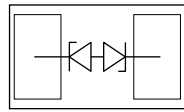
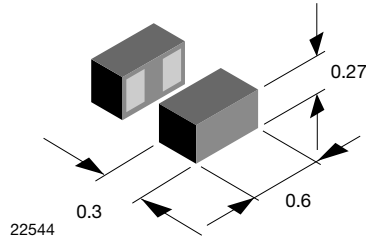


# Bidirectional Symmetrical (BiSy) Single Line ESD Protection Diode in Silicon Package



22543



22544

## MARKING



## LINKS TO ADDITIONAL RESOURCES



3D Models



Application Notes



Marking

## FEATURES

- Ultra compact CLP0603 package
- Low package height < 0.3 mm
- 1-line ESD protection
- AEC-Q101 qualified available
- Working range  $\pm 3.3$  V
- Low leakage current < 0.1  $\mu$ A
- Low load capacitance  $C_D < 14$  pF
- ESD immunity acc. IEC 61000-4-2  $\pm 30$  kV contact discharge  $\pm 30$  kV air discharge
- Lead plating: Au (e4)
- Lead material: Ni
- Topside coating
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- 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)

## Footprint and soldering recommendation:

 please see Application Note: [www.vishay.com/doc?85917](http://www.vishay.com/doc?85917)

| ORDERING INFORMATION  |                    |  |             |                             |                         |
|-----------------------|--------------------|--|-------------|-----------------------------|-------------------------|
| PART NUMBER (EXAMPLE) | AEC-Q101 QUALIFIED | ENVIRONMENTAL AND QUALITY CODE               |             | PACKAGING CODE              | ORDERING CODE (EXAMPLE) |
|                       |                    | RoHS-COMPLIANT + LEAD (Pb)-FREE TERMINATIONS | GOLD PLATED | 15K PER 7" REEL (8 mm TAPE) |                         |
|                       |                    | GREEN  |             | 15K/BOX = MOQ               |                         |
| VCUT03G1-SD0          | -                  | G  | 4           | -08                         | VCUT03G1-SD0-G4-08      |
| VCUT03G1-SD0          | H                  | G  | 4           | -08                         | VCUT03G1-SD0HG4-08      |

| PACKAGE DATA |              |           |         |   |
|--------------|--------------|-----------|---------|---|
| DEVICE NAME  | PACKAGE NAME | TYPE CODE | WEIGHT  | SOLDERING CONDITIONS  |
| VCUT03G1-SD0 | CLP0603-2L   | 3G        | 0.12 mg | Peak temperature max. 260 °C<br>Reflow soldering according JEDEC® STD-020 |

| ABSOLUTE MAXIMUM RATINGS |   |           |             |      |
|--------------------------|---|-----------|-------------|------|
| PARAMETER                | TEST CONDITIONS   | SYMBOL    | VALUE       | UNIT |
| Peak pulse current       | acc. IEC 61000-4-5, 8/20 $\mu$ s/single shot                            | $I_{PPM}$ | 6           | A    |
| Peak pulse power         | Pin 1 to pin 2<br>acc. IEC 61000-4-5; $t_p = 8/20$ $\mu$ s; single shot | $P_{PP}$  | 78          | W    |
| ESD immunity             | Contact discharge acc. IEC 61000-4-2; 10 pulses                         | $V_{ESD}$ | $\pm 30$    | kV   |
|                          | Air discharge acc. IEC 61000-4-2; 10 pulses                             |           | $\pm 30$    |      |
| Operating temperature    | Junction temperature  | $T_J$     | -55 to +150 | °C   |
| Storage temperature      |   | $T_{stg}$ | -55 to +150 | °C   |

**CUT THE SPIKES WITH VCUT03G1-SD0**

The VCUT03G1-SD0 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 VCUT03G1-SD0 offers a high isolation (low leakage current, low capacitance) within the specified working range. Due to the short leads and small package size of the tiny CLP0603 package the line inductance is very low, so that fast transients like and ESD strike can be clamped with minimal over- or undershoots.

| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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  | Max. reverse working voltage   | $V_{RWM}$     | -    | -    | 3.3  | V             |
| Reverse voltage  | at $I_R = 0.1\text{ }\mu\text{A}$  | $V_R$         | 3.3  | -    | -    | V             |
| Reverse current  | at $V_{RWM} = 3.3\text{ V}$  | $I_R$         | -    | -    | 0.1  | $\mu\text{A}$ |
| Reverse breakdown voltage  | at $I_R = 1\text{ mA}$   | $V_{BR}$      | 6.5  | 8    | 9    | V             |
| Reverse clamping voltage   | at $I_{PP} = 1\text{ A}$ ; $t_p = 8/20\text{ }\mu\text{s}$ single shot           | $V_C$         | -    | 8.8  | 10   | V             |
|  | at $I_{PP} = I_{PPM} = 6\text{ A}$ ; $t_p = 8/20\text{ }\mu\text{s}$ single shot | $V_C$         | -    | 11   | 13   | V             |
| Capacitance  | at $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$                                       | $C_D$         | -    | 13   | 14   | pF            |
|  | at $V_R = 2.5\text{ V}$ ; $f = 1\text{ MHz}$                                     | $C_D$         | -    | 11   | -    | pF            |
| Clamping voltage   | Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$<br>$I_{TLP} = 8\text{ A}$   | $V_{C-TLP}$   | -    | 9.8  | -    | V             |
| Clamping voltage   | Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$<br>$I_{TLP} = 16\text{ A}$  | $V_{C-TLP}$   | -    | 11   | -    | V             |
| Dynamic resistance   | Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$                             | $R_{DYN}$     | -    | 0.15 | -    | $\Omega$      |

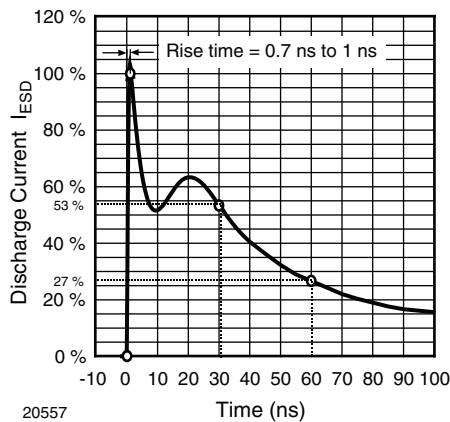
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


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

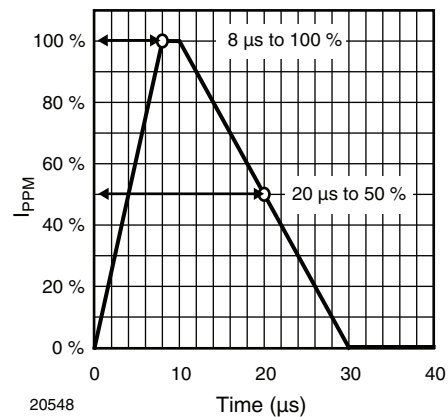


Fig. 2 - 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form  
acc. IEC 61000-4-5

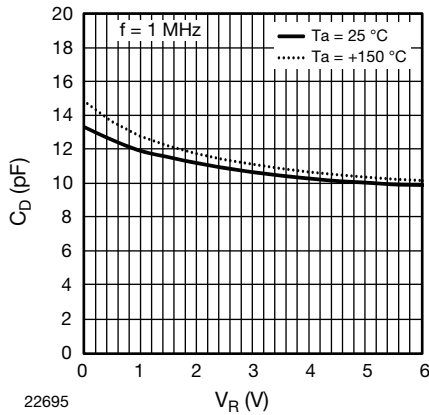


Fig. 3 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

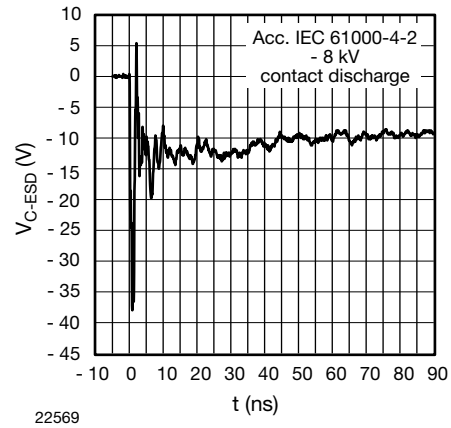


Fig. 6 - Typical Clamping Performance at 8 kV Contact Discharge acc. IEC 61000-4-2

