

## Product Summary

| V <sub>BR</sub> (Min) | I <sub>PP</sub> (Max) | C <sub>T</sub> (Typ) |
|-----------------------|-----------------------|----------------------|
| 5.0V to 14.1V         | 12A to 16A            | 85pF to 130pF        |

## Description

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of small size SOD523 and high ESD surge capability makes it ideal for use in general applications in automotive market field as infotainment, ADAS.

## Application

- Automotive electronics
- Telematics
- Automotive infotainment

SOD523



Top View



Device Schematic

## Features

- Provides ESD Protection per IEC 61000-4-2 Standard: Air ±30kV, Contact ±30kV
- 1 Channel of ESD Protection
- Uni-Directional Protection
- Small Surface-Mount Package: SOD523
- Excellent Clamping Capability, Fast Response Time
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- The T3V3S5AQ-T12S5AQ are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**  
<https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

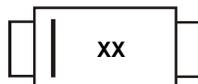
- Package: SOD523
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: Cathode Band
- Terminals: Finish - Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 Ⓔ
- Weight: 0.001 grams (Approximate)

## Ordering Information (Note 4)

| Orderable Part Number<br>(Note 5)<br>(Part Number)-7 | Package | Marking<br>(Note 6) | Reel Size (inches) | Tape Width (mm) | Packing |             |
|--|---------|---------------------|--------------------|-----------------|---------|-------------|
|  |         |                     |                    |                 | Qty.    | Carrier     |
|  | SOD523  | XX                  | 7                  | 8               | 3,000   | 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 <https://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/>.
  - Dispensed in every other cavity of the tape.
  - See the *Electrical Characteristics* table for marking code by part number.

## Marking Information



XX = Product Type Marking Code  
(See *Electrical Characteristics* table)

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

| Characteristic                         |                                | Symbol         | Value | Unit |
|--|--------------------------------|----------------|-------|------|
| Forward Voltage @I <sub>F</sub> = 10mA |                                | V <sub>F</sub> | 0.9   | V    |
| ESD Rating                             | Human Body Model               | ESD            | 8     | kV   |
|  | Machine Model                  |                | 400   | V    |
|  | IEC61000-4-2 Air Discharge     |                | ±30   | kV   |
|  | IEC61000-4-2 Contact Discharge |                | ±30   | kV   |

**Thermal Characteristics**

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 7) (See Figure 2)            | P <sub>D</sub>                    | 300         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 7) | 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.)

| Part Number | Reverse Standoff Voltage | Min Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> | Test Current        | Max Reverse Leakage @ V <sub>RWM</sub> (Note 8) | Typ Clamping Voltage @ I <sub>PP</sub> = 5A (t <sub>P</sub> = 8 × 20μs) (See Figure 1) | Max Clamping Voltage V <sub>C1</sub> @ I <sub>PP1</sub> (See Figure 1) |                     | Max Clamping Voltage V <sub>C2</sub> @ I <sub>PP2</sub> (See Figure 1) |                     | Typical Power Dissipation (See Figure 1) | Typical Total Capacitance V <sub>R</sub> = 0V f = 1MHz | Marking Code |
|-------------|--------------------------|--|---------------------|---|--|--|---------------------|--|---------------------|--|--|--------------|
|             | V <sub>RWM</sub> (V)     | Min (V)  | I <sub>T</sub> (mA) | I <sub>R</sub> (μA)                             | V <sub>C</sub> (V)   | V <sub>C</sub> (V)   | I <sub>PP</sub> (A) | V <sub>C</sub> (V)   | I <sub>PP</sub> (A) | P <sub>PK</sub> (W)                      | C <sub>T</sub> (pF)                                    |              |
| T3V3S5AQ    | 3.3                      | 5.0  | 1.0                 | 1   | 6.6  | 12.7   | 11.2                | 13.7   | 16                  | 220                                      | 125  | EE           |
| T5V0S5AQ    | 5.0                      | 6.2  | 1.0                 | 0.05  | 7.6  | 16.1   | 9.4                 | 17.3   | 15                  | 260                                      | 130  | EK           |
| T6V0S5AQ    | 6.0                      | 6.8  | 1.0                 | 0.05  | 8.5  | 17   | 8.8                 | 20   | 13                  | 260                                      | 110  | EM           |
| T12S5AQ     | 12.0                     | 14.1   | 1.0                 | 0.01  | 17.2   | 24   | 9.6                 | 25   | 12                  | 300                                      | 85   | ET           |

Notes: 7. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.  
8. Short duration pulse test used to minimize self-heating effect.

