

## Product Summary

|                |                |                |
|----------------|----------------|----------------|
| <b>VBR_MIN</b> | <b>IPP_MAX</b> | <b>CIN_TYP</b> |
| 5V             | 3A             | 0.17pF         |

## 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 USB3.1 and Thunderbolt 3.

## Applications

- USB3.1
- Thunderbolt 3
- Computers and Peripheral

## Features

- Provides ESD Protection per IEC 61000-4-2 Standard: Air  $\pm 8kV$ , Contact  $\pm 8kV$
- 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)**
- **The DESD3V3Z1BCSFQ 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/>

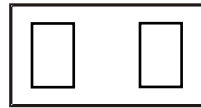
## Mechanical Data

- Case: X2-DSN0603-2
- Case Material: Chip Scale Package
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiAu Bump. Solderable per MIL-STD-202, Method 208
- Weight: 0.0002 grams (Approximate)

X2-DSN0603-2



Top View



Bottom View



Device Schematic

## Ordering Information (Note 4)

| Part Number      | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel  |
|------------------|------------|---------|--------------------|-----------------|--------------------|
| DESD3V3Z1BCSFQ-7 | Automotive | MZ      | 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



MZ = Product Type Marking Code  
Bar Denotes Pin 1

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

| Characteristic                     | Symbol                   | Value | Unit | Condition             |
|------------------------------------|--------------------------|-------|------|-----------------------|
| Peak Pulse Power Dissipation       | PPP                      | 25    | W    | 8/20μs, per Figure 3  |
| Peak Pulse Current                 | I <sub>PP</sub>          | 3     | A    | 8/20μs, per Figure 3  |
| ESD Protection – Air Discharge     | V <sub>ESD_AIR</sub>     | ±8    | kV   | IEC61000-4-2 Standard |
| ESD Protection – Contact Discharge | V <sub>ESD_CONTACT</sub> | ±8    | kV   | IEC61000-4-2 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>                  | 500         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C   |

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

| Characteristic                   | Symbol           | Min | Typ  | Max  | Unit | Test Conditions                                    |
|----------------------------------|------------------|-----|------|------|------|----------------------------------------------------|
| Reverse Standoff Voltage         | V <sub>RWM</sub> | —   | —    | 3.3  | V    | —                                                  |
| Channel Leakage Current (Note 6) | I <sub>RM</sub>  | —   | —    | 1    | μA   | V <sub>RWM</sub> = 3.3V                            |
| Clamping Voltage                 | V <sub>CL</sub>  | —   | 4.5  | —    | V    | I <sub>PP</sub> = 3A, t <sub>p</sub> = 8/20μs      |
|                                  |                  | —   | 6.0  | —    |      | I <sub>PP</sub> = 8A, TLP, t <sub>p</sub> = 100ns  |
|                                  |                  | —   | 11.5 | —    |      | I <sub>PP</sub> = 16A, TLP, t <sub>p</sub> = 100ns |
| Breakdown Voltage                | V <sub>BR</sub>  | 5   | —    | 9    | V    | I <sub>R</sub> = 1mA                               |
| Differential Resistance          | R <sub>DYN</sub> | —   | 0.4  | —    | Ω    | TLP, 10A, t <sub>p</sub> = 100ns                   |
| Channel Input Capacitance        | C <sub>IN</sub>  | —   | 0.17 | 0.25 | pF   | V <sub>R</sub> = 0V, f = 1MHz                      |

