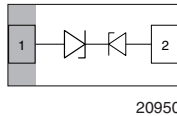
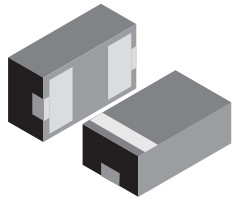




## Bidirectional Asymmetrical (BiAs) Single Line ESD Protection Diode in LLP1006-2L



20950



20855

### MARKING (example only)



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

### DESIGN SUPPORT TOOLS

[click logo to get started](#)



### FEATURES

- Ultra compact LLP1006-2L
- Low package height < 0.4 mm
- 1-line ESD protection
- Working range -7 V up to +14 V or -14 V up to +7 V
- Low leakage current < 0.1  $\mu$ A
- Low load capacitance typical  $C_D = 8$  pF
- ESD immunity acc. IEC 61000-4-2  
± 25 kV contact discharge  
± 30 kV air discharge
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- 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 |               |                    |  |                        |
|----------------------|---------------|--------------------|--|------------------------|
| PIN PLATING          | DEVICE NAME   | ORDERING CODE      | TAPED UNITS PER REEL<br>(8 mm TAPE ON 7" REEL) | MINIMUM ORDER QUANTITY |
| e4                   | VCUT0714A-HD1 | VCUT0714A-HD1-GS08 | 8000   | 8000                   |
| e3                   | VCUT0714AHD1  | VCUT0714AHD1-G3-08 | 10 000   | 100 000                |

| PACKAGE DATA  |              |             |           |         |   |                                      |                             |
|---------------|--------------|-------------|-----------|---------|---|--------------------------------------|-----------------------------|
| DEVICE NAME   | PACKAGE NAME | PIN PLATING | TYPE CODE | WEIGHT  | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL           | SOLDERING CONDITIONS        |
| VCUT0714A-HD1 | LLP1006-2L   | e4          | B         | 0.72 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s<br>at terminals |
| VCUT0714AHD1  | LLP1006-2L   | e3          | 7         | 0.72 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s<br>at terminals |

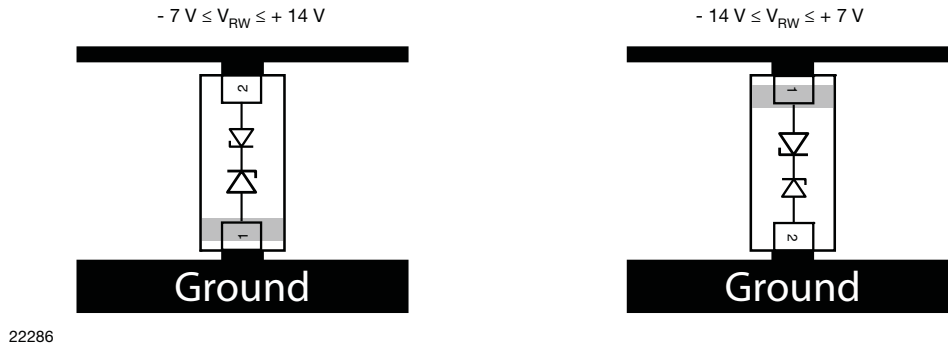
| ABSOLUTE MAXIMUM RATINGS VCUT0714A-HD1 |  |           |             |      |
|--|--|-----------|-------------|------|
| PARAMETER                              | TEST CONDITIONS  | SYMBOL    | VALUE       | UNIT |
| Peak pulse current                     | Pin 1 to pin 2<br>acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot | $I_{PPM}$ | 5           | A    |
|  | Pin 2 to pin 1<br>acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot |           | 2           | A    |
| Peak pulse power                       | Pin 1 to pin 2<br>acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot | $P_{PP}$  | 63          | W    |
|  | Pin 2 to pin 1<br>acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot |           | 54          | W    |
| ESD immunity                           | Contact discharge acc. IEC 61000-4-2; 10 pulses                | $V_{ESD}$ | ± 25        | kV   |
|  | Air discharge acc. IEC 61000-4-2; 10 pulses                    |           | ± 30        | kV   |
| Operating temperature                  | Junction temperature   | $T_J$     | -40 to +125 | °C   |
| Storage temperature                    |  | $T_{STG}$ | -55 to +150 | °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 VCUT0714A-HD1

