

## Product Summary

| V <sub>BR</sub> (MIN) | I <sub>PP</sub> (MAX) | C <sub>T</sub> (TYP) |
|-----------------------|-----------------------|----------------------|
| 5.2V to 40V           | 2A to 20A             | 20 to 180pF          |

## Features and Benefits

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±30kV, Contact ±30kV
- 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 DESDxxVxS2UTQ series 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/>

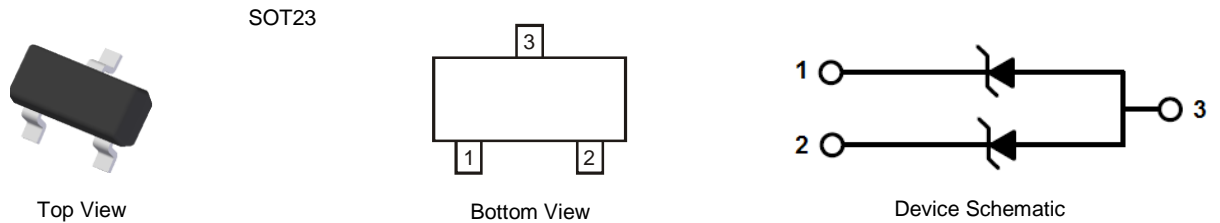
## Description and Applications

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 portable applications such as:

- USB modules
- HDMI ports
- LVDs

## Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin over Copper Leadframe, per MIL-STD-202, Method 208 (Ⓔ3)
- Weight: 0.001 grams (Approximate)

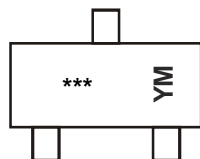


## Ordering Information (Note 4)

| Part Number     | Package | Marking | Reel Size (inches) | Tape Width (mm) | Packing |             |
|-----------------|---------|---------|--------------------|-----------------|---------|-------------|
|                 |         |         |                    |                 | Qty.    | Carrier     |
| DESDxxVxS2UTQ-7 | SOT23   | ***     | 7                  | 8               | 3000    | 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



- \*\*\* = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: K = 2023)  
 M = Month (ex: 8 = August)

### Date Code Key

| Year | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | K    | L    | M    | N    | P    | R    | S    | T    | U    | V    | W    | X    |

| 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 Power Dissipation       | PPP                      | 130 to 252 | W    | 8/20μs, per Figure 3   |
| ESD Protection – Contact Discharge | V <sub>ESD_Contact</sub> | ±30        | kV   | IEC 61000-4-2 Standard |
| ESD Protection – Air Discharge     | V <sub>ESD_Air</sub>     | ±30        | 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>                  | 330         | °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.)

| Part Number    | Reverse Standoff Voltage | Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> (Note 6) |         | Test Current I <sub>T</sub> (mA) | Max. Reverse Leakage @ V <sub>RWM</sub> I <sub>R</sub> (μA) | Max. Clamping Voltage @ I <sub>PP</sub> V <sub>C</sub> (V) | Max. Peak Pulse Current I <sub>PP</sub> (Note 5) (A) | Typical Channel Input Capacitance @ 0V C <sub>T</sub> (pF) | Marking Code |
|----------------|--------------------------|---|---------|----------------------------------|---|--|--|--|--------------|
|                |                          | Min (V)   | Max (V) |                                  |   |  |  |  |              |
| DESD3V3S2UTQ-7 | 3.3                      | 5.2   | 6.0     | 5                                | 1   | 12   | 20   | 180  | 2R5          |
| DESD5V2S2UTQ-7 | 5.0                      | 6.4   | 7.2     | 5                                | 1   | 14   | 18   | 130  | 2R6          |
| DESD12VS2UTQ-7 | 12                       | 14.7  | 17.1    | 5                                | 0.5   | 24   | 6  | 50   | 2R7          |
| DESD15VS2UTQ-7 | 15                       | 17.6  | 20.4    | 5                                | 0.5   | 30   | 5  | 40   | 2R8          |
| DESD24VS2UTQ-7 | 24                       | 26.5  | 30.8    | 5                                | 0.5   | 45   | 3  | 30   | 2R9          |
| DESD36VS2UTQ-7 | 36                       | 40  | 48      | 5                                | 0.5   | 65   | 2  | 20   | 2S0          |

