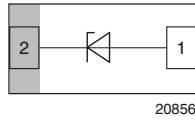
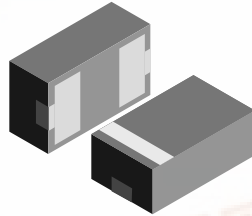


ESD-Protection Diode in LLP1006-2L



20856



20855

MARKING (example only)



Bar = cathode marking

X = date code

Y = type code (see table below)

FEATURES

- Ultra compact LLP1006-2L package
- Low package height < 0.4 mm
- 1-line ESD-protection
- Low leakage current < 1 μ A
- Low load capacitance $C_D = 76$ pF ($V_R = 2.5$ V; $f = 1$ MHz)
- ESD-protection acc. IEC 61000-4-2 ± 30 kV contact discharge ± 30 kV air discharge
- High surge current acc. IEC61000-4-5 $I_{PP} > 16$ A
- 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
VESD05A1A-HD1	VESD05A1A-HD1-GS08	8000	8000

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VESD05A1A-HD1	LLP1006-2L	H	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; $t_p = 8/20$ μ s; single shot	I_{PPM}	16	A
Peak pulse power	acc. IEC 61000-4-5; $t_p = 8/20$ μ s; single shot	P_{PP}	192	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	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 VESD05A1A-HD1 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 $I_R = 1 \mu A$	V_{RWM}	5	-	-	V
Reverse current	at $V_R = 5 V$	I_R	-	< 0.1	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	-	7.2	8.5	V
	at $I_{PP} = I_{PPM} = 16 A$	V_C	-	10.5	12	V
Forward clamping voltage	at $I_{PP} = 1 A$	V_F	-	1	1.5	V
	at $I_{PP} = I_{PPM} = 16 A$	V_F	-	3.2	4.5	V
Capacitance	at $V_R = 0 V$; $f = 1 MHz$	C_D	-	130	150	pF
	at $V_R = 2.5 V$; $f = 1 MHz$	C_D	-	76	-	pF

Note

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

BIAS-MODE (BIDIRECTIONAL ASYMMETRICAL PROTECTION MODE)

With the **VESD05A1A-HD1** 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 **VESD05A1A-HD1** clamping behaviour is **Bidirectional** and **Asymmetrical (BiAs)**.



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

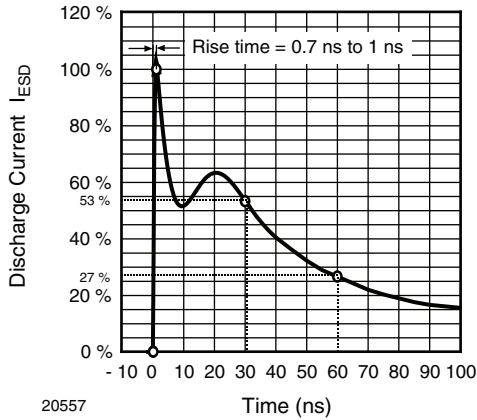


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω /150 pF)

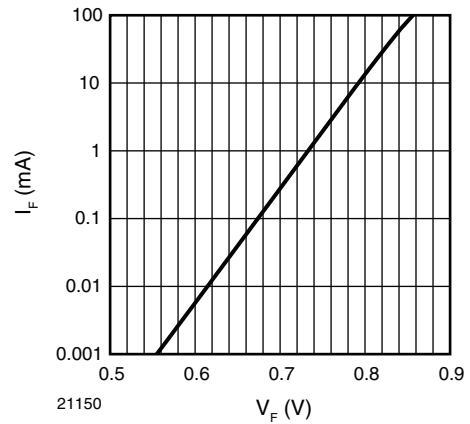


Fig. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

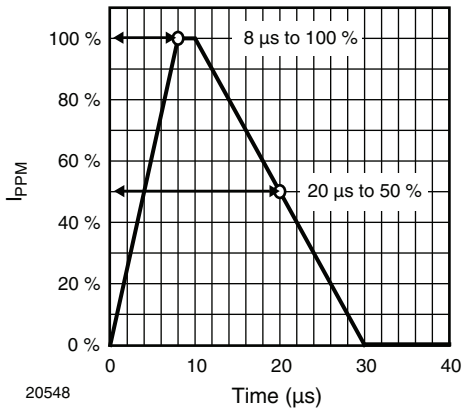


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form (acc. IEC 61000-4-5)