The VCUT0714A-HD1 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 VCUT0714A-HD1 offers a high isolation (low leakage current, small capacitance) within the specified working range of -7 V to +14 V or -14 V and +7 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 VCUT0714A-HD1 (pin 2 to pin 1)

(T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS/REMARKS                     | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|---|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected      | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage                | V <sub>RWM</sub>     | -    | -    | 14   | V     |
| Reverse voltage           | At I <sub>R</sub> = 0.1 μA                  | V <sub>R</sub>       | 14   | -    | -    | V     |
| Reverse current           | At V <sub>RWM</sub> = 14 V                  | I <sub>R</sub>       | -    | -    | 0.1  | μA    |
| Reverse breakdown voltage | At I <sub>R</sub> = 1 mA                    | V <sub>BR</sub>      | 14.5 | -    | -    | V     |
| Reverse clamping voltage  | At I <sub>PP</sub> = 1 A                    | V <sub>C</sub>       | -    | -    | 27   | V     |
|                           | At I <sub>PP</sub> = I <sub>PPM</sub> = 2 A | V <sub>C</sub>       | -    | -    | 30   | V     |
| Capacitance               | At V <sub>R</sub> = 0 V; f = 1 MHz          | C <sub>D</sub>       | -    | 8    | 8.5  | pF    |
|                           | At V <sub>R</sub> = 7 V; f = 1 MHz          | C <sub>D</sub>       | -    | 4    | -    | pF    |

### ELECTRICAL CHARACTERISTICS (pin 1 to pin 2)

(T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS/REMARKS                     | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
|---------------------------|---|----------------------|------|------|------|-------|
| Protection paths          | Number of lines which can be protected      | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage                | V <sub>RWM</sub>     | -    | -    | 7    | V     |
| Reverse voltage           | At I <sub>R</sub> = 0.1 μA                  | V <sub>R</sub>       | 7    | -    | -    | V     |
| Reverse current           | At V <sub>RWM</sub> = 7 V                   | I <sub>R</sub>       | -    | -    | 0.1  | μA    |
| Reverse breakdown voltage | At I <sub>R</sub> = 1 mA                    | V <sub>BR</sub>      | 7.3  | -    | -    | V     |
| Reverse clamping voltage  | At I <sub>PP</sub> = 1 A                    | V <sub>C</sub>       | -    | -    | 13   | V     |
|                           | At I <sub>PP</sub> = I <sub>PPM</sub> = 5 A | V <sub>C</sub>       | -    | -    | 17   | V     |
| Capacitance               | At V = 0 V; f = 1 MHz                       | C <sub>D</sub>       | -    | 8    | 8.5  | pF    |
|                           | At V = 3.5 V; f = 1 MHz                     | C <sub>D</sub>       | -    | 6.4  | -    | pF    |

## TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

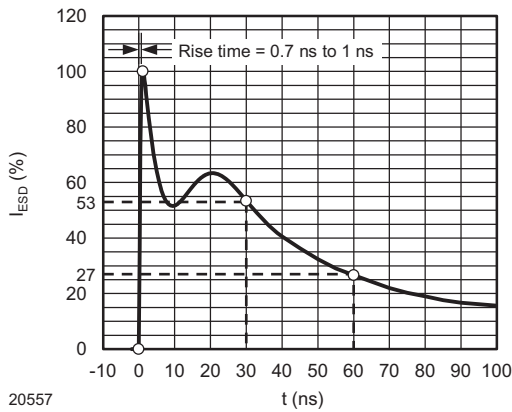


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω/150 pF)