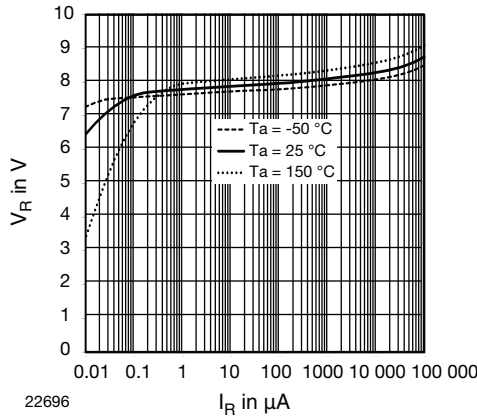


Fig. 4 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

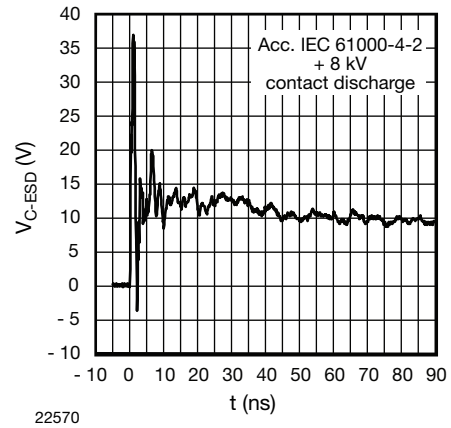


Fig. 7 - Typical Clamping Performance at 8 kV Contact Discharge acc. IEC 61000-4-2

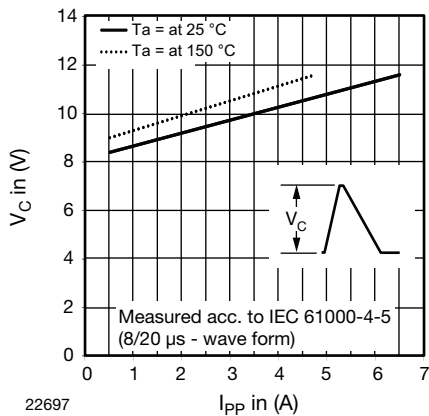


Fig. 5 - Typical Peak Clamping Voltage  $V_C$  vs. Peak Pulse Current  $I_{PP}$

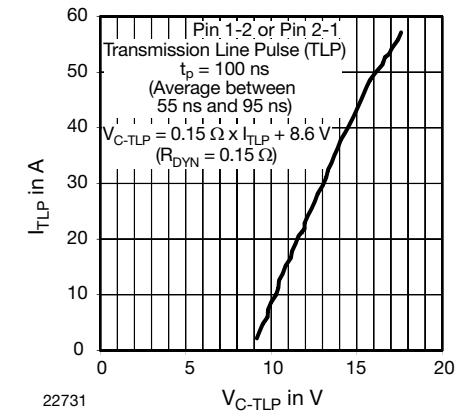
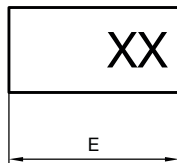
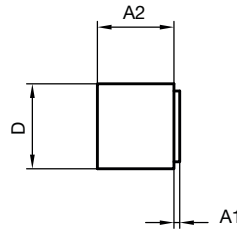
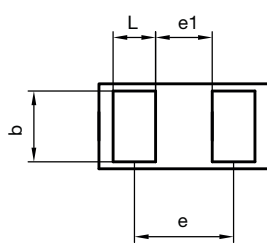


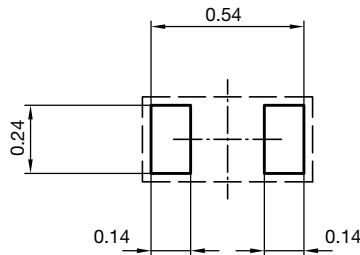
Fig. 8 - Typical Clamping Voltage at 100 ns Transmission Line Pulse (TLP)

**PACKAGE DIMENSIONS** in millimeters (mils): **CLP0603-2L Gen2**


|    | Millimeters |      |      | mils  |       |       |
|----|-------------|------|------|-------|-------|-------|
|    | min.        | nom. | max. | min.  | nom.  | max.  |
| A  | 0.25        | 0.28 | 0.30 | 9.84  | 11.02 | 11.81 |
| A1 | 0.01        | 0.01 | 0.02 | 0.39  | 0.39  | 0.79  |
| A2 | 0.24        | 0.27 | 0.28 | 9.45  | 10.63 | 11.02 |
| b  | 0.22        | 0.25 | 0.28 | 8.66  | 9.84  | 11.02 |
| D  | 0.27        | 0.30 | 0.33 | 10.62 | 11.81 | 12.99 |
| E  | 0.57        | 0.60 | 0.63 | 22.44 | 23.62 | 24.80 |
| e  |             | 0.40 |      |       | 15.75 |       |
| e1 |             | 0.25 |      |       | 9.84  |       |
| L  | 0.12        | 0.15 | 0.18 | 4.72  | 5.91  | 7.09  |

