

## Product Summary

|                             |                             |                            |
|-----------------------------|-----------------------------|----------------------------|
| <b>V<sub>BR</sub> (min)</b> | <b>I<sub>PP</sub> (max)</b> | <b>C<sub>T</sub> (typ)</b> |
| 13V                         | 4A                          | 10pF                       |

## Description

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of small size and high ESD surge capability makes it ideal for use in portable applications such as cellular phones, digital cameras, and MP3 players.

## Applications

- Cellular Handsets
- Portable Electronics
- Computers and Peripheral

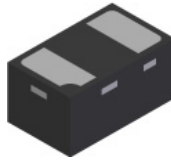
## Features

- Low Profile Package (0.53mm max) and Ultra-small PCB Footprint Area (1.08 \* 0.68mm max) Suitable for Compact Portable Electronics
- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±30kV, Contact ±30kV
- 1 Channel of ESD Protection
- Low Channel Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## 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 <sup>(e4)</sup>
- Weight: 0.001 grams (approximate)

X1-DFN1006-2



Bottom View



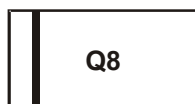
Device Schematic

## Ordering Information (Note 4)

| Product        | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel  |
|----------------|------------|---------|--------------------|-----------------|--------------------|
| D12V0L1B2LP-7B | AEC-Q101   | Q8      | 7                  | 8               | 10,000/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](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



Q8 = Product Type Marking Code  
Line Denotes Pin 1

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                     | Symbol             | Value    | Unit | Conditions                    |
|------------------------------------|--------------------|----------|------|-------------------------------|
| Peak Pulse Power Dissipation       | $P_{PP}$           | 100      | W    | 8/20 $\mu\text{s}$ , Figure 3 |
| Peak Pulse Current                 | $I_{PP}$           | 4        | A    | 8/20 $\mu\text{s}$ , Figure 3 |
| ESD Protection – Contact Discharge | $V_{ESD\_Contact}$ | $\pm 30$ | kV   | IEC 61000-4-2 Standard        |
| ESD Protection – Air Discharge     | $V_{ESD\_Air}$     | $\pm 30$ | kV   | IEC 61000-4-2 Standard        |

**Thermal Characteristics**

| Characteristic                                   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Package Power Dissipation (Note 5)               | $P_D$           | 250         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 500         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -65 to +150 | $^\circ\text{C}$          |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                   | Symbol    | Min | Typ | Max | Unit | Test Conditions                             |
|----------------------------------|-----------|-----|-----|-----|------|---|
| Reverse Standoff Voltage         | $V_{RWM}$ | —   | —   | 12  | V    | —   |
| Channel Leakage Current (Note 6) | $I_{RM}$  | —   | 1   | 50  | nA   | $V_{RWM} = 12\text{V}$                      |
| Clamping Voltage, IEC 61000-4-5  | $V_{CL}$  | —   | —   | 20  | V    | $I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$ |
|                                  |           | —   | —   | 25  |      | $I_{PP} = 4\text{A}, t_p = 8/20\mu\text{s}$ |
| Breakdown Voltage                | $V_{BR}$  | 13  | —   | —   | V    | $I_R = 1\text{mA}$                          |
| Channel Input Capacitance        | $C_T$     | —   | 10  | 13  | pF   | $V_R = 0\text{V}, f = 1\text{MHz}$          |

