# LOW CAPACITANCE BIDIRECTIONAL TVS DIODE

## Features

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±30kV, Contact ±30kV
- 1 Channel of ESD Protection
- Low Channel Input Capacitance
- Typically Used in Cellular Handsets, Portable Electronics, Communication Systems, Computers and Peripherals
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

## Mechanical Data

- Case: X1-DFN1006-2
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)

X1-DFN1006-2

Bottom View


Device Schematic

## Ordering Information (Note 3)

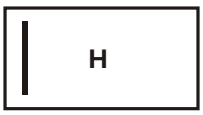
**D 5V0 L X B X XXX- XX**

| Voltage | Capacitance | # of Channels | Polarity | # of Pins | Package | Packing |
|---|---|---|---|---|---|---|
| 5V0: 5.0 Volts | X: Extremely Low (<0.5pF)<br>F: Ultra Low (0.5 ~ 1.0pF)<br>P: Very Low (1.1 ~ 10pF)<br>L: Low (10.1 ~ 20pF)<br>M: Medium (>20pF) | 1: 1 Channel<br>2: 2 Channels<br>4: 4 Channels<br>6: 6 Channels | B: Bidirectional (Symmetrical)<br>U: Unidirectional<br>A: Bidirectional (Asymmetrical) | 2: 2 Pins<br>3: 3 Pins<br>5: 5 Pins<br>6: 6 Pins<br>8: 8 Pins<br>10: 10 Pins | LP3: X3-DFN0603-2<br>LP: X1-DFN1006-2<br>LP4: X2-DFN1006-2<br>WS: SOD323<br>T: SOD523/SOT523<br>SO: SOT23/SOT25<br>W: SOD123/SOT323<br>TS: TSOT25/TSOT26<br>S: SOT353/SOT363<br>V:SOT553/SOT563 | 7: 7" reel (3K/reel)<br>7B: 7" reel (10Kreel)<br>13: 13" reel |

| Part Number | Case | Packaging |
|---|---|---|
| D5V0L1B2LP-7B | X1-DFN1006-2 | 10,000/Tape & Reel |

Notes: 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

## Marking Information




H = Product Type Marking Code
Line Denotes Pin 1

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

| Characteristic | Symbol | Value | Unit | Conditions |
|---|---|---|---|---|
| Peak Pulse Power Dissipation | $P_{PP}$ | 84 | W | 8/20µs, per Fig. 1 |
| Peak Pulse Current | $I_{PP}$ | 6 | A | 8/20µs, per Fig. 1 |
| ESD Protection – Contact Discharge | $V_{ESD\_Contact}$ | ±30 | kV | IEC 61000-4-2 Standard |
| ESD Protection – Air Discharge | $V_{ESD\_Air}$ | ±30 | kV | IEC 61000-4-2 Standard |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Package Power Dissipation (Note 4) | $P_D$ | 250 | mW |
| Thermal Resistance, Junction to Ambient (Note 4) | $R_{\theta JA}$ | 500 | °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 Conditions |
|---|---|---|---|---|---|---|
| Reverse Standoff Voltage | $V_{RWM}$ | - | - | 5 | V | - |
| Channel Leakage Current (Note 5) | $I_{RM}$ | - | 10 | 100 | nA | $V_{RWM}$ = 5V |
| Clamping Voltage, Positive Transients | $V_{CL}$ | - | 7.0 | 9.0 | V | $I_{PP}$ = 1A, $t_p$ = 8/20µS |
| | | - | 8.7 | 10.7 | | $I_{PP}$ = 3A, $t_p$ = 8/20µS |
| | | - | 10.5 | 12.0 | | $I_{PP}$ = 5A, $t_p$ = 8/20µS |
| | | - | 11.5 | 14.0 | | $I_{PP}$ = 6A, $t_p$ = 8/20µS |
| Breakdown Voltage | $V_{BR}$ | 6 | 7 | 8 | V | $I_R$ = 1mA |
| Differential Resistance | $R_{DIF}$ | - | 0.2 | - | Ω | $I_R$ = 1A, $t_p$ = 8/20µS |
| Channel Input Capacitance | $C_{IN}$ | - | 15 | 20 | pF | $V_R$ = 0V, f = 1MHz |

Notes: 4. Device mounted on FR-4 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.
5. Short duration pulse test used to minimize self-heating effect.

