# 4 CHANNEL LOW CAPACITANCE TVS DIODE ARRAY

NEW PRODUCT

## Product Summary

| $V_{BR\ (Min)}$ | $I_{PP\ (Max)}$ | $C_{T\ (Typ)}$ |
|---|---|---|
| 6V | 10A | 1.0pF |

## Description

The DT2041-04SO is a high-performance device suitable for protecting four high speed I/Os. These devices are assembled in SOT26 package and have high ESD surge capability and low capacitance.

## Applications

Typically used at high-speed ports such as USB 2.0, IEEE1394 (Firewire®, iLink), Serial ATA, DVI™, HDMI™, PCI.

## Features

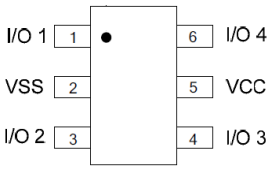
- Low Clamping Voltage: Typical 9V at 10A 100ns, TLP, I/O to $V_{SS}$; Typical 8V at 10A 100ns, TLP, $V_{CC}$ to $V_{SS}$
- IEC 61000-4-2 (ESD): Air – ±30kV, Contact – ±30kV
- IEC61000-4-5(Lighting):10A,I/O to $V_{SS;}$ 12A, $V_{CC}$ to $V_{SS}$
- TLP Dynamic Resistance: 0.25Ω
- Low Channel Input Capacitance of 1.0pF Typical
- 4 Channel of ESD Protection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

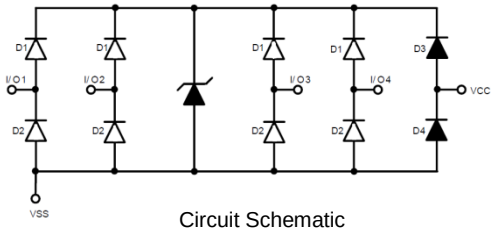
- Case: SOT26
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method208 e3
- Weight: 0.016 grams (Approximate)

**SOT26**

Top View




Device Schematic



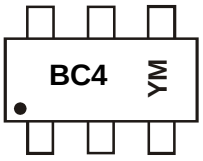

Circuit Schematic

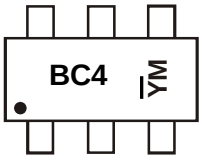
## Ordering Information (Note 4)

| Product | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---|---|---|---|---|---|
| DT2041-04SO-7 | Standard | BC4 | 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




BC4 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: D = 2016)
M = Month (ex: 9 = September)
Note: "—" Represents Internal Code

Date Code Key

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Code | D | E | F | G | H | I |

