

## Features

- ESD protection for one line with bi-directional
- Provide transient protection for one line to  
**IEC 61000-4-2 (ESD) ±18kV (air), ±18kV (contact)**  
**IEC 61000-4-4 (EFT) 50A (5/50ns)**  
**Cable Discharge Event (CDE)**
- Suitable for, **3.3V and below**, operating voltage applications
- **01005 small CSP package** saves board space
- Protect one I/O line or one power line
- Fast turn-on and low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- **Green part**

## Applications

- Mobile phones
- Hand held portable applications
- Computer interfaces protection
- Microprocessors protection
- Serial and parallel port protection
- Control signal lines protection
- Power lines on PCB protection
- Fingerprint

## Description

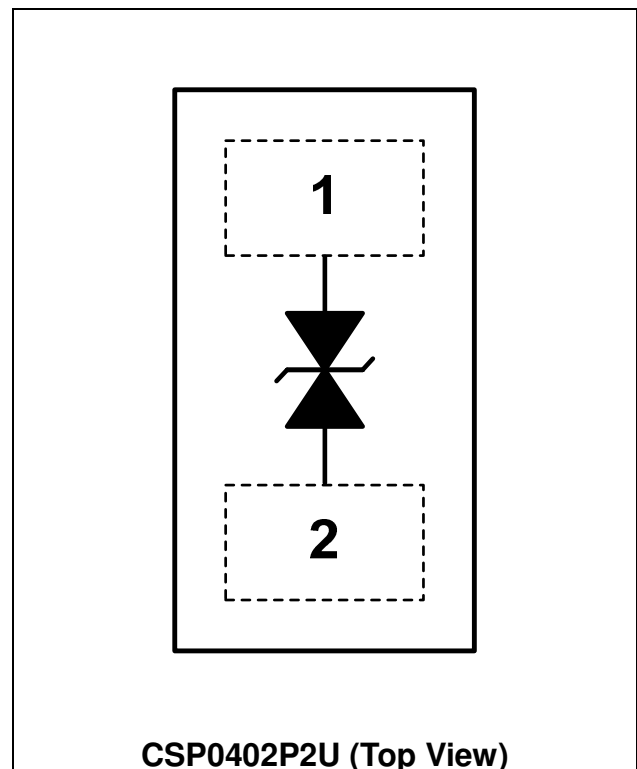
AZ5C23-01B is a design which includes one bi-directional ESD rated clamping cell to protect one power line, or one control line, or one low-speed data line in an electronic system. The AZ5C23-01B has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage and latch-up caused by Electrostatic Discharging (ESD), Electrical Fast

Transients (EFT), and Cable Discharge Event (CDE).

AZ5C23-01B is a unique design which includes proprietary clamping cell in a single package. During transient conditions, the proprietary clamping cell prevents over-voltage on the power line or control/data lines, protecting any downstream components.

AZ5C23-01B may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

## Circuit Diagram / Pin Configuration





## SPECIFICATIONS

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified) |             |               |                  |
|---|-------------|---------------|------------------|
| PARAMETER   | SYMBOL      | RATING        | UNIT             |
| Operating Supply Voltage  | $V_{DC}$    | $\pm 3.6$     | V                |
| ESD per IEC 61000-4-2 (Air)   | $V_{ESD-1}$ | $\pm 18$      | kV               |
| ESD per IEC 61000-4-2 (Contact)   | $V_{ESD-2}$ | $\pm 18$      |                  |
| Lead Soldering Temperature  | $T_{SOL}$   | 260 (10 sec.) | $^\circ\text{C}$ |
| Operating Temperature   | $T_{OP}$    | -55 to +125   | $^\circ\text{C}$ |
| Storage Temperature   | $T_{STO}$   | -55 to +150   | $^\circ\text{C}$ |

