

## Product Summary

<b>VBR Min</b>	<b>IPP Max</b>	<b>Cl/O Typ</b>
6.2V	6A	0.65pF

## Features And Benefits

- Low Clamping Voltage, I/O to V<sub>ss</sub>
- Typical 9V at 10A, 100ns, TLP
- Typical 7.7V at 6A, 8/20μs
- IEC61000-4-2 (ESD): Air – ±16kV, Contact – ±16kV
- 4 Channels of ESD Protection
- Low Channel Input Capacitance of 0.65pF Typical
- TLP Dynamic Resistance: 0.25Ω
- Typically Used for High-Speed Ports Such as USB 2.0
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DT1042-04SOQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

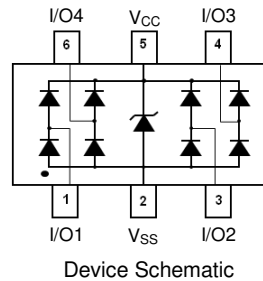
## Description And Applications

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of its small size and high ESD surge capability makes it ideal for use in automotive applications.

- USB modules
- HDMI ports
- LVDS

## Mechanical Data

- Package: SOT26
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Lead-frame (Lead-Free Plating). Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.016 grams (Approximate)

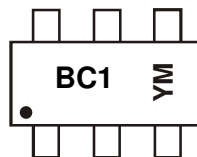


## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DT1042-04SOQ-7	SOT26	BC1	7	8	3,000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



BC1 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: K = 2023)  
 M = Month (ex: 4 = April)

### Date Code Key

Year	2019	-	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	G	-	K	L	M	N	O	P	R	S	T	U

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 IEC61000-4-5	I <sub>PP_I/O</sub>	±6	A	I/O to V <sub>SS</sub> , 8/20μs
Peak Pulse Power, per IEC61000-4-5	P <sub>PP_I/O</sub>	55	W	I/O to V <sub>SS</sub> , 8/20μs
Operating Voltage (DC)	V <sub>DC</sub>	5.5	V	I/O to V <sub>SS</sub>
ESD Protection – Contact Discharge, per IEC61000-4-2	V <sub>ESD_CONTACT</sub>	±16	kV	I/O to V <sub>SS</sub>
ESD Protection – Air Discharge, per IEC61000-4-2	V <sub>ESD_AIR</sub>	±16	kV	I/O to V <sub>SS</sub>
Operating Temperature	T <sub>OP</sub>	-55 to +150	°C	—
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C	—

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation Typical (Note 6)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	R <sub>θJA</sub>	417	°C/W

### 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> )	—	—	1.0	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> )	—	—	0.5	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>	6.2	—	—	V	I <sub>R</sub> = 1mA, V <sub>CC</sub> to V <sub>SS</sub>
Forward Clamping Voltage	V <sub>F</sub>	-1.0	-0.8	—	V	I <sub>F</sub> = -15mA, V <sub>CC</sub> to V <sub>SS</sub>
Reverse Clamping Voltage (Note 7)	V <sub>C_VCC</sub>	—	6.3	—	V	I <sub>PP</sub> = 9A, V <sub>CC</sub> to V <sub>SS</sub> , 8/20μs
	V <sub>C_I/O</sub>	—	7.7	9	V	I <sub>PP</sub> = 6A, I/O to V <sub>SS</sub> , 8/20μs
ESD Clamping Voltage (Note 8)	V <sub>ESD_VCC</sub>	—	6.8	—	V	TLP, 10A, t <sub>P</sub> = 100ns, V <sub>CC</sub> to V <sub>SS</sub> , per Figure 8
	V <sub>ESD_I/O</sub>	—	9	—	V	TLP, 10A, t <sub>P</sub> = 100ns, I/O to V <sub>SS</sub> , per Figure 8
Dynamic Resistance	R <sub>DIF_VCC</sub>	—	0.1	—	Ω	TLP, 10A, t <sub>P</sub> = 100ns, V <sub>CC</sub> to V <sub>SS</sub>
	R <sub>DIF_I/O</sub>	—	0.25	—	Ω	TLP, 10A, t <sub>P</sub> = 100ns, I/O to V <sub>SS</sub>
Channel Input Capacitance	C <sub>I/O</sub>	—	0.65	0.8	pF	V <sub>R</sub> = 2.5V, V <sub>CC</sub> = 5V, f = 1MHz
Variation of Channel Input Capacitance	ΔC <sub>I/O</sub>	—	0.02	—	pF	V <sub>CC</sub> = 5V, V <sub>SS</sub> = 0V, I/O = 2.5V, f = 1MHz, I/O <sub>x</sub> to V <sub>SS</sub> – I/O <sub>y</sub> to V <sub>SS</sub>

