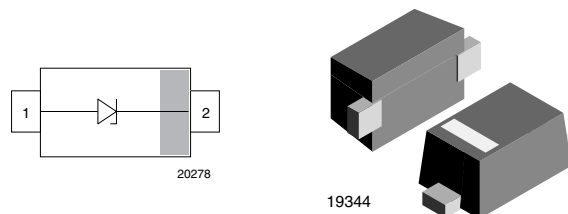


Single ESD-Protection Diode in SOD-523



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 < 0.7 mm
- 1-line ESD-protection
- AEC-Q101 qualified
- Working range 5 V
- Low leakage current $I_R < 0.1 \mu A$
- Capacitance typical $C_D = 12 \text{ pF}$
- ESD-protection acc. IEC 61000-4-2
± 30 kV contact discharge
± 30 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 | |
| VESD05B1-02V | - | G | 3 | -08 | VESD05B1-02V-G3-08 |
| VESD05B1-02V | H | G | 3 | -08 | VESD05B1-02VHG3-08 |

PACKAGE DATA

| DEVICE NAME | PACKAGE NAME | TYPE CODE | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
|--------------|--------------|-----------|---------|---|--------------------------------------|------------------------------|
| VESD05B1-02V | SOD-523 | . H | 1.32 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 μs /single shot | I_{PPM} | 3.5 | A |
| Peak pulse power | Acc. IEC 61000-4-5, 8/20 μs /single shot | P_{PP} | 40 | W |
| ESD immunity | Contact discharge acc. IEC 61000-4-2; 10 pulses | V_{ESD} | ± 30 | kV |
| | Air discharge acc. IEC 61000-4-2; 10 pulses | | ± 30 | kV |
| Operating temperature | Junction temperature | T_J | -55 to +150 | °C |
| Storage temperature | | T_{stg} | -55 to +150 | °C |

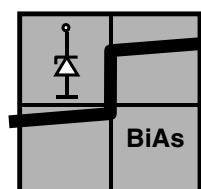
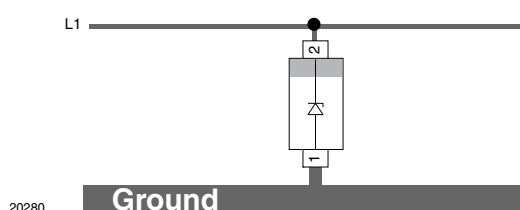
BiAs-MODE (bidirectional asymmetrical protection mode)

With the VESD05B1-02V one signal- or data-lines (L1) can be protected against voltage transients. With pin 1 connected to ground and pin 2 connected to a signal- or data-line which has to be protected. As long as the voltage level on the data- or signal-line is between 0 V (ground level) and the specified maximum reverse working voltage (V_{RWM}) the protection diode between data line and ground offers a high isolation to the ground line. The protection device behaves like an open switch.

As soon as any positive transient voltage signal exceeds the break down voltage level of the protection diode, the diode becomes conductive and shorts the transient current to ground. Now the protection device behaves like a closed switch. The clamping voltage (V_C) is defined by the break down voltage (V_{BR}) level plus the voltage drop at the series impedance (resistance and inductance) of the protection device.

Any negative transient signal will be clamped accordingly. The negative transient current is flowing in the forward direction of the protection diode. The low forward voltage (V_F) clamps the negative transient close to the ground level.

Due to the different clamping levels in forward and reverse direction the VESD05B1-02V clamping behavior is bidirectional and asymmetrical (BiAs).



20280

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 | V |
| Reverse voltage | At $I_R = 0.1\text{ }\mu\text{A}$ | V_R | 5 | - | - | V |
| Reverse current | At $V_R = 5\text{ V}$ | I_R | - | 0.01 | 0.1 | μA |
| Reverse breakdown voltage | At $I_R = 1\text{ mA}$ | V_{BR} | 6 | 6.8 | 7.5 | V |
| Reverse clamping voltage | At $I_{PP} = 1\text{ A}$, $t_p = 300\text{ }\mu\text{s}$ | V_C | - | 7.2 | 9.5 | V |
| | At $I_{PP} = I_{PPM} = 3.5\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$ | V_C | - | 8.6 | 11 | V |
| Forward clamping voltage | At $I_{PP} = 0.2\text{ A}$, $t_p = 300\text{ }\mu\text{s}$ | V_F | - | 0.95 | 1.2 | V |
| | At $I_{PP} = 1\text{ A}$, $t_p = 300\text{ }\mu\text{s}$ | V_F | - | 1.3 | - | V |
| | At $I_{PP} = I_{PPM} = 3.5\text{ A}$, $t_p = 300\text{ }\mu\text{s}$ | V_F | - | 1.9 | - | V |
| Dynamic resistance | $t_p = 100\text{ ns}$ (TLP); pin 1-2 | r_{dyn} | - | 0.2 | - | Ω |
| | $t_p = 100\text{ ns}$ (TLP); pin 2-1 | | - | 0.31 | - | Ω |
| Capacitance | At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$ | C_D | - | 19 | 23 | pF |
| | At $V_R = 2.5\text{ V}$; $f = 1\text{ MHz}$ | C_D | - | 12 | - | pF |

