

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

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

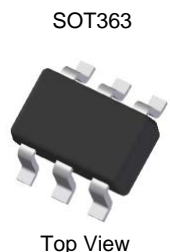
**Description**

The DT1446-04S is a high performance device suitable for protecting four high speed I/Os and one  $V_{CC}$ . 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:

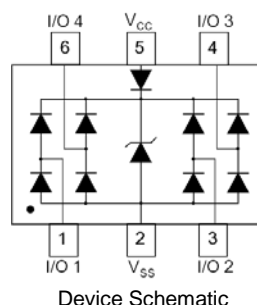
- USB 2.0
- IEEE1394
- HDMI
- Laptop and Personal Computers
- Flat Panel Displays
- Video Graphics Displays
- SIM Ports


**Features**

- IEC 61000-4-2 (ESD): Air –  $\pm 19kV$ , Contact –  $\pm 16kV$
- Low Channel Input Capacitance of 0.55pF Max
- 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: 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

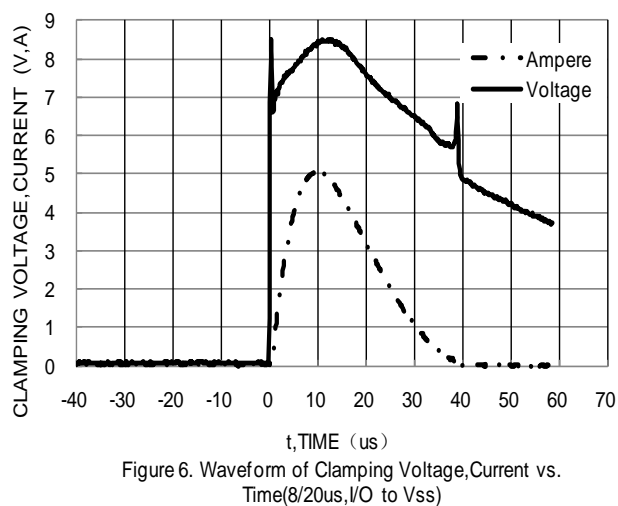
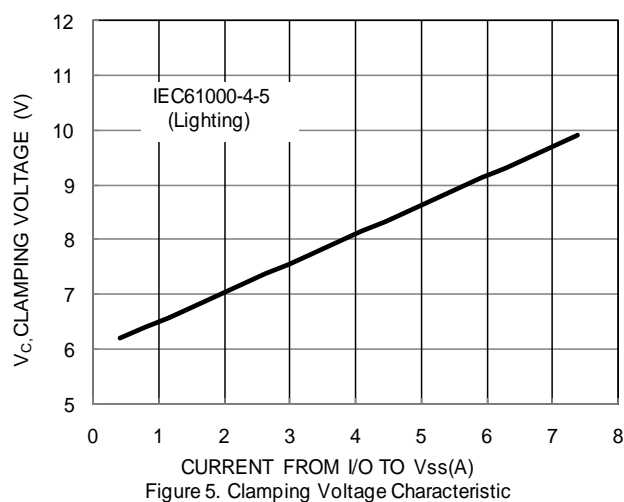
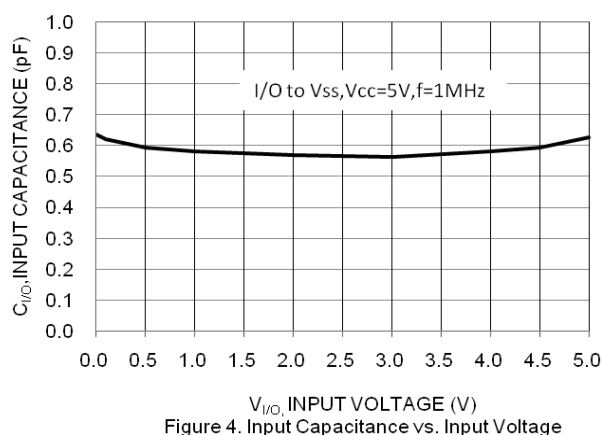
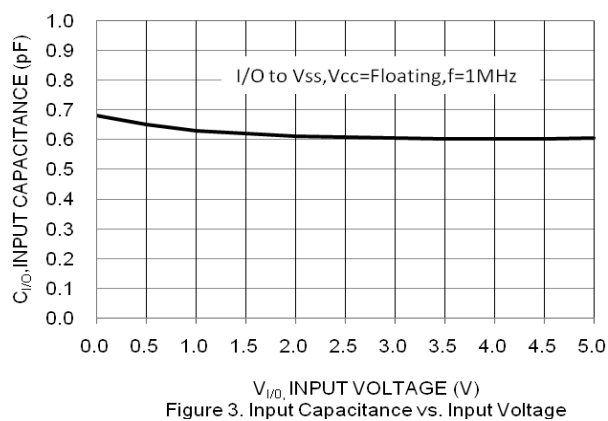
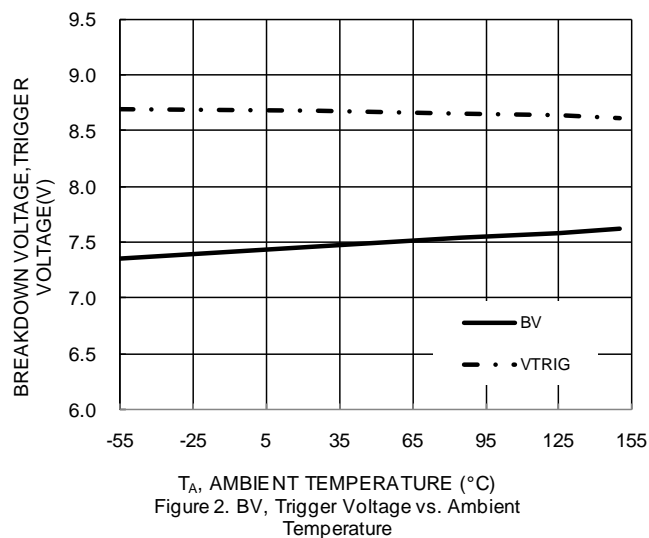
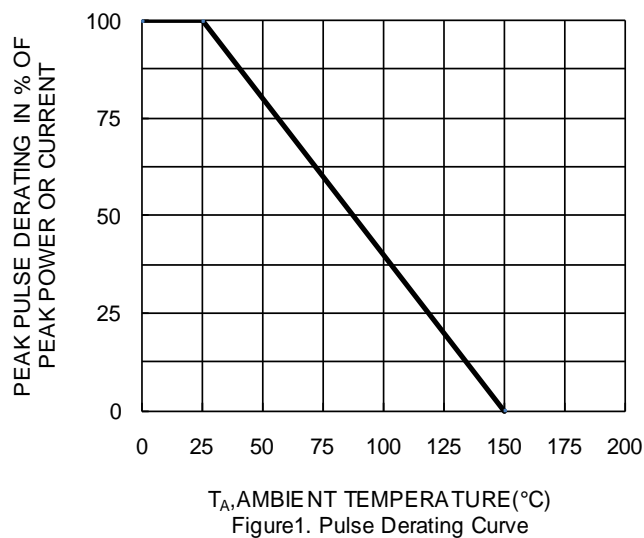
## Thermal Characteristics

