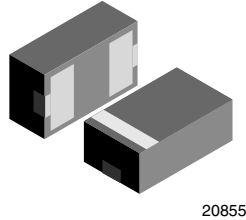
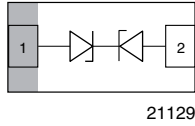


## Bidirectional Symmetrical (BiSy) Low Capacitance, Single-Line ESD-Protection Diode in LLP1006-2M


**MARKING** (example only)


Bar = pin 1 marking

X = date code

Y = type code (see table below)

**FEATURES**

- Ultra compact LLP1006-2M package
- Low package height < 0.4 mm
- 1-line ESD-protection
- Working range  $\pm 5.5$  V
- Low leakage current  $I_R < 0.1 \mu\text{A}$
- Very low load capacitance  $C_D = 0.3$  pF
- ESD-protection acc. IEC 61000-4-2  
 $\pm 15$  kV contact discharge  
 $\pm 16$  kV air discharge
- Soldering can be checked by standard vision inspection; no X-ray necessary
- Pin plating NiPdAu (e4) no whisker growth
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- 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
VBUS05L1-DD1	VBUS05L1-DD1-G-08	8000	8000

PACKAGE DATA						
DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VBUS05L1-DD1	LLP1006-2M	R	0.72 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS VBUS05L1-DD1				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Acc. IEC 61000-4-5; $t_p = 8/20 \mu\text{s}$ ; single shot	$I_{PPM}$	2	A
Peak pulse power	Pin 1 to pin 2, acc. IEC 61000-4-5; $t_p = 8/20 \mu\text{s}$ ; single shot	$P_{PP}$	34	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	$V_{ESD}$	$\pm 15$	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		$\pm 16$	kV
Operating temperature	Junction temperature	$T_J$	- 40 to + 125	°C
Storage temperature		$T_{STG}$	- 40 to + 150	°C

ELECTRICAL CHARACTERISTICS VBUS05L1-DD1 ( $T_{amb} = 25$ °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	at $I_R = 0.05 \mu\text{A}$	$V_{RWM}$	5.5	-	-	V
Reverse current	at $V_R = 5.5$ V	$I_R$	-	-	0.05	$\mu\text{A}$
Reverse breakdown voltage	at $I_R = 1$ mA	$V_{BR}$	7	8.4	9.5	V
Reverse clamping voltage	at $I_{PP} = 1$ A	$V_C$	-	11.5	14	V
	at $I_{PP} = I_{PPM} = 2$ A	$V_C$	-	14	17	V
Capacitance	at $V_R = 0$ V, $f = 1$ MHz	$C_D$	-	0.33	0.4	pF
	at $V_R = 2.5$ V, $f = 1$ MHz	$C_D$	-	0.34	-	pF

 \*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

## VBUS05L1-DD1: ESD PROTECTION WITH LOWEST LOAD CAPACITANCE

The **VBUS05L1-DD1** is a Bidirectional and Symmetrical (BiSy) ESD-protection device which clamps positive and negative overvoltage transients to ground. Connected between the signal or data line and the ground the **VBUS05L1-DD1** offers a high isolation (low leakage current, lowest capacitance) within the specified working range. Due to the short leads and small package size of the tiny LLP1006-2M package the line inductance is very low, so that fast transients like an ESD-strike can be clamped with minimal over- or undershoots.

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

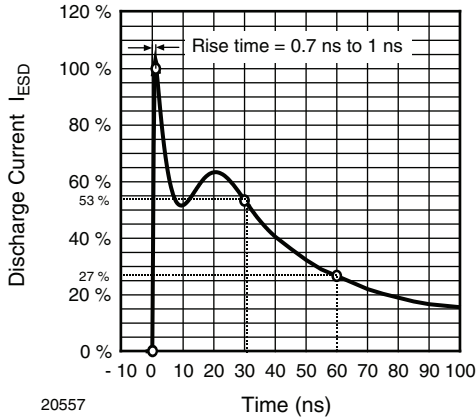


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330  $\Omega$ /150 pF)