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

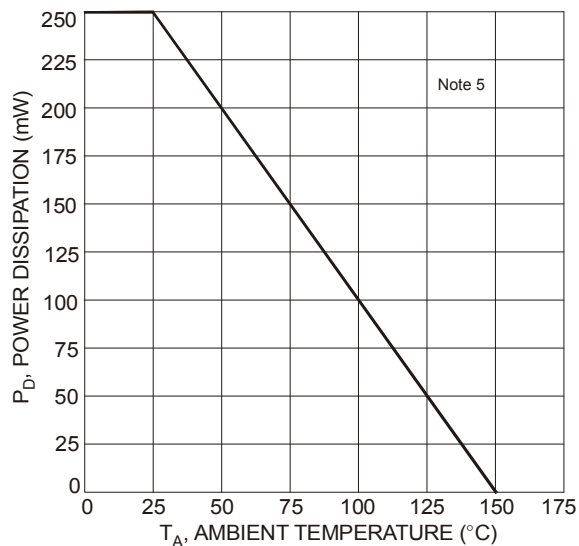


Figure 1 Power Derating Curve

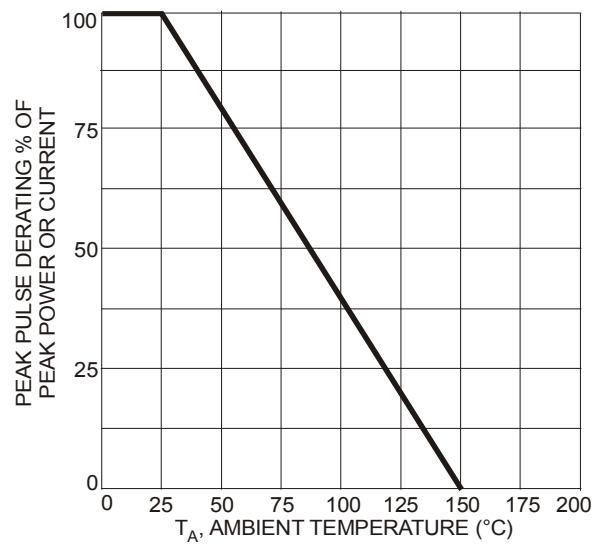


Figure 2 Pulse Derating Curve

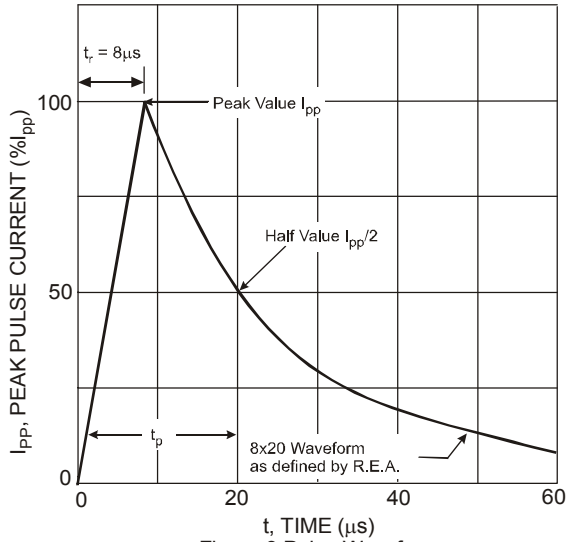


Figure 3 Pulse Waveform

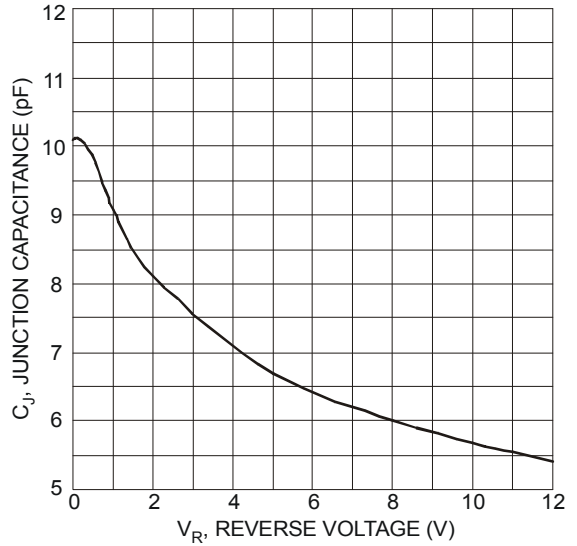


Figure 4 Typical Junction Capacitance

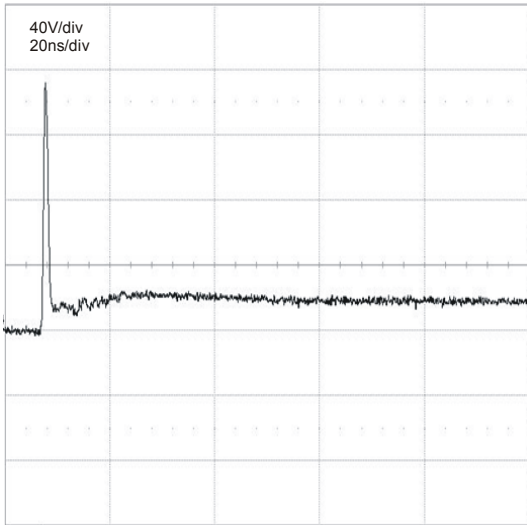


Figure 5 ESD Response to IEC 61000-4-2 (+8kV Contact Discharge)