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</sub> (V <sub>CC</sub> to V <sub>SS</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</sub> (I/O to V <sub>SS</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.



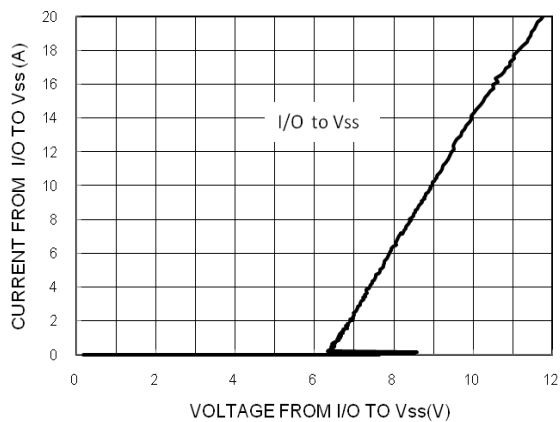


Figure 7. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

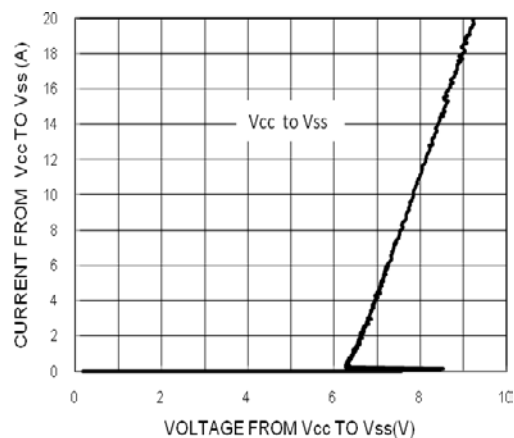
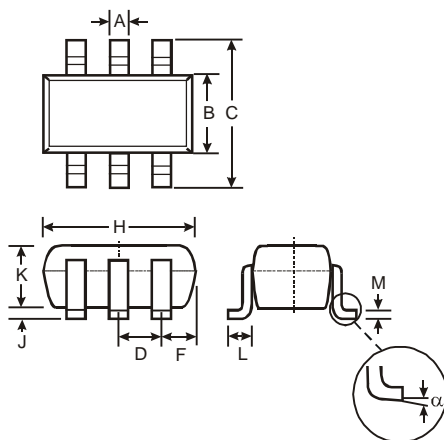


Figure 8. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

## Package Outline Dimensions

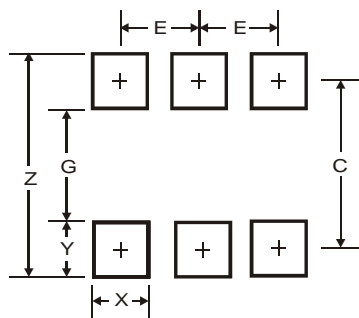
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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°	-
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	2.5
G	1.3
X	0.42
Y	0.6
C	1.9
E	0.65

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