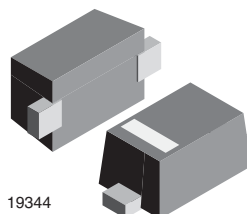
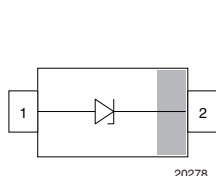


## Single ESD-Protection Diode in SOD-523



### FEATURES

- Single-line ESD-protection
- Low leakage current
- ESD-immunity acc. IEC 61000-4-2  
± 8 kV contact discharge  
± 15 kV air discharge
- e3 - Sn
- Material categorization:  
For definitions of compliance please see  
[www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)

### MARKING (example only)



Bar = cathode marking

X = date code

Y = type code (see table below)

### ORDERING INFORMATION

| DEVICE NAME | ORDERING CODE   | TAPED UNITS PER REEL<br>(8 mm TAPE ON 7" REEL) | MINIMUM ORDER QUANTITY |
|-------------|-----------------|------------------------------------------------|------------------------|
| VESD01-02V  | VESD01-02V-G-08 | 3000                                           | 3000                   |
| VESD03-02V  | VESD03-02V-G-08 | 3000                                           | 3000                   |
| VESD05-02V  | VESD05-02V-G-08 | 3000                                           | 3000                   |
| VESD08-02V  | VESD08-02V-G-08 | 3000                                           | 3000                   |
| VESD12-02V  | VESD12-02V-G-08 | 3000                                           | 3000                   |

### PACKAGE DATA

| DEVICE NAME | PACKAGE NAME | TYPE CODE | WEIGHT | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE<br>SENSITIVITY LEVEL        | SOLDERING<br>CONDITIONS  |
|-------------|--------------|-----------|--------|-----------------------------------------|--------------------------------------|--------------------------|
| VESD01-02V  | SOD-523      | . V       | 1.4 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |
| VESD03-02V  | SOD-523      | . B       | 1.4 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |
| VESD05-02V  | SOD-523      | . C       | 1.4 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |
| VESD08-02V  | SOD-523      | . D       | 1.4 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |
| VESD12-02V  | SOD-523      | . E       | 1.4 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |

**ABSOLUTE MAXIMUM RATINGS VESD01-02V**

| PARAMETER             | TEST CONDITIONS                                 | SYMBOL           | VALUE         | UNIT |
|-----------------------|-------------------------------------------------|------------------|---------------|------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | I <sub>PPM</sub> | 7             | A    |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | P <sub>PP</sub>  | 63            | W    |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses | V <sub>ESD</sub> | $\pm 8$       | kV   |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses     |                  | $\pm 15$      | kV   |
| Operating temperature | Junction temperature                            | T <sub>J</sub>   | - 40 to + 125 | °C   |
| Storage temperature   |                                                 | T <sub>stg</sub> | - 55 to + 150 | °C   |

**ABSOLUTE MAXIMUM RATINGS VESD03-02V**

| PARAMETER             | TEST CONDITIONS                                 | SYMBOL           | VALUE         | UNIT |
|-----------------------|-------------------------------------------------|------------------|---------------|------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | I <sub>PPM</sub> | 9             | A    |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | P <sub>PP</sub>  | 108           | W    |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses | V <sub>ESD</sub> | $\pm 8$       | kV   |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses     |                  | $\pm 15$      | kV   |
| Operating temperature | Junction temperature                            | T <sub>J</sub>   | - 40 to + 125 | °C   |
| Storage temperature   |                                                 | T <sub>stg</sub> | - 55 to + 150 | °C   |

**ABSOLUTE MAXIMUM RATINGS VESD05-02V**

| PARAMETER             | TEST CONDITIONS                                 | SYMBOL           | VALUE         | UNIT |
|-----------------------|-------------------------------------------------|------------------|---------------|------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | I <sub>PPM</sub> | 6             | A    |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | P <sub>PP</sub>  | 120           | W    |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses | V <sub>ESD</sub> | $\pm 8$       | kV   |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses     |                  | $\pm 15$      | kV   |
| Operating temperature | Junction temperature                            | T <sub>J</sub>   | - 40 to + 125 | °C   |
| Storage temperature   |                                                 | T <sub>stg</sub> | - 55 to + 150 | °C   |

**ABSOLUTE MAXIMUM RATINGS VESD08-02V**

| PARAMETER             | TEST CONDITIONS                                 | SYMBOL           | VALUE         | UNIT |
|-----------------------|-------------------------------------------------|------------------|---------------|------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | I <sub>PPM</sub> | 4             | A    |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | P <sub>PP</sub>  | 120           | W    |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses | V <sub>ESD</sub> | $\pm 8$       | kV   |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses     |                  | $\pm 15$      | kV   |
| Operating temperature | Junction temperature                            | T <sub>J</sub>   | - 40 to + 125 | °C   |
| Storage temperature   |                                                 | T <sub>stg</sub> | - 55 to + 150 | °C   |