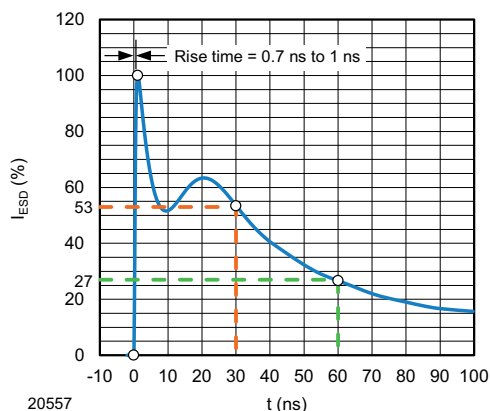


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω / 150 pF)

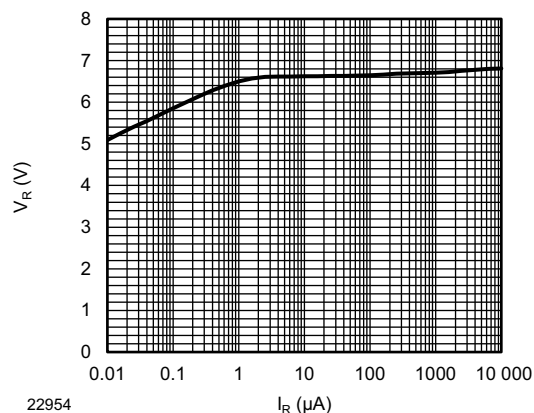


Fig. 4 - Typical Reverse Voltage vs. Reverse Current

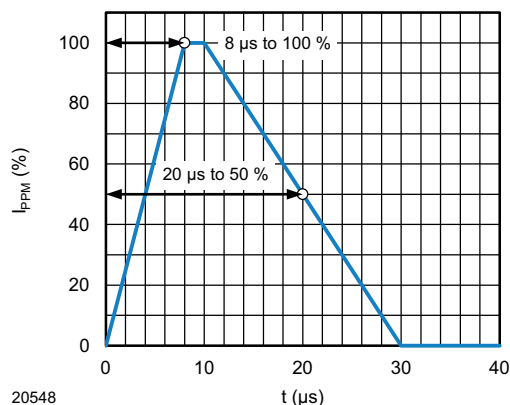


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form acc. IEC 61000-4-5

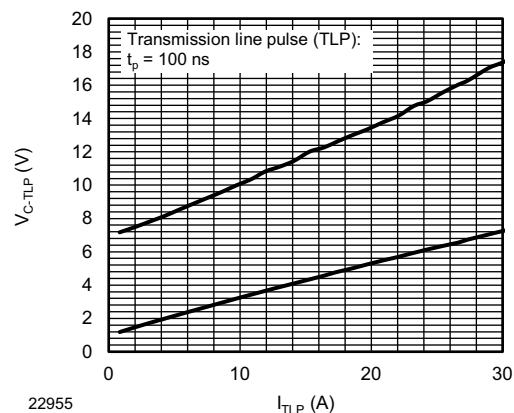


Fig. 5 - Typical Clamping Voltage vs. Peak Pulse Current

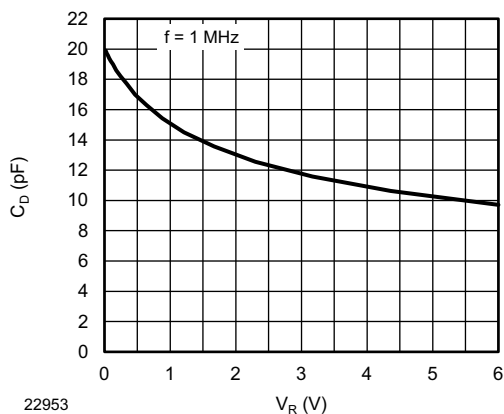


Fig. 3 - Typical Capacitance vs. Reverse Voltage

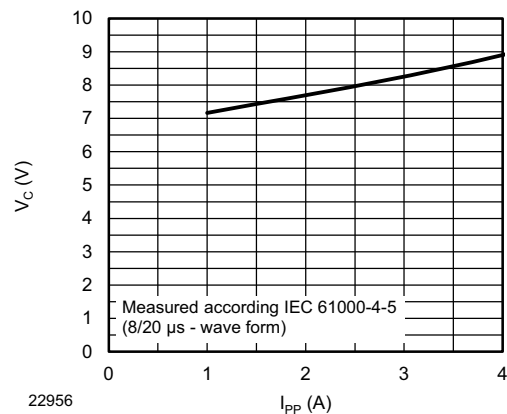
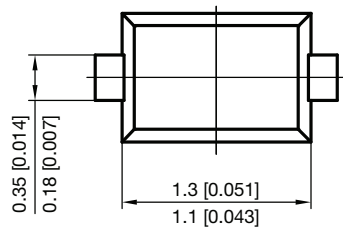