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

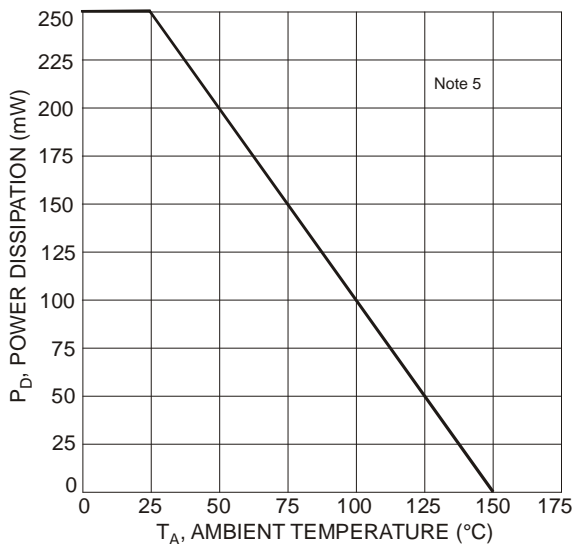


Figure 1 Power Derating Curve

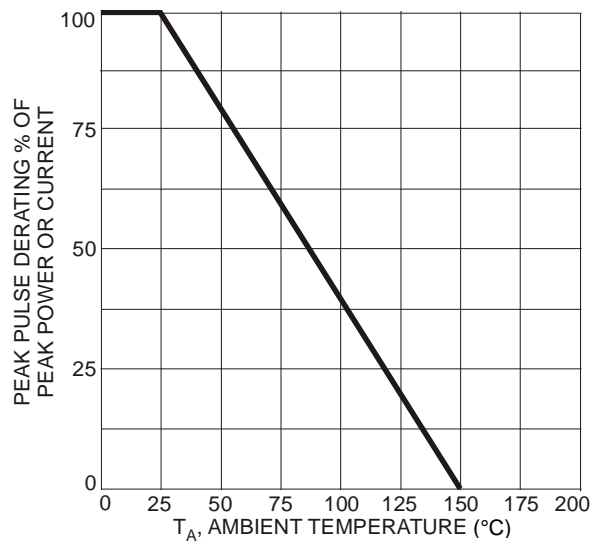
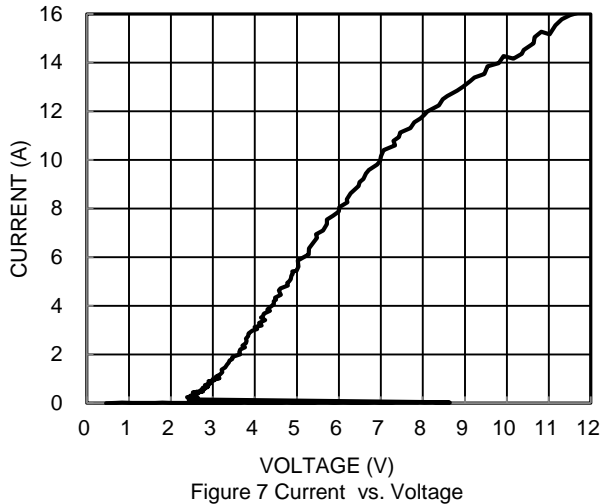
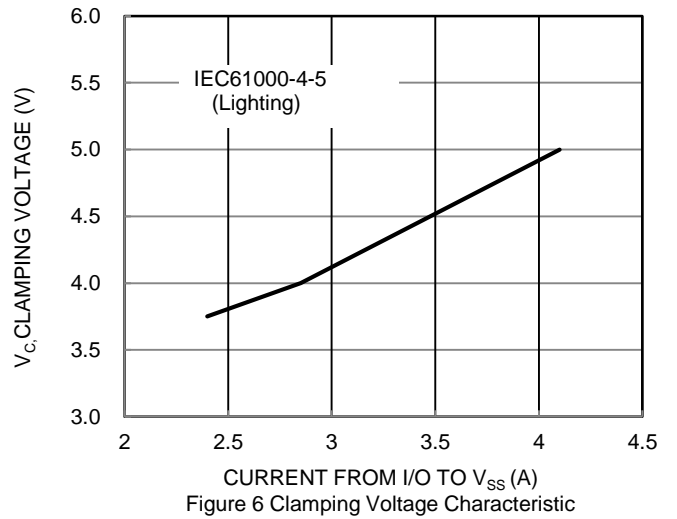
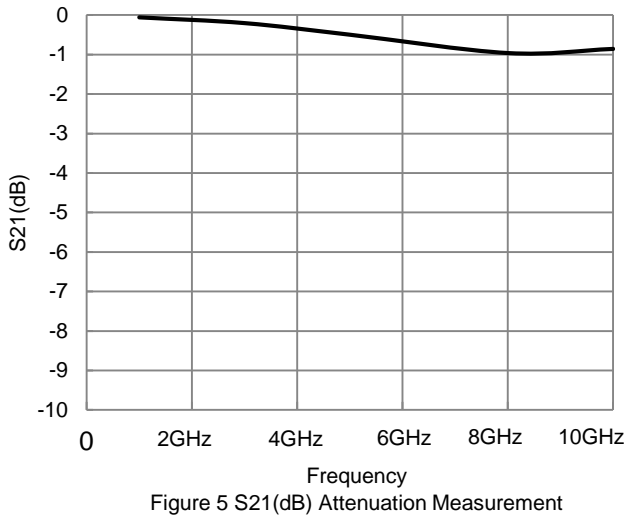
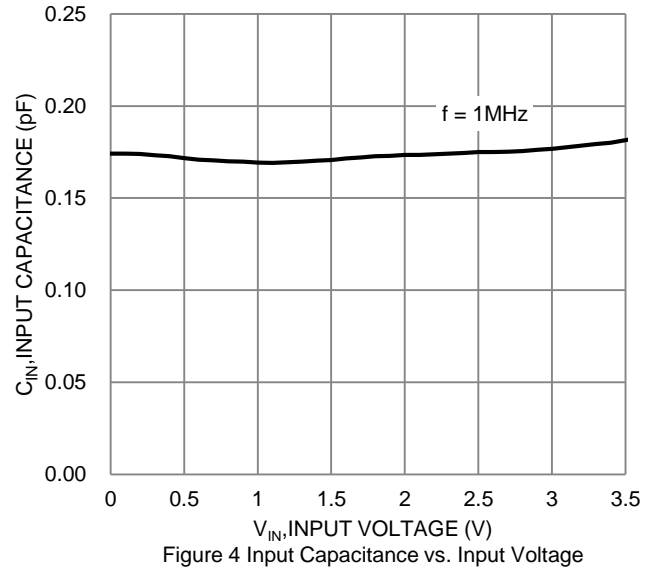
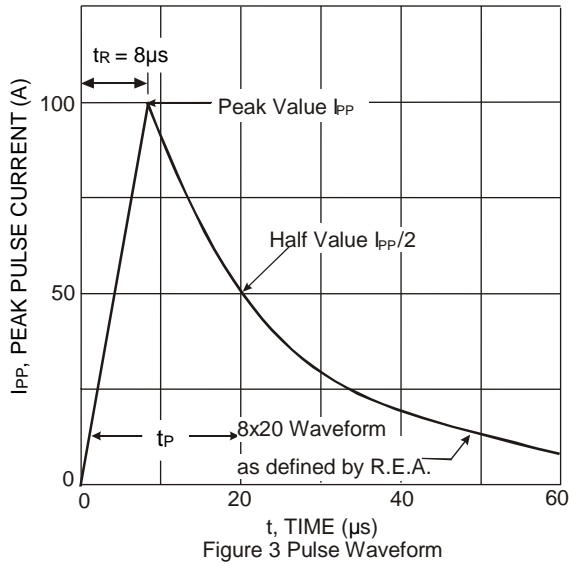


