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Diodes Incorporated
SDA004-7

For any questions, you can email us directly:
sales@integrated-circuit.com

Lead-free Green

**SDA004**

**DATA BUS TRANSIENT SUPPRESSOR**

## Features

- ESD Protection >30kV (Human Body Model) (Note 1)
- Ultra-Small Surface Mount Package
- Protects 2 Data Lines
- Low Leakage <25nA
- Low Capacitance 3pF Typ.
- Protects USB 2.0 and USB 1.1
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 2, 3 and 4)**

## Mechanical Data

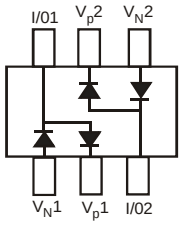
- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Orientation: See Diagram Below
- Weight: 0.006 grams (approximate)

## EC Compatibility (Note 1)

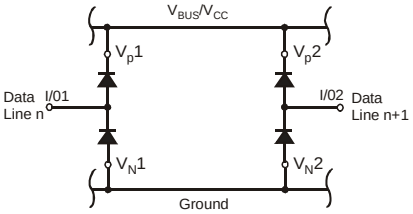
- 61000-4-2 (ESD) Air-30kV Contact-30kV
- 61000-4-4 (EFT) 40A, 5/50 ns
- 61000-4-5 (Surge) 8x20μs, 20 Amperes

SOT-363

Top View




Internal Schematic




APPLICATION

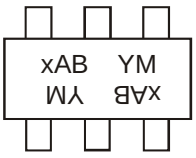
Top View

## Ordering Information (Note 5)

| Part Number | Case | Packaging |
|---|---|---|
| SDA004-7 | SOT-363 | 3000/Tape & Reel |

Notes:
1. Tested with $V_P$ connected to $V_N$ to simulate appropriate $V_{BUS}/V_{CC}$ decoupling to ground.
2. No purposefully added lead. Halogen and Antimony Free.
3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
4. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or $Sb_2O_3$ Fire Retardants.
5. For packaging details, go to our website at http://www.diodes.com.

## Marking Information




KAB or JAB = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: R = 2004
M = Month ex: 9 = September

Date Code Key

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2111 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | R | S | T | U | V | W | X | Y | Z | A | B | C |

| 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 |

**SDA004**

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Non-Repetitive Peak Reverse Voltage | $V_{RM}$ | 100 | V |
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 80 | V |
| Forward Continuous Current (Note 6) | $I_{FM}$ | 500 | mA |
| Repetitive Peak Forward Current @ $T_p$ = 5µs, f = 50kHz (Note 6) | $I_{FRM}$ | 1000 | mA |
| Non-Repetitive Peak Forward Surge Current @ t = 1.0µs<br>@ t = 1.0s | $I_{FSM}$ | 20<br>1.0 | A |
| Clamping Voltage @ $I_{pp}$ = 20A (Note 7)<br>8x20µs Waveform | $V_C$ | 16 | V |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 6) | $P_D$ | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | °C |

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage (Note 8) | $V_{(BR)R}$ | 80 | — | — | V | $I_R$ = 100µA |
| Forward Voltage | $V_F$ | 0.62<br>—<br>—<br>— | — | 0.72<br>0.93<br>1.0<br>1.25 | V | $I_F$ = 5.0mA<br>$I_F$ = 20mA<br>$I_F$ = 100mA<br>$I_F$ = 150mA |
| Reverse Current (Note 8) | $I_R$ | — | — | 100<br>50<br>30<br>25 | nA<br>µA<br>µA<br>nA | $V_R$ = 70V<br>$V_R$ = 75V, $T_J$ = 150°C<br>$V_R$ = 25V, $T_J$ = 150°C<br>$V_R$ = 20V |
| Capacitance, Between I/O Lines (I/O1 & I/O2) | $C_{LL}$ | — | 2.5 | 4.0 | pF | $V_R$ = 0V, f = 1.0MHz |
| Capacitance Between I/O Line and Ground | $C_{LG}$ | — | 3.3 | 5.3 | pF | $V_R$ = 0V, f = 1.0MHz |
| Reverse Recovery Time | $t_{rr}$ | — | — | 4.0 | ns | $V_R$ = 6V, $I_F$ = 5mA |

Notes:
6. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com.
7. Referenced to $V_P$ or $V_N$.
8. Short duration pulse test used to minimize self-heating effect.

