

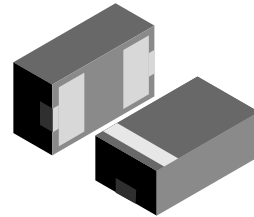
## Bidirectional Symmetrical (BiSy) Low Cap. Single Line ESD-Protection Diode in LLP1006-2M

### Features

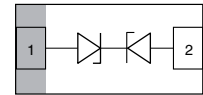
- Very low load capacitance  $C_D = 0.3 \text{ pF}$
- Ultra compact LLP1006-2M package
- Low package height < 0.4 mm
- 1-line ESD-protection
- Working range  $\pm 5.5 \text{ V}$
- Low leakage current <  $0.1 \mu\text{A}$
- ESD-protection acc. IEC 61000-4-2
  - $\pm 9 \text{ kV}$  contact discharge
  - $\pm 9 \text{ kV}$  air discharge
- Soldering can be checked by standard vision inspection. No X-ray necessary
- Pin plating NiPdAu (e4) no whisker growth
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT  
**GREEN**  
[5-2008]\*\*



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### Marking (example only)



Bar = pin 1 marking  
X = date code  
Y = type code (see table below)

### 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

Parameter	Test conditions	Symbol	Value	Unit
Peak pulse current	Acc. IEC 61000-4-5, 8/20 $\mu\text{s}$ /single shot	$I_{PPM}$	2	A
Peak pulse power	Pin 1 to pin 2 acc. IEC 61000-4-5, 8/20 $\mu\text{s}$ /single shot	$P_{PP}$	34	W
ESD immunity	Contact discharge acc. IEC61000-4-2; 10 pulses	$V_{ESD}$	$\pm 9$	kV
	Air discharge acc. IEC61000-4-2; 10 pulses		$\pm 9$	
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](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.

### Electrical Characteristics

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

#### VBUS05L1-DD1

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 $I = 0.05\text{ }\mu\text{A}$	$V_{RWM}$	5.5			V
Reverse current	at $V = 5.5\text{ V}$	$I_R$			0.05	$\mu\text{A}$
Reverse breakdown voltage	at $I = 1\text{ mA}$	$V_{BR}$	7	8.4	9.5	V
Reverse clamping voltage	at $I_{PP} = 1\text{ A}$	$V_C$		11.5	14	V
	at $I_{PP} = I_{PPM} = 2\text{ A}$	$V_C$		14	17	V
Capacitance	at $V = 0\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$		0.33	0.4	pF
	at $V = 2.5\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$		0.34		pF

### Typical Characteristics

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

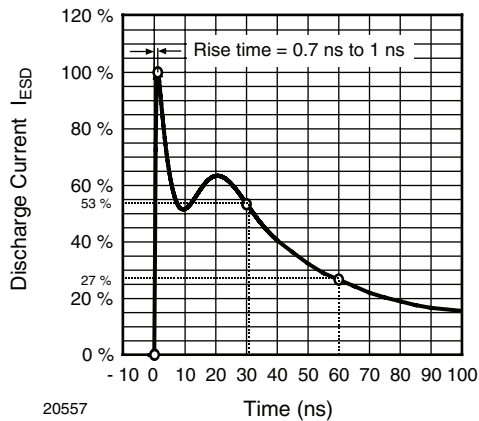


Figure 1. ESD Discharge Current Wave Form  
acc. IEC 61000-4-2 (330  $\Omega$ /150 pF)

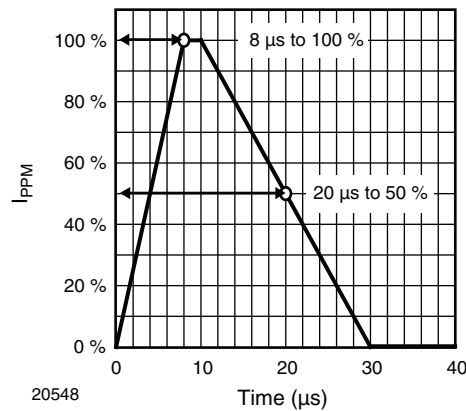


Figure 2. 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form  
acc. IEC 61000-4-5

