

## Product Summary

|                             |                             |                            |
|-----------------------------|-----------------------------|----------------------------|
| <b>V<sub>BR</sub> (Min)</b> | <b>I<sub>PP</sub> (Max)</b> | <b>C<sub>T</sub> (Typ)</b> |
| 23.5V                       | 28A                         | 200pF                      |

## 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

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±30kV, Contact ±30kV
- One Channels of ESD Protection
- Low Channel Input Capacitance
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Case: U-DFN1610-2
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.003 grams (Approximate)



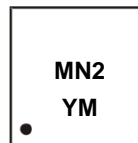
Device Schematic

## Ordering Information (Note 4)

| Part Number       | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel  |
|-------------------|------------|---------|--------------------|-----------------|--------------------|
| D22V0H1U2LP1610-7 | Standard   | MN2     | 7                  | 8               | 10,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - See [http://www.diodes.com/quality/lead\\_free/](http://www.diodes.com/quality/lead_free/) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



MN2 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: G = 2019)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|------|------|------|------|------|------|
| Code | G    | H    | I    | J    | K    | L    | M    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

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

| Characteristic                     | Symbol                   | Value | Unit | Conditions             |
|------------------------------------|--------------------------|-------|------|------------------------|
| Peak Pulse Current                 | I <sub>PP</sub>          | 28    | A    | 8/20μs (Note 7)        |
| Peak Pulse Power Dissipation       | P <sub>PP</sub>          | 1000  | W    | 8/20μs (Note 7)        |
| ESD Protection – Contact Discharge | V <sub>ESD_CONTACT</sub> | ±30   | kV   | Standard IEC 61000-4-2 |
| ESD Protection – Air Discharge     | V <sub>ESD_AIR</sub>     | ±30   | kV   | Standard IEC 61000-4-2 |

**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                                       | P <sub>D</sub>                    | 300         | mW   |
| Thermal Resistance, Junction to Ambient (T <sub>A</sub> = +25°C) | R <sub>θJA</sub>                  | 417         | °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 Standoff Voltage                       | V <sub>RWM</sub> | —    | —    | 22  | V    | —  |
| Channel Leakage Current (Note 6)               | I <sub>R</sub>   | —    | —    | 200 | nA   | V <sub>R</sub> = 22V                               |
| Reverse Breakdown Voltage                      | V <sub>BR</sub>  | 23.5 | —    | —   | V    | I <sub>R</sub> = 1mA                               |
| Clamping Voltage, Positive Transients (Note 7) | V <sub>C</sub>   | —    | 27   | 29  | V    | I <sub>PP</sub> = 1A, t <sub>P</sub> = 8/20μs      |
|  |                  | —    | 30   | 32  | V    | I <sub>PP</sub> = 10A, t <sub>P</sub> = 8/20μs     |
|  |                  | —    | 35   | 37  | V    | I <sub>PP</sub> = 28A, t <sub>P</sub> = 8/20μs     |
| Channel Input Capacitance (Note 8)             | C <sub>T</sub>   | —    | 200  | —   | pF   | V <sub>R</sub> = 0V, f = 1MHz, Any I/O to GND      |
| Dynamic Resistance                             | R <sub>DYN</sub> | —    | 0.05 | —   | Ω    | TLP, I <sub>PP</sub> = 10A, t <sub>P</sub> = 100ns |

- Notes:
5. 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>.
  6. Short duration pulse test used to minimize self-heating effect.
  7. Clamping voltage value is based on an 8x20μs peak pulse current (I<sub>PP</sub>) waveform.
  8. Measured from any I/O to GND.