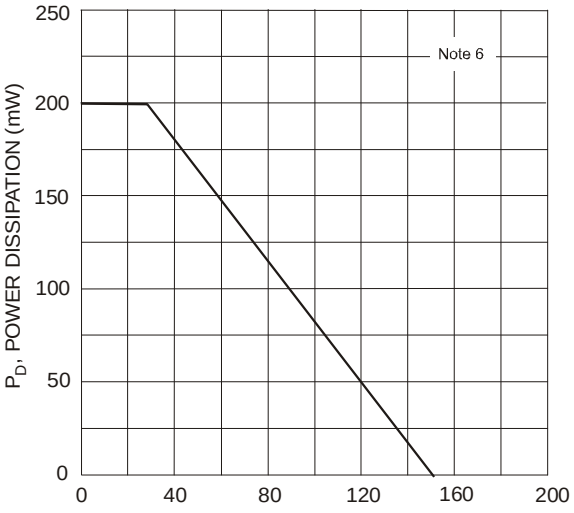



Fig. 1 Power Derating Curve, Total Package

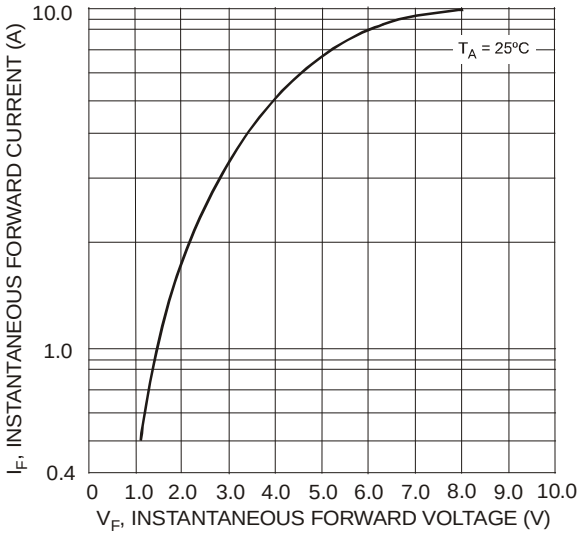



Fig. 2 Typical Forward Characteristics, High Current, Per Element

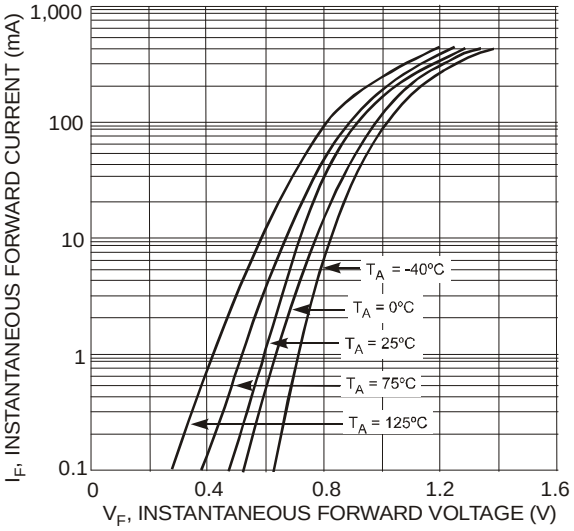



Fig. 3 Typical Forward Characteristics, Low Current, Per Element

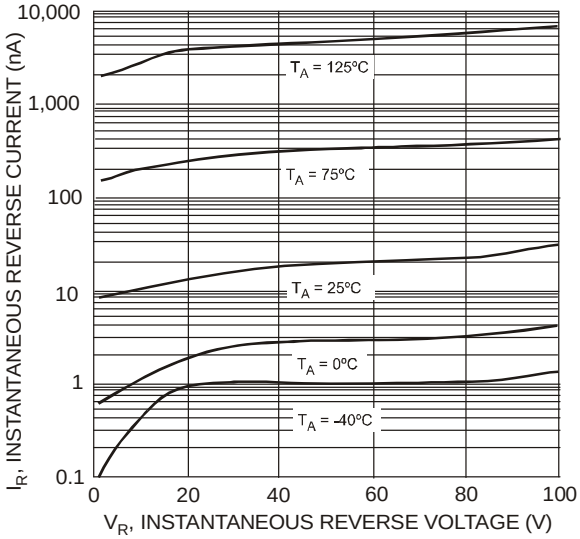



Fig. 4 Typical Reverse Characteristics, Per Element

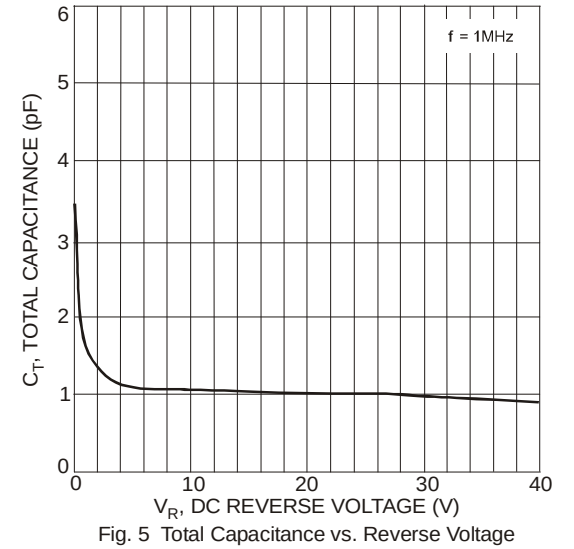



Fig. 5 Total Capacitance vs. Reverse Voltage Per Element

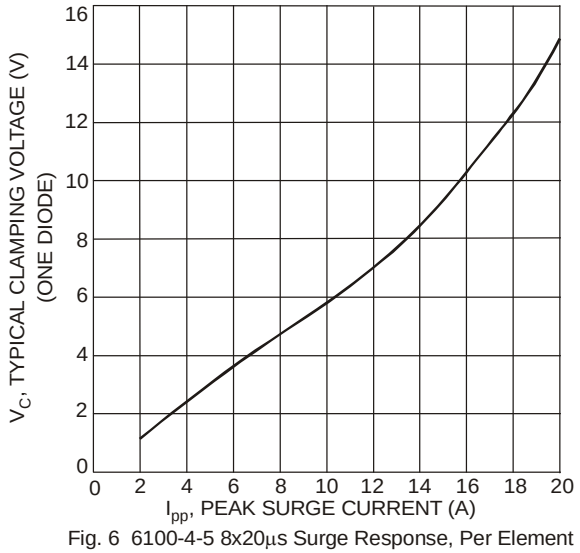
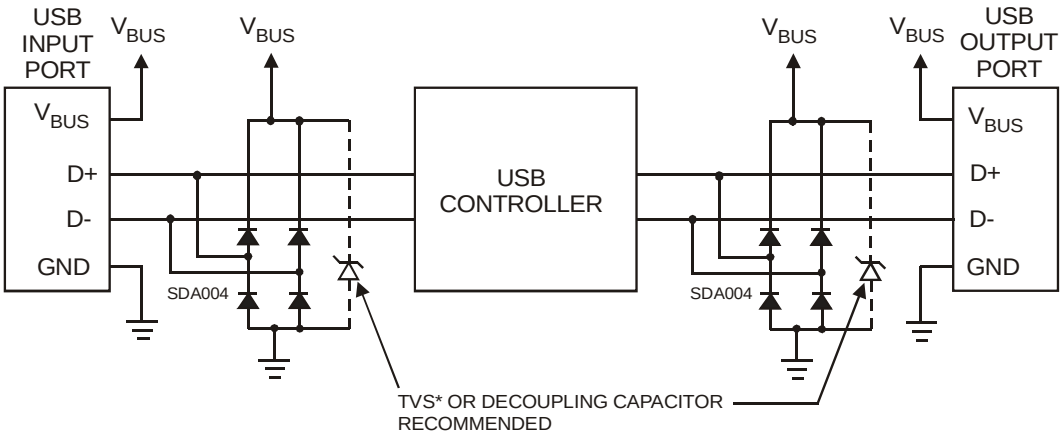
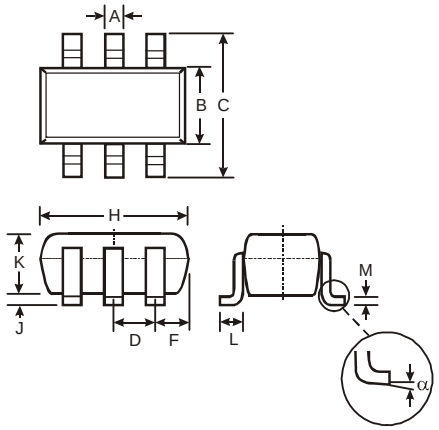



Fig. 6 6100-4-5 8x20µs Surge Response, Per Element



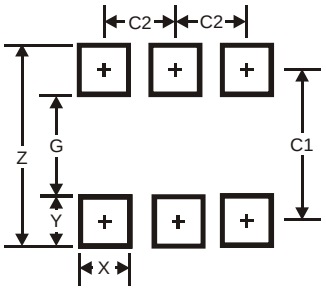

ESD PROTECTION - USB APPLICATION

## Package Outline Dimensions




| SOT-363 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.10 | 0.30 |
| **B** | 1.15 | 1.35 |
| **C** | 2.00 | 2.20 |
| **D** | 0.65 Typ | |
| **F** | 0.40 | 0.45 |
| **H** | 1.80 | 2.20 |
| **J** | 0 | 0.10 |
| **K** | 0.90 | 1.00 |
| **L** | 0.25 | 0.40 |
| **M** | 0.10 | 0.22 |
| **α** | 0° | 8° |
| **All Dimensions in mm** | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **Z** | 2.5 |
| **G** | 1.3 |
| **X** | 0.42 |
| **Y** | 0.6 |
| **C1** | 1.9 |
| **C2** | 0.65 |

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