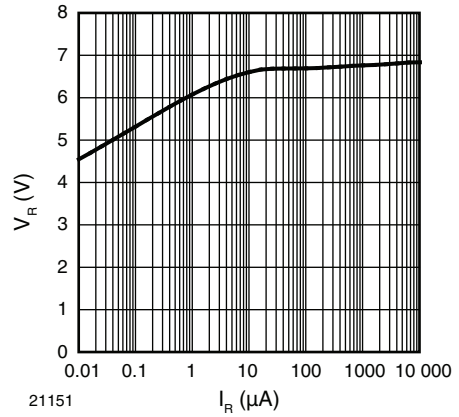


Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

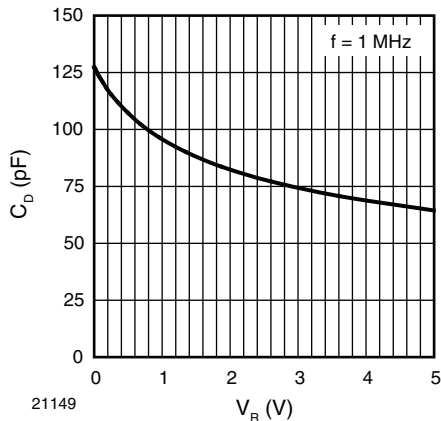


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

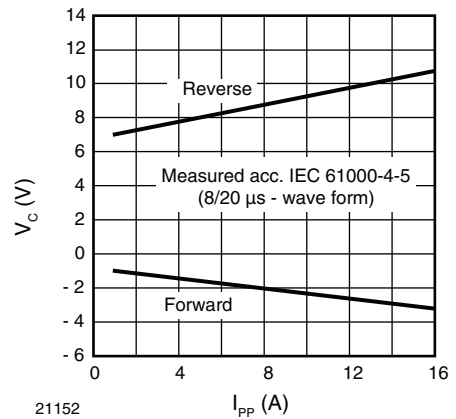
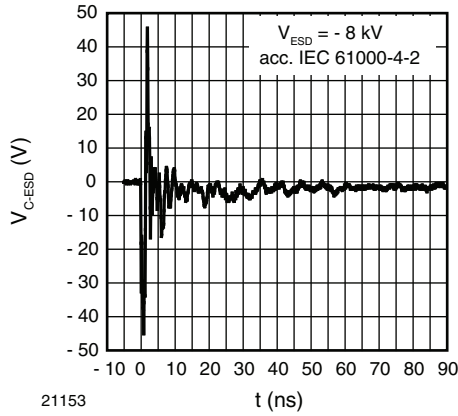
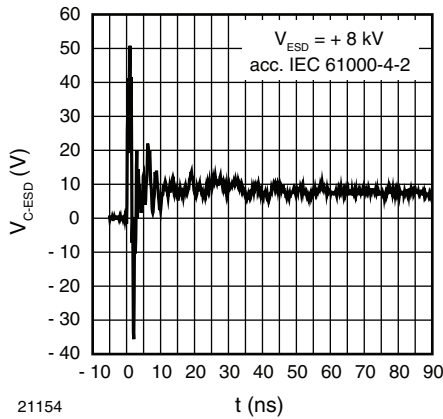


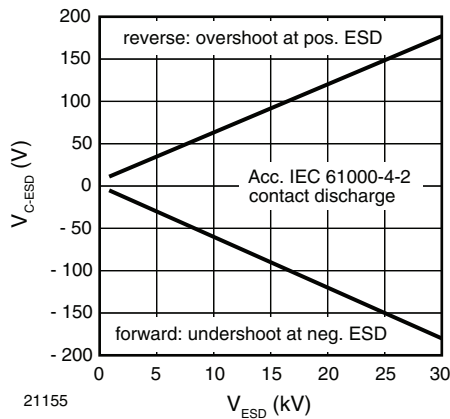
Fig. 6 - Typical Clamping Voltage vs. Peak Pulse Current I_{PP}



21153
Fig. 7 - Typical Clamping Performance on - 8 kV ESD Events (acc. IEC 61000-4-2)

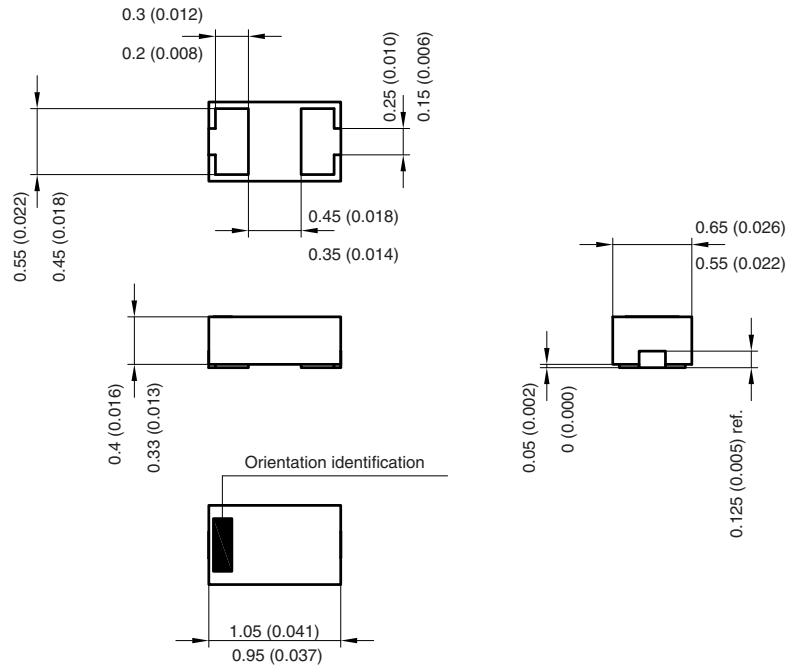


21154
Fig. 8 - Typical Clamping Performance on + 8 kV ESD Events (acc. IEC 61000-4-2)

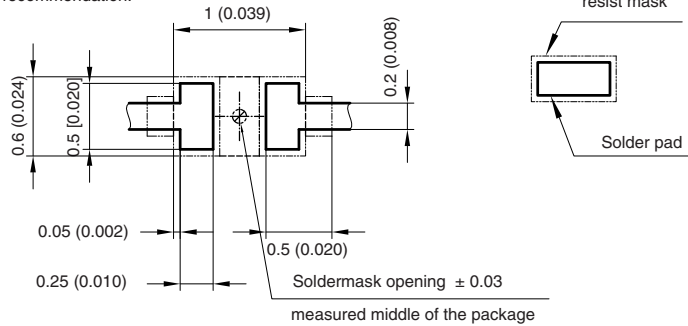


21155
Fig. 9 - Typical max. Clamping Voltage at ESD Contact Discharge (acc. IEC 61000-4-2)

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



Foot print recommendation:



Created - Date: 13. July, 2007
 Rev. 4 - Date: 12. Sept. 2008
 Document no.:S8-V-3906.04-005 (4)
 20812

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