

**15V ULTRA LOW CAPACITANCE BIDIRECTIONAL TVS DIODE**

**Product Summary**

|                             |                             |                            |
|-----------------------------|-----------------------------|----------------------------|
| <b>V<sub>BR</sub> (Min)</b> | <b>I<sub>PP</sub> (Max)</b> | <b>C<sub>T</sub> (Typ)</b> |
| 16.5V                       | 4A                          | 0.5pF                      |

**Features**

- Low Profile Package (0.53mm Max) and Ultra-Small PCB Footprint Area (1.08mm x 0.68mm Max) Suitable for Compact Portable Electronics
- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±24kV, Contact ±20kV
- One 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)**
- **The D15V0X1B2LPQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

**Description And Applications**

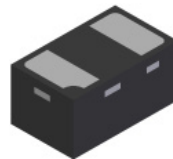
This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of small size and high ESD surge capability makes it ideal for use in automotive applications such as:

- USB Modules
- HDMI Ports
- LVDS

**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 (e4)
- Weight: 0.001 grams (Approximate)

X1-DFN1006-2



Bottom View



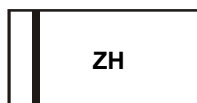
Device Schematic

**Ordering Information (Note 4)**

| Part Number     | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel  |
|-----------------|------------|---------|--------------------|-----------------|--------------------|
| D15V0X1B2LPQ-7B | Automotive | ZH      | 7                  | 8               | 10,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**



ZH = Product Type Marking Code  
Bar Denotes Pin 1

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                     | Symbol                   | Value | Unit | Conditions             |
|------------------------------------|--------------------------|-------|------|------------------------|
| Peak Pulse Current                 | I <sub>PP</sub>          | 4     | A    | 8/20μs, See Figure 3   |
| ESD Protection – Contact Discharge | V <sub>ESD_CONTACT</sub> | ±20   | kV   | IEC 61000-4-2 Standard |
| ESD Protection – Air Discharge     | V <sub>ESD_AIR</sub>     | ±24   | kV   | IEC 61000-4-2 Standard |

**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Package Power Dissipation (Note 5)               | P <sub>D</sub>                    | 250         | mW   |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 310         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                | Symbol           | Min  | Typ | Max  | Unit | Test Conditions                               |
|---|------------------|------|-----|------|------|---|
| Reverse Working Voltage                       | V <sub>RWM</sub> | —    | —   | 15.0 | V    | —   |
| Reverse Current (Note 6)                      | I <sub>R</sub>   | —    | —   | 1    | μA   | V <sub>R</sub> = 15.0V                        |
| Reverse Breakdown Voltage                     | V <sub>BR</sub>  | 16.5 | —   | —    | V    | I <sub>R</sub> = 1mA                          |
| Reverse Clamping Voltage, Positive Transients | V <sub>CL</sub>  | —    | —   | 28   | V    | I <sub>PP</sub> = 1A, t <sub>P</sub> = 8/20μs |
|   |                  | —    | —   | 30   | V    | I <sub>PP</sub> = 4A, t <sub>P</sub> = 8/20μs |
| Dynamic Resistance                            | R <sub>DYN</sub> | —    | 0.6 | —    | Ω    | I <sub>R</sub> = 1A, t <sub>P</sub> = 8/20μs  |
| Capacitance                                   | C <sub>T</sub>   | —    | 0.5 | 0.7  | pF   | V <sub>R</sub> = 0V, f = 1MHz                 |

- Notes:
- 5. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes Incorporated's suggested pad layout per <http://www.diodes.com/package-outlines.html>.
  - 6. Short duration pulse test used to minimize self-heating effect.