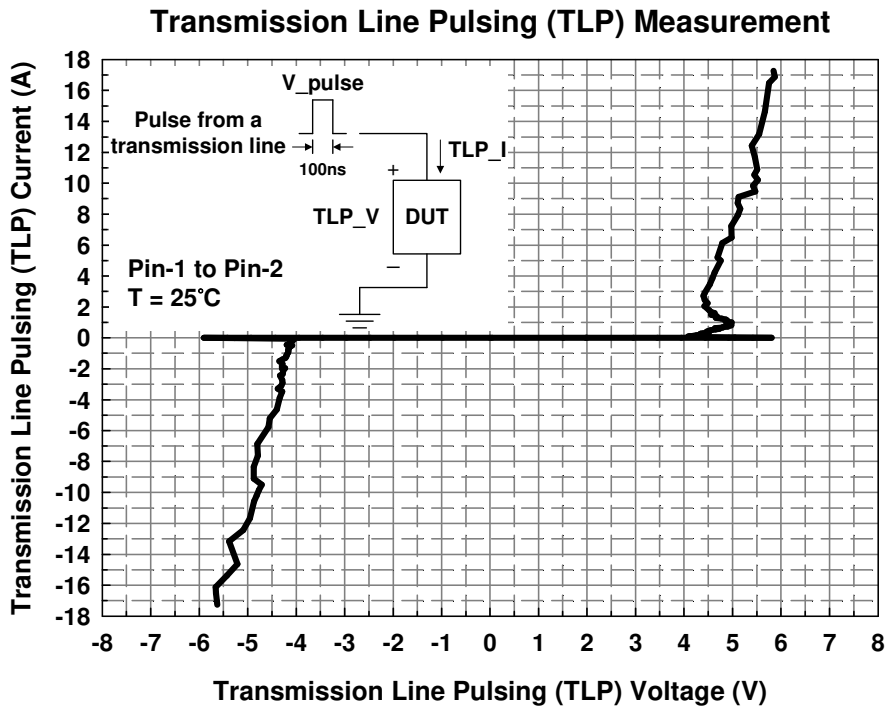
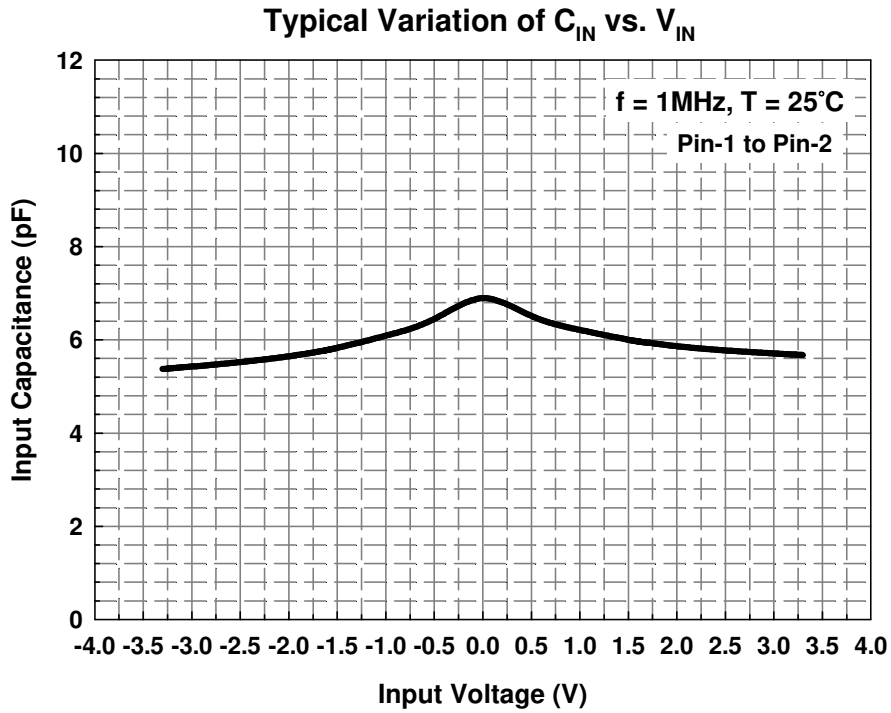
| ELECTRICAL CHARACTERISTICS     |               |   |      |     |     |          |
|--------------------------------|---------------|---|------|-----|-----|----------|
| PARAMETER                      | SYMBOL        | CONDITION   | MIN  | TYP | MAX | UNIT     |
| Reverse Stand-Off Voltage      | $V_{RWM}$     | $T = 25^\circ\text{C}$ .  | -3.3 |     | 3.3 | V        |
| Reverse Leakage Current        | $I_{Leak}$    | $V_{RWM} = \pm 3.3\text{V}$ , $T = 25^\circ\text{C}$ .                                |      |     | 100 | nA       |
| Reverse Breakdown Voltage      | $V_{BV}$      | $I_{BV} = 1\text{mA}$ , $T = 25^\circ\text{C}$ .                                      | 4.0  |     | 6.8 | V        |
| ESD Clamping Voltage (Note 1)  | $V_{CL-ESD}$  | IEC 61000-4-2 +8kV ( $I_{TLP} = 16\text{A}$ ), Contact mode, $T = 25^\circ\text{C}$ . |      | 5.8 |     | V        |
| ESD Dynamic Turn-on Resistance | $R_{dynamic}$ | IEC 61000-4-2 0~+8kV, Contact mode, $T = 25^\circ\text{C}$ .                          |      | 0.1 |     | $\Omega$ |
| Channel Input Capacitance      | $C_{IN}$      | $V_R = 0\text{V}$ , $f = 1\text{MHz}$ , $T = 25^\circ\text{C}$ .                      |      | 7   | 10  | pF       |