- Notes:
- Device mounted on Polyimide PCB pad layout (2oz copper) as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
  - 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.
  - Transmission Line Pulse Test (TLP) settings: t<sub>P</sub> = 100ns, t<sub>R</sub> = 10ns, I<sub>TLP</sub> and V<sub>TLP</sub> averaging window is from 70ns to 90ns.

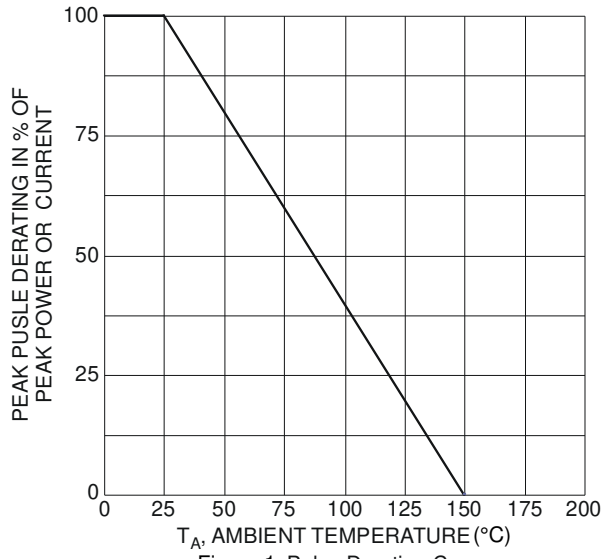


Figure 1. Pulse Derating Curve

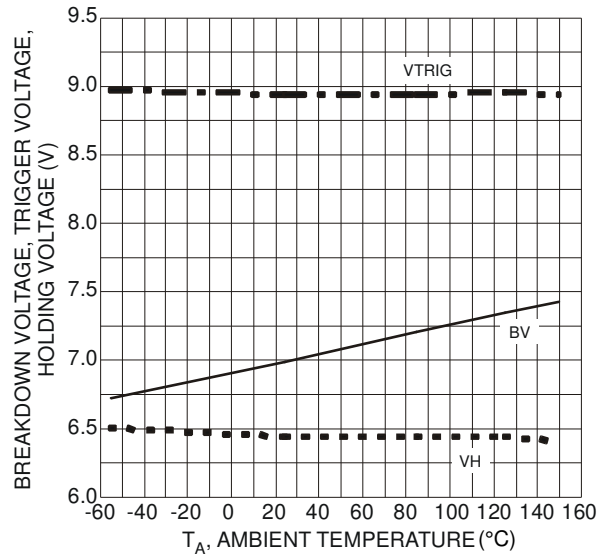


Figure 2. Breakdown Voltage, Trigger Voltage, Holding Voltage vs. Ambient Temperature

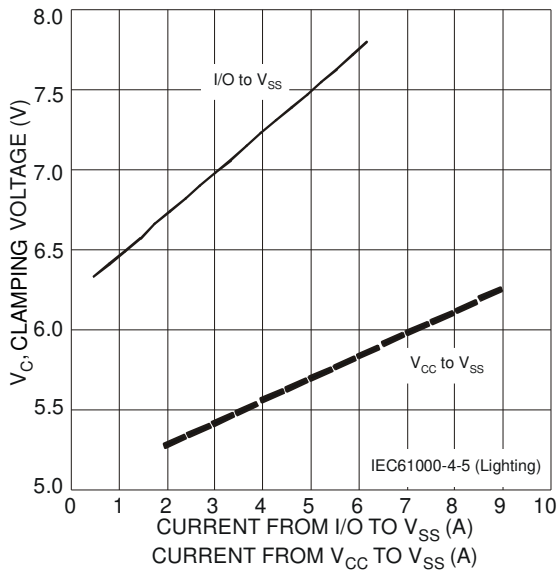


Figure 3. Clamping Voltage Characteristics

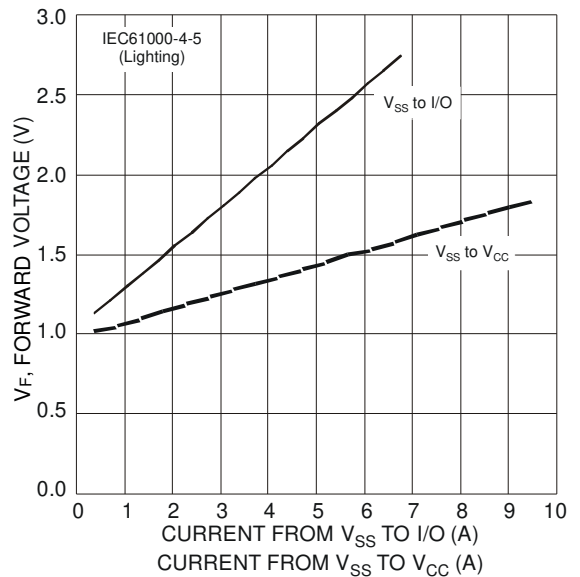


Figure 4. Forward Voltage Characteristics

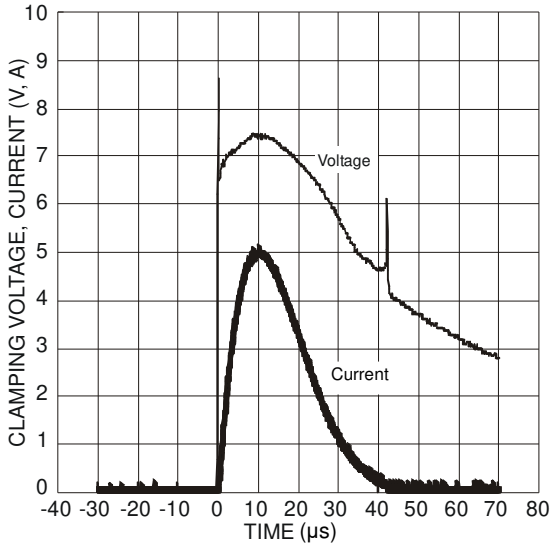


Figure 5. Waveform of Clamping Voltage, Current vs. Time (8/20µs, I/O to V<sub>SS</sub>)

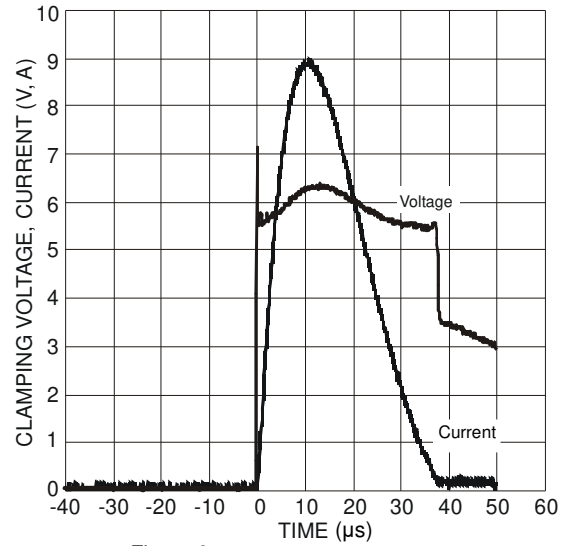


Figure 6. Waveform of Clamping Voltage, Current vs. Time (8/20µs, V<sub>CC</sub> to V<sub>SS</sub>)