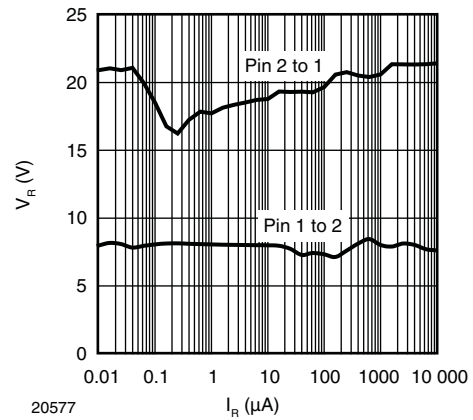


Fig. 4 - Typical Reverse Voltage V<sub>R</sub> vs. Reverse Current I<sub>R</sub>

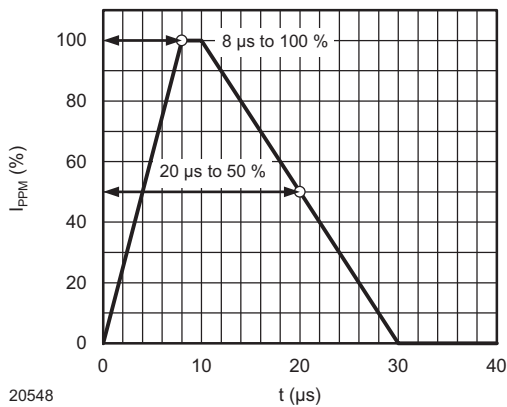


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form acc. IEC 61000-4-5

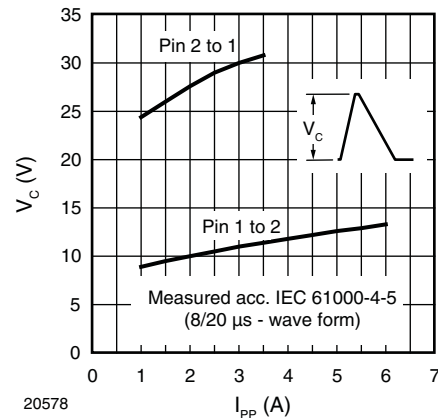


Fig. 5 - Typical Peak Clamping Voltage V<sub>C</sub> vs. Peak Pulse Current I<sub>PP</sub>

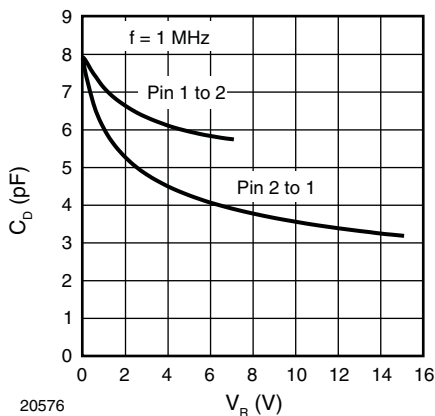


Fig. 3 - Typical Capacitance C<sub>D</sub> vs. Reverse Voltage V<sub>R</sub>

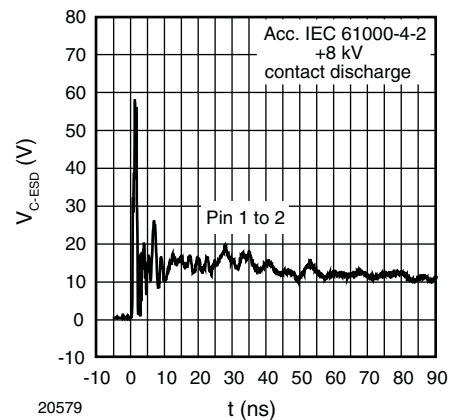


Fig. 6 - Typical Clamping Performance at +8 kV Contact Discharge (acc. IEC 61000-4-2)