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

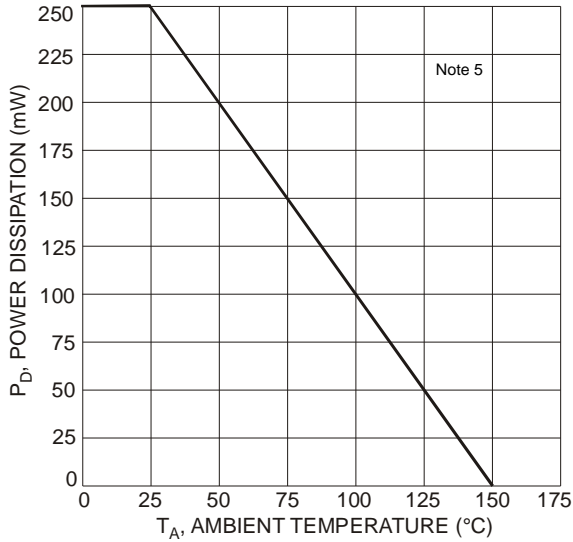


Figure 1 Power Derating Curve

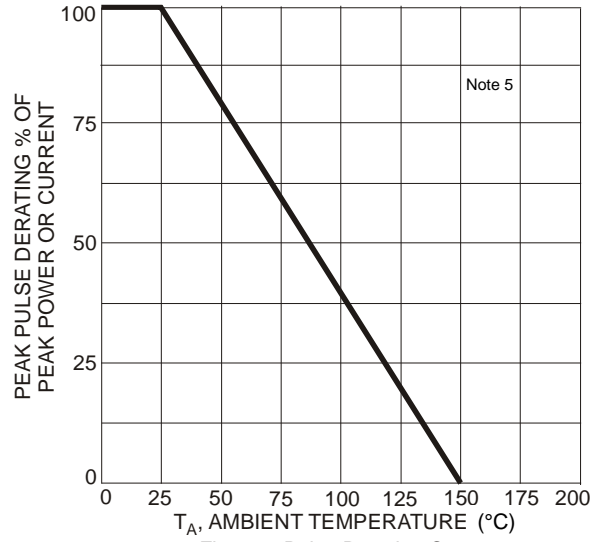


Figure 2 Pulse Derating Curve

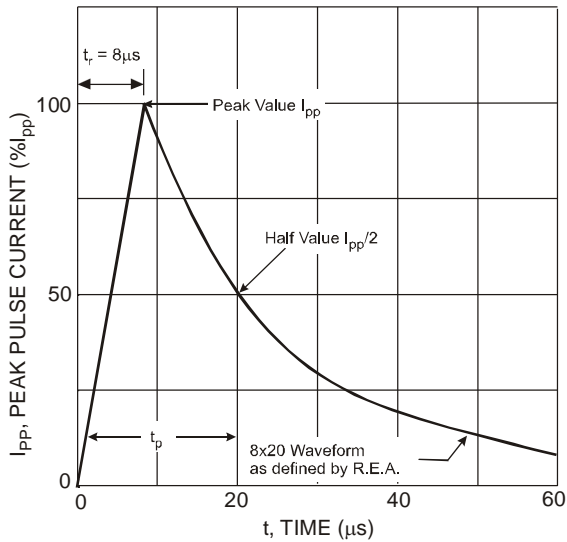


Figure 3 Pulse Waveform

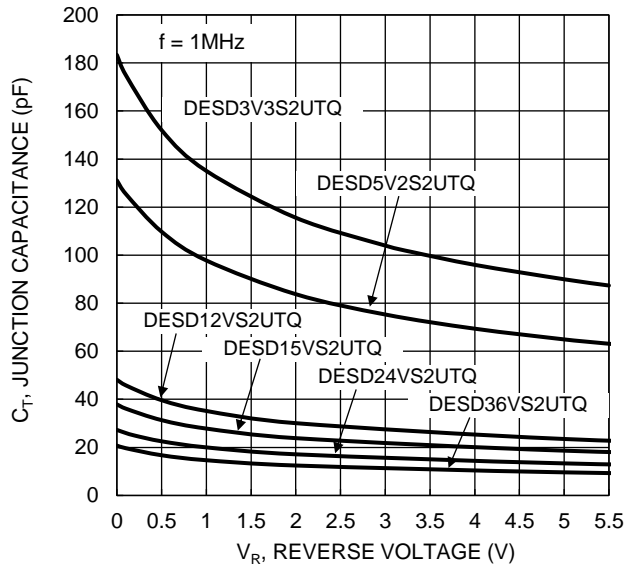
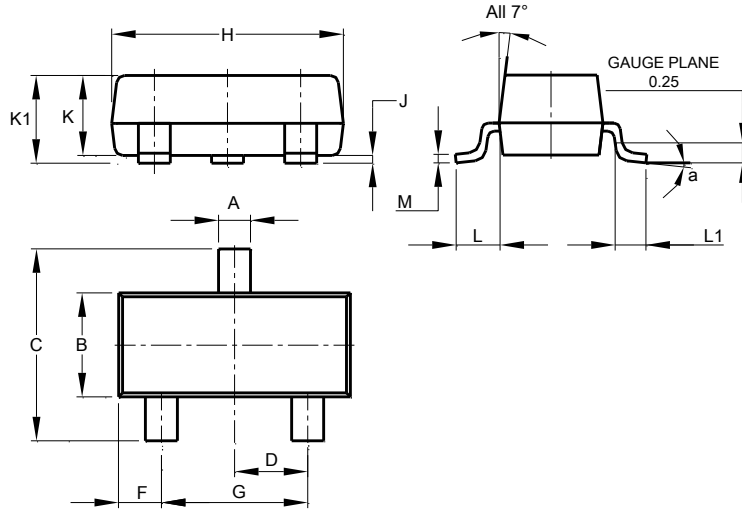


Figure 4 Typical Junction Capacitance

**Package Outline Dimensions**

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

**SOT23**

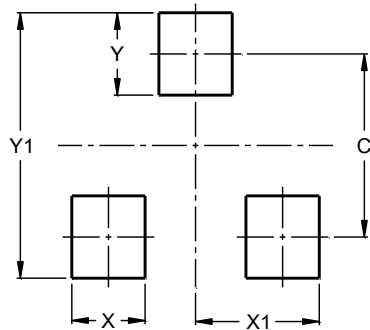


| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

**Suggested Pad Layout**

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

**SOT23**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.0           |
| X          | 0.8           |
| X1         | 1.35          |
| Y          | 0.9           |
| Y1         | 2.9           |

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