

## Product Summary

|                             |                             |                            |
|-----------------------------|-----------------------------|----------------------------|
| <b>V<sub>BR</sub> (min)</b> | <b>I<sub>PP</sub> (max)</b> | <b>C<sub>T</sub> (typ)</b> |
| 6.0V                        | 4A                          | 8pF                        |

## 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

- Ultra-Small, Low Profile Leadless Surface Mount Package (0.6 \* 0.3 \* 0.3mm)
- Provides ESD Protection per IEC 61000-4-2 Standard:  
Air ±17kV, Contact ±15kV
- 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: X3-DFN0603-2
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin over Copper leadframe, solderable per MIL-STD-202, Method 208 <sup>e3</sup>
- Weight: 0.0002 grams (approximate)



Top View



Bottom View



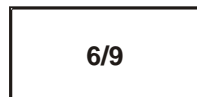
Device Schematic

## Ordering Information (Note 4)

| Product       | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel  |
|---------------|------------|---------|--------------------|-----------------|--------------------|
| D5V0P1B2LP3-7 | Standard   | 6/9     | 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



6/9 = Product Type Marking Code  
Bar Denotes Cathode Side

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

| Characteristic                     | Symbol             | Value    | Unit | Conditions                        |
|------------------------------------|--------------------|----------|------|-----------------------------------|
| Peak Pulse Current                 | $I_{PP}$           | 4        | A    | 8/20 $\mu\text{s}$ , per Figure 3 |
| ESD Protection – Contact Discharge | $V_{ESD\_Contact}$ | $\pm 15$ | kV   | IEC 61000-4-2 Standard            |
| ESD Protection – Air Discharge     | $V_{ESD\_Air}$     | $\pm 17$ | 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         | $^\circ\text{C/W}$ |
| 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              | $V_{RWM}$ | —   | —    | 5.5  | V    | —  |
| Channel Leakage Current (Note 6)      | $I_{RM}$  | —   | 10   | 100  | nA   | $V_{RWM} = 5\text{V}$                                  |
| Clamping Voltage, Positive Transients | $V_{CL}$  | —   | 7.0  | 9.0  | V    | $I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$ , Figure 3 |
|                                       |           | —   | 11.0 | 13.0 |      | $I_{PP} = 4\text{A}, t_p = 8/20\mu\text{s}$ , Figure 3 |
| Breakdown Voltage                     | $V_{BR}$  | 6   | 7    | 8    | V    | $I_R = 1\text{mA}$                                     |
| Channel Input Capacitance             | $C_T$     | —   | 8    | 10   | 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.