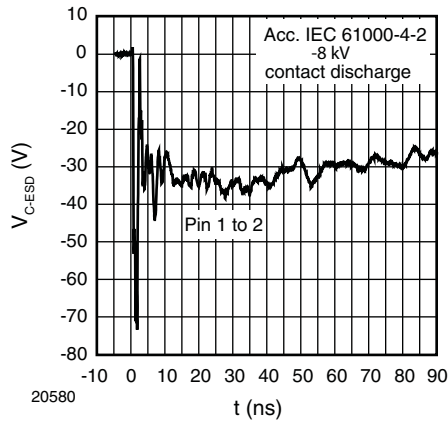


Fig. 7 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

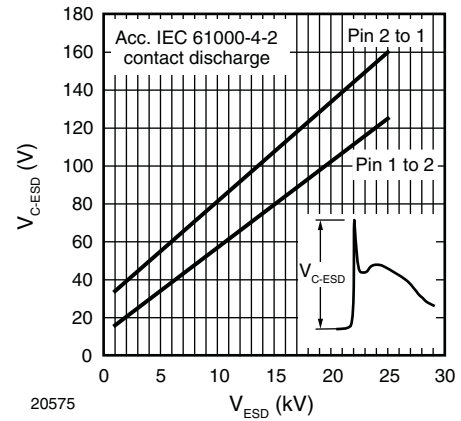
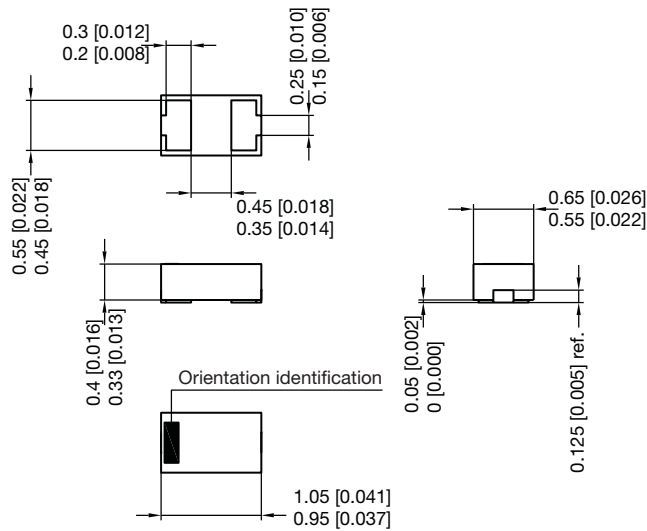
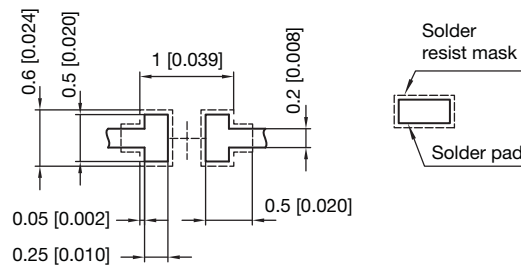


Fig. 8 - Typical Peak Clamping Voltage at ESD Contact Discharge (acc. IEC 61000-4-2)

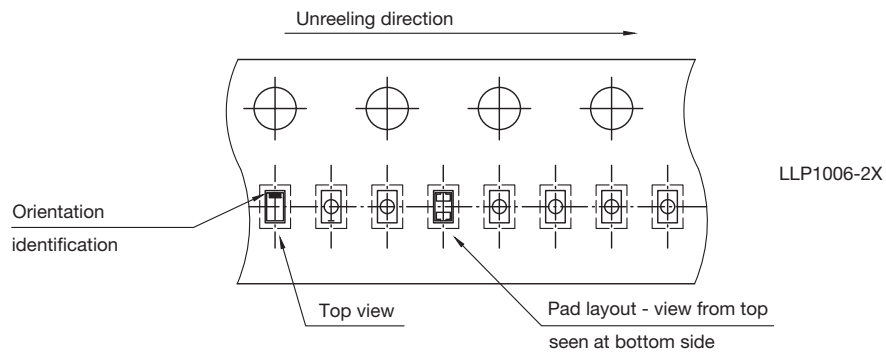
## PACKAGE DIMENSIONS in millimeters (inches): LLP1006-2L



Foot print recommendation:



Pad Design Patented:  
(©)US 9.018.537 B2



S8-V-3906.04-017 (4)  
02.05.2017  
22965



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