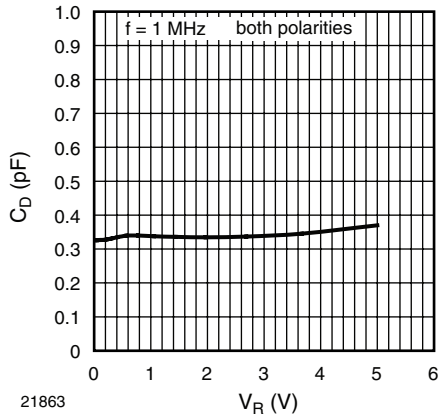


Figure 3. Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

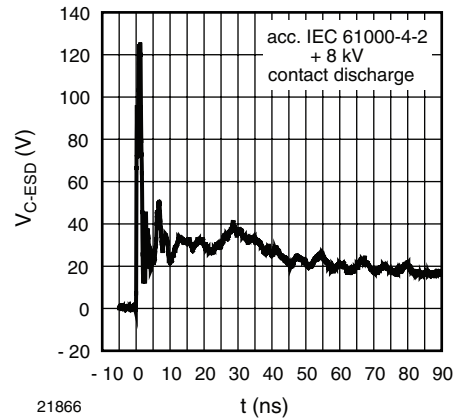


Figure 6. Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

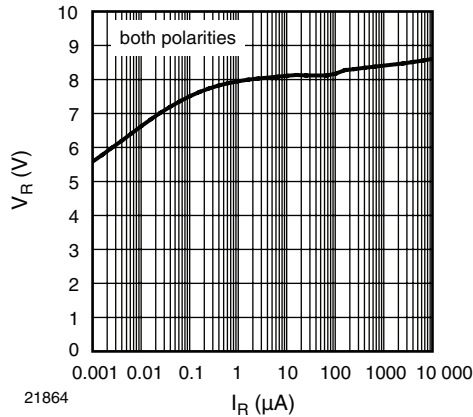


Figure 4. Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

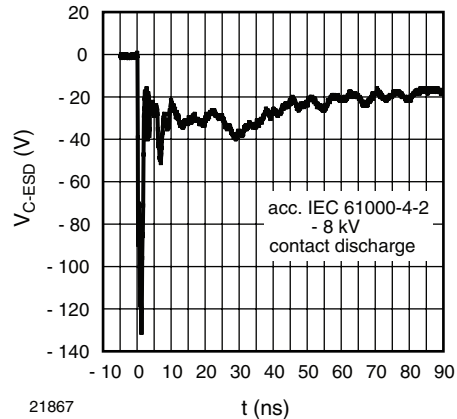


Figure 7. Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

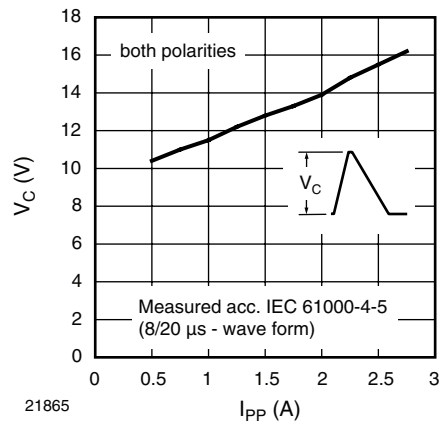


Figure 5. Typical Peak Clamping Voltage  $V_C$  vs. Peak Pulse Current  $I_{PP}$

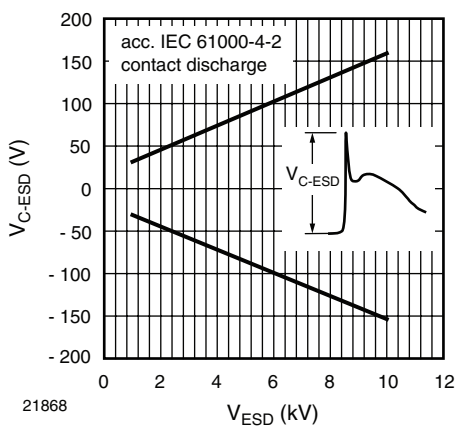
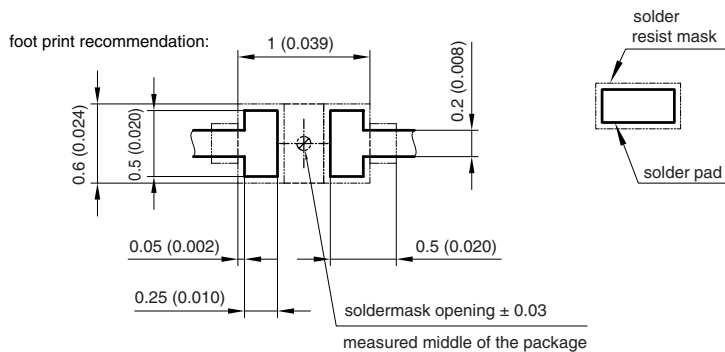
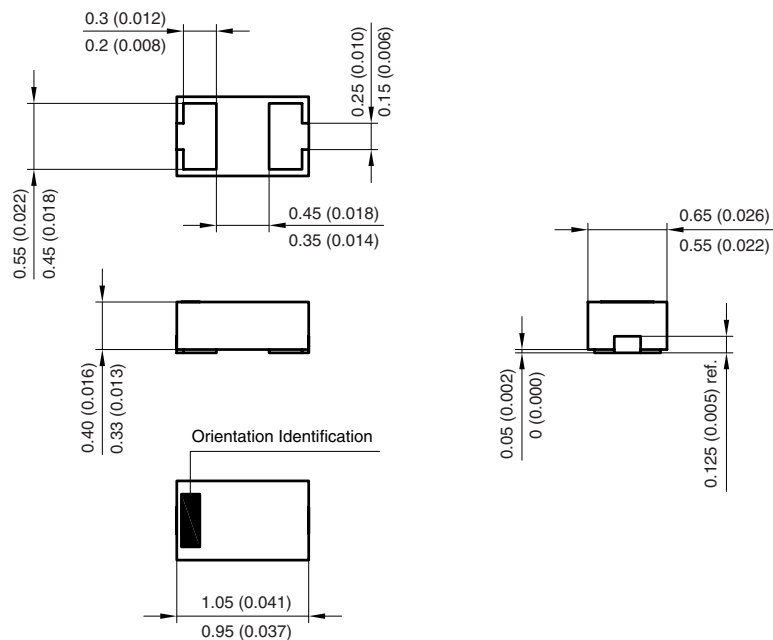


Figure 8. Typical Peak Clamping Voltage at ESD Contact Discharge (acc. IEC 61000-4-2)

## Package Dimensions in millimeters (inches): LLP1006-2M



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