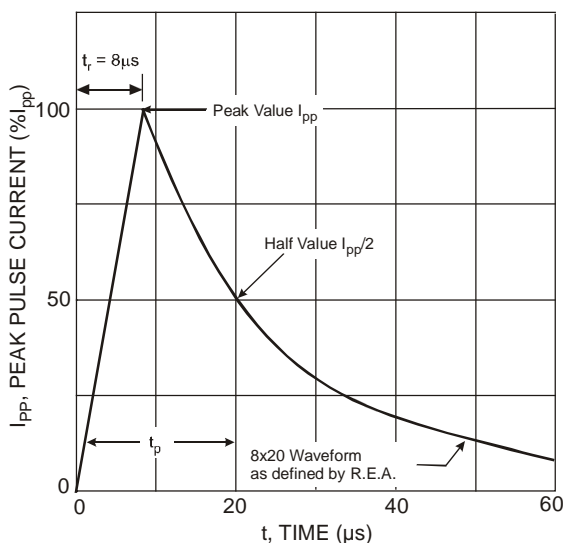


Figure 1 Pulse Waveform

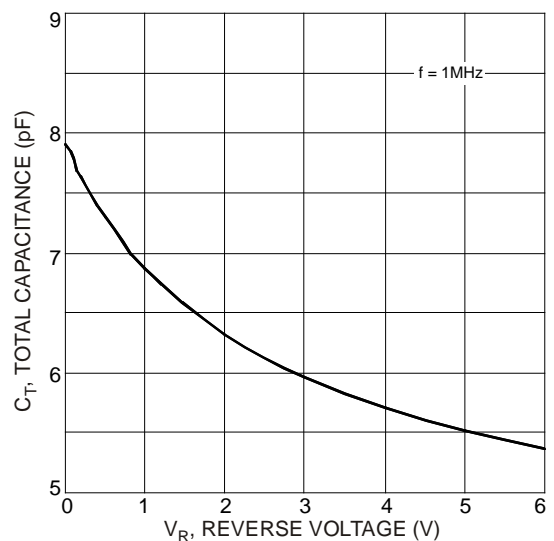


Figure 2 Typical Total Capacitance vs. Reverse Voltage

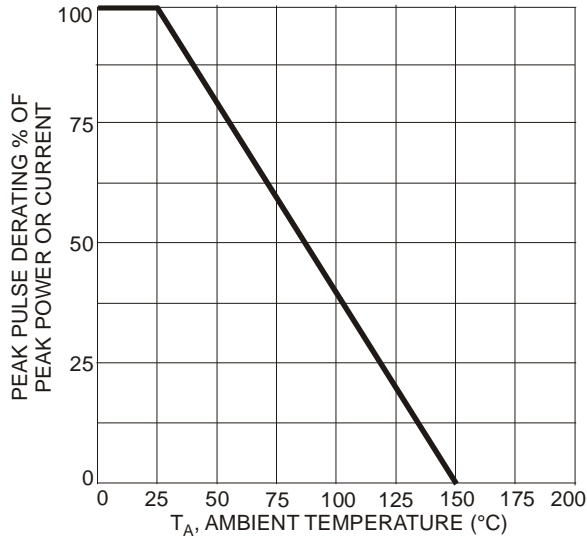


Figure 3 Pulse Derating Curve

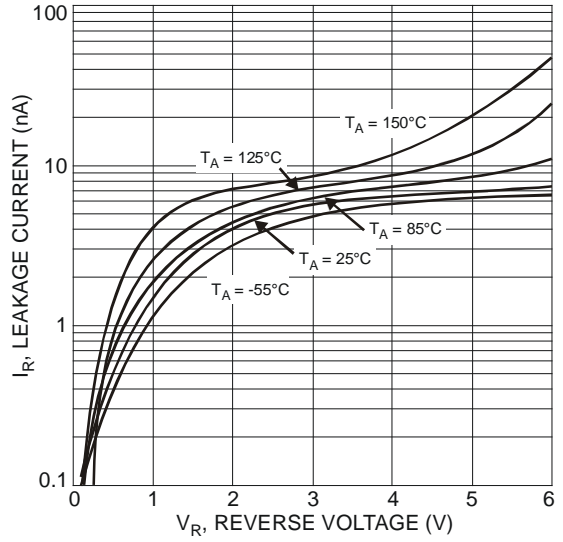


Figure 4 Typical Reverse Characteristics

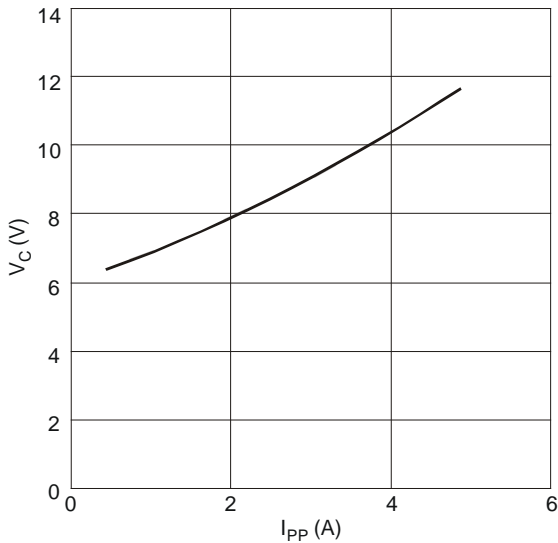


Figure 5 Typical Peak Clamping Voltage  $V_C$  vs. Peak Pulse Current  $I_{PP}$

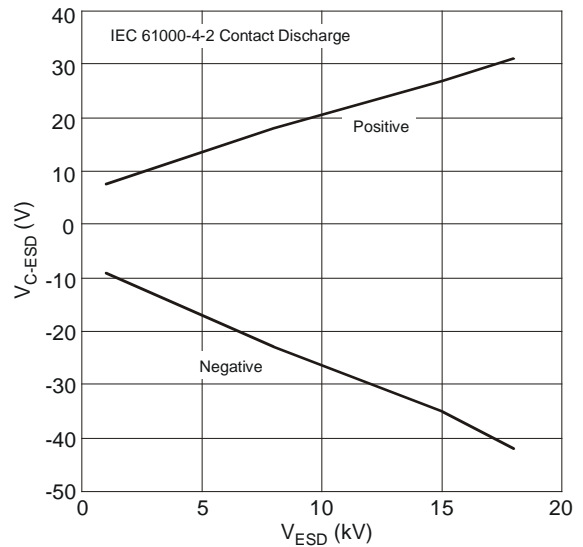


Figure 6 Typical Clamping Voltage vs. Contact Discharge Voltage

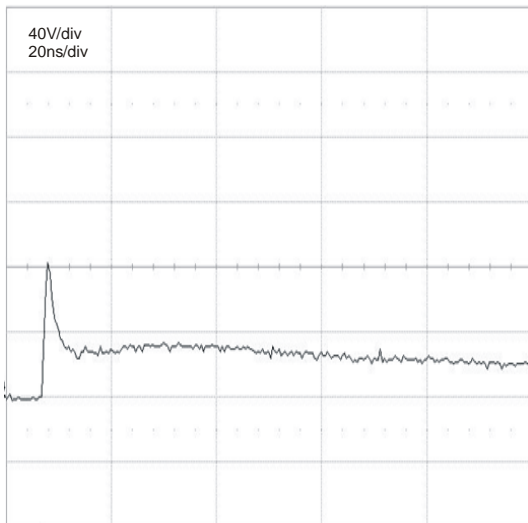


Figure 7 IEC 6100-4-2 Clamping Voltage +8kV Contact

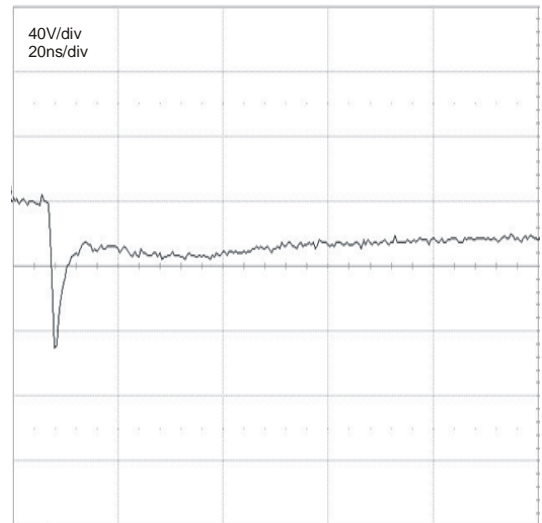


Figure 8 IEC 6100-4-2 Clamping Voltage -8kV Contact

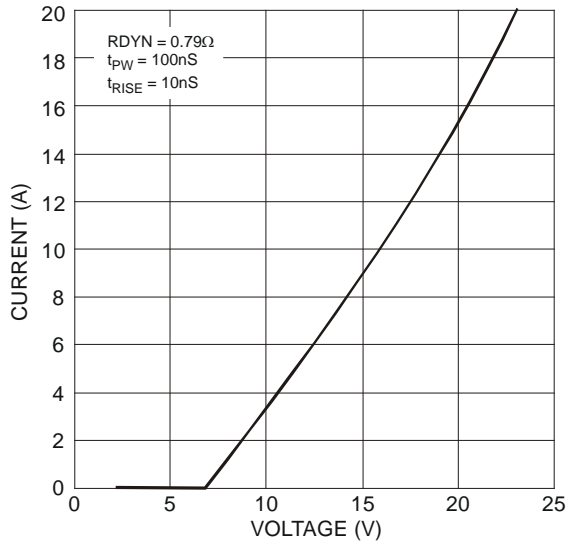
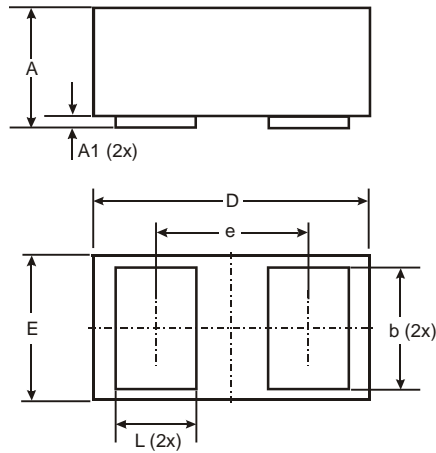


Figure 9 4 TLP, tPW = 100nS, tRISE = 10nS  
Data to GND

**Package Outline Dimensions**

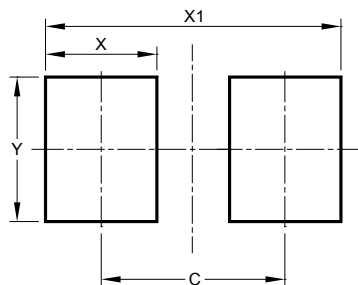
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| X3-DFN0603-2         |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.27  | 0.35  | 0.30  |
| A1                   | 0.00  | 0.03  | 0.02  |
| b                    | 0.19  | 0.29  | 0.24  |
| D                    | 0.595 | 0.645 | 0.62  |
| E                    | 0.295 | 0.345 | 0.32  |
| e                    | -     | -     | 0.355 |
| L                    | 0.14  | 0.24  | 0.19  |
| 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) |
|------------|---------------|
| C          | 0.380         |
| X          | 0.230         |
| X1         | 0.610         |
| Y          | 0.300         |

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