, T = +25°C, C _{I/OMAX-C_{I/OMIN}} |

- 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_{pp}) waveform.



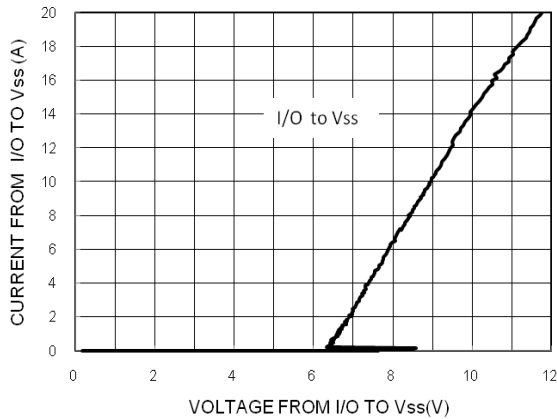


Figure 7. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

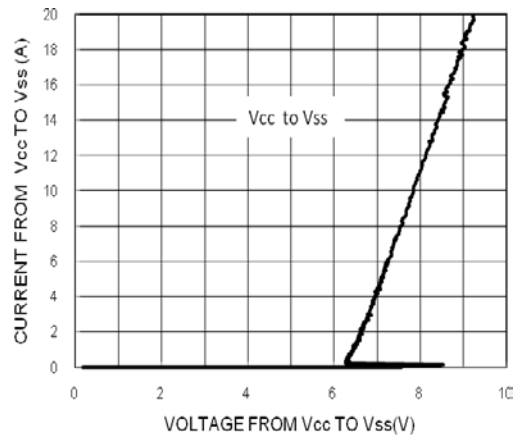
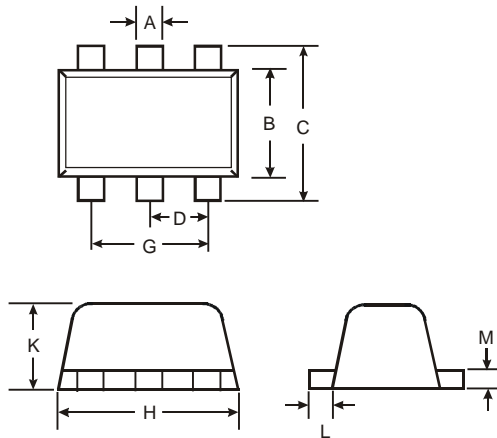


Figure 8. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

Package Outline Dimensions

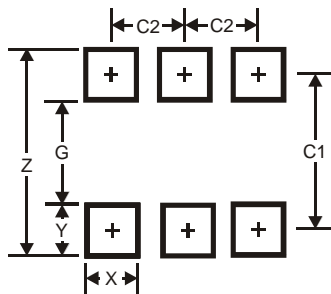
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT563 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.20 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | - | - | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.55 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | 0.11 |
| 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 | 2.2 |
| G | 1.2 |
| X | 0.375 |
| Y | 0.5 |
| C1 | 1.7 |
| C2 | 0.5 |

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