| 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 |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## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit | Conditions |
|---|---|---|---|---|
| Peak Pulse Current, per IEC61000-4-5 | $I_{PP}$ | ±10 | A | I/O to $V_{SS}$, 8/20 µs |
| Peak Pulse Current, per IEC61000-4-5 | $I_{PP}$ | ±12 | A | $V_{CC}$ to $V_{SS}$, 8/20 µs |
| Peak Pulse Power, per IEC61000-4-5 | $P_{PP}$ | 105 | W | I/O to $V_{SS}$, 8/20 µs |
| Operating Voltage (DC) | $V_{DC}$ | 5.5 | V | I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| ESD Protection – Contact Discharge, per IEC61000-4-2 | $V_{ESD\_CONTACT}$ | ±30 | kV | I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| ESD Protection – Air Discharge, per IEC61000-4-2 | $V_{ESD\_AIR}$ | ±30 | kV | I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| Operating Temperature | $T_{OP}$ | -55 to +85 | °C | — |
| Storage Temperature | $T_{STG}$ | -55 to +150 | °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 | °C/W |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Reverse Working Voltage | $V_{RWM}$ | — | — | 5.5 | V | I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| Reverse Current (Note 6) | $I_R$ | — | — | 1 | µA | $V_R$ = 5V, I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| Reverse Breakdown Voltage | $V_{BR}$ | 6 | — | 9 | V | $I_R$ = 1mA, I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| Forward Clamping Voltage | $V_F$ | -1.0 | -0.8 | — | V | $I_F$ = -15mA, I/O to $V_{SS}$, $V_{CC}$ to $V_{SS}$ |
| Holding Voltage | $V_H$ | 5.5 | — | — | V | — |
| Trigger Voltage | $V_{TRIG}$ | — | 9 | 9.5 | V | — |
| Reverse Clamping Voltage (Note 7) | $V_{C\_5A}$ | — | 7.5 | — | V | $I_{PP}$ = 5A, I/O to $V_{SS}$, 8/20 µs |
| Reverse Clamping Voltage (Note 7) | $V_{C\_10A}$ | — | 9 | 10.5 | V | $I_{PP}$ = 10A, I/O to $V_{SS}$, 8/20 µs |
| ESD Clamping Voltage | $V_{ESD}$ | — | 9 | — | V | TLP, 10A, tp = 100ns, I/O to $V_{SS}$ |
| | | — | 8 | — | | TLP, 10A, tp = 100ns, $V_{CC}$ to $V_{SS}$ |
| Dynamic Resistance | $R_{DIF}$ | — | 0.25 | — | Ω | TLP, 10A, tp = 100ns, I/O to $V_{SS}$ |
| | | — | 0.15 | — | | TLP, 10A, tp = 100ns, $V_{CC}$ to $V_{SS}$ |
| Channel Input Capacitance | $C_T$ | — | 1.0 | 1.5 | pF | $V_{I/O}$ = 2.5V, $V_{CC}$=5V, f = 1MHz |
| Variation of Channel Input Capacitance | $\Delta C_T$ | — | 0.02 | — | pF | $V_{SS}$ = 0V, $V_{I/O}$ = 2.5V, f =1MHz, I/O_x to $V_{SS}$ – I/O_y to $V_{SS}$ |

Notes:
5. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes, Inc. 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.


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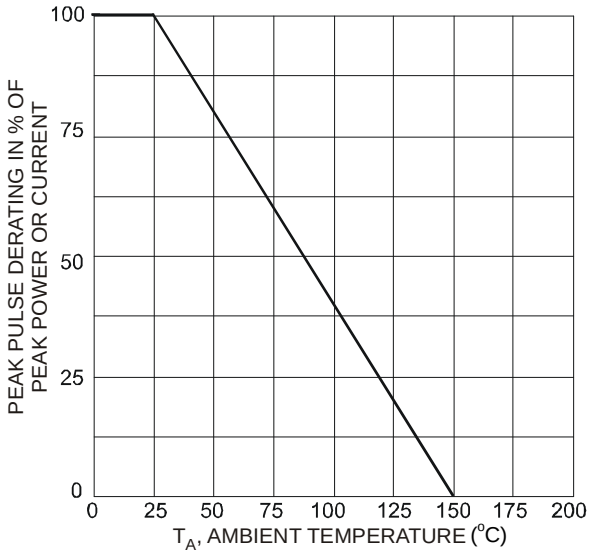