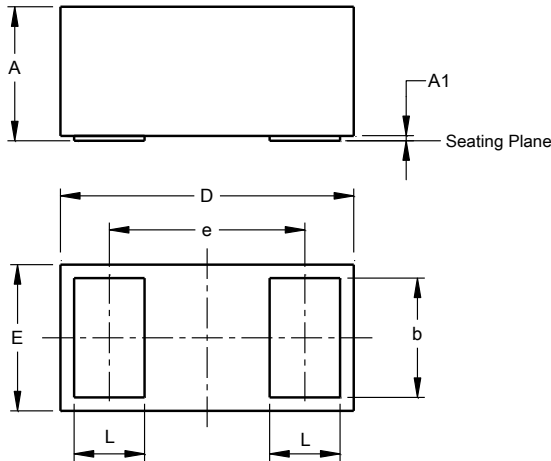
Figure 2 Pulse Derating Curve



**Package Outline Dimensions** (Note 7)

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

**X2-DSN0603-2**



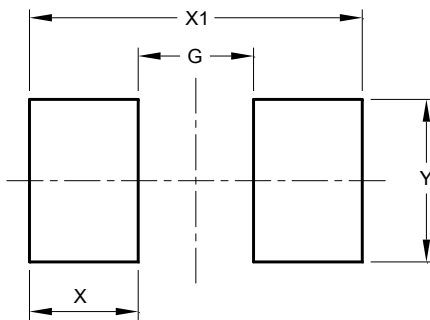
| X2-DSN0603-2         |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.280 | 0.320 | 0.300 |
| A1                   | 0.00  | 0.020 | 0.010 |
| b                    | 0.220 | 0.260 | 0.240 |
| D                    | 0.575 | 0.625 | 0.600 |
| E                    | 0.275 | 0.325 | 0.300 |
| e                    | -     | -     | 0.400 |
| L                    | 0.120 | 0.160 | 0.140 |
| All Dimensions in mm |       |       |       |

Note 7: Device side walls are electrically active bare silicon. Avoid contact of solder or flux on the side walls during the PCB assembly process.

**Suggested Pad Layout**

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

**X2-DSN0603-2**



| Dimensions | Value (in mm) |
|------------|---------------|
| G          | 0.206         |
| X          | 0.194         |
| Y          | 0.291         |
| X1         | 0.594         |

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