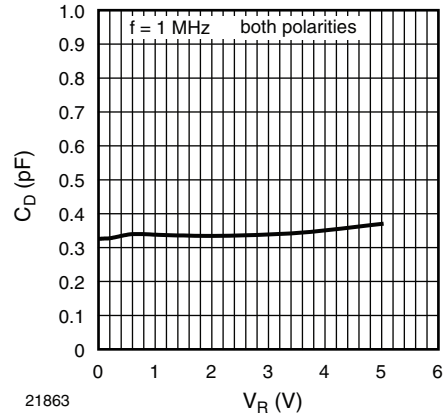


Fig. 3 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

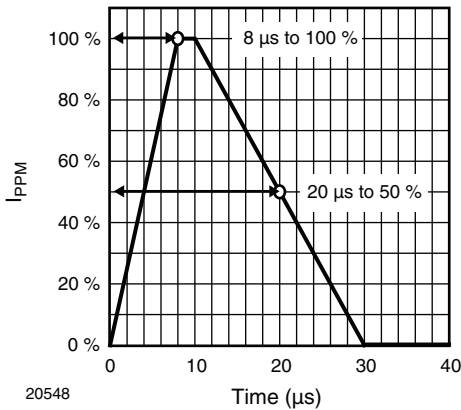


Fig. 2 - 8/20  $\mu$ s Peak Pulse Current Wave Form acc. IEC 61000-4-5

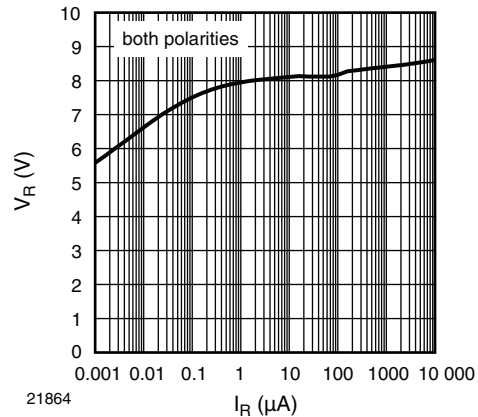


Fig. 4 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

Bidirectional Symmetrical (BiSy) Low  
Capacitance, Single-Line ESD-Protection Diode  
in LLP1006-2M

Vishay Semiconductors

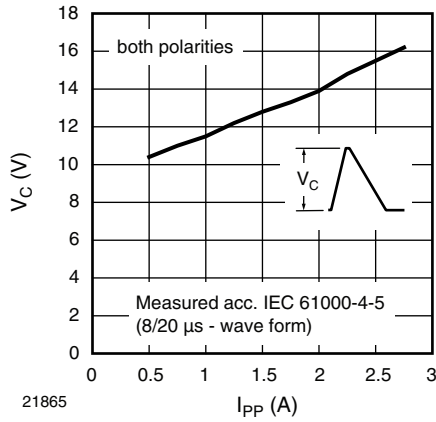


Fig. 5 - Typical Peak Clamping Voltage  $V_C$  vs. Peak Pulse Current  $I_{PP}$

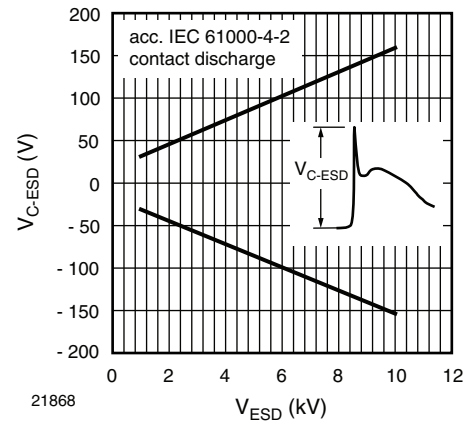


Fig. 8 - Typical Peak Clamping Voltage at ESD Contact Discharge (acc. IEC 61000-4-2)

