



## Features

- ESD Protection for 1 Line with Bi-directional.
- Provide ESD protection for the protected line to IEC 61000-4-2 (ESD)  $\pm 20\text{kV}$  (air),  $\pm 12\text{kV}$  (contact)  
IEC 61000-4-4 (EFT) 40A (5/50ns)  
IEC 61000-4-5 (Lightning) 7A (8/20 $\mu\text{s}$ )  
Cable Discharge Event (CDE)
- Ultra-small SOD-323 package saves board space.
- Protect one I/O line or one power line
- Fast turn-on and Low clamping voltage
- Low operating voltage: 5V
- Solid-state silicon-avalanche and active circuit triggering technology
- Green part available

## Applications

- Computer Interfaces Protection
- Microprocessors Protection
- Serial and Parallel Ports Protection
- Control Signal Lines Protection
- Power lines on PCB Protection
- Latchup Protection

## Description

AZ2225-01L is a design which includes a bi-directional surge rated clamping cell to protect one power line, or one control line, or one low speed data line in an electronic systems. The AZ2225-01L has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage and latch-up caused by Electrostatic Discharging (ESD), Electrical Fast Transients (EFT), Lightning, and Cable Discharge Event (CDE).

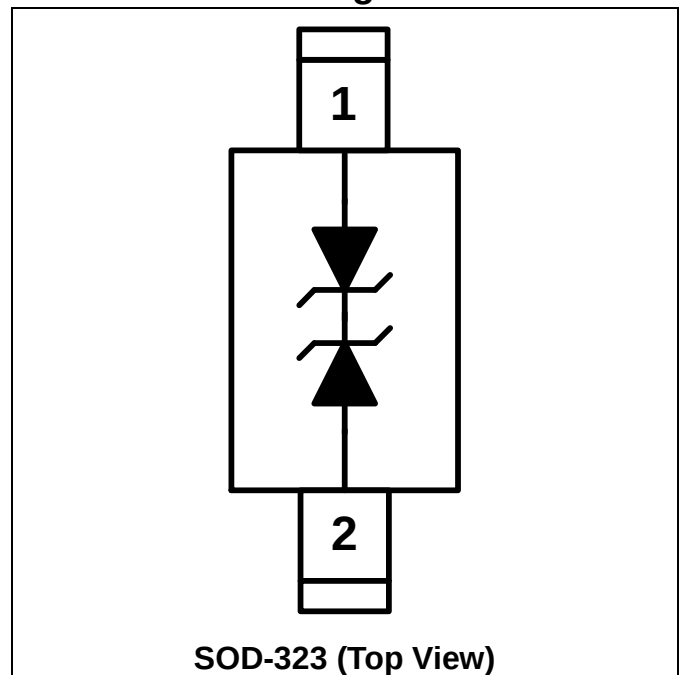
AZ2225-01L is a unique design which includes proprietary clamping cells in a single package.

During transient conditions, the proprietary clamping cells prevent over-voltage on the power line or control/data lines, protecting any downstream components.

AZ2225-01L is bi-directional and may be used on lines where the signal swings above and below ground.

AZ2225-01L may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge).