Note 1: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

TLP conditions:  $Z_0 = 50\Omega$ ,  $t_p = 100\text{ns}$ ,  $t_r = 1\text{ns}$ .



## Typical Characteristics





## Application Information

The AZ5C23-01B is designed to protect one line against system ESD/EFT/Cable Discharge pulses by clamping it to an acceptable reference. It provides bi-directional protection.

The usage of the AZ5C23-01B is shown in Fig. 1. Protected line, such as data line, control line, or power line, is connected at pin 1. The pin 2 is connected to a ground plane on the board. In order to minimize parasitic inductance in the board traces, all path lengths connected to the pins of AZ5C23-01B should be kept as short as possible.

In order to obtain enough suppression of ESD induced transient, a good circuit board is critical. Thus, the following guidelines are recommended:

- Minimize the path length between the protected lines and the AZ5C23-01B.
- Place the AZ5C23-01B 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.

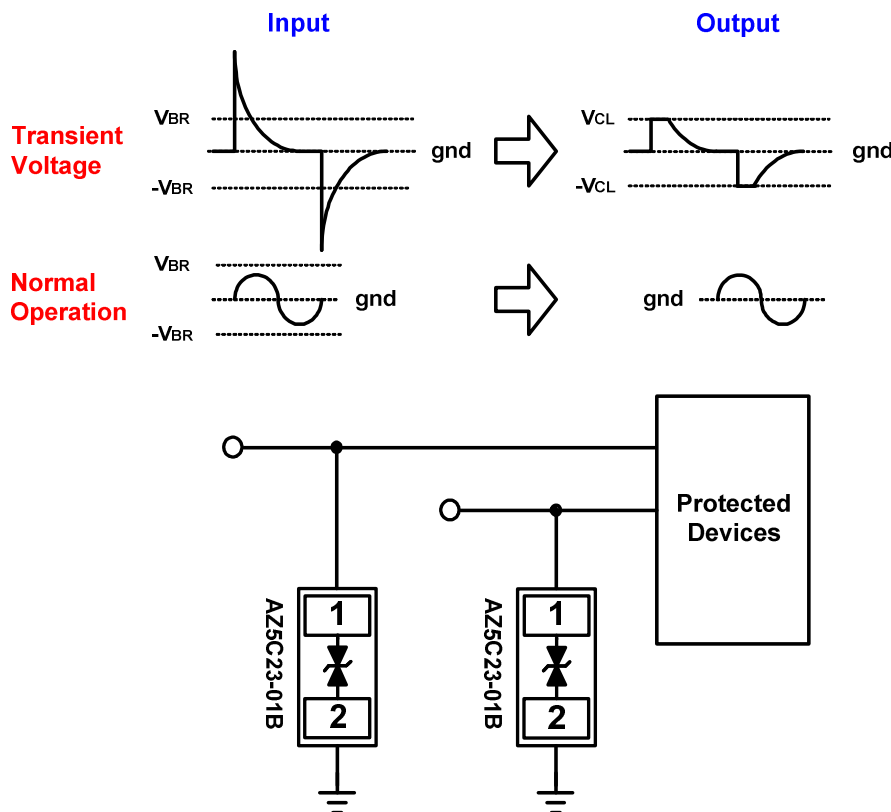
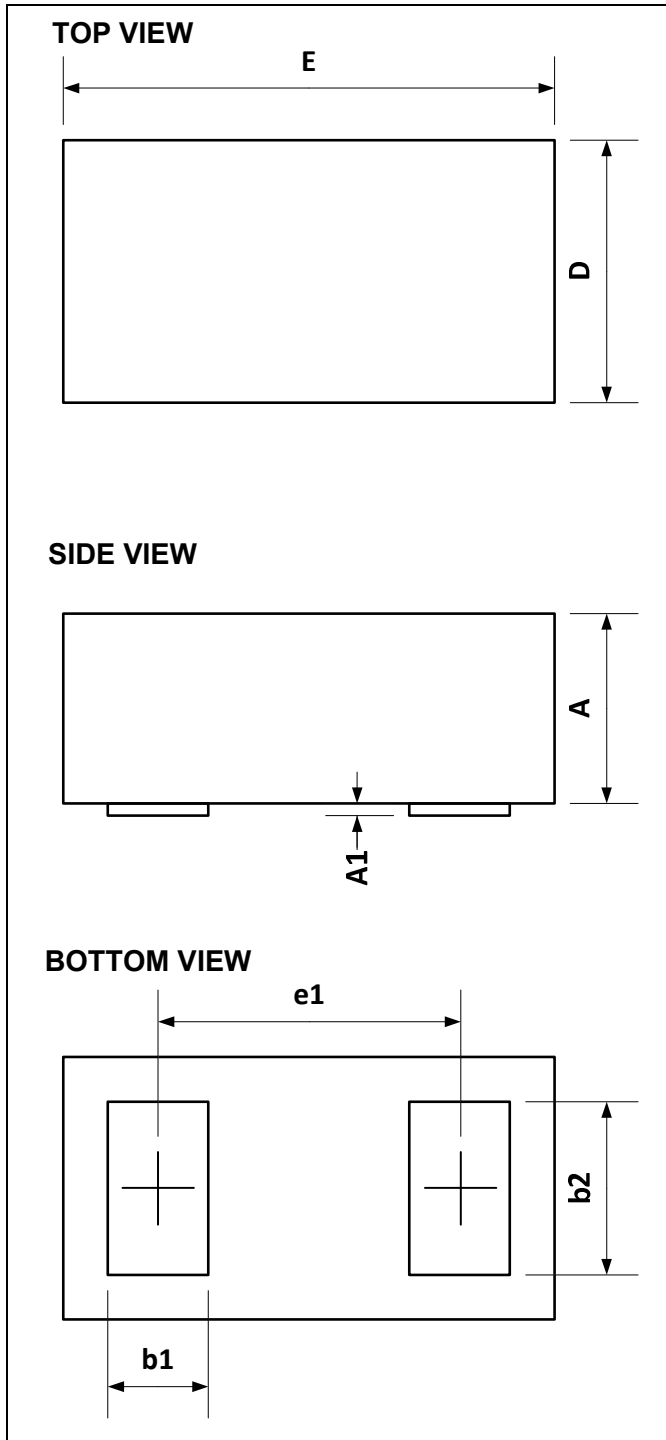


Fig. 1 ESD protection scheme by using AZ5C23-01B

## Mechanical Details

