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

SOT363

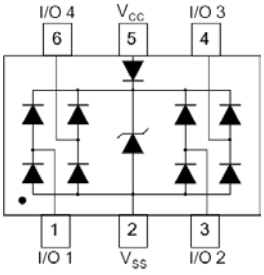
Top View

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_{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 208 e3
- Weight: 0.006 grams (approximate)



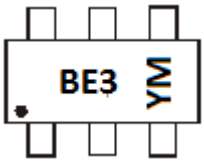
Device Schematic

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 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_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

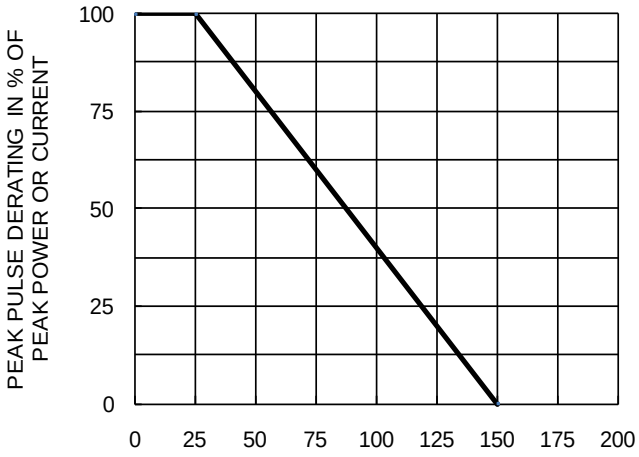
Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation Typical (Note 5)	P_D	200	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

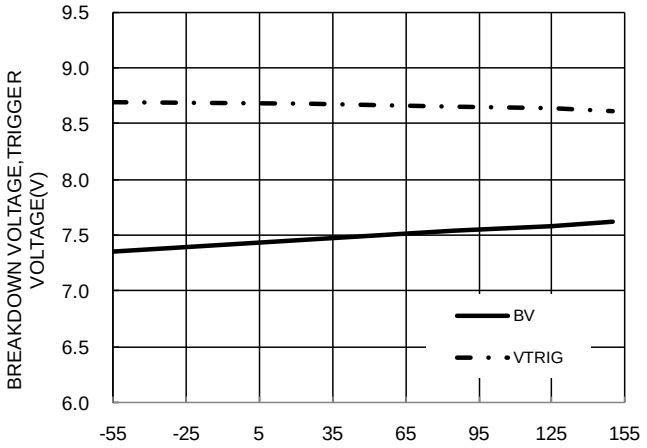
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Working Voltage	V_{RWM}	—	—	5.0	V	V_{CC} to V_{SS}
Reverse Current (Note 6)	$I_{R(V_{CC}\ to\ V_{SS})}$	—	—	5.0	µA	$V_R = V_{RWM}$ = 5V, V_{CC} to V_{SS}
Reverse Current (Note 6)	$I_{R(IO\ to\ V_{SS})}$	—	—	1.0	µA	$V_R = V_{RWM}$ = 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 = 100ns, V_{CC} to V_{SS}
	$V_{ESD\_I/O}$	—	12	—	V	TLP, 20A, tp = 100ns, I/O to V_{SS}
Dynamic Resistance	R_{DIF_VCC}	—	0.14	—	Ω	TLP, 20A, tp = 100ns, V_{CC} to V_{SS}
	$R_{DIF\_I/O}$	—	0.3	—	Ω	TLP, 20A, tp = 100ns, I/O to V_{SS}
Channel Input Capacitance	$C_{I/O\ to\ V_{SS}}$	—	0.55	0.65	pF	V_R = 2.5V, V_{CC} = 5V, f = 1MHz
Channel Input Capacitance	$C_{I/O\ to\ V_{SS}}$	—	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 , $C_{I/OMAX}$ - $C_{I/OMIN}$

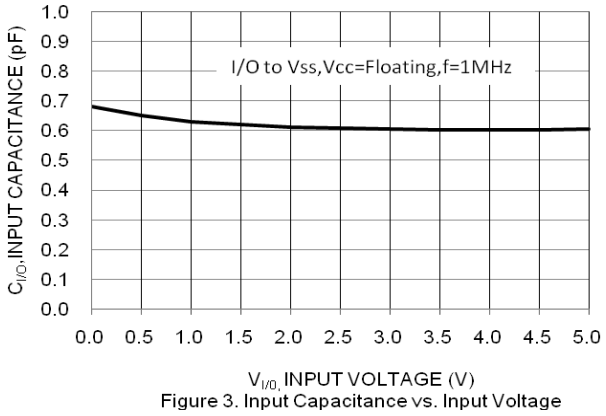
Notes:
5. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at http://www.diodes.com.
6. Short duration pulse test used to minimize self-heating effect.
7. Clamping voltage value is based on an 8x20µs peak pulse current (I_{pp}) waveform.