XX ... TYPE CODE AND ALSO PIN1 LOCATION

foot print recommendation:



Document no.: S8-V-3906.04-068 (4)  
 Created - Date: 14. July 2020  
 Rev. 1 - Date 03-June 2021

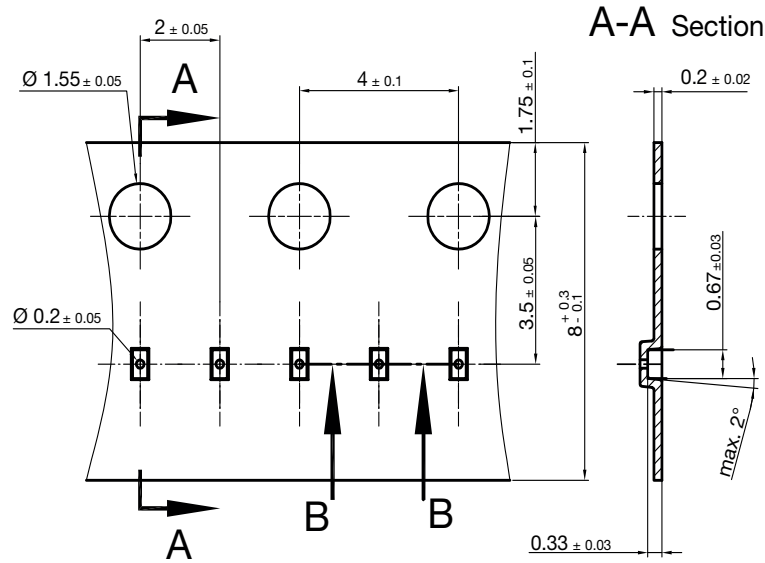
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**Footprint and soldering recommendation:**

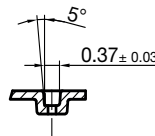
please see Application Note: [www.vishay.com/doc?85917](http://www.vishay.com/doc?85917)



**CARRIER TAPE** in millimeters: **CLP0603-2L Gen2**



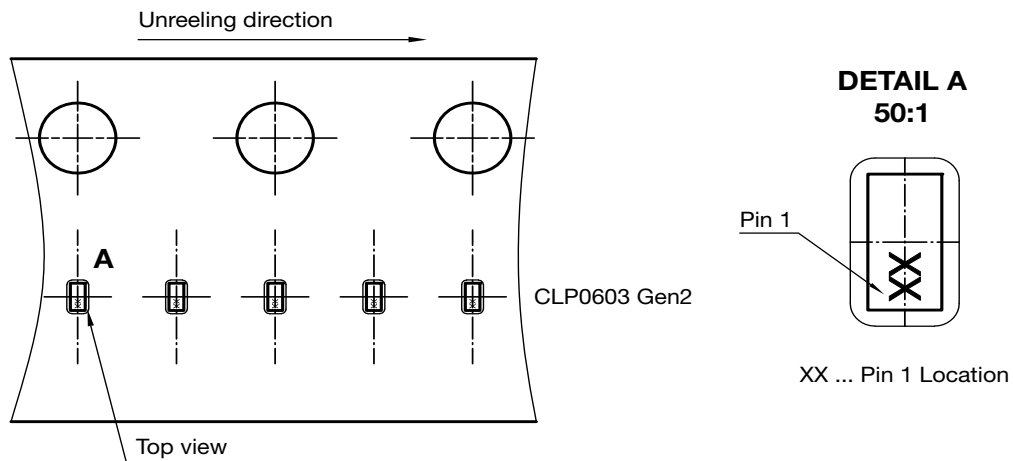
**B-B Section**



Cummulative tolerances of 10 sprocket holes is +/-0.2 mm

22591  
Document no. S8-V-3906.04-0025 (4)  
Created - Date: 22. Nov. 2010

**ORIENTATION IN CARRIER CLP0603-2L Gen2**



Document no.: S8-V-3906.04-069 (4)  
Created - Date: 14-July-2020  
Rev. 1 - Date 23-January-2024

23179



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