

## 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 DT1446-04SO is a high performance device suitable for protecting four high speed I/Os and one V<sub>CC</sub>. These devices are assembled in SOT26 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



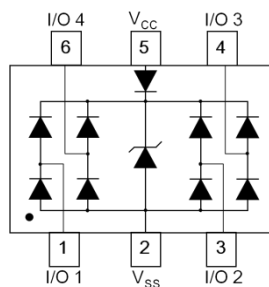
Top View

### 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: SOT26
- 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 208 **e3**
- Weight: 0.016 grams (approximate)



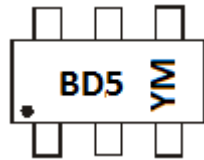
Device Schematic

### Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DT1446-04SO-7	Standard	BD5	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



BD5 = 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>	300	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	R <sub>θJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

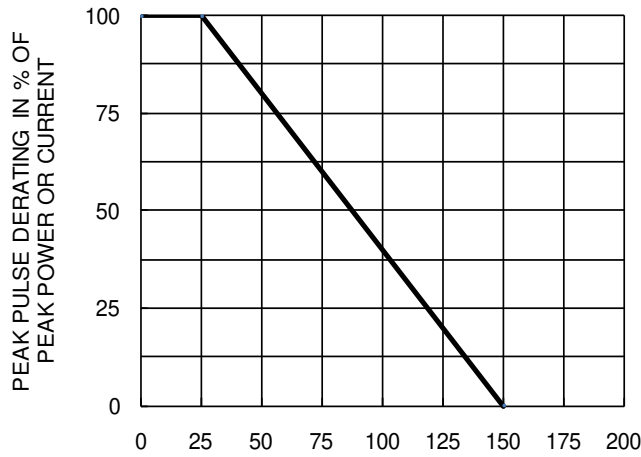
## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

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 = 100 ns, V <sub>CC</sub> to V <sub>SS</sub>
	V <sub>ESD_I/O</sub>	—	12	—	V	TLP, 20A, tp = 100 ns, I/O to V <sub>SS</sub>
Dynamic Resistance	R <sub>DIF_VCC</sub>	—	0.14	—	Ω	TLP, 20A, tp = 100 ns, V <sub>CC</sub> to V <sub>SS</sub>
	R <sub>DIF_I/O</sub>	—	0.3	—	Ω	TLP, 20A, tp = 100 ns, 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-C<sub>I/OMIN</sub></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-C<sub>I/OMIN</sub></sub>
Variation of Channel Input Capacitance	C <sub>I/OMAX-C<sub>I/OMIN</sub></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-C<sub>I/OMIN</sub></sub>

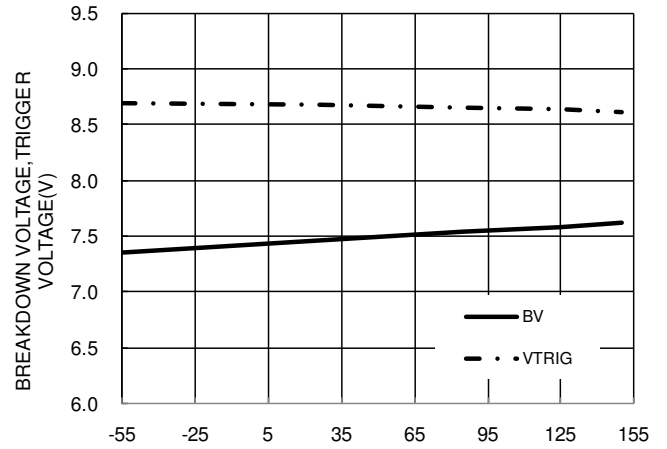
Notes: 5. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com>.

6. Short duration pulse test used to minimize self-heating effect.

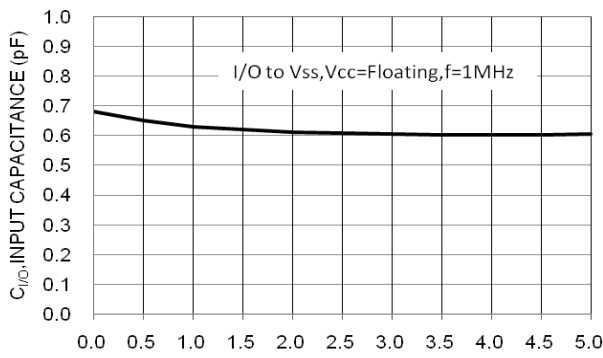
7. Clamping voltage value is based on an 8x20μs peak pulse current (I<sub>pp</sub>) waveform.