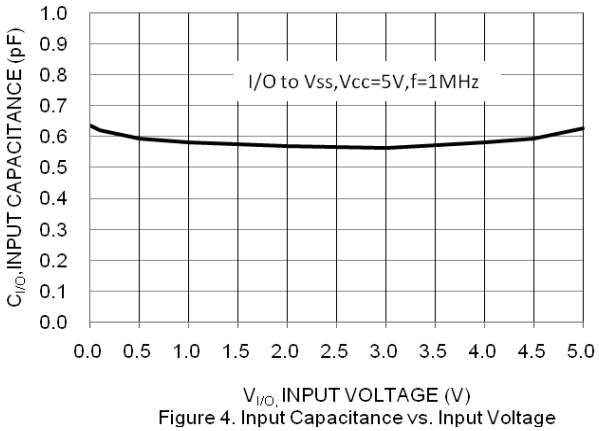
T_A,AMBIENT TEMPERATURE(°C)
Figure1. Pulse Derating Curve



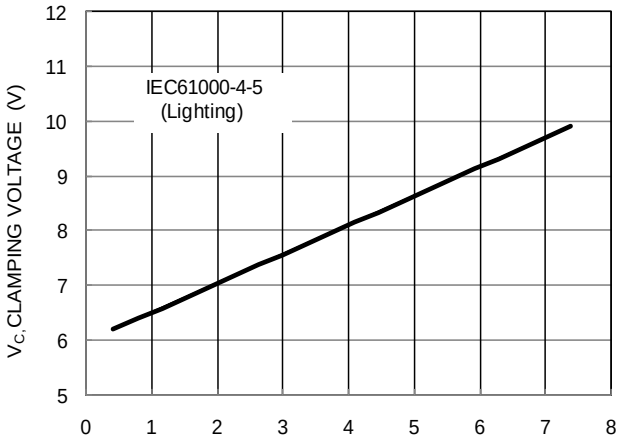
T_A, AMBIENT TEMPERATURE (°C)
Figure 2. BV, Trigger Voltage vs. Ambient Temperature



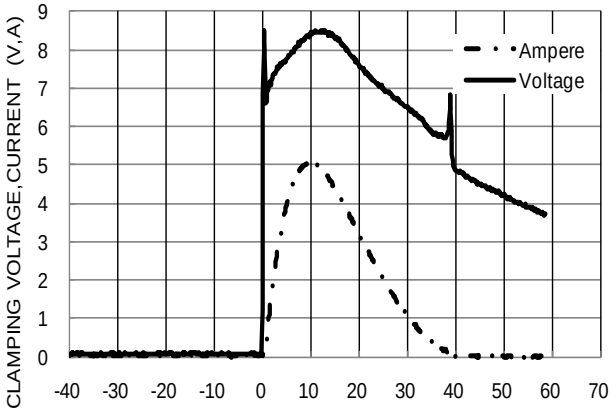
$V_{I/O}$, INPUT VOLTAGE (V)
Figure 3. Input Capacitance vs. Input Voltage



$V_{I/O}$, INPUT VOLTAGE (V)
Figure 4. Input Capacitance vs. Input Voltage



CURRENT FROM I/O TO Vss(A)
Figure 5. Clamping Voltage Characteristic



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

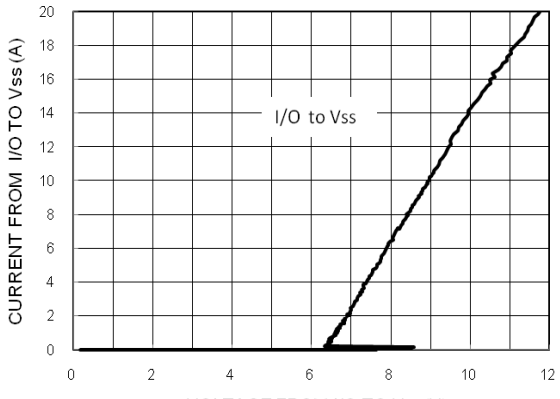


Figure 7. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

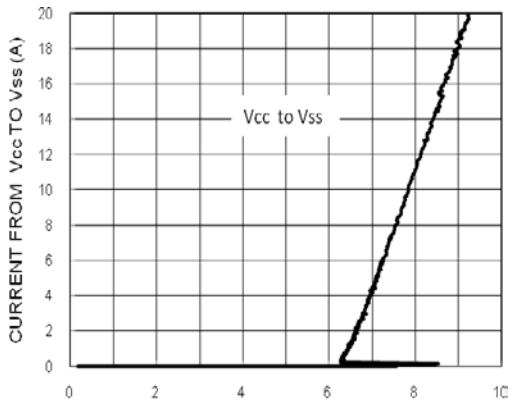
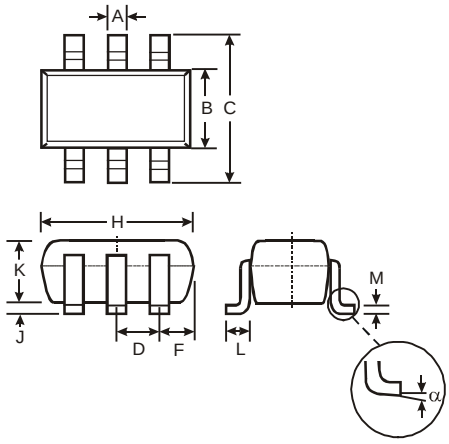


Figure 8. Transmission Line Pulsing (TLP) Measurement Current vs. Voltage

Package Outline Dimensions

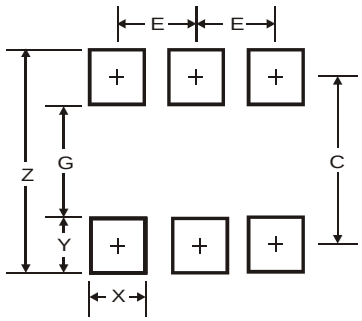
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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
α	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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