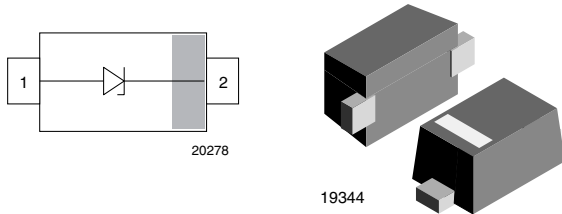


Low Capacitance Single Line ESD-Protection Diode in SOD-523


MARKING (example only)


Bar = cathode marking
 X = date code
 Y = type code (see table below)

LINKS TO ADDITIONAL RESOURCES

FEATURES

- Compact SOD-523 package
- Low package height < 0.75 mm
- 1-line ESD-protection
- AEC-Q101 qualified available
- Working range 5.5 V
- Low leakage current < 0.1 μ A
- Low load capacitance $C_D = 0.7$ pF typ.
- ESD-protection acc. IEC 61000-4-2
 ± 18 kV contact discharge
 ± 18 kV air discharge
- Lead plating: Sn (e3)
 Soldering can be checked by standard vision inspection.
 AOI = automated optical inspection
 No X-ray necessary
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



| ORDERING INFORMATION | | | | | |
|-----------------------|--------------------|--|------------|----------------------------|-------------------------|
| PART NUMBER (EXAMPLE) | AEC-Q101 QUALIFIED | ENVIRONMENTAL AND QUALITY CODE | | | ORDERING CODE (EXAMPLE) |
| | | RoHS COMPLIANT + LEAD (Pb)-FREE TERMINATIONS | TIN PLATED | 8K PER 7" REEL (8 mm TAPE) | |
| | | GREEN | | MOQ = 8K/BOX | |
| VBUS05M1-02V | - | G | 3 | -08 | VBUS05M1-02V-G3-08 |
| VBUS05M1-02V | H | G | 3 | -08 | VBUS05M1-02VHG3-08 |

| PACKAGE DATA | | | | | | | |
|--------------|--------------|-------------|-----------|--------|--------------------------------------|-----------------------------------|------------------------------|
| DEVICE NAME | PACKAGE NAME | PIN PLATING | TYPE CODE | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
| VBUS05M1-02V | SOD-523 | e3 | B | 1.4 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|--------------------------|---|--|-----------|-------------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | VALUE | UNIT |
| Peak pulse current | acc. IEC 61000-4-5, 8/20 μ s/single shot | | I_{PPM} | 4.5 | A |
| Peak pulse power | Pin 1 to pin 2 acc. IEC 61000-4-5; $t_p = 8/20$ μ s; single shot | | P_{PP} | 70 | W |
| ESD immunity | Contact discharge acc. IEC 61000-4-2; 10 pulses | | V_{ESD} | ± 18 | kV |
| | Air discharge acc. IEC 61000-4-2; 10 pulses | | | ± 18 | |
| Operating temperature | Junction temperature | | T_J | -55 to +150 | °C |
| Storage temperature | | | T_{stg} | -55 to +150 | °C |



ESD-PROTECTION FOR HIGH-SPEED SIGNAL OR DATA LINES

The VBUS05M1-02V is a bidirectional but asymmetrical (BiAs) ESD-protection device which clamps positive and negative overvoltage transients to ground. Connected between the signal or data line and the ground the VBUS05M1-02V offers a high isolation (low leakage current, low capacitance) within the specified working range. Due to the short leads and small package size of the small SOD-523 package the line inductance is very low, so that fast transients like an ESD-strike can be clamped with minimal over- or undershoots. Due to the very low capacitance the VBUS05M1-02V can be used for high speed data ports like HDMI, USB, or Thunderbolt.

| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|---|---------------|------|------|------|---------------|
| PARAMETER | TEST CONDITIONS/REMARKS | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Protection paths | Number of lines which can be protected | $N_{channel}$ | - | - | 1 | lines |
| Reverse stand-off voltage | Max. reverse working voltage | V_{RWM} | - | - | 5.5 | V |
| Reverse voltage | At $I_R = 0.1\text{ }\mu\text{A}$ | V_R | 5.5 | - | - | V |
| Reverse current | At $V_{RWM} = 5.5\text{ V}$ | I_R | - | - | 0.1 | μA |
| Reverse breakdown voltage | At $I_R = 1\text{ mA}$ | V_{BR} | 6.5 | 7.5 | 8.5 | V |
| Reverse clamping voltage | At $I_{PP} = 1\text{ A}$ | V_C | - | 9 | 11 | V |
| | At $I_{PP} = I_{PPM} = 4.5\text{ A}$ | V_C | - | 12.5 | 15 | V |
| Capacitance | At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$ | C_D | - | 0.7 | 0.8 | pF |
| | At $V_R = 3.3\text{ V}$; $f = 1\text{ MHz}$ | C_D | - | 0.7 | - | pF |
| Clamping voltage | Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ $I_{TLP} = 8\text{ A}$ | V_{C-TLP} | - | 15 | - | V |
| | Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ $I_{TLP} = 16\text{ A}$ | | - | 21 | - | |
| Dynamic resistance | Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ | R_{DYN} | - | 0.7 | - | Ω |

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

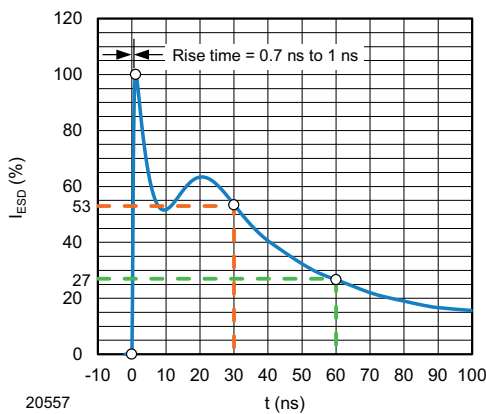


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω / 150 pF)

