

## Features

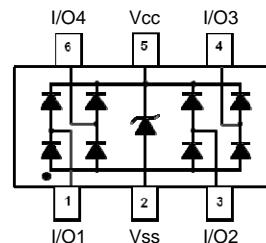
- Low Clamping Voltage, I/O to V<sub>SS</sub>
- Typical 9V at 10A 100ns, TLP
- Typical 7.7V at 6A 8μs/20μs
- IEC 61000-4-2 (ESD): Air – +27/-19kV, Contact – ±16kV
- IEC 61000-4-4 (EFT): Level-4
- IEC 61000-4-5 (Lightning): ±6A
- 4 Channels of ESD protection
- Low Channel Input Capacitance of 0.65pF Typical
- TLP Dynamic Resistance: 0.25Ω
- Typically Used for High Speed Ports such as USB 2.0, IEEE1394, HDMI, Laptop and Personal Computers, Flat Panel Displays, Video Graphics Displays, SIM Ports
- **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
- Terminals: Matte Tin Finish annealed over Copper leadframe
- (Lead Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.016 grams (approximate)



Top View



Device Schematic

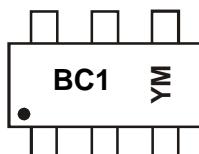
## Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DT1042-04SO-7	Standard	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) 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



BC1 = 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Current, per IEC 61000-4-5	$I_{PP\_I/O}$	$\pm 6$	A	I/O to $V_{SS}$ , 8/20 $\mu\text{s}$
Peak Pulse Power, per IEC 61000-4-5	$P_{PP\_I/O}$	55	W	I/O to $V_{SS}$ , 8/20 $\mu\text{s}$
Operating Voltage (DC)	$V_{DC}$	5.5	V	I/O to $V_{SS}$
ESD Protection – Contact Discharge, per IEC 61000-4-2	$V_{ESD\_I/O}$	$\pm 16$	kV	I/O to $V_{SS}$
ESD Protection – Air Discharge, per IEC 61000-4-2	$V_{ESD\_I/O}$	+27/-19	kV	I/O to $V_{SS}$
Operating Temperature	$T_{OP}$	-55 to +85	$^\circ\text{C}$	—
Storage Temperature	$T_{STG}$	-55 to +150	$^\circ\text{C}$	—

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation Typical (Note 5)	$P_D$	300	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	$R_{\theta JA}$	417	$^\circ\text{C/W}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , 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)	$I_R(V_{CC} \text{ to } V_{SS})$	—	—	1.0	$\mu\text{A}$	$V_R = V_{RWM} = 5\text{V}$ , $V_{CC}$ to $V_{SS}$
Reverse Current (Note 6)	$I_R(I/O \text{ to } V_{SS})$	—	—	0.5	$\mu\text{A}$	$V_R = V_{RWM} = 5\text{V}$ , any I/O to $V_{SS}$
Reverse Breakdown Voltage	$V_{BR}$	6.2	—	—	V	$I_R = 1\text{mA}$ , $V_{CC}$ to $V_{SS}$
Forward Clamping Voltage	$V_F$	-1.0	-0.8	—	V	$I_F = -15\text{mA}$ , $V_{CC}$ to $V_{SS}$
Reverse Clamping Voltage (Note 7)	$V_{C\_V_{CC}}$	—	6.3	—	V	$I_{PP} = 9\text{A}$ , $V_{CC}$ to $V_{SS}$ , 8/20 $\mu\text{s}$
	$V_{C\_I/O}$	—	7.7	9	V	$I_{PP} = 6\text{A}$ , I/O to $V_{SS}$ , 8/20 $\mu\text{s}$
ESD Clamping Voltage	$V_{ESD\_V_{CC}}$	—	6.8	—	V	TLP, 10A, tp = 100 ns, $V_{CC}$ to $V_{SS}$ , per Fig. 8
	$V_{ESD\_I/O}$	—	9	—	V	TLP, 10A, tp = 100 ns, I/O to $V_{SS}$ , per Fig. 8
Dynamic Resistance	$R_{DIF\_V_{CC}}$	—	0.1	—	$\Omega$	TLP, 10A, tp = 100 ns, $V_{CC}$ to $V_{SS}$
	$R_{DIF\_I/O}$	—	0.25	—	$\Omega$	TLP, 10A, tp = 100 ns, I/O to $V_{SS}$
Channel Input Capacitance	$C_{I/O \text{ to } V_{SS}}$	—	0.65	0.8	pF	$V_R = 2.5\text{V}$ , $V_{CC} = 5\text{V}$ , f = 1MHz
Variation of Channel Input Capacitance	$\Delta C_{I/O}$	—	0.02	—	pF	$V_{CC} = 5\text{V}$ , $V_{SS} = 0\text{V}$ , I/O = 2.5V, f = 1MHz, $T = +25^\circ\text{C}$ , I/O_x to $V_{SS}$ – I/O_y to $V_{SS}$

