



DT1446-04V

#### **Product Summary**

VBR (min)	IPP (max)	C <sub>T (typ)</sub>
6V	4.7A	0.55pF
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

#### 4 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY

#### 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  $V_{\mbox{\tiny CC}}$
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

#### **Mechanical Data**

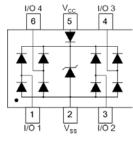
- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound.
  UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method208 (3)
- Weight: 0.003 grams (approximate)



Top View

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Bottom View



Device Schematic

# Ordering Information (Note 4)

Product Comp	iance Marki	Deal Olar (in all as		
•••••		ng 🔰 🔰 Reel Size (inches	s) Tape Width (mm)	Quantity per Reel
DT1446-04V-7 Stan	dard BE4	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.

 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**



BE4 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: A = 2013) M = Month (ex: 9 = September)

Date	Code	Key

Year	20	13	20	14	20	15	20	16	20	17	20	18
Code	l l	ł	E	3	(	)	[	)	E		F	-
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	-	0	0	4	E	6	7	0	0	$\circ$	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	IPP_I/O	4.7	А	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 $V_{SS}$ , per IEC 61000-4-2
ESD Frotection – Contact Discharge	$V_{ESD}V_{CC}$	±30	kV	Vcc to V <sub>SS</sub> , per IEC 61000-4-2
ESD Protection Air Discharge ner IEC 61000 4.0	V <sub>ESD_I/O</sub>	±19	kV	I/O to $V_{SS}$ , per IEC 61000-4-2
ESD Protection – Air Discharge, per IEC 61000-4-2	$V_{ESD}V_{CC}$	±30	kV	$V_{CC}$ to $V_{SS}$ , per IEC 61000-4-2

## **Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation Typical (Note 5)	PD	380	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	Rθ <sub>JA</sub>	327	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

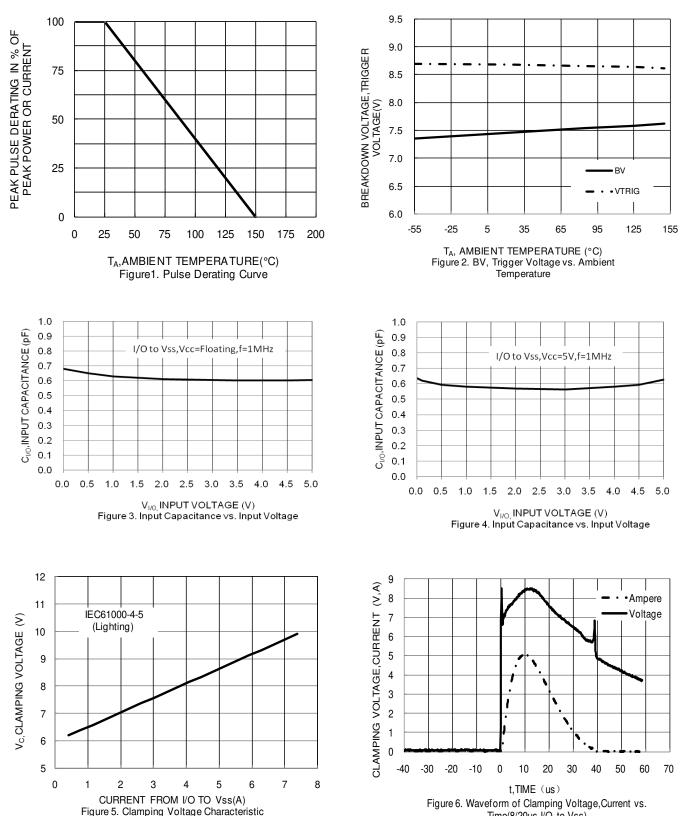
## Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Conditions
Reverse Working Voltage	VRWM	—	_	5.5	V	V <sub>CC</sub> to V <sub>SS</sub>
Reverse Current (Note 6)	IR(VCC to VSS)	_	_	5.0	μA	$V_R = 5V, V_{CC}$ to $V_{SS}$
Reverse Current (Note 6)	I <sub>R(IO to</sub> V <sub>SS)</sub>	—	_	1.0	μA	$V_R = 5V$ , any I/O to $V_{SS}$
Reverse Breakdown Voltage	VBR	6.0	_	9.0	V	$I_R = 1mA$ , $V_{CC}$ to $V_{SS}$
Forward Clamping Voltage	V <sub>F</sub>	—	0.8	1.0	V	$I_F = 15mA$ , $V_{SS}$ to $V_{CC}$
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	Vesd_Vcc	—	10	_	V	TLP, 20A, tp = 100 ns, $V_{CC}$ to $V_{SS}$
	Vesd_I/O	—	12	_	V	TLP, 20A, tp = 100 ns, I/O to $V_{SS}$
Dynamic Resistance	$R_{DIF}V_{CC}$	—	0.2	_	Ω	TLP, 20A, tp = 100 ns, $V_{CC}$ to $V_{SS}$
Dynamic Resistance	R <sub>DIF_I/O</sub>	—	0.3	_	Ω	TLP, 20A, tp = 100 ns, I/O to $V_{SS}$
Channel Input Capacitance	CI/O to VSS	_	0.55	0.65	pF	$V_R = 2.5V, V_{CC} = 5V, f = 1MHz$
Channel Input Capacitance	CI/O to VSS	_	0.65	_	pF	$V_R = 2.5V, V_{CC} = $ floating, f = 1MHz
Variation of Channel Input Capacitance	CI/OMAX-CI/OMIN	—	0.03	_	pF	
Variation of Channel Input Capacitance	CI/OMAX-CI/OMIN	_	0.05	_	pF	$\label{eq:VCC} \begin{split} V_{CC} &= \text{floating} \ , \ V_{SS} = 0 V, \ \text{I/O} = 2.5 V, \\ \text{f} &= 1 MHz, \ T = +25^\circ C \ , \ C_{\text{I/OMAX}} - C_{\text{I/OMIN}} \end{split}$

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 Notes: 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 (Ipp) waveform.

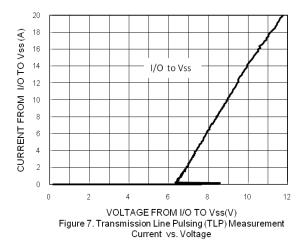


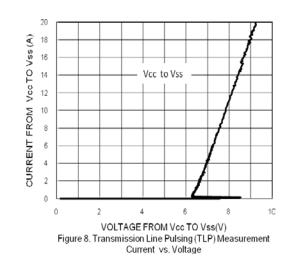


Time(8/20us,I/O to Vss)

NEW PRODUCT

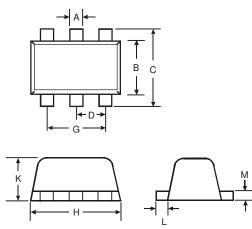






## **Package Outline Dimensions**

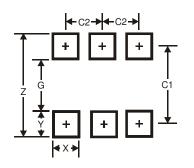
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT563						
Dim	Min	Max	Тур			
Α	0.15	0.30	0.20			
В	1.10	1.25	1.20			
С	1.55	1.70	1.60			
D	-	-	0.50			
G	0.90	1.10	1.00			
н	1.50	1.70	1.60			
Κ	0.55	0.60	0.60			
L	0.10	0.30	0.20			
М	0.10	0.18	0.11			
All	Dimens	sions 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
Х	0.375
Y	0.5
C1	1.7
C2	0.5



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