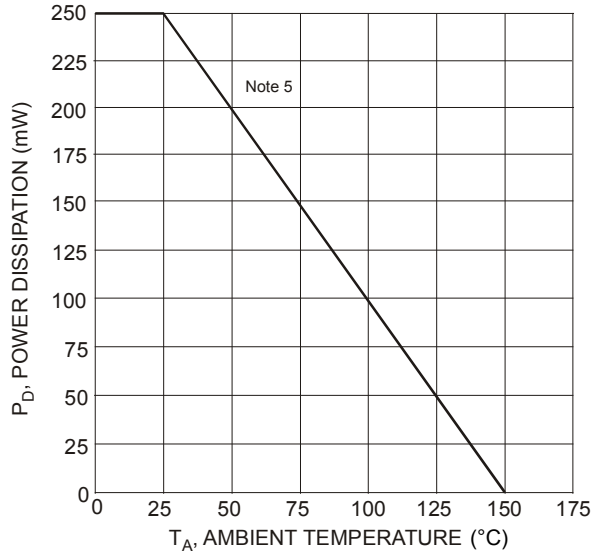


Figure 1 Power Derating Curve

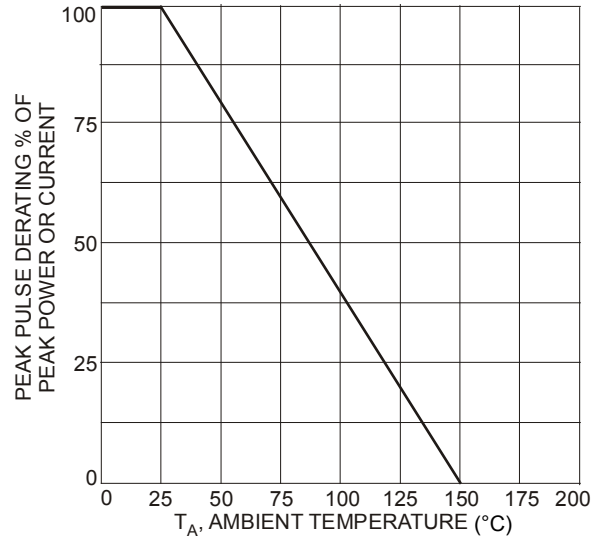


Figure 2 Pulse Derating Curve

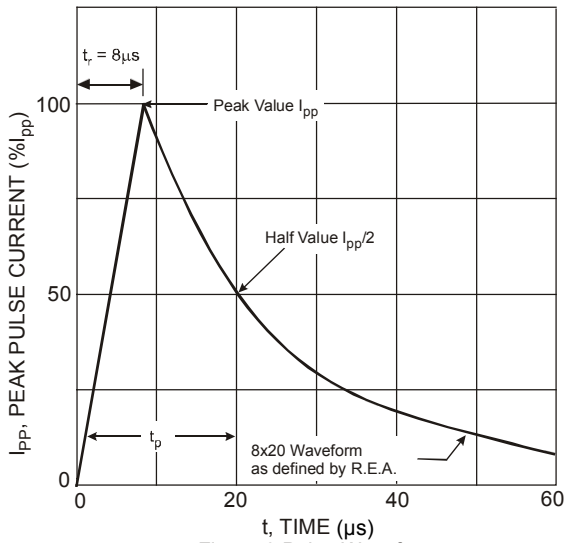


Figure 3 Pulse Waveform

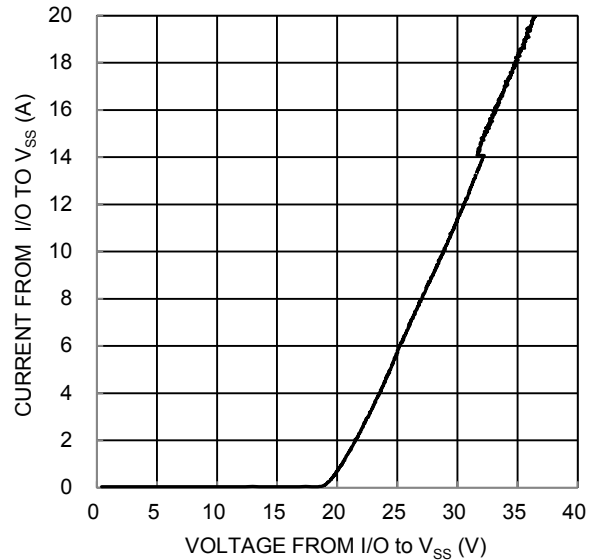


Figure 4 Current vs. Voltage

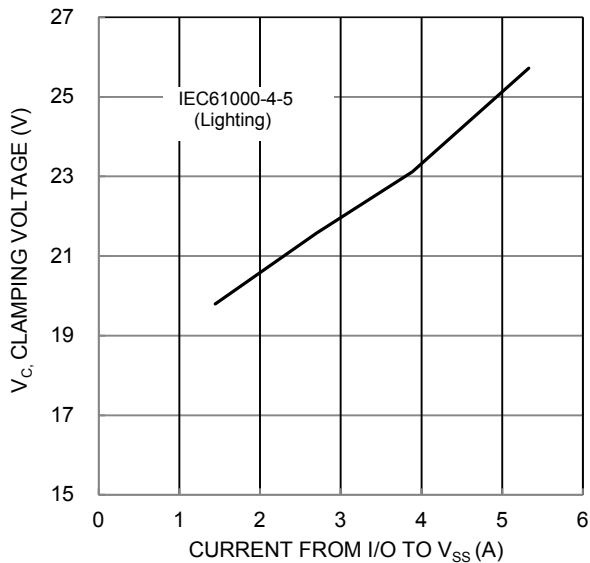


Figure 5 Clamping Voltage Characteristic

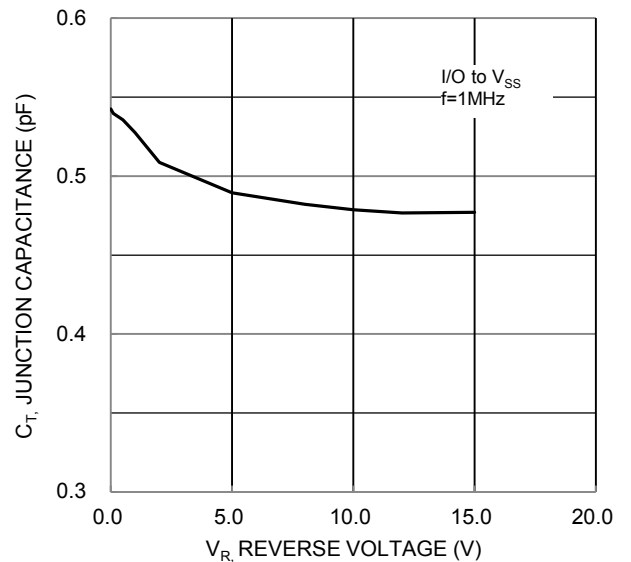
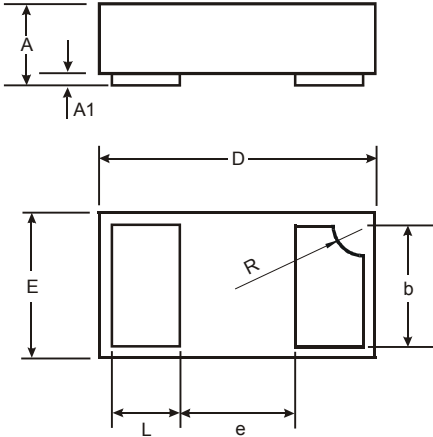


Figure 6 Typical Total Capacitance

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X1-DFN1006-2**

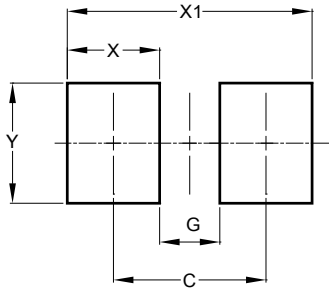


| X1-DFN1006-2         |      |       |      |
|----------------------|------|-------|------|
| Dim                  | Min  | Max   | Typ  |
| A                    | 0.47 | 0.53  | 0.50 |
| A1                   | 0    | 0.05  | 0.03 |
| b                    | 0.45 | 0.55  | 0.50 |
| D                    | 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 <http://www.diodes.com/package-outlines.html> for the latest version.

**X1-DFN1006-2**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.70          |
| G          | 0.30          |
| X          | 0.40          |
| X1         | 1.10          |
| Y          | 0.70          |

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