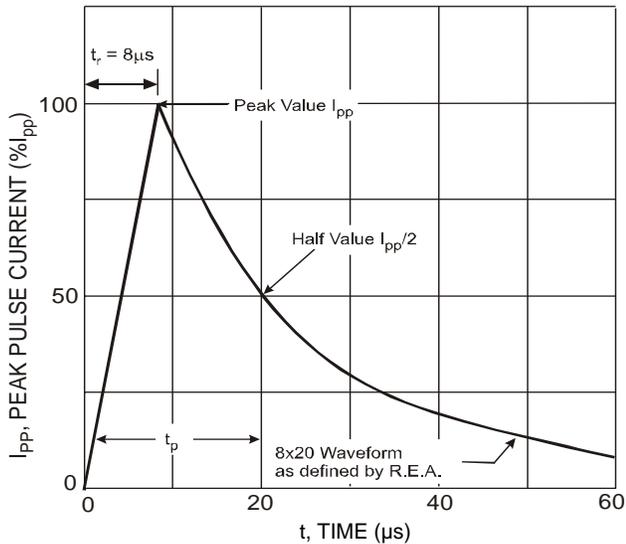


Figure 1. Typical 8 x 20µs Pulse Waveform

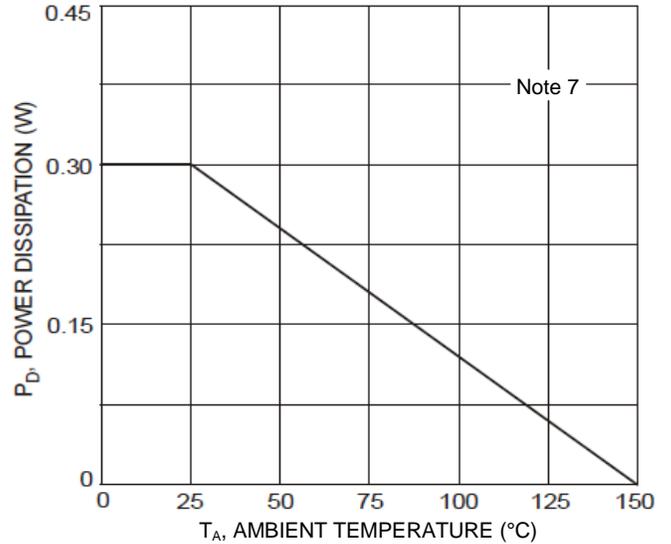


Figure 2. Power Derating Curve

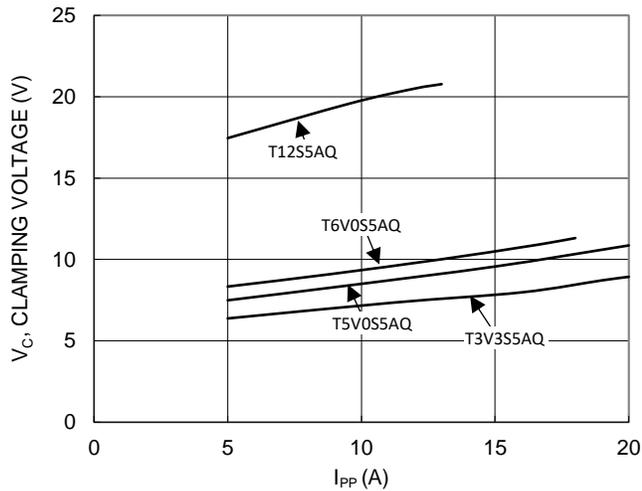


Figure 3. Typical Peak Clamping Voltage  $V_c$  vs. Peak Pulse Current  $I_{PP}$

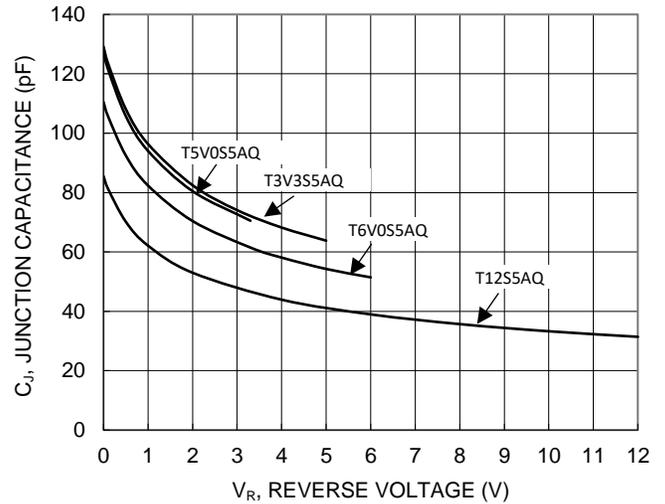


Figure 4. Typical Junction Capacitance

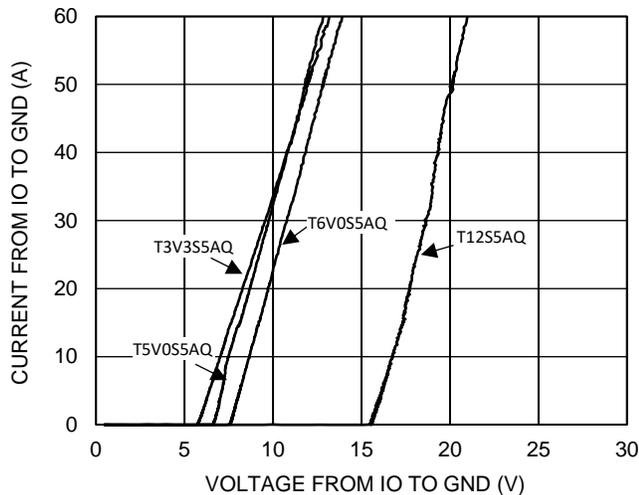


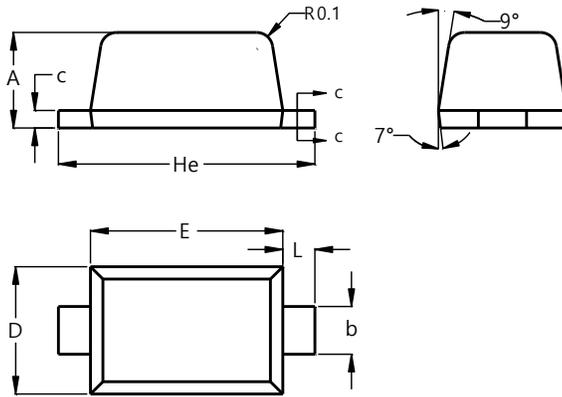
Figure 5. TLP Curve ( $t_p = 100\text{ns}$ )

Note: 7. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.

**Package Outline Dimensions**

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

**SOD523**

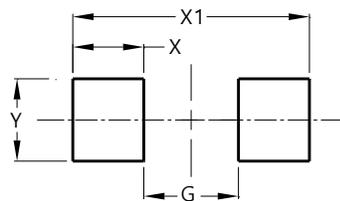


| SOD523               |      |      |
|----------------------|------|------|
| Dim                  | Min  | Max  |
| A                    | 0.55 | 0.65 |
| b                    | 0.26 | 0.34 |
| c                    | 0.11 | 0.17 |
| D                    | 0.75 | 0.85 |
| E                    | 1.15 | 1.25 |
| He                   | 1.55 | 1.65 |
| L                    | 0.10 | 0.30 |
| All Dimensions in mm |      |      |

**Suggested Pad Layout**

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

**SOD523**



| Dimensions | Value (in mm) |
|------------|---------------|
| G          | 0.80          |
| X          | 0.60          |
| X1         | 2.00          |
| Y          | 0.70          |

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