## Circuit Diagram / Pin Configuration



## SPECIFICATIONS

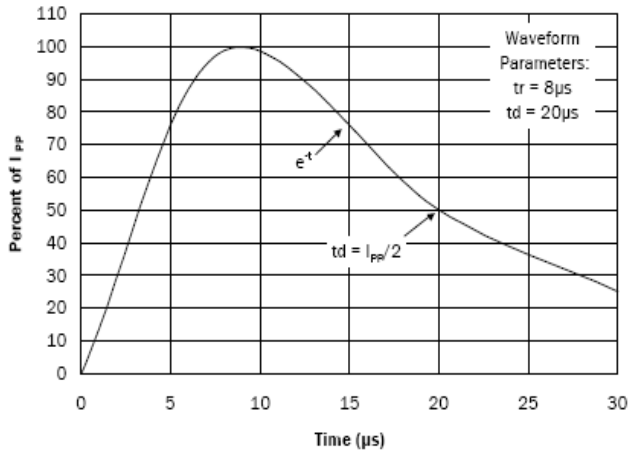
| ABSOLUTE MAXIMUM RATINGS                     |                   |               |       |
|----------------------------------------------|-------------------|---------------|-------|
| PARAMETER                                    | PARAMETER         | RATING        | UNITS |
| Peak Pulse Current (tp =8/20us)              | I <sub>PP</sub>   | 8.5           | A     |
| Operating Supply Voltage (pin-1,-2 to pin-3) | V <sub>DC</sub>   | 6             | V     |
| ESD per IEC 61000-4-2 (Air)                  | V <sub>ESD1</sub> | ±22           | kV    |
| ESD per IEC 61000-4-2 (Contact)              |                   | ±15           |       |
| Lead Soldering Temperature                   | T <sub>SOL</sub>  | 260 (10 sec.) | °C    |
| Operating Temperature                        | T <sub>OP</sub>   | -55 to +125   | °C    |
| Storage Temperature                          | T <sub>STO</sub>  | -55 to +150   | °C    |

| ELECTRICAL CHARACTERISTICS |                   |                                           |      |      |      |       |
|----------------------------|-------------------|-------------------------------------------|------|------|------|-------|
| PARAMETER                  | SYMBOL            | CONDITIONS                                | MINI | TYP  | MAX  | UNITS |
| Reverse Stand-Off Voltage  | V <sub>RWM</sub>  | T=25 °C.                                  |      |      | 5    | V     |
| Reverse Leakage Current    | I <sub>Leak</sub> | V <sub>RWM</sub> = 5V, T=25 °C.           |      |      | 2.5  | μA    |
| Reverse Breakdown Voltage  | V <sub>BV</sub>   | I <sub>BV</sub> = 1mA, T=25 °C.           | 6.1  |      | 9    | V     |
| Clamping Voltage           | V <sub>CL</sub>   | I <sub>PP</sub> =5A, tp=8/20us, T=25 °C.  |      | 7    | 8    | V     |
| Clamping Voltage           | V <sub>CL</sub>   | I <sub>PP</sub> =7A, tp=8/20us, T=25 °C.  |      | 8    | 9    | V     |
| ESD Holding Voltage        | V <sub>hold</sub> | IEC 61000-4-2 6kV, T=25 °C, Contact mode. |      | 10.5 |      | V     |
| Channel Input Capacitance  | C <sub>IN</sub>   | V <sub>R</sub> = 0V, f = 1MHz, T=25 °C.   |      | 14   | 16.5 | pF    |