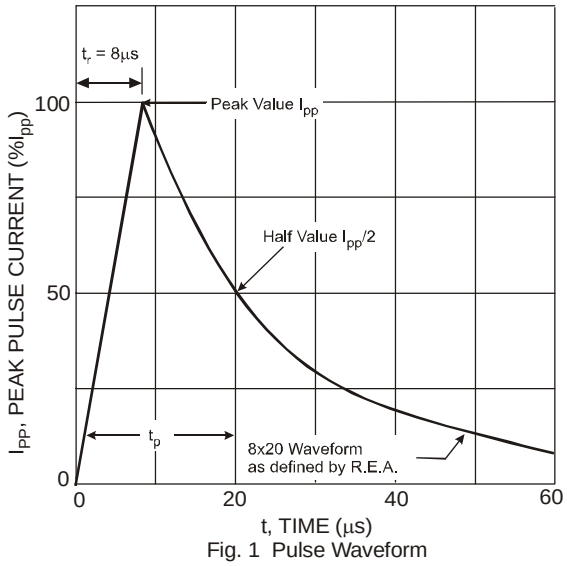


Fig. 1 Pulse Waveform

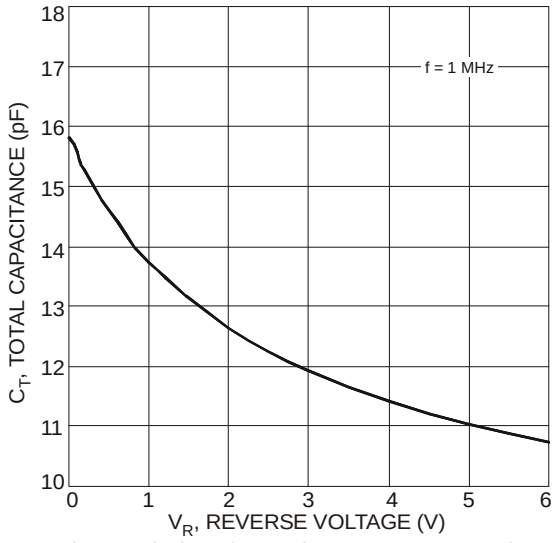


Fig. 2 Typical Total Capacitance vs. Reverse Voltage

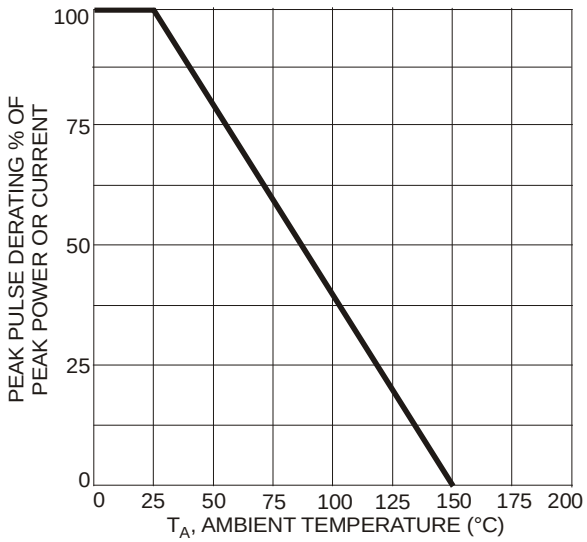


Fig. 3 Pulse Derating Curve

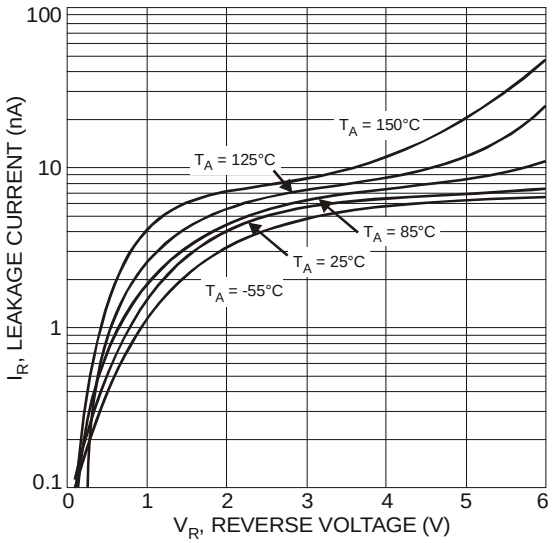
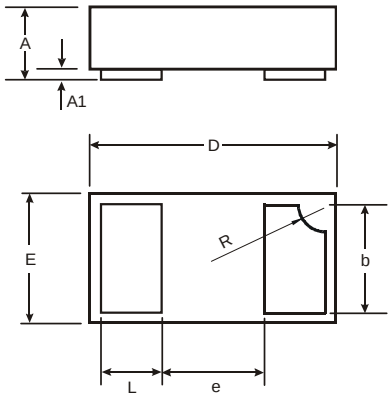


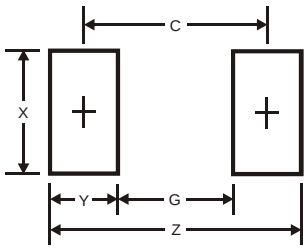
Fig. 4 Typical Reverse Characteristics

## Package Outline Dimensions




| X1-DFN1006-2 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.47 | 0.53 | 0.50 |
| **A1** | 0 | 0.05 | 0.03 |
| **b** | 0.45 | 0.55 | 0.50 |
| **D** | 0.95 | 1.075 | 1.00 |
| **E** | 0.55 | 0.675 | 0.60 |
| **e** | - | - | 0.40 |
| **L** | 0.20 | 0.30 | 0.25 |
| **R** | 0.05 | 0.15 | 0.10 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **Z** | 1.1 |
| **G** | 0.3 |
| **X** | 0.7 |
| **Y** | 0.4 |
| **C** | 0.7 |

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