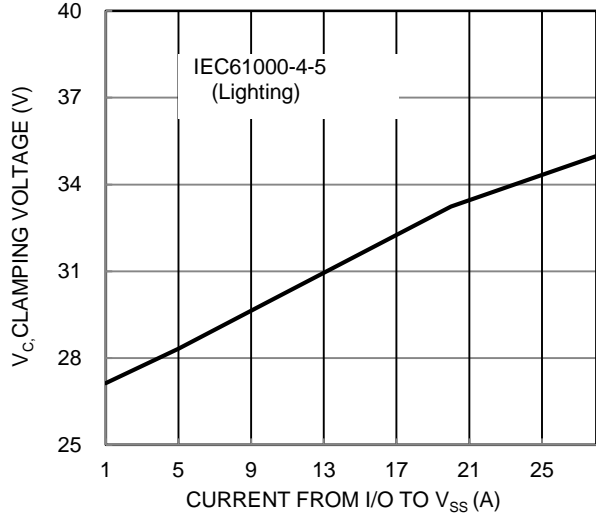


Figure 1 Clamping Voltage Characteristic

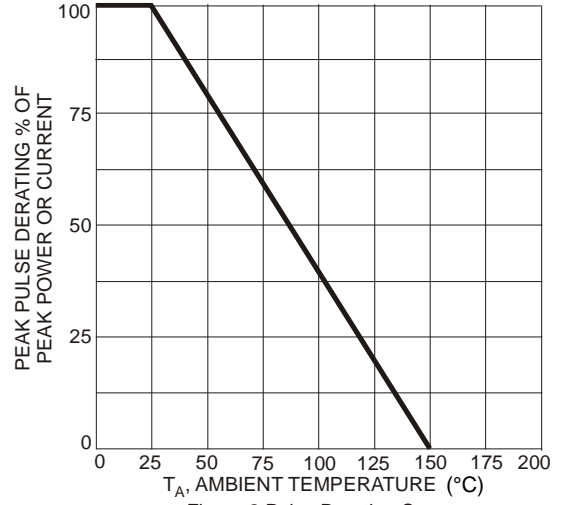


Figure 2 Pulse Derating Curve

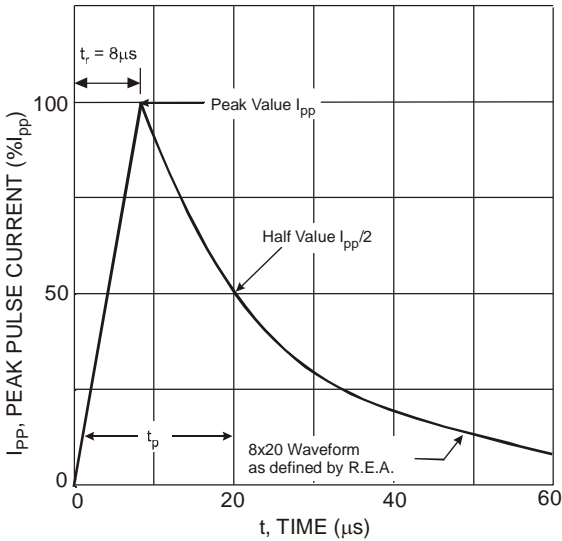


Figure 3 Pulse Waveform

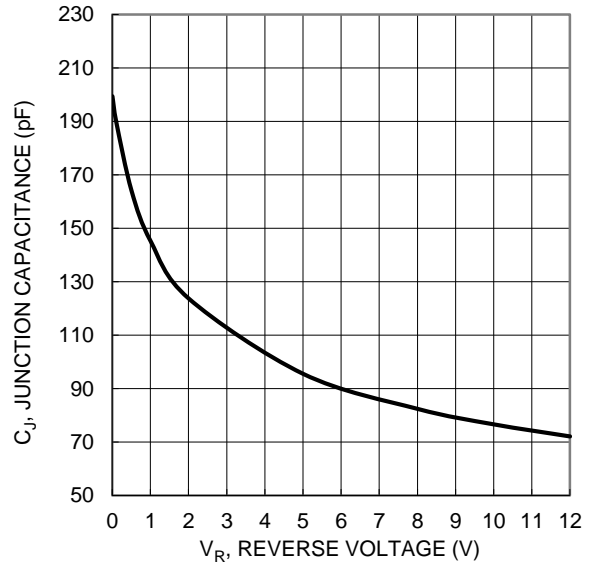


Figure 4 : Typical Junction Capacitance

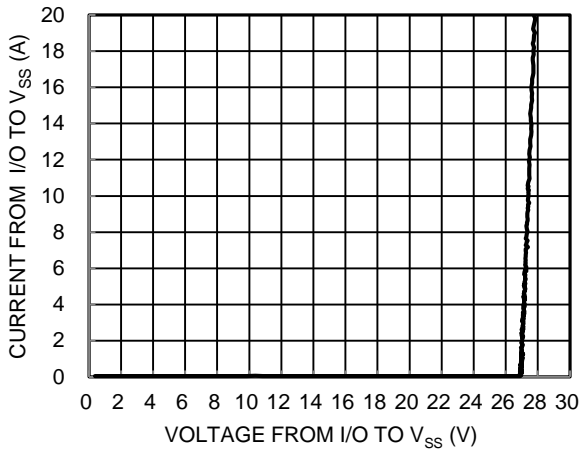
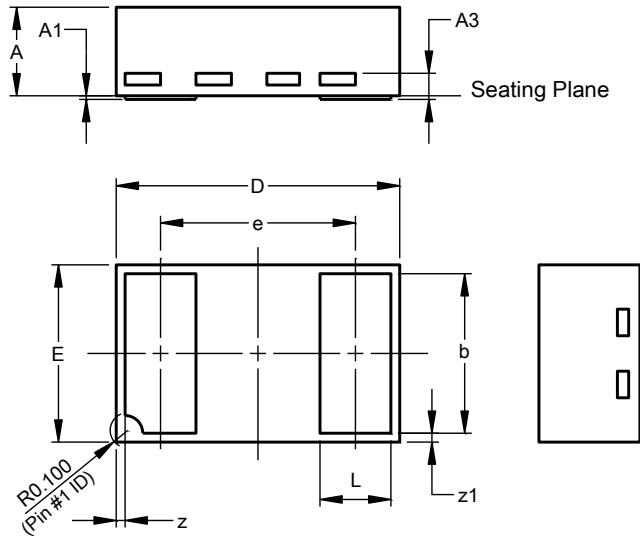


Figure 5. Current vs. Voltage

**Package Outline Dimensions**

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

**U-DFN1610-2 (Type B)**

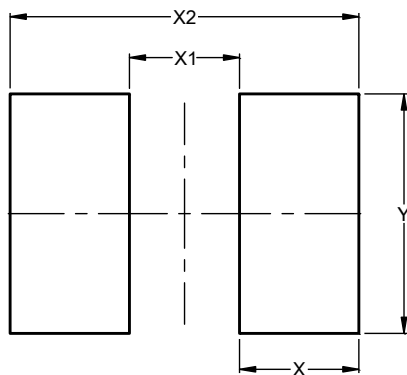


| U-DFN1610-2<br>(Type B) |           |      |       |
|-------------------------|-----------|------|-------|
| Dim                     | Min       | Max  | Typ   |
| A                       | 0.45      | 0.55 | 0.50  |
| A1                      | 0.00      | 0.05 | 0.015 |
| A3                      | -         | -    | 0.127 |
| b                       | 0.85      | 0.95 | 0.90  |
| D                       | 1.55      | 1.65 | 1.60  |
| E                       | 0.95      | 1.05 | 1.00  |
| e                       | -         | -    | 1.10  |
| L                       | 0.35      | 0.45 | 0.40  |
| z                       | 0.050 REF |      |       |
| z1                      | 0.050 REF |      |       |
| All Dimensions in mm    |           |      |       |

**Suggested Pad Layout**

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

**U-DFN1610-2 (Type B)**



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.650         |
| X1         | 0.600         |
| X2         | 1.900         |
| Y          | 1.300         |

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