Lead-free Green

4 CHANNELS LOW-CAPACITANCE TVS DIODE ARRAY

Product Summary

$V_{BR\ Min}$	$I_{PP\ Max}$	$C_{I/O\ Typ}$
6.2V	6A	0.65pF

Features And Benefits

- Low Clamping Voltage, I/O to V_{SS}
- 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.

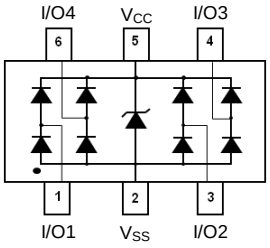
- USB modules
- HDMI ports
- LVDS

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)

SOT26

Top View



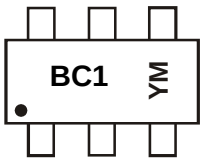
Device Schematic

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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Current, per IEC61000-4-5	$I_{PP\_I/O}$	±6	A	I/O to V_{SS}, 8/20µs
Peak Pulse Power, per IEC61000-4-5	$P_{PP\_I/O}$	55	W	I/O to V_{SS}, 8/20µs
Operating Voltage (DC)	V_{DC}	5.5	V	I/O to V_{SS}
ESD Protection – Contact Discharge, per IEC61000-4-2	$V_{ESD\_CONTACT}$	±16	kV	I/O to V_{SS}
ESD Protection – Air Discharge, per IEC61000-4-2	V_{ESD_AIR}	±16	kV	I/O to V_{SS}
Operating Temperature	T_{OP}	-55 to +150	°C	—
Storage Temperature	T_{STG}	-55 to +150	°C	—

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation Typical (Note 6)	P_D	300	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	$R_{\theta JA}$	417	°C/W

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})	—	—	1.0	µA	$V_R = V_{RWM}$ = 5V, V_{CC} to V_{SS}
Reverse Current (Note 6)	I_R (I/O to V_{SS})	—	—	0.5	µA	$V_R = V_{RWM}$ = 5V, Any I/O to V_{SS}
Reverse Breakdown Voltage	V_{BR}	6.2	—	—	V	I_R = 1mA, V_{CC} to V_{SS}
Forward Clamping Voltage	V_F	-1.0	-0.8	—	V	I_F = -15mA, V_{CC} to V_{SS}
Reverse Clamping Voltage (Note 7)	V_{C_VCC}	—	6.3	—	V	I_{PP} = 9A, V_{CC} to V_{SS}, 8/20µs
	$V_{C\_I/O}$	—	7.7	9	V	I_{PP} = 6A, I/O to V_{SS}, 8/20µs
ESD Clamping Voltage (Note 8)	V_{ESD_VCC}	—	6.8	—	V	TLP, 10A, t_P = 100ns, V_{CC} to V_{SS}, per Figure 8
	$V_{ESD\_I/O}$	—	9	—	V	TLP, 10A, t_P = 100ns, I/O to V_{SS}, per Figure 8
Dynamic Resistance	R_{DIF_VCC}	—	0.1	—	Ω	TLP, 10A, t_P = 100ns, V_{CC} to V_{SS}
	$R_{DIF\_I/O}$	—	0.25	—	Ω	TLP, 10A, t_P = 100ns, I/O to V_{SS}
Channel Input Capacitance	$C_{I/O}$	—	0.65	0.8	pF	V_R = 2.5V, V_{CC} = 5V, f = 1MHz
Variation of Channel Input Capacitance	$\Delta C_{I/O}$	—	0.02	—	pF	V_{CC} = 5V, V_{SS} = 0V, I/O = 2.5V, f = 1MHz, I/O_x to V_{SS} – I/O_y to V_{SS}

Notes:
5. Device mounted on Polymide 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.
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.
8. Transmission Line Pulse Test (TLP) settings: t_P = 100ns, t_R = 10ns, I_{TLP} and V_{TLP} averaging window is from 70ns to 90ns.

