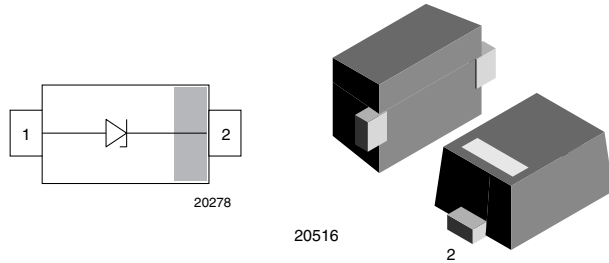


ESD-Protection Diode in SOD-923



MARKING (example only)



Bar = cathode marking

X = date code

Y = type code (see table below)

FEATURES

- Single-line ESD-protection device
- ESD-immunity acc. IEC 61000-4-2
> 20 kV contact discharge
> 30 kV air discharge
- Tiny SOD-923 package
- Package height = 0.4 mm
- Typ. capacitance 12 pF ($V_R = 2.5$ V; $f = 1$ MHz)
- Leakage current $< 0.1 \mu\text{A}$ ($V_R = 5$ V)
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE on 7" REEL)	MINIMUM ORDER QUANTITY
VESD05A1B-02Z	VESD05A1B-02Z-GS08	8000	8000

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VESD05A1B-02Z	SOD-923	H	0.45 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	acc. IEC 61000-4-5; $t_p = 8/20 \mu\text{s}$; single shot	I_{PPM}	3	A
Peak pulse power	acc. IEC 61000-4-5; $t_p = 8/20 \mu\text{s}$; single shot	P_{PP}	33	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 20	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{stg}	- 55 to + 150	°C

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

ELECTRICAL CHARACTERISTICS VESD05A1B-02Z BIAS mode (between pin 1 and pin 2)						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{lines}	-	-	1	lines
Reverse stand off voltage	at $I_R = 0.1 \mu A$	V_{RWM}	5	-	-	V
Reverse current	at $V_R = 5 V$	I_R	-	0.01	0.1	μA
Reverse breakdown voltage	at $I_R = 1 mA$	V_{BR}	6	6.8	7.5	V
Reverse Clamping voltage	at $I_{PP} = 1 A$	V_C	-	8	9.5	V
	at $I_{PP} = I_{PPM} = 3 A$	V_C	-	8.9	11	V
Forward clamping voltage	at $I_{PP} = 0.2 A$	V_F	-	0.95	1.2	V
	at $I_{PP} = 1 A$	V_F	-	1.3	-	V
	at $I_{PP} = I_{PPM} = 3 A$	V_F	-	1.9	-	V
Capacitance	at $V_R = 0 V$; $f = 1 MHz$	C_D	-	19	23	pF
	at $V_R = 2.5 V$; $f = 1 MHz$	C_D	-	12	-	pF

Note

- Ratings at 25 °C, ambient temperature unless otherwise specified

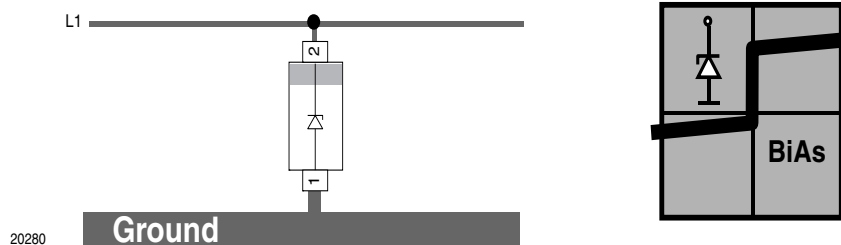
BIAS-MODE (BIDIRECTIONAL ASYMMETRICAL PROTECTION MODE)