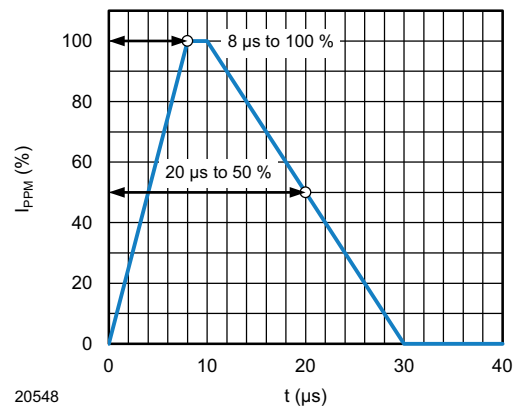


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form acc. IEC 61000-4-5

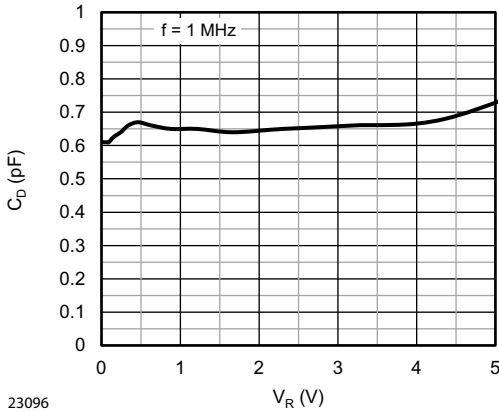


Fig. 3 - Typical Capacitance vs. Reverse Voltage

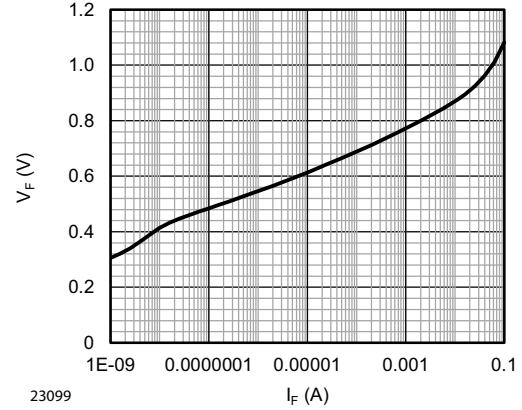


Fig. 6 - Typical Forward Voltage vs. Forward Current

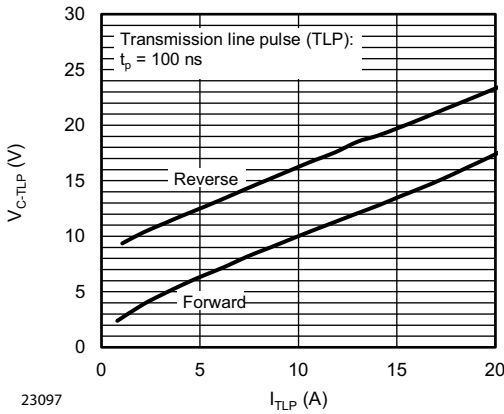


Fig. 4 - Typical Clamping Voltage vs. Peak Pulse Current

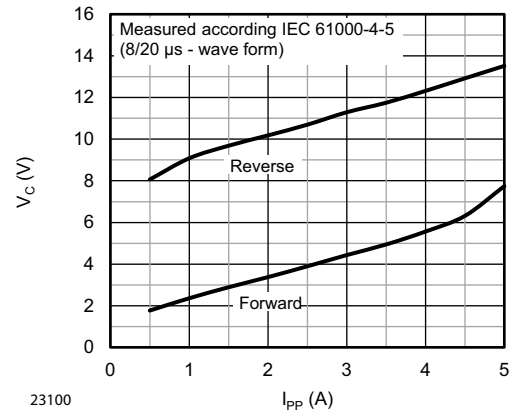


Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

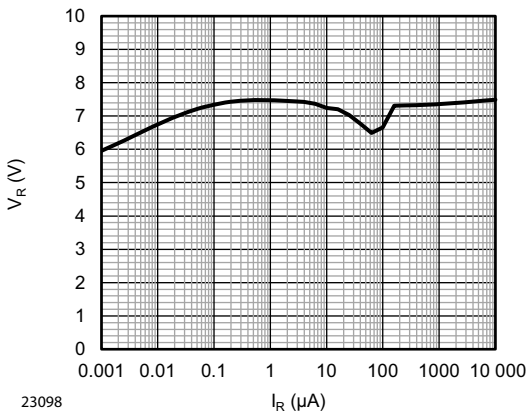
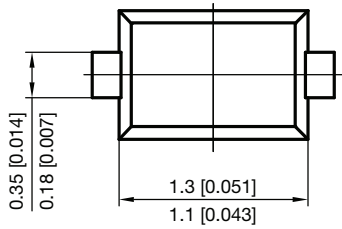
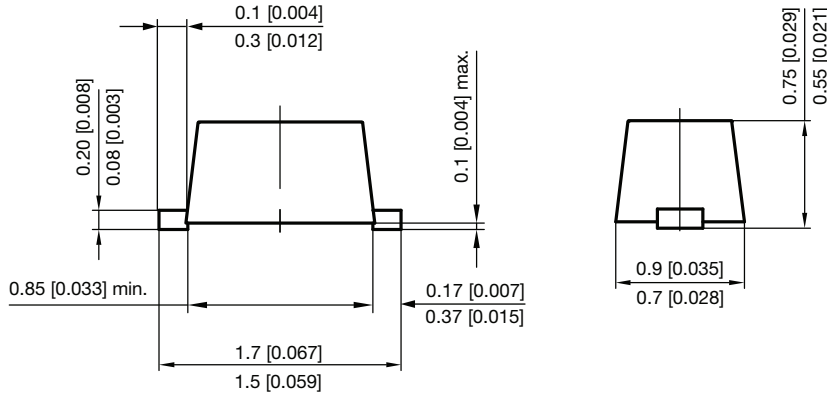