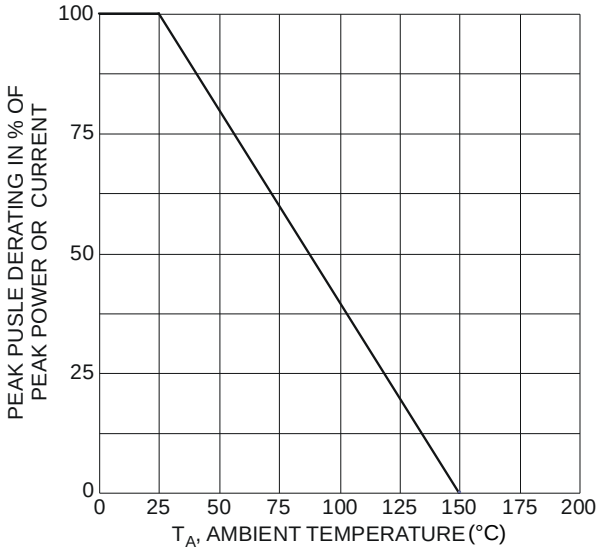


Figure 1. Pulse Derating Curve

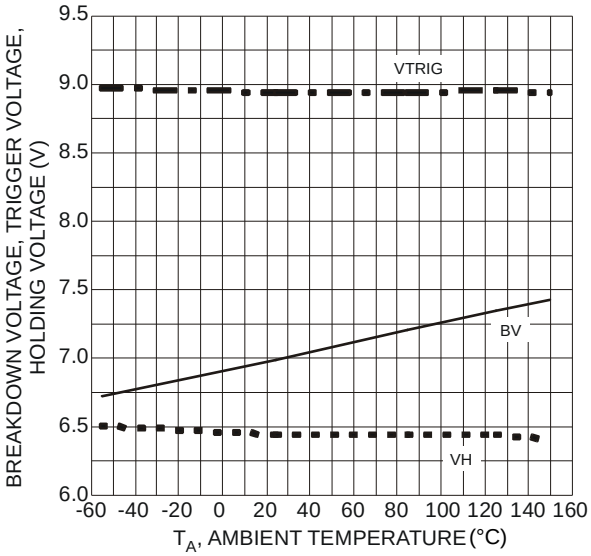


Figure 2. Breakdown Voltage, Trigger Voltage, Holding Voltage vs. Ambient Temperature

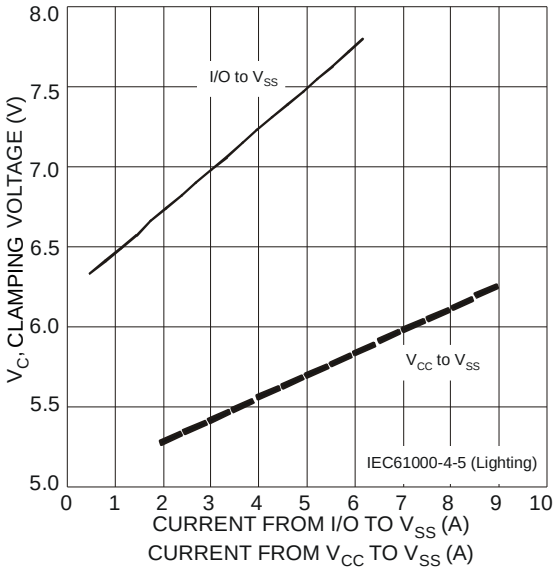


Figure 3. Clamping Voltage Characteristics

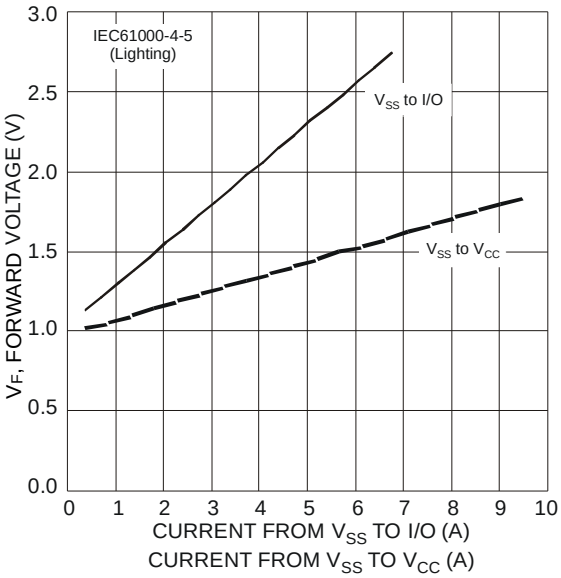


Figure 4. Forward Voltage Characteristics

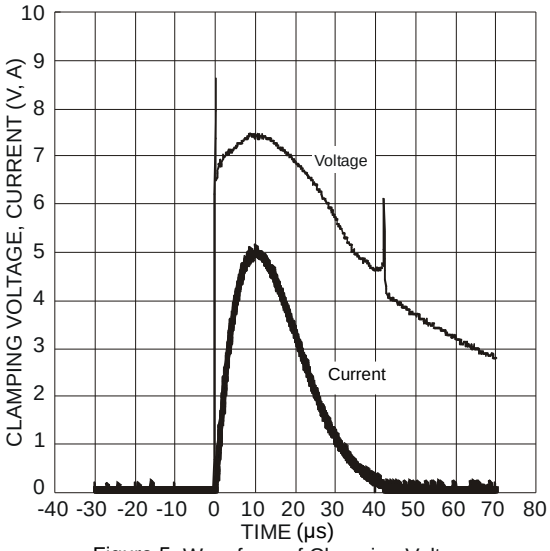


Figure 5. Waveform of Clamping Voltage, Current vs. Time (8/20µs, I/O to V_{SS})