**ABSOLUTE MAXIMUM RATINGS VESD12-02V**

| PARAMETER             | TEST CONDITIONS                                 | SYMBOL           | VALUE         | UNIT |
|-----------------------|-------------------------------------------------|------------------|---------------|------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | I <sub>PPM</sub> | 2             | A    |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot    | P <sub>PP</sub>  | 25            | W    |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses | V <sub>ESD</sub> | $\pm 8$       | kV   |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses     |                  | $\pm 15$      | kV   |
| Operating temperature | Junction temperature                            | T <sub>J</sub>   | - 40 to + 125 | °C   |
| Storage temperature   |                                                 | T <sub>stg</sub> | - 55 to + 150 | °C   |

**ELECTRICAL CHARACTERISTICS VESD01-02V**(T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|----------------------------------------|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 1    | V     |
| Reverse voltage           | at I <sub>R</sub> = 100 µA             | V <sub>R</sub>       | 1    | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 1 V                | I <sub>R</sub>       | -    | -    | 100  | µA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 1.5  | -    | -    | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> (see fig. 1)        | V <sub>C</sub>       | -    | 9    | -    | V     |
| Capacitance               | at V <sub>R</sub> = 0 V; f = 1 MHz     | C <sub>D</sub>       | -    | 180  | -    | pF    |

**ELECTRICAL CHARACTERISTICS VESD03-02V**(T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|----------------------------------------|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 3    | V     |
| Reverse voltage           | at I <sub>R</sub> = 20 µA              | V <sub>R</sub>       | 3    | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 3 V                | I <sub>R</sub>       | -    | -    | 20   | µA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 4    | -    | -    | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> (see fig. 1)        | V <sub>C</sub>       | -    | 12   | -    | V     |
| Capacitance               | at V <sub>R</sub> = 0 V; f = 1 MHz     | C <sub>D</sub>       | -    | 110  | -    | pF    |

**ELECTRICAL CHARACTERISTICS VESD05-02V**(T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|----------------------------------------|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 5    | V     |
| Reverse voltage           | at I <sub>R</sub> = 0.1 µA             | V <sub>R</sub>       | 5    | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 5 V                | I <sub>R</sub>       | -    | -    | 0.1  | µA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 6.5  | -    | -    | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> (see fig. 1)        | V <sub>C</sub>       | -    | 20   | -    | V     |
| Capacitance               | at V <sub>R</sub> = 0 V; f = 1 MHz     | C <sub>D</sub>       | -    | 55   | -    | pF    |

**ELECTRICAL CHARACTERISTICS VESD08-02V**(T<sub>amb</sub> = 25 °C, unless otherwise specified)

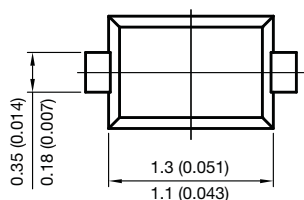
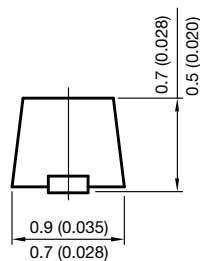
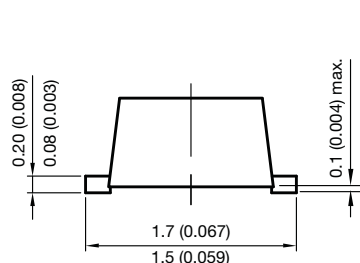
| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|----------------------------------------|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 8    | V     |
| Reverse voltage           | at I <sub>R</sub> = 0.1 µA             | V <sub>R</sub>       | 8    | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 8 V                | I <sub>R</sub>       | -    | -    | 0.1  | µA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 9    | -    | -    | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> (see fig. 1)        | V <sub>C</sub>       | -    | 30   | -    | V     |
| Capacitance               | at V <sub>R</sub> = 0 V; f = 1 MHz     | C <sub>D</sub>       | -    | 35   | -    | pF    |

**ELECTRICAL CHARACTERISTICS VESD12-02V**(T<sub>amb</sub> = 25 °C, unless otherwise specified)

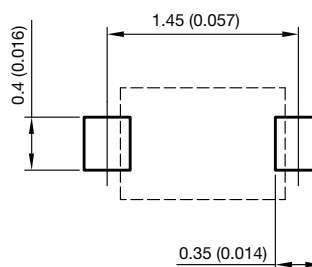
| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|----------------------------------------|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 12   | V     |
| Reverse voltage           | at I <sub>R</sub> = 0.1 µA             | V <sub>R</sub>       | 12   | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 12 V               | I <sub>R</sub>       | -    | -    | 0.1  | µA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 14   | -    | -    | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> (see fig. 1)        | V <sub>C</sub>       | -    | 25   | -    | V     |
| Capacitance               | at V <sub>R</sub> = 0 V; f = 1 MHz     | C <sub>D</sub>       | -    | 30   | -    | pF    |



**PACKAGE DIMENSIONS** in millimeters (Inches): **SOD-523**



foot print recommendation:



Document no.: S8-V-3880.02-001 (4)

Rev. h - Date: 13. Oct. 2010

16864



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.