# DATA BUS TRANSIENT SUPPRESSOR / 3-PHASE FULL WAVE BRIDGE RECTIFIER

## Features

- Fast Switching Speed
- Ultra-Small Surface Mount Package
- For 3-Phase Full Wave Bridge Rectification, or 3 Dataline Rail Clamp
- **Lead Free By Design/RoHS Compliant (Note 3)**
- **"Green" Device (Note 4)**

## IEC Compatibility (Note 5)

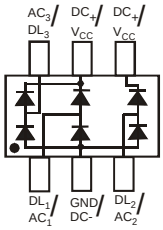
- 61000-4-2 (ESD) Air-10kV Contact-8kV
- 61000-4-5 (Surge) 8x20μs, 14.5 Amperes

## Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 4)
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (approximate)

SOT-363

TOP VIEW




TOP VIEW
Internal Schematic

## 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>$V_R$ | 75 | V |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 53 | V |
| Forward Continuous Current (Note 1) | $I_{FM}$ | 215 | mA |
| Non-Repetitive Peak Forward Surge Current @ t = 1.0μs<br>@ t = 1.0ms<br>@ t = 1.0s | $I_{FSM}$ | 2.0<br>1.0<br>0.5 | A |
| Clamping Voltage (Note 6) @ Ipp = 14.5A<br>8x20μs Waveform | $V_C$ | 16 | V |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 1) | $P_D$ | 200 | mW |
| Power Dissipation (Note 2) | $P_D$ | 300 | mW |
| Thermal Resistance Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 625 | °C/W |
| Thermal Resistance Junction to Ambient Air (Note 2) | $R_{\theta JA}$ | 417 | °C/W |
| Operating and Storage Temperature Range | $T_J$ , $T_{STG}$ | -65 to +150 | °C |

Notes:
1. 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/datasheets/ap02001.pdf.
2. Device mounted on Alumina PCB, 0.4 inch x 0.3 inch x 0.024 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/datasheets/ap02001.pdf.
3. No purposefully added lead.
4. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
5. Tested with $V_{CC}$ connected to Ground to simulate appropriate $V_{CC}$ decoupling to Ground.
6. Reference to $V_{CC}$ or Ground.

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage (Note 7) | $V_{(BR)R}$ | 75 | — | — | V | $I_R$ = 2.5μA |
| Forward Voltage (Note 7) | $V_F$ | — | — | 0.715<br>0.855<br>1.0<br>1.25 | V | $I_F$ = 1.0mA<br>$I_F$ = 10mA<br>$I_F$ = 50mA<br>$I_F$ = 150mA |
| Reverse Current (Note 7) | $I_R$ | — | — | 2.5<br>50<br>30<br>25 | μA<br>μA<br>μA<br>nA | $V_R$ = 75V<br>$V_R$ = 75V, $T_J$ = 150°C<br>$V_R$ = 25V, $T_J$ = 150°C<br>$V_R$ = 20V |
| Junction Capacitance (per element) | $C_J$ | — | — | 2.0 | pF | $V_R$ = 0V, f = 1.0MHz |
| Capacitance, Between I/O Lines (I/O1 & I/O2) | $C_{LL}$ | — | 35 | — | pF | $V_R$ = 0V, f = 1.0MHz |
| Capacitance, Between I/O Line and Ground | $C_{LG}$ | — | 11 | — | pF | $V_R$ = 0V, f = 1.0MHz |
| Reverse Recovery Time | $t_{rr}$ | — | — | 4.0 | ns | $I_F$ = $I_R$ = 10mA,<br>$I_{rr}$ = 0.1 x $I_R$, $R_L$ = 100Ω |

Notes: 7. Short duration pulse test used to minimize self-heating effect.