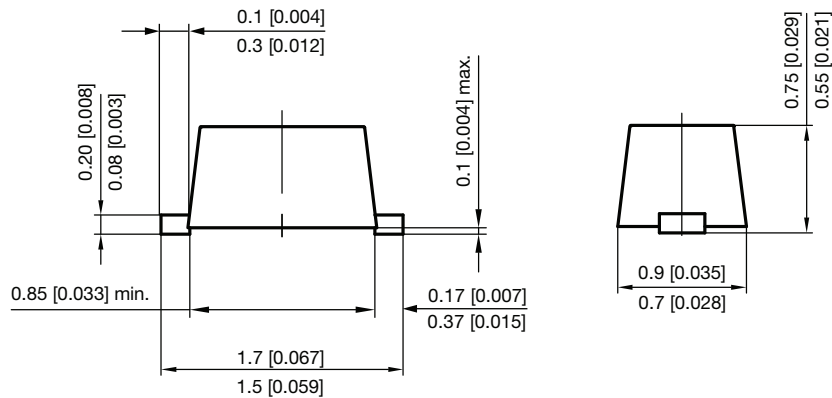
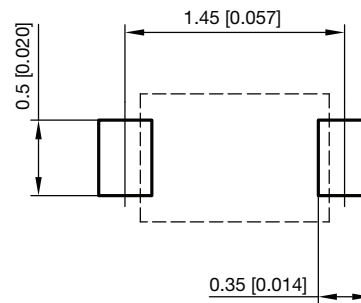


Fig. 6 - Typical Peak Clamping Voltage vs. Peak Pulse Current

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


Footprint recommendation:



Document no.: S8-V-3880.02-003 (4)

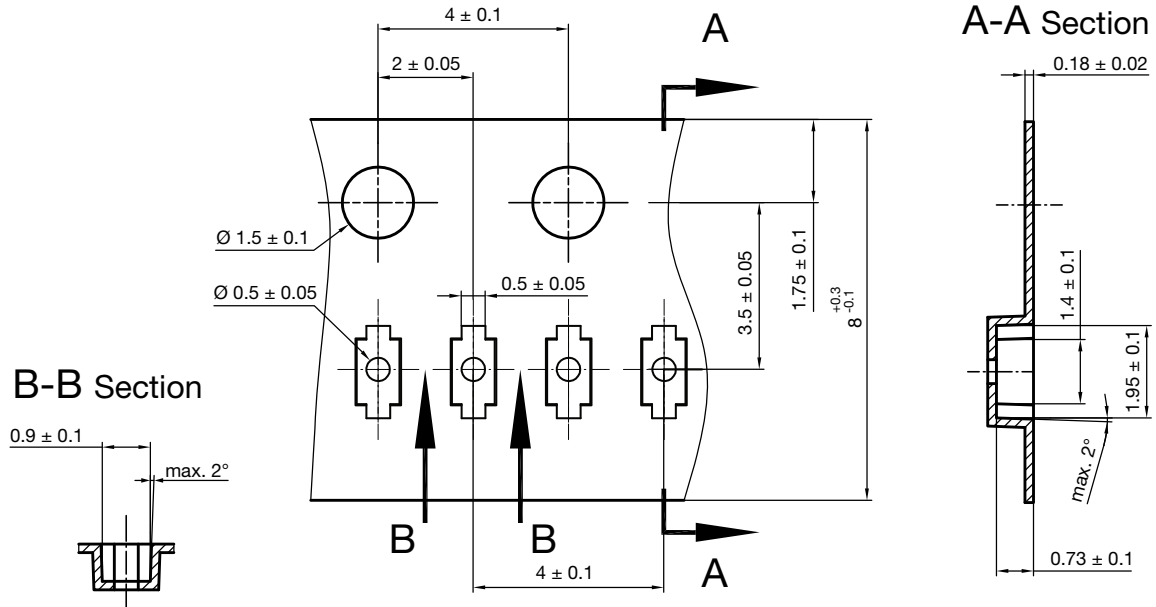
Created - Date: 04. April 2017

Rev. 4 - Date: 03. Aug. 2020

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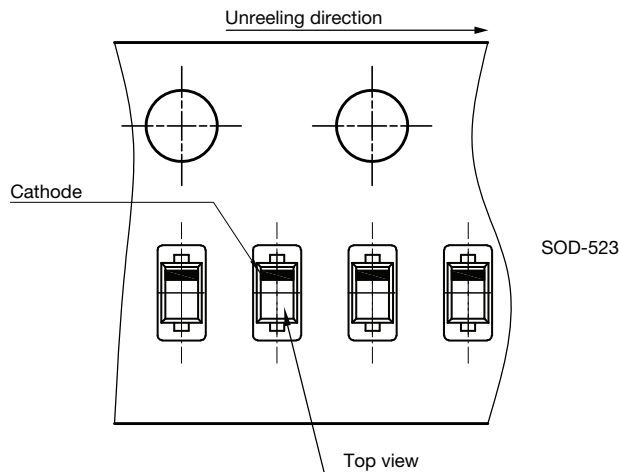


CARRIER TAPE SOD-523



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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