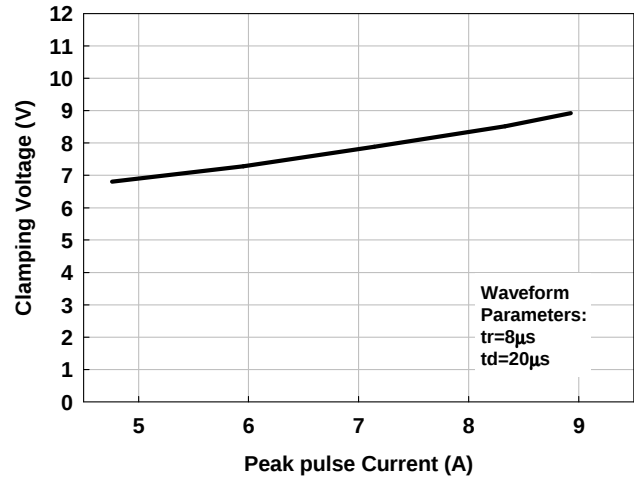


## Typical Characteristics

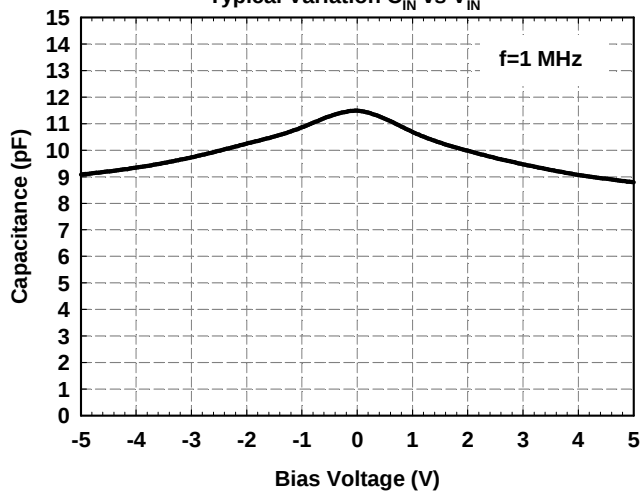
Pulse Waveform



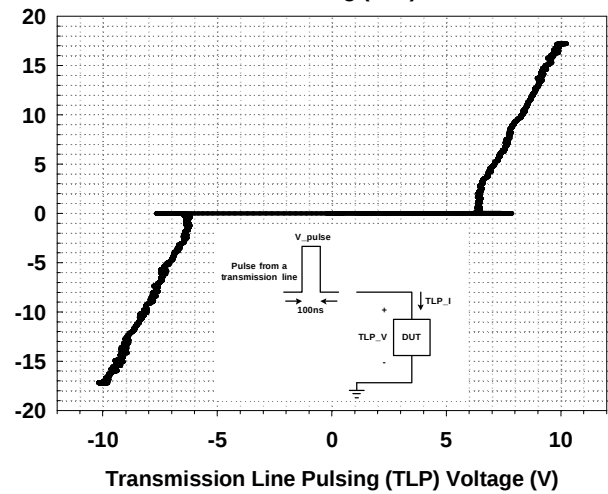
Clamping Voltage vs. Peak Pulse Current



Typical Variation  $C_{IN}$  vs  $V_{IN}$



Transmission Line Pulsing (TLP) Measurement



## Applications Information

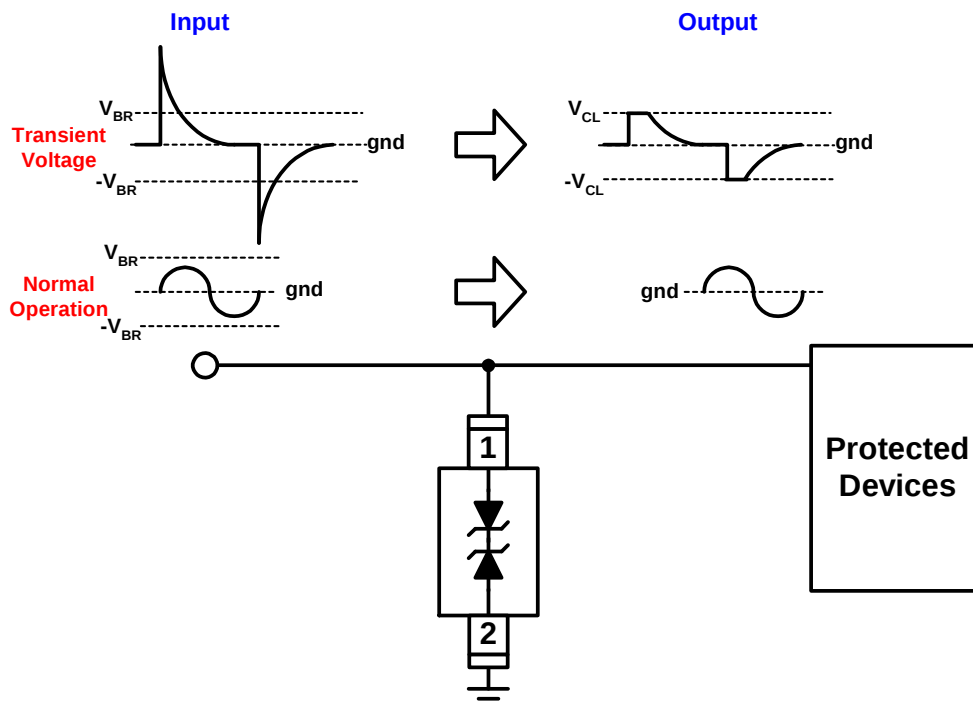
The AZ2225-01L is designed to protect one line against System ESD/EFT/Lightning pulses by clamping them to an acceptable reference. It provides bi-directional protection.