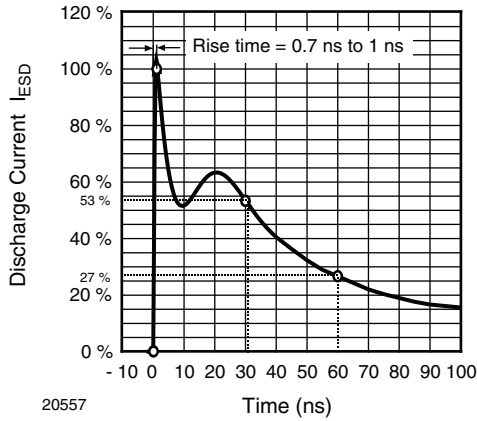
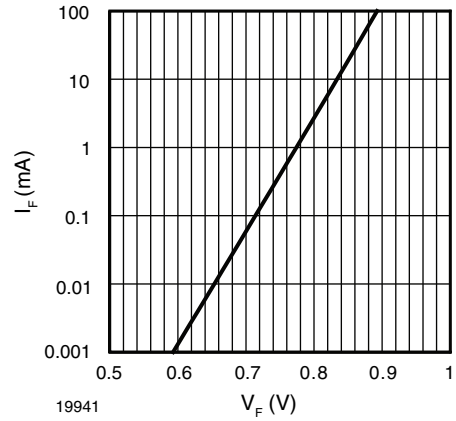
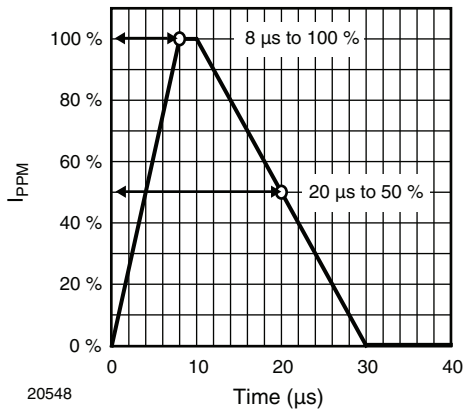
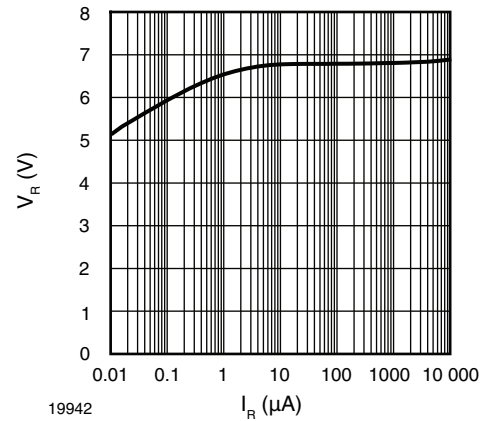
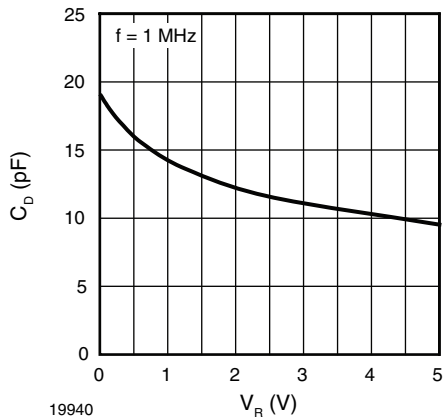
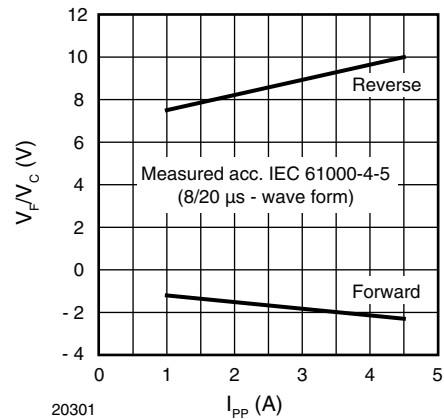
With the **VESD05A1B-02Z** one signal- or data-lines (L1) can be protected against voltage transients. With pin 1 connected to ground and pin 2 connected to a signal- or data-line which has to be protected. As long as the voltage level on the data- or signal-line is between 0 V (ground level) and the 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 through 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 **Breakthrough 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 **VESD05A1B-02Z** clamping behaviour is **Bidirectional** and **Asymmetrical (BiAs)**.



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. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