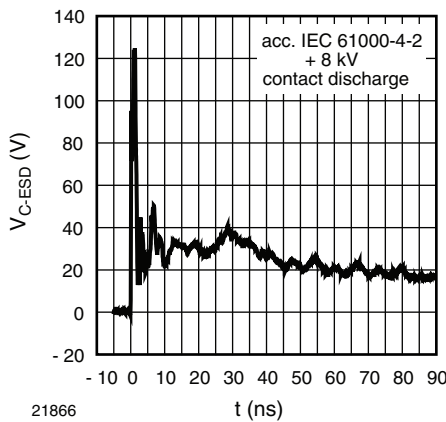


Fig. 6 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

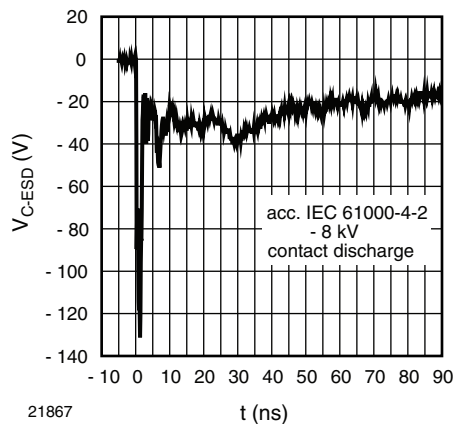


Fig. 7 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

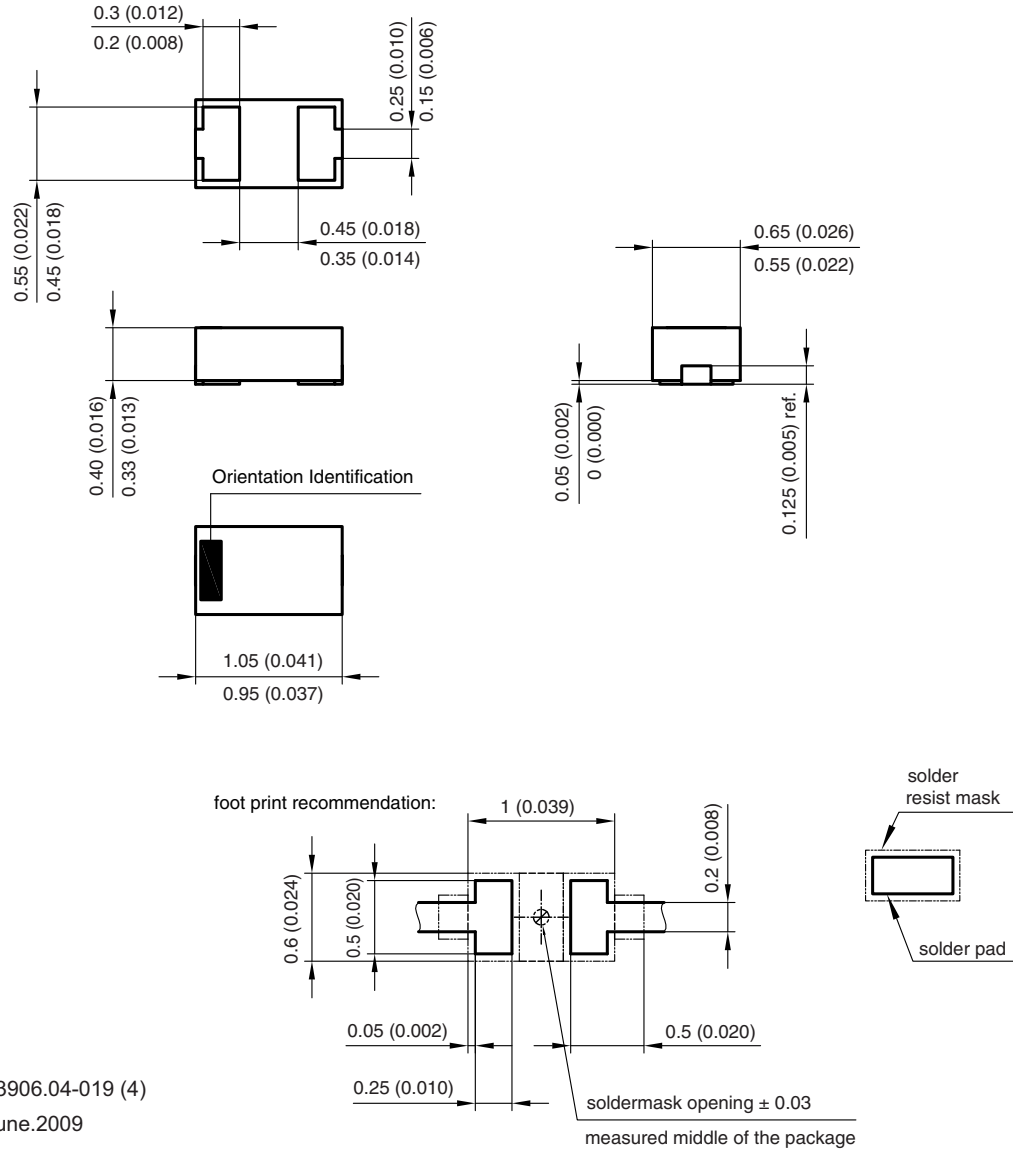
# VBUS05L1-DD1



Vishay Semiconductors

Bidirectional Symmetrical (BiSy) Low Capacitance, Single-Line ESD-Protection Diode in LLP1006-2M

**PACKAGE DIMENSIONS** in millimeters (inches): **LLP1006-2M**



Document no.:S8-V-3906.04-019 (4)

Created - Date: 24.June.2009

21798



## Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.