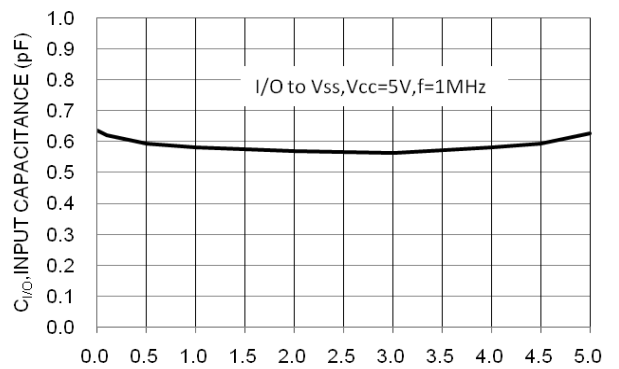
TA, AMBIENT TEMPERATURE (°C)  
Figure 1. Pulse Derating Curve



TA, AMBIENT TEMPERATURE (°C)  
Figure 2. BV, Trigger Voltage vs. Ambient Temperature



V<sub>I/O</sub>, INPUT VOLTAGE (V)  
Figure 3. Input Capacitance vs. Input Voltage



V<sub>I/O</sub>, INPUT VOLTAGE (V)  
Figure 4. Input Capacitance vs. Input Voltage

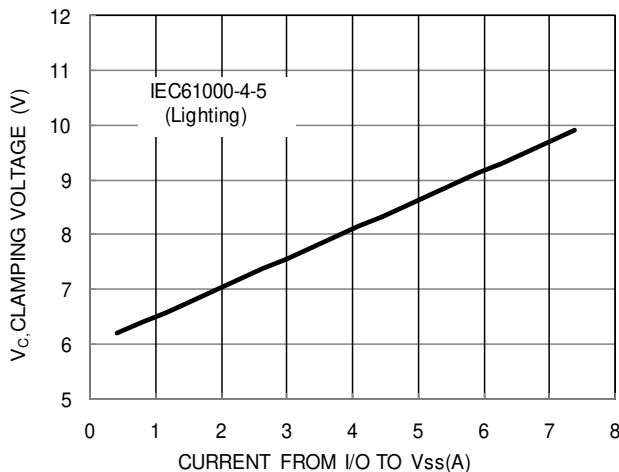


Figure 5. Clamping Voltage Characteristic

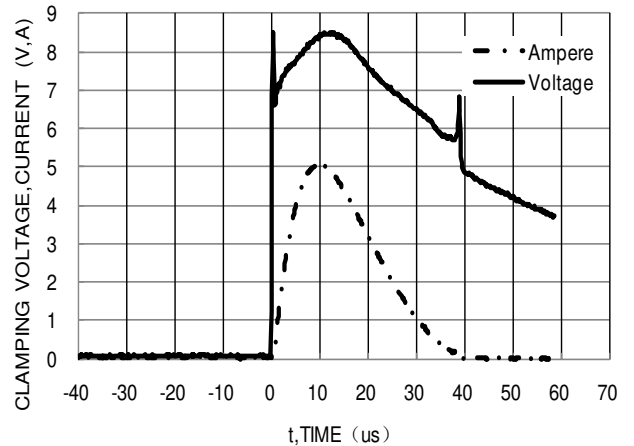


Figure 6. Waveform of Clamping Voltage, Current vs. Time(8/20μs, I/O to Vss)

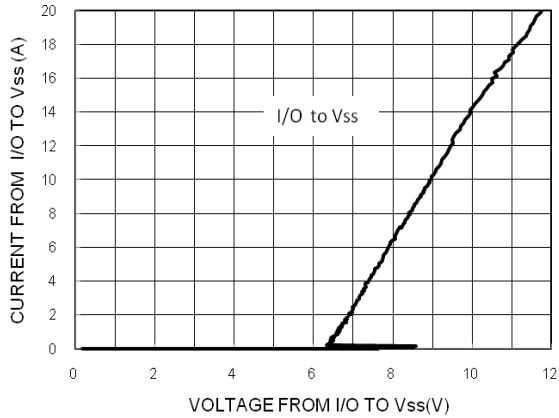


Figure 7. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

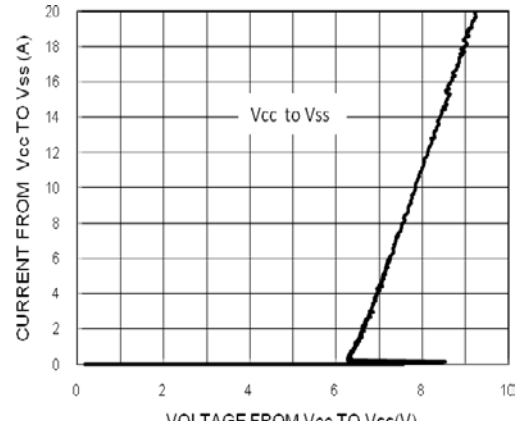
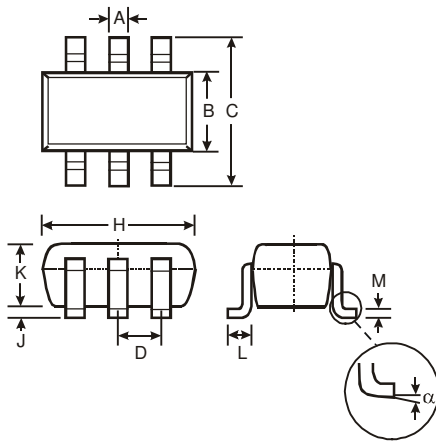


Figure 8. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

**Package Outline Dimensions**

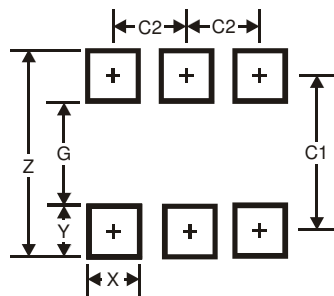
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
$\alpha$	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	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

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