Figure 1 Pulse Derating Curve

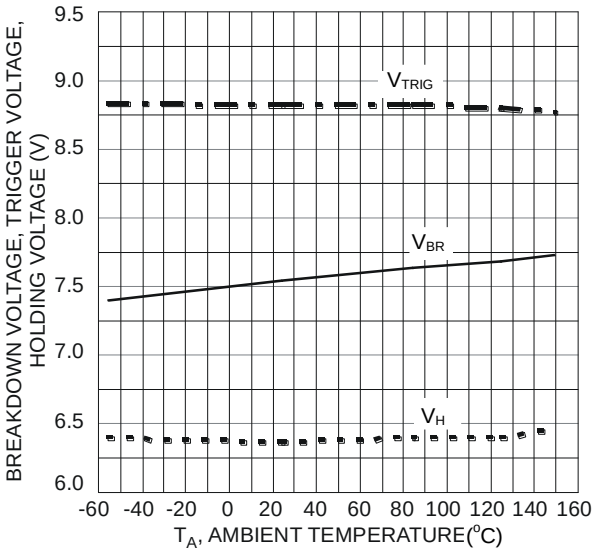


Figure 2 $V_{BR}$, Trigger Voltage, Holding Voltage vs. Ambient Temperature

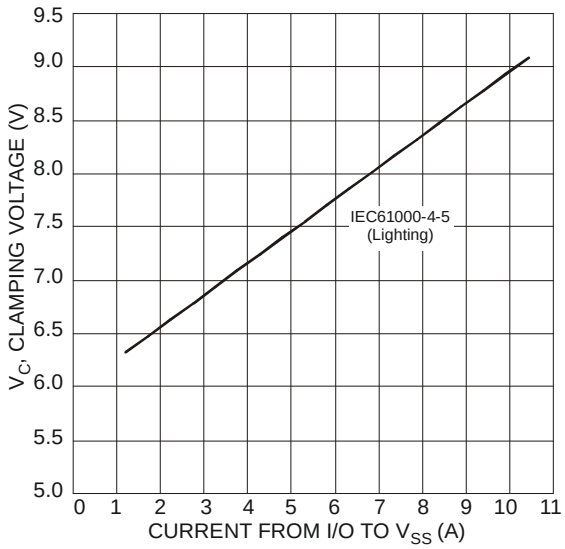


Figure 3 Clamping Voltage Characteristic

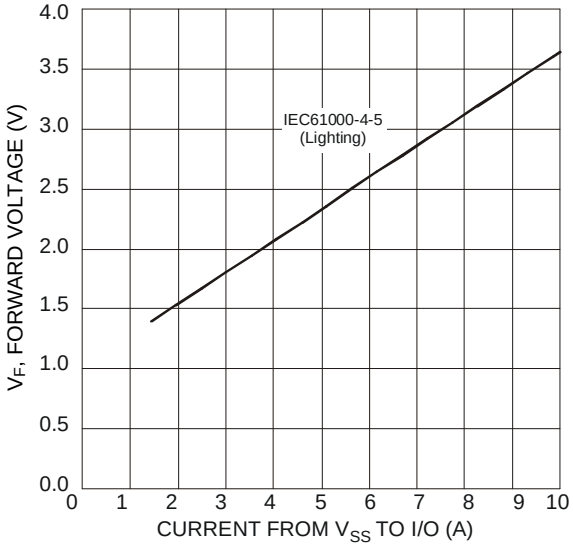


Figure 4 Forward Voltage Characteristic


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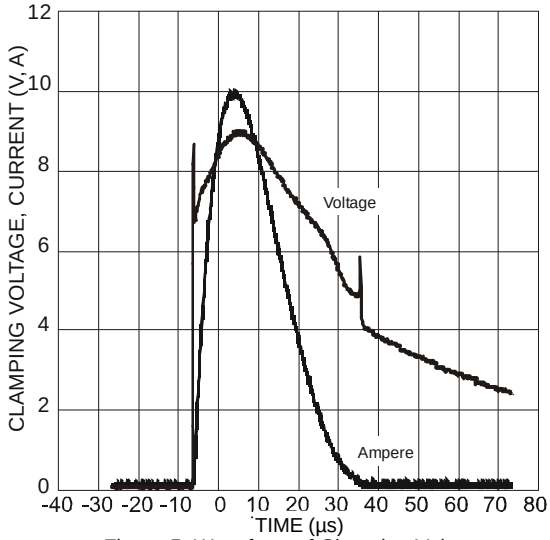


Figure 5 Waveform of Clamping Voltage, Current vs. Time (8/20µs, I/O to $V_{SS}$)

