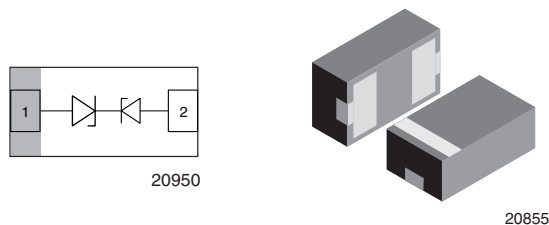


# Bidirectional Asymmetrical (BiAs) Single Line ESD Protection Diode in LLP1006-2L



## MARKING (example only)



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

## ADDITIONAL RESOURCES



## FEATURES

- Ultra compact LLP1006-2L
- Low package height = 0.4 mm
- 1-line ESD protection
- Working range -6 V up to +10 V or -10 V up to +6 V
- Low leakage current < 0.1  $\mu$ A
- Low load capacitance typical  $C_D$  = 5.4 pF at 0 V
- ESD immunity acc. IEC 61000-4-2  
± 18 kV contact discharge  
± 18 kV air discharge
- e3 - Sn  
Tin plated exposed side wall of lead frame  
- Soldering can be checked by standard vision inspection  
- AOI = Automated Optical Inspection  
- No X-ray necessary
- PATENT(S): [www.vishay.com/patents](http://www.vishay.com/patents)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
VCUT0610AHD1	VCUT0610AHD1-G3-08	10k	10k

## PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VCUT0610AHD1	LLP1006-2L	6	0.72 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

## ABSOLUTE MAXIMUM RATINGS VCUT0610AHD1

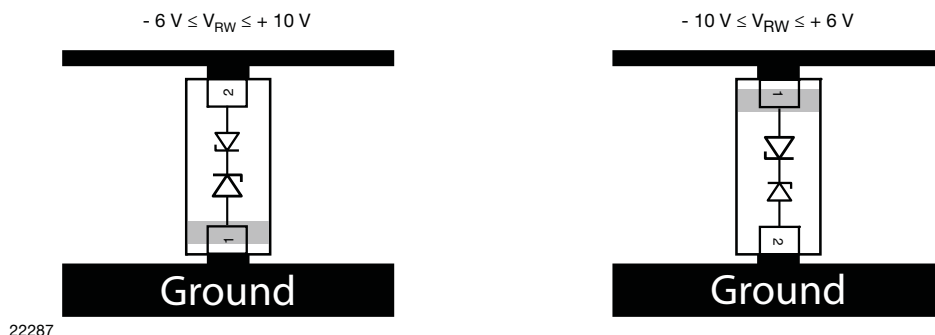
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 1 to pin 2 acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot; $T_{amb}$ = 25 °C	$I_{PPM}$	3.2	A
	Pin 2 to pin 1 acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot; $T_{amb}$ = 25 °C		2.3	A
Peak pulse power	Pin 1 to pin 2 acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot; $T_{amb}$ = 25 °C	$P_{PP}$	54	W
	Pin 2 to pin 1 acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot; $T_{amb}$ = 25 °C		64	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses; $T_{amb}$ = 25 °C	$V_{ESD}$	± 18	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 18	kV
Operating temperature	Junction temperature	$T_J$	-40 to +125	°C
Storage temperature		$T_{STG}$	-55 to +125	°C

PATENT(S): [www.vishay.com/patents](http://www.vishay.com/patents)

This Vishay product is protected by one or more United States and international patents.

## CUT THE SPIKES WITH VCUT0610AHD1

The VCUT0610AHD1 is a bidirectional but asymmetrical (BiAs) ESD protection device which clamps positive and negative overvoltage transients to ground. Connected between the signal or data line and the ground the VCUT0610AHD1 offers a high isolation (low leakage current, small capacitance) within the specified working range of -6 V to +10 V or -10 V and +6 V. Due to the short leads and small package size of the tiny LLP1006-2L 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 VCUT0610AHD1 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Measured from pin 2 to pin 1

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	Max. reverse working voltage	$V_{RWM}$	-	-	10	V
Reverse voltage	At $I_R = 0.1\text{ }\mu\text{A}$	$V_R$	10	-	-	V
Reverse current	At $V = 10\text{ V}$	$I_R$	-	-	0.1	$\mu\text{A}$
Reverse breakdown voltage	At $I = 1\text{ mA}$	$V_{BR}$	12	-	-	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$ ; $t_p = 8/20\text{ }\mu\text{s}$	$V_C$	-	19	23	V
	At $I_{PP} = I_{PPM} = 2.3\text{ A}$ ; $t_p = 8/20\text{ }\mu\text{s}$		-	24	28	V
Capacitance	At $V = 0\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$	-	5.4	6.5	pF
	At $V = 3.3\text{ V}$ ; $f = 1\text{ MHz}$		-	3.4	-	pF