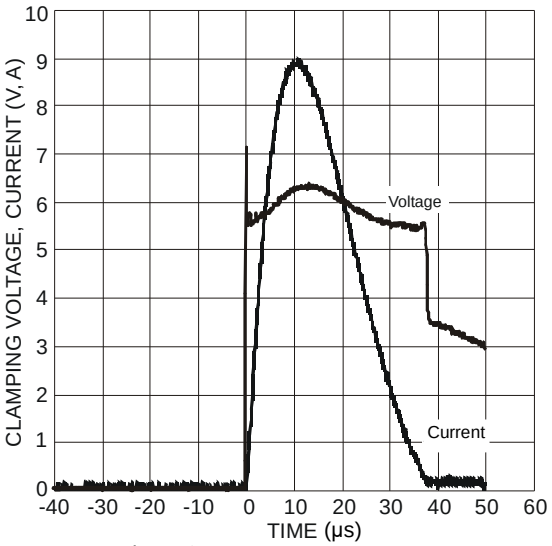


Figure 6. Waveform of Clamping Voltage, Current vs. Time (8/20µs, V_{CC} to V_{SS})

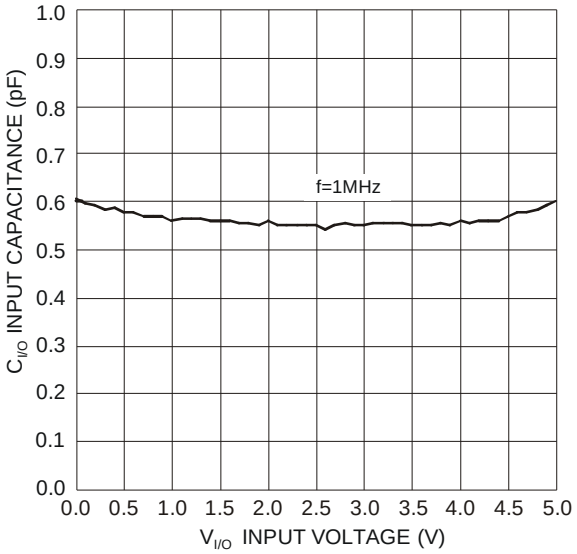


Figure 7. Input Capacitance vs. Input Voltage

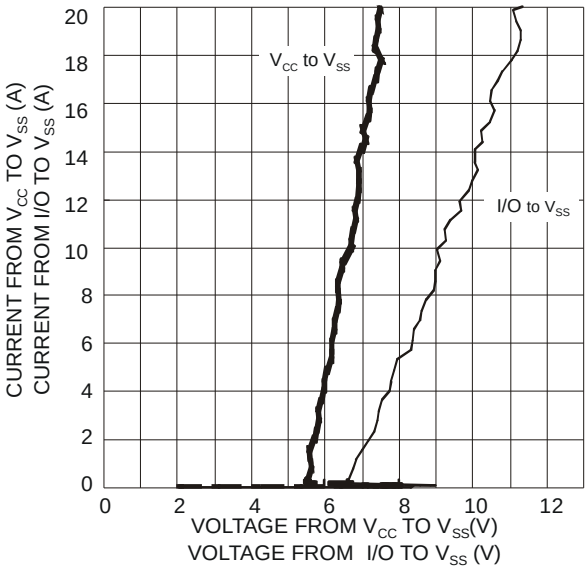


Figure 8. Current vs. Voltage

Package Outline Dimensions

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

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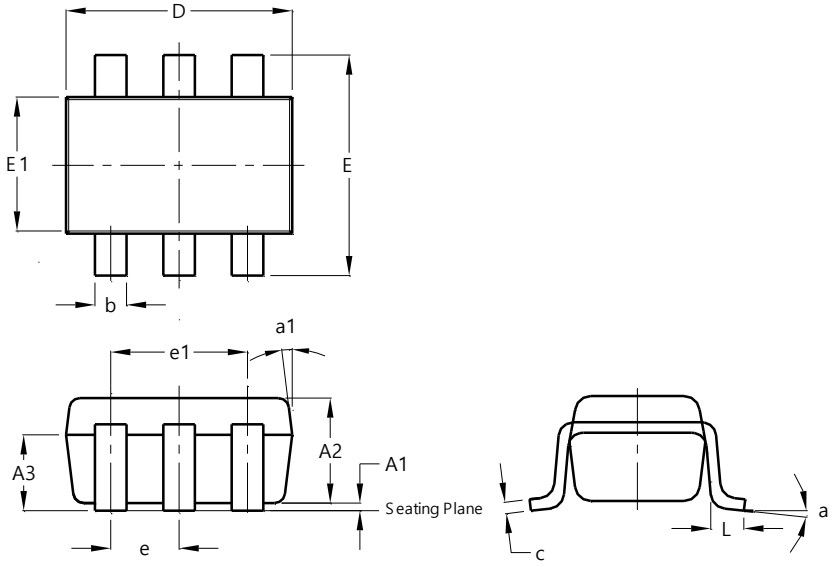
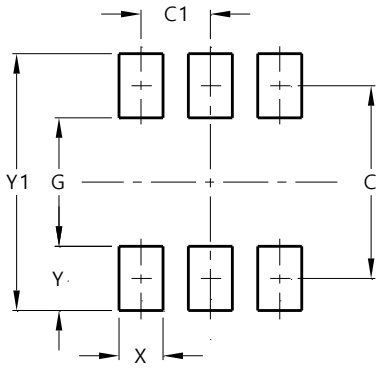


SOT26			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

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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