The usage of the AZ2225-01L is shown in Fig. 1. Protected line, such as data lines, control lines, or power lines, is connected at pin 1. The pin 2 is connected to a ground plane on the board. Since AZ2225-01L is bi-directional, these connections can be reversed (protected line to pin 2, ground to pin 1). In order to minimize parasitic inductance in the board traces, all path lengths connected to the pins of AZ2225-01L should be kept as short as possible.

In order to obtain enough suppression of ESD induced transient, good circuit board is critical.

Thus, the following guidelines are recommended:

- Minimize the path length between the protected lines and the AZ2225-01L.
- Place the AZ2225-01L near the input terminals or connectors to restrict transient coupling.
- The ESD current return path to ground should be kept as short as possible.
- Use ground planes whenever possible.
- NEVER route critical signals near board edges and near the lines which the ESD transient easily injects to.



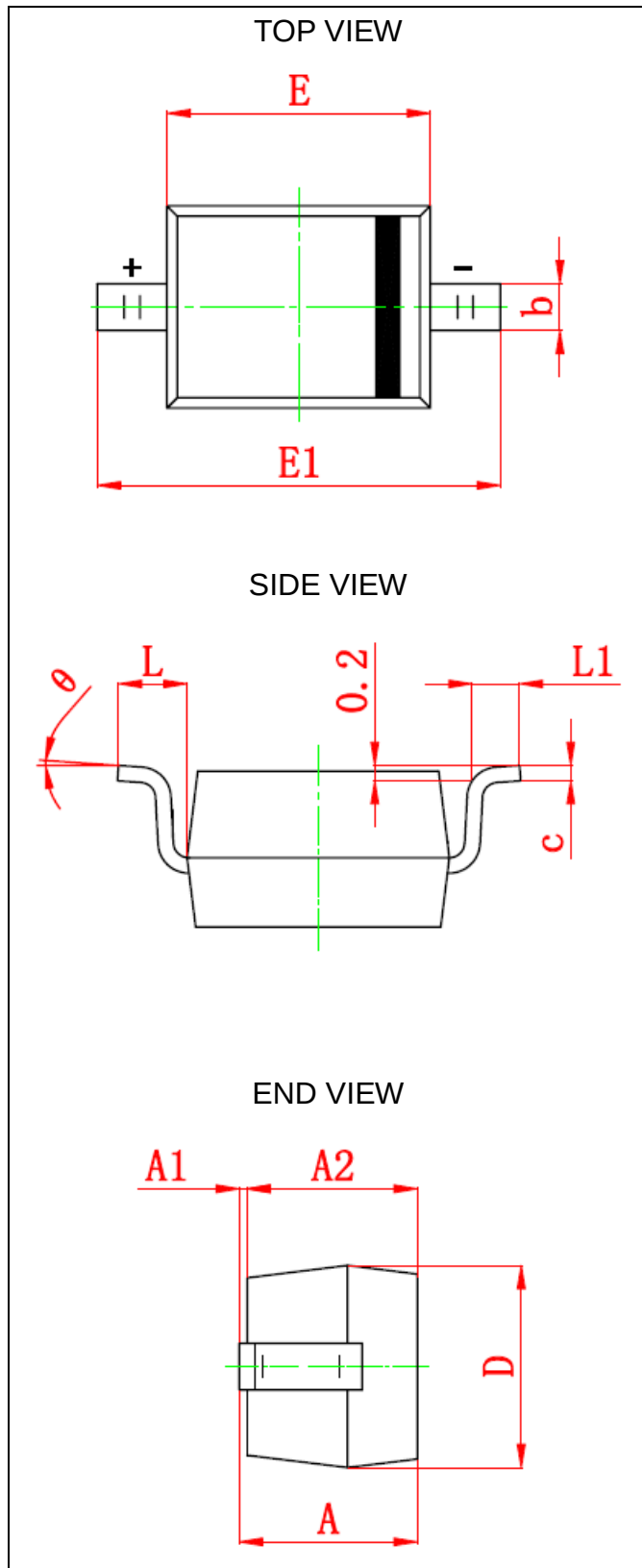
**Fig. 1**



## Mechanical Details

### SOD-323

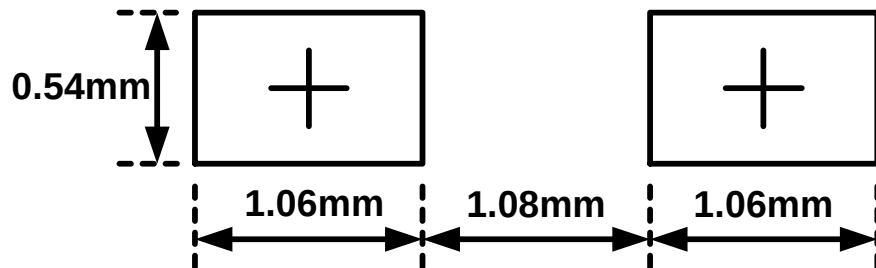
#### PACKAGE DIAGRAMS



#### PACKAGE DIMENSIONS

| Symbol   | Millimeters |      | Inches    |       |
|----------|-------------|------|-----------|-------|
|          | MIN.        | MAX. | MIN.      | MAX.  |
| A        | 0.8         | 1.0  | 0.031     | 0.039 |
| A1       | 0           | 0.1  | 0.000     | 0.004 |
| A2       | 0.8         | 0.9  | 0.031     | 0.035 |
| b        | 0.25        | 0.35 | 0.010     | 0.014 |
| C        | 0.08        | 0.15 | 0.003     | 0.006 |
| D        | 1.2         | 1.4  | 0.047     | 0.055 |
| E        | 1.6         | 1.8  | 0.063     | 0.071 |
| E1       | 2.5         | 2.7  | 0.098     | 0.106 |
| L        | 0.475REF    |      | 0.019 REF |       |
| L1       | 0.25        | 0.4  | 0.010     | 0.016 |