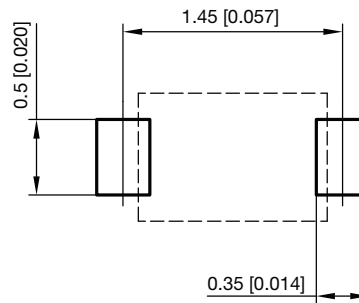
Fig. 5 - Typical Reverse Voltage vs. Reverse Current



PACKAGE DIMENSIONS in millimeters [inches]: **SOD-523**



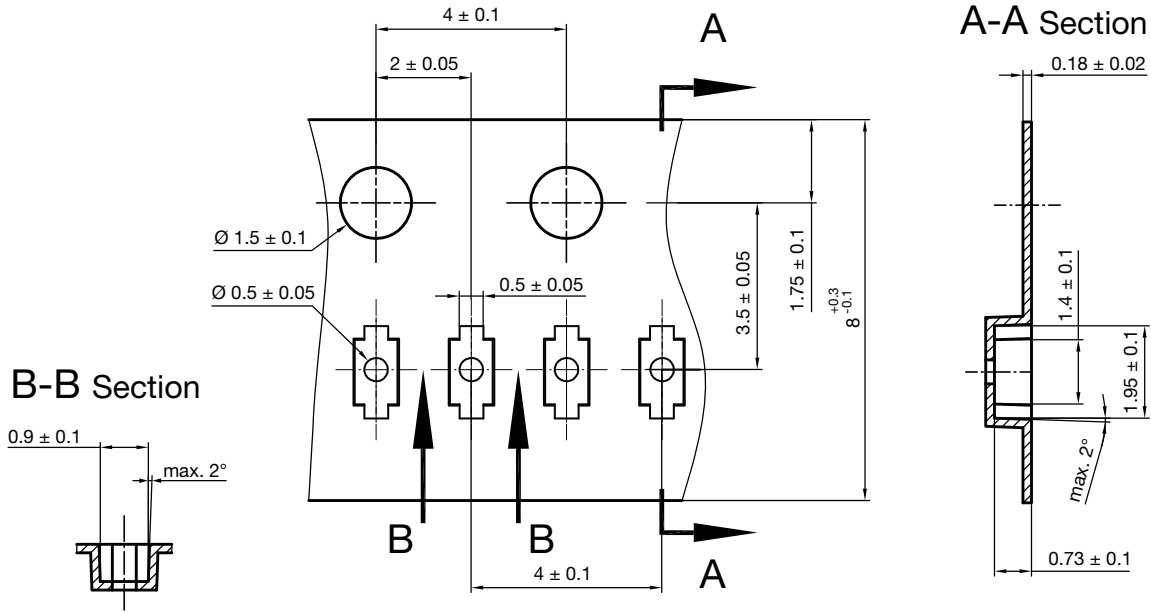
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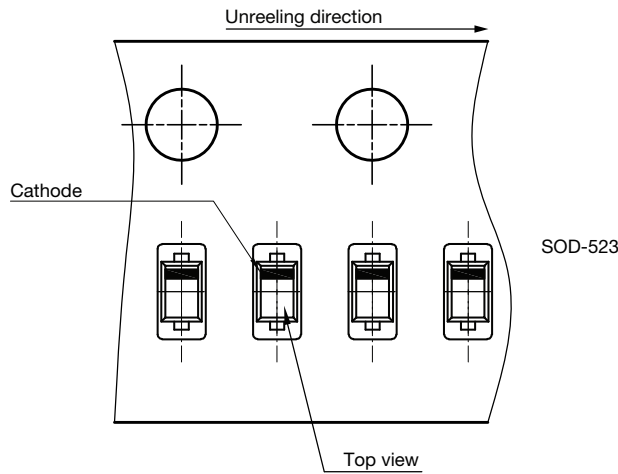


CARRIER TAPE SOD-523



S8-V-3717.03-005 (4)
05.07.2018
22959

ORIENTATION IN CARRIER TAPE SOD-523



S8-V-3717.03-006 (4)
05.07.2018
22958



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