Notes:

- Device mounted on Polyimide 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 8x20 $\mu\text{s}$  peak pulse current ( $I_{PP}$ ) waveform.

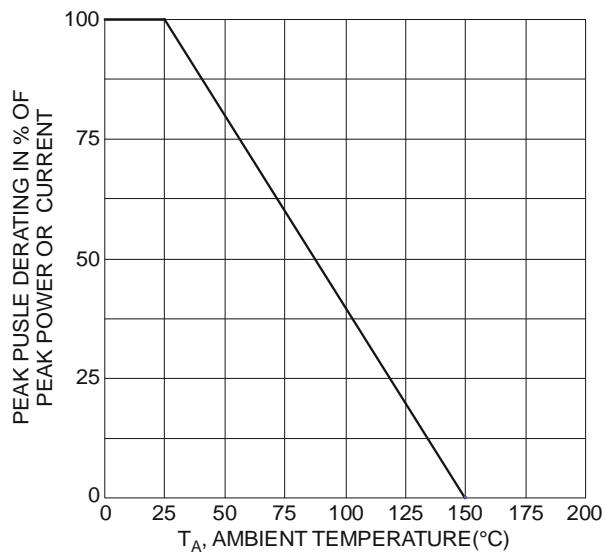


Figure 1 Pulse Derating Curve

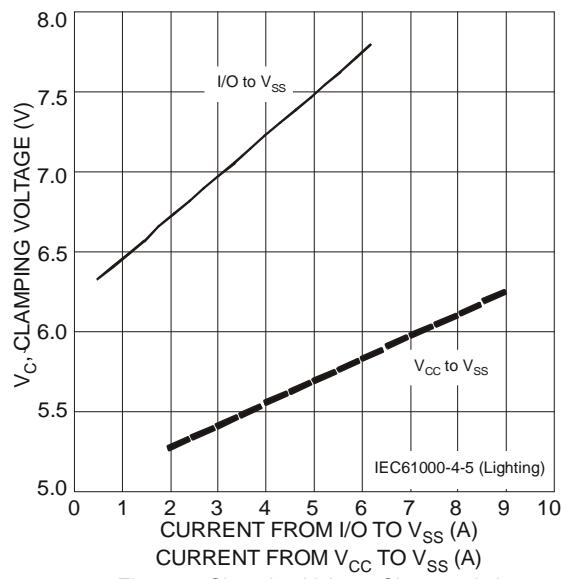


Figure 3 Clamping Voltage Characteristics

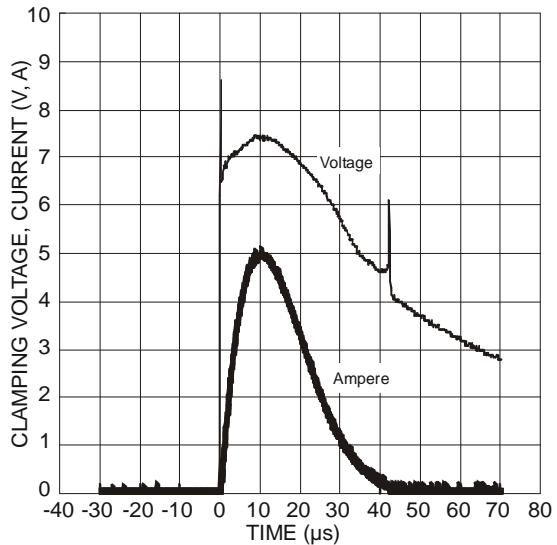


Figure 5 Waveform of Clamping Voltage, Current vs. Time (8/20μs, I/O to V<sub>ss</sub>)