### ELECTRICAL CHARACTERISTICS VCUT0610AHD1 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Measured from pin 1 to pin 2

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	Max. reverse working voltage	$V_{RWM}$	-	-	6	V
Reverse voltage	At $I_R = 0.1\text{ }\mu\text{A}$	$V_R$	6	-	-	V
Reverse current	At $V = 6\text{ V}$	$I_R$	-	-	0.1	$\mu\text{A}$
Reverse breakdown voltage	At $I = 1\text{ mA}$	$V_{BR}$	6.5	-	-	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$ ; $t_p = 8/20\text{ }\mu\text{s}$	$V_C$	-	10.3	12	V
	At $I_{PP} = I_{PPM} = 3.2\text{ A}$ ; $t_p = 8/20\text{ }\mu\text{s}$		-	13.8	17	V
Capacitance	At $V = 0\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$	-	5.4	6.5	pF
	At $V = 3.3\text{ V}$ ; $f = 1\text{ MHz}$		-	4	-	pF

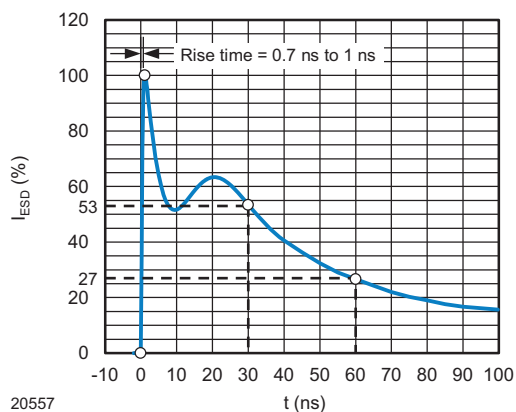
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