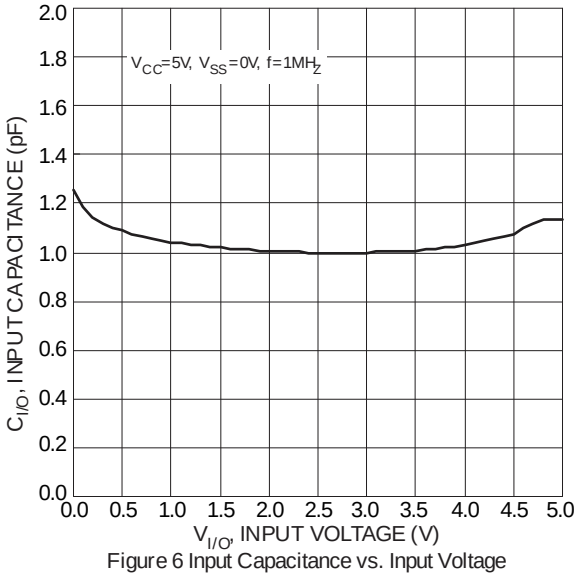


Figure 6 Input Capacitance vs. Input Voltage

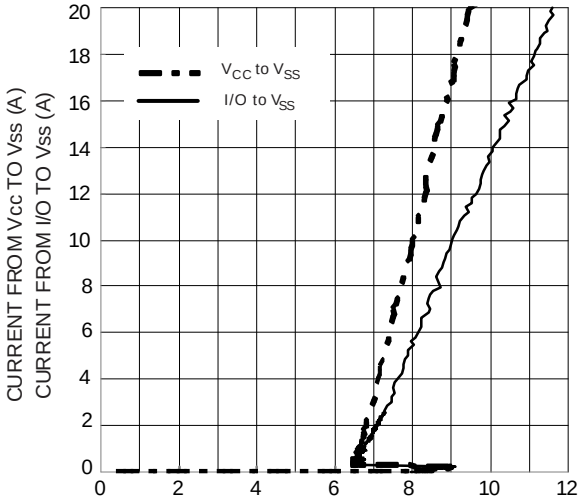


Figure 7 Current vs. Voltage


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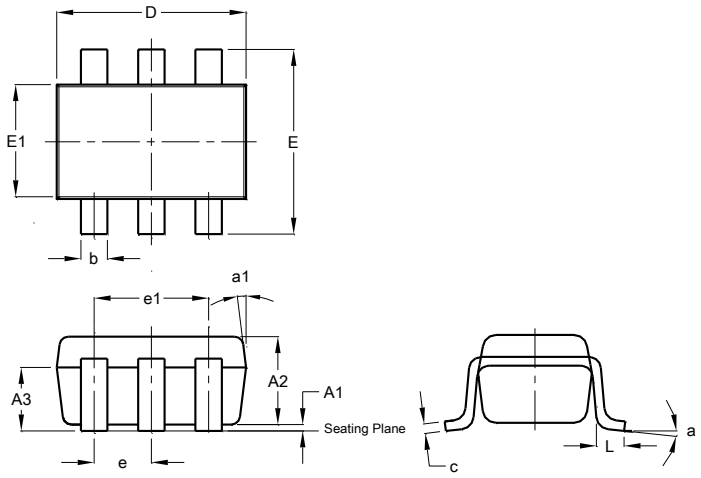
## Package Outline Dimensions

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

**SOT26**

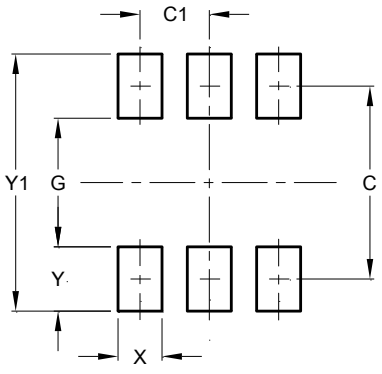



| SOT26 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A1** | 0.013 | 0.10 | 0.05 |
| **A2** | 1.00 | 1.30 | 1.10 |
| **A3** | 0.70 | 0.80 | 0.75 |
| **b** | 0.35 | 0.50 | 0.38 |
| **c** | 0.10 | 0.20 | 0.15 |
| **D** | 2.90 | 3.10 | 3.00 |
| **e** | - | - | 0.95 |
| **e1** | - | - | 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° |
| **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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