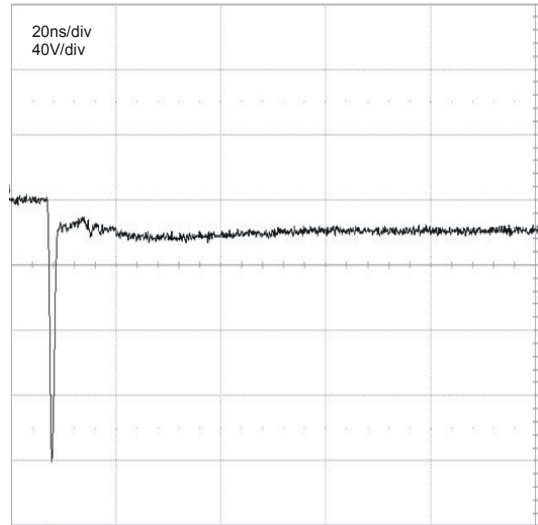


Figure 6 ESD Response to IEC 61000-4-2 (-8kV Contact Discharge)

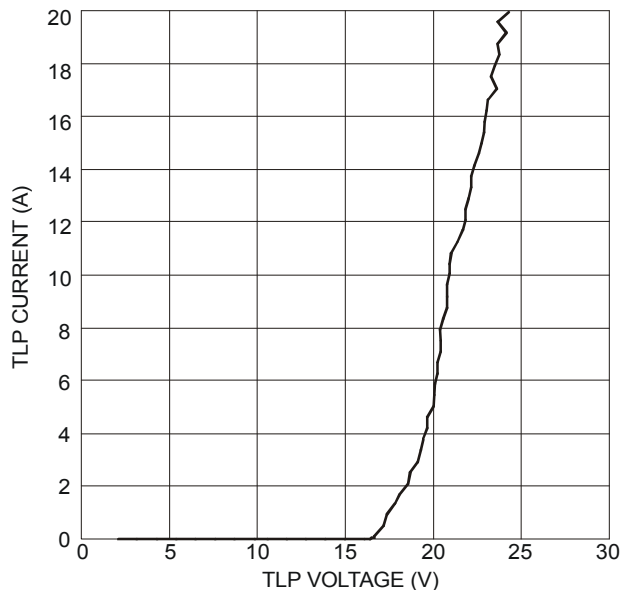
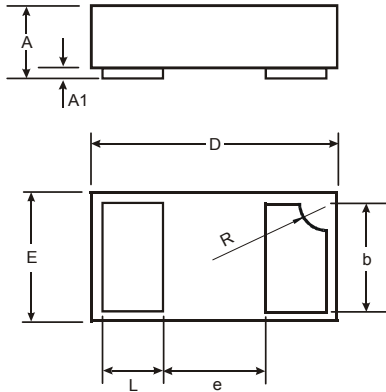


Figure 7 Transmission Line Pulsing (TLP) Current vs. Voltage

**Package Outline Dimensions**

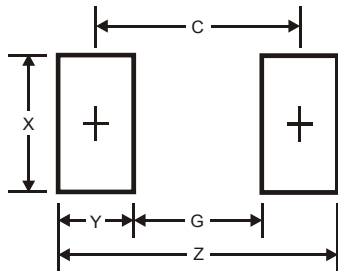
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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

NEW PRODUCT

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