| $\theta$ | 0°          | 8°   | 0°        | 8°    |

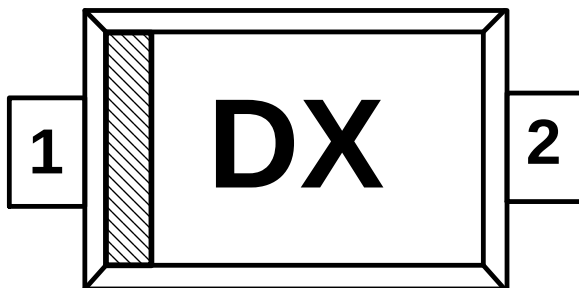
## LAND LAYOUT



Notes:

This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

## MARKING CODE



D = Device Code  
 X = Date Code

| Part Number                | Marking Code |
|----------------------------|--------------|
| AZ2225-01L                 | DX           |
| AZ2225-01L<br>(Green part) | dX           |

Note : Pin-1 and Pin-2 are identical and can be swapped.

## Ordering Information

| PN#            | Material | Type | Reel size | MOQ/interal box   | MOQ/carton          |
|----------------|----------|------|-----------|-------------------|---------------------|
| AZ2225-01L.R7G | Green    | T/R  | 7 inch    | 4 reel=12,000/box | 6 box=72,000/carton |



## Revision History

| Revision            | Modification Description                                                                             |
|---------------------|------------------------------------------------------------------------------------------------------|
| Revision 2008/08/14 | Original Release.                                                                                    |
| Revision 2008/09/29 | Add the marking code for Green part.                                                                 |
| Revision 2008/11/26 | Add the anode indication bar at the mark.                                                            |
| Revision 2008/12/26 | Update the PACKAGE DIMENSIONS.                                                                       |
| Revision 2011/06/18 | 1. Update the Company Logo.<br>2. Add the Ordering Information.<br>3. Update the Package Dimensions. |
|                     |                                                                                                      |
|                     |                                                                                                      |