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

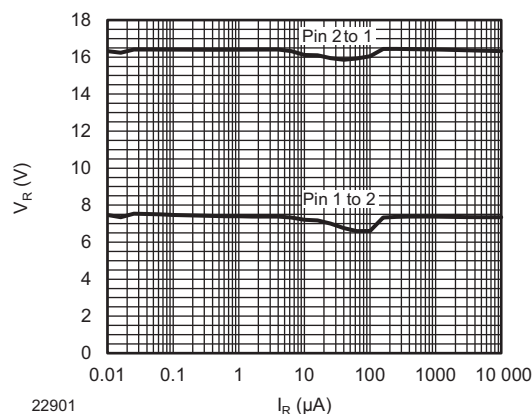


Fig. 4 - Typical Forward and Reverse Voltage vs. Reverse Current

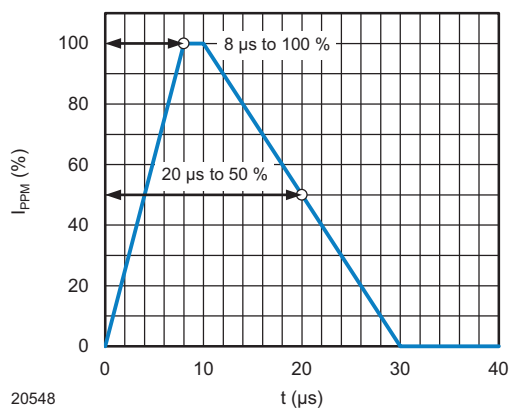


Fig. 2 - 8/20  $\mu$ s Peak Pulse Current Wave Form  
acc. IEC 61000-4-5

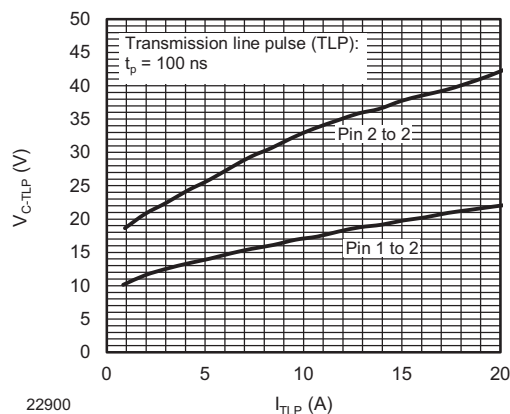


Fig. 5 - Typical Clamping Voltage vs. Peak Pulse Current

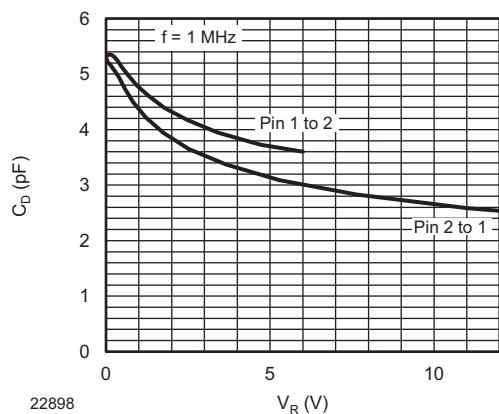


Fig. 3 - Typical Capacitance vs. Reverse Voltage

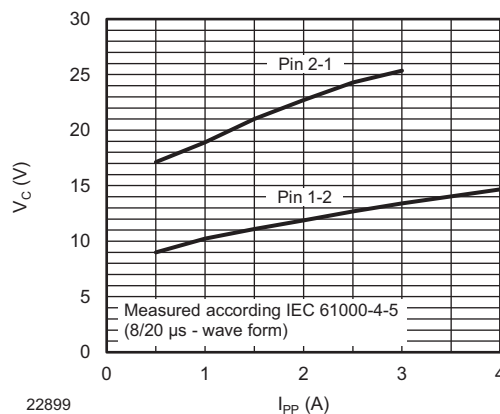
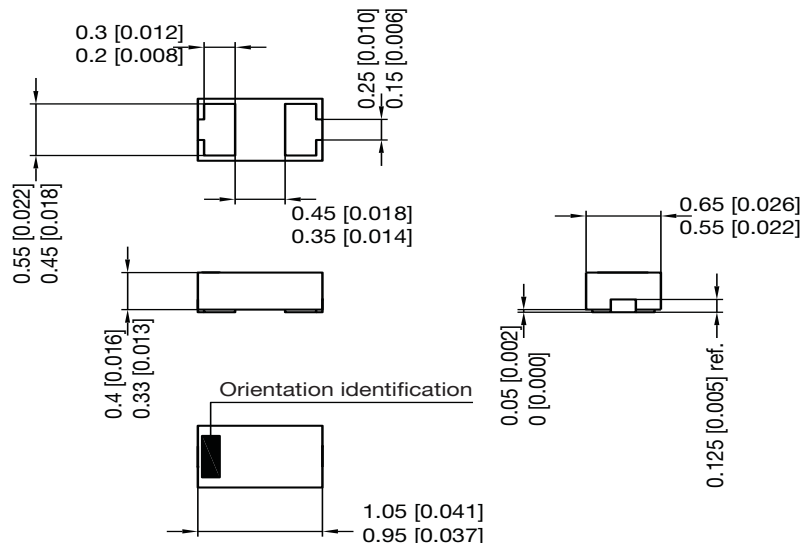
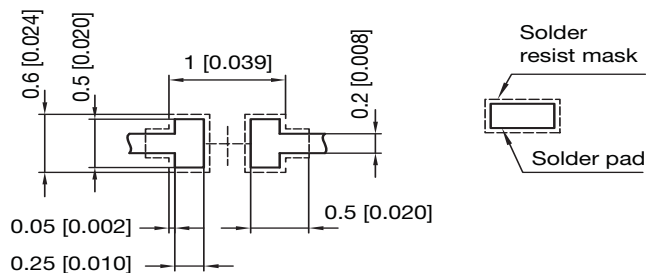
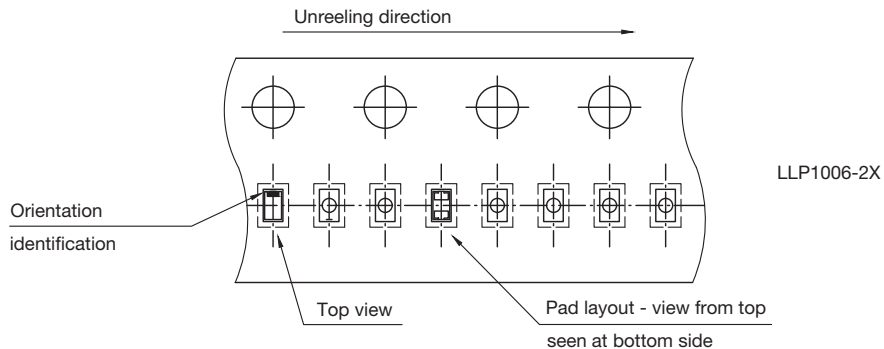


Fig. 6 - Typical Peak Clamping Voltage vs. Peak Pulse Current

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

**Foot print recommendation:**


Pad Design Patented:  
(©US 9.018.537 B2)

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