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

 Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

 Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

 Fig. 6 - Typical Clamping Voltage vs. Peak Pulse Current I_{PP}

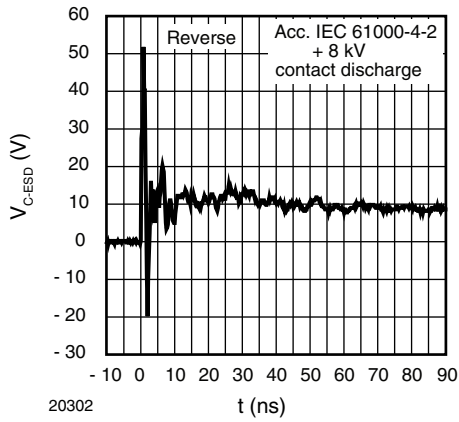


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

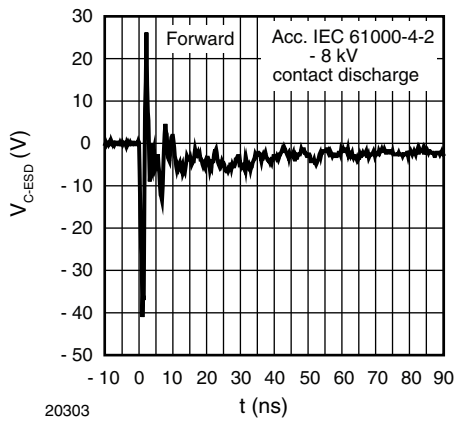


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

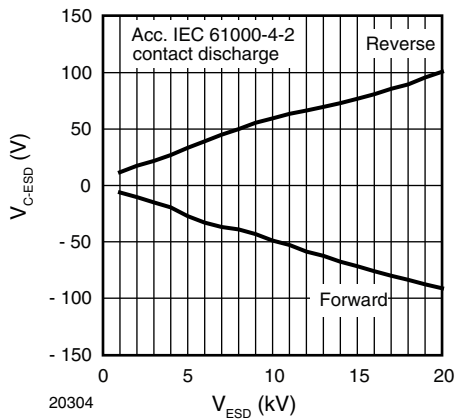
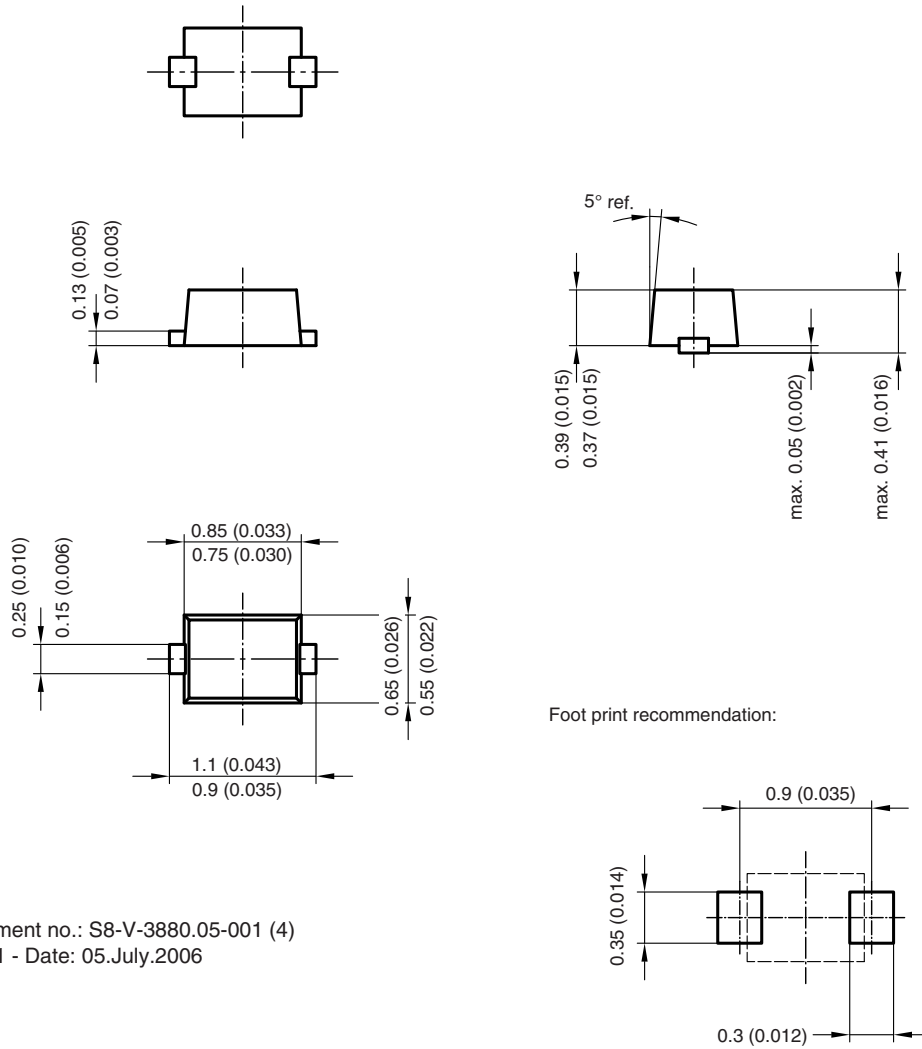


Fig. 9 - Typical Clamping Voltage at ± ESD Contact Discharge (acc. IEC 61000-4-2)

PACKAGE DIMENSIONS in millimeters (inches): **SOD-923**


Document no.: S8-V-3880.05-001 (4)
 Rev. 1 - Date: 05.July.2006
 20096



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 and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. 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.