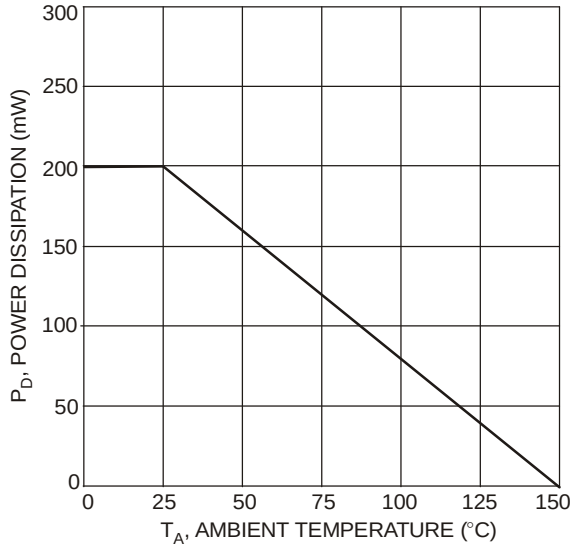



Fig. 1 Power Derating Curve, Total Package

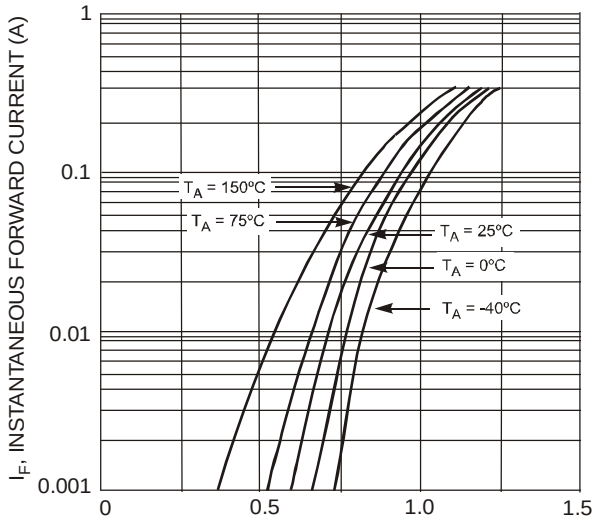



Fig. 2 Typical Forward Characteristics, Per Element

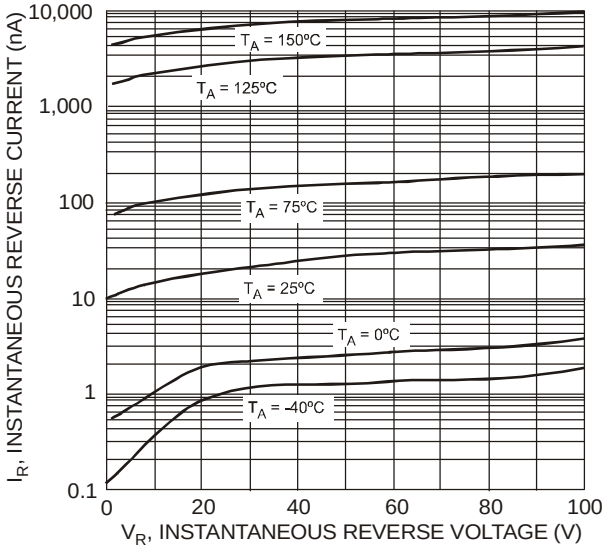



Fig. 3 Typical Reverse Characteristics, Per Element

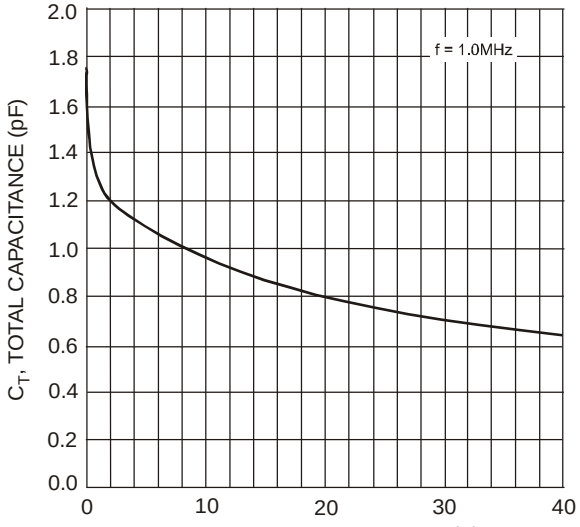


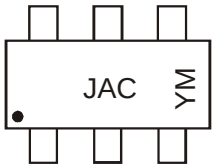

Fig. 4 Total Capacitance vs. Reverse Voltage, Per Element

## Ordering Information (Note 8)

| Part Number | Case | Packaging |
|---|---|---|
| SDA006-7 | SOT-363 | 3000/Tape & Reel |

Notes: 8. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information




JAC = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

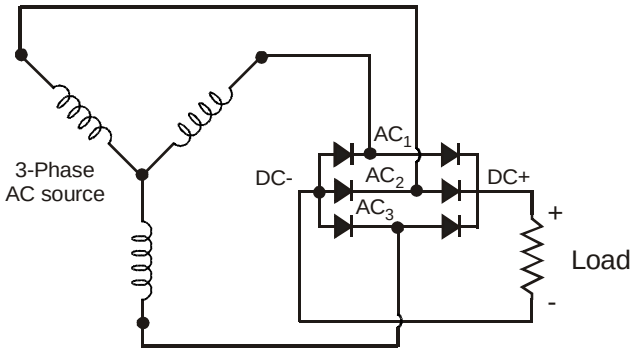
Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | N | P | R | S | T | U | V | W | X | Y | Z |

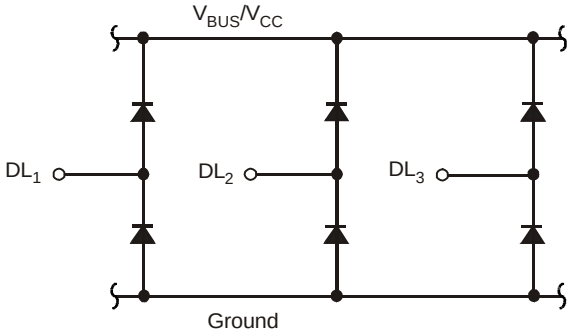
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

## Typical Applications

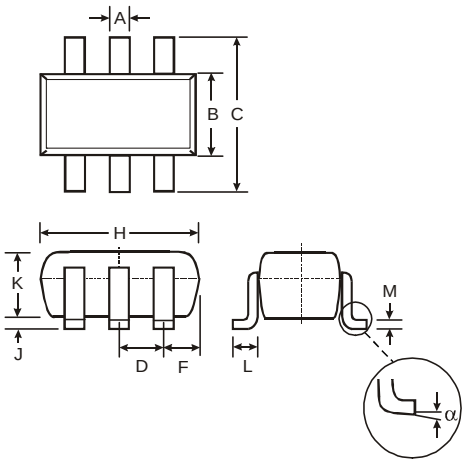
Three Phase, Full-Wave Bridge Rectifier




Data Line Bus Transient Suppressor

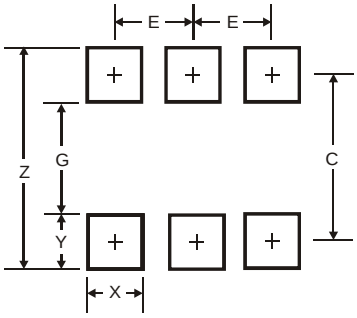


## Package Outline Dimensions




| SOT-363 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.10 | 0.30 |
| **B** | 1.15 | 1.35 |
| **C** | 2.00 | 2.20 |
| **D** | 0.65 Nominal | |
| **F** | 0.30 | 0.40 |
| **H** | 1.80 | 2.20 |
| **J** | — | 0.10 |
| **K** | 0.90 | 1.00 |
| **L** | 0.25 | 0.40 |
| **M** | 0.10 | 0.25 |
| **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 |
| C | 1.9 |
| E | 0.65 |