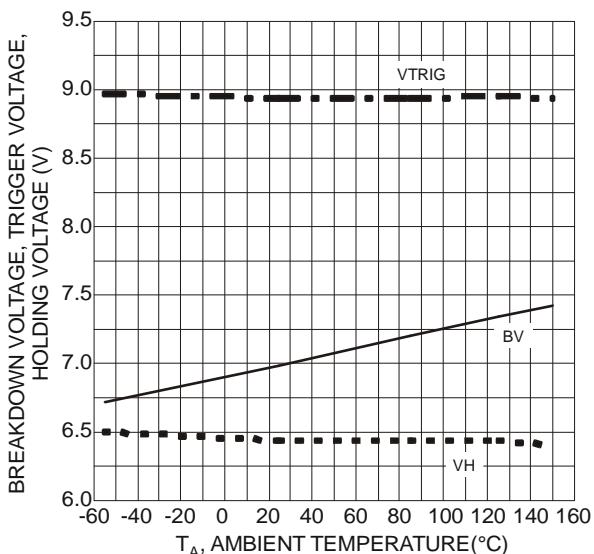


Figure 2 Breakdown Voltage, Trigger Voltage, Holding Voltage vs. Ambient Temperature

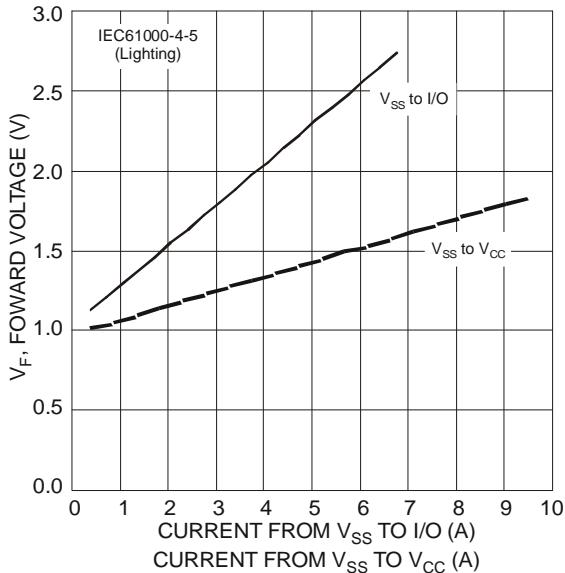


Figure 4 Forward Voltage Characteristics

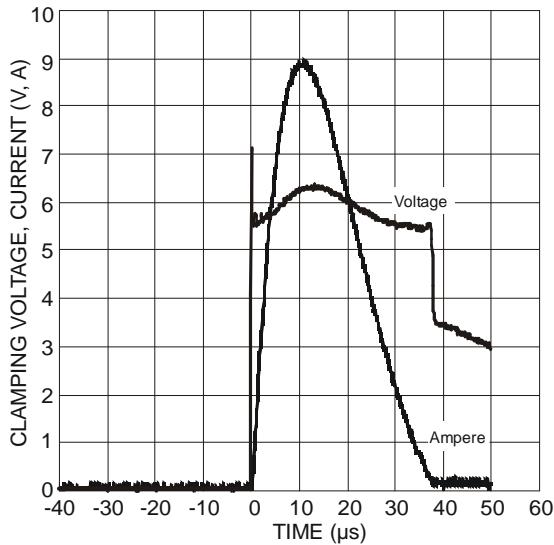


Figure 6 Waveform of Clamping Voltage, Current vs. Time (8/20μs, V<sub>cc</sub> to V<sub>ss</sub>)