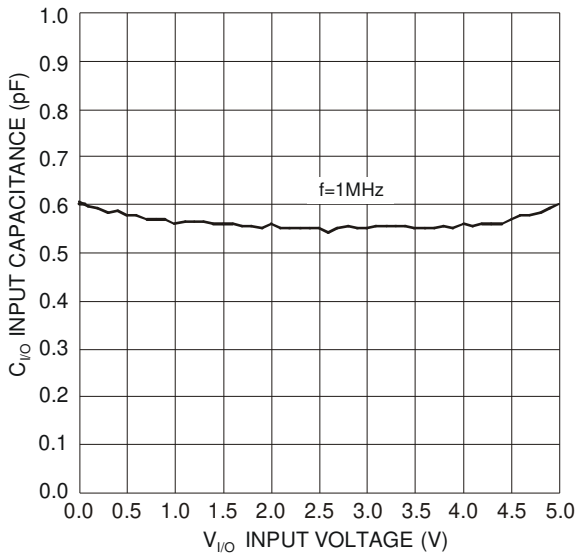


Figure 7. Input Capacitance vs. Input Voltage

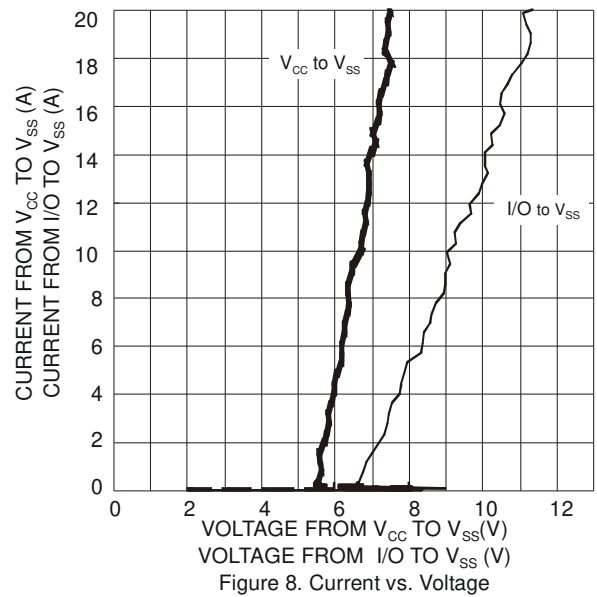
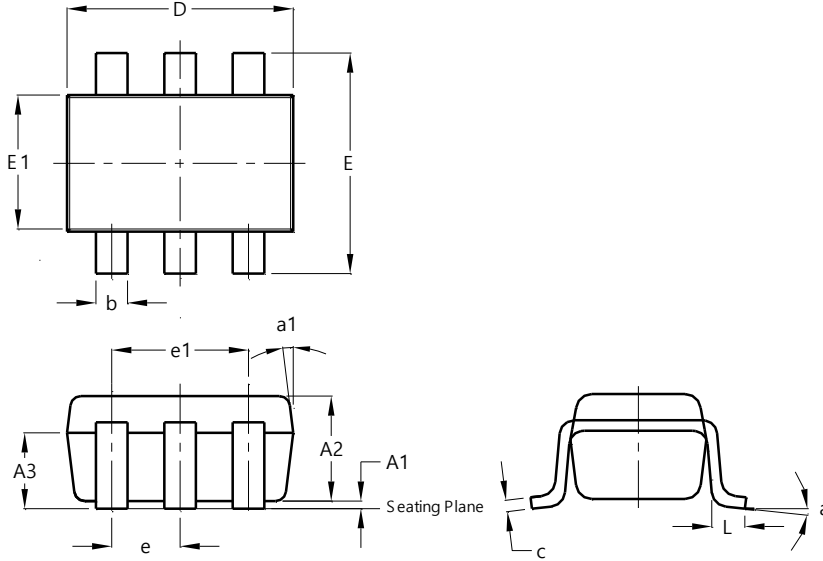


Figure 8. Current vs. Voltage

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT26**

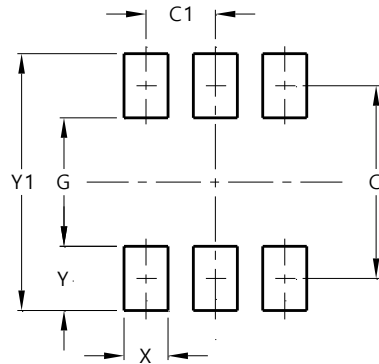


SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT26**



Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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