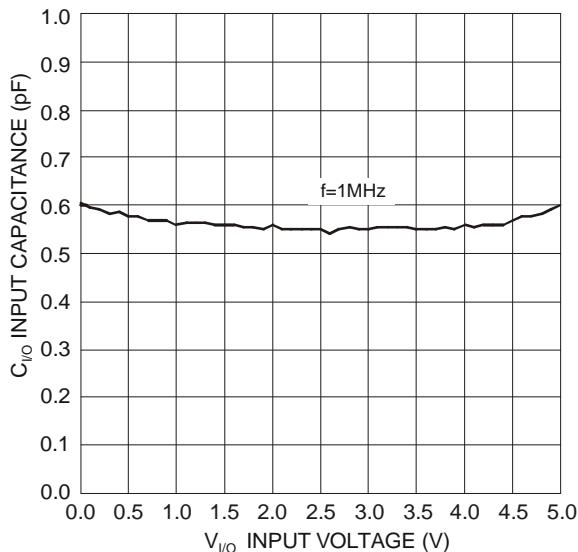


Figure 7 Input Capacitance vs. Input Voltage

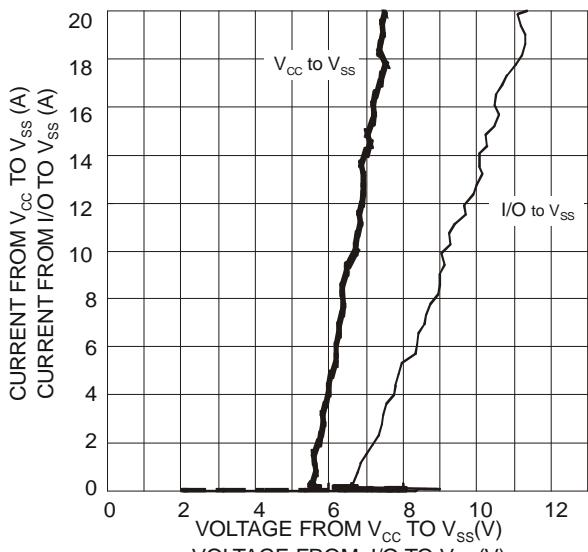
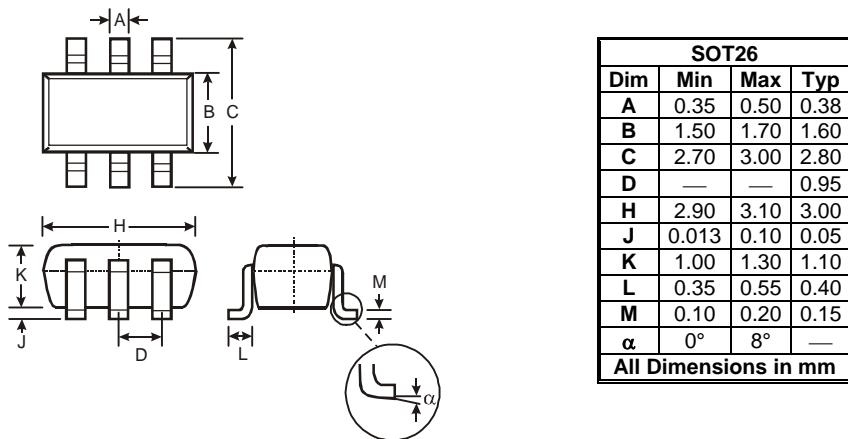


Figure 8. Current vs. Voltage

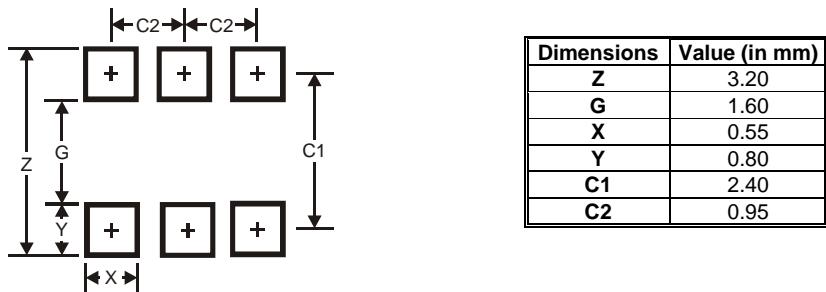
## Package Outline Dimensions

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



## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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#### Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: [org@eplast1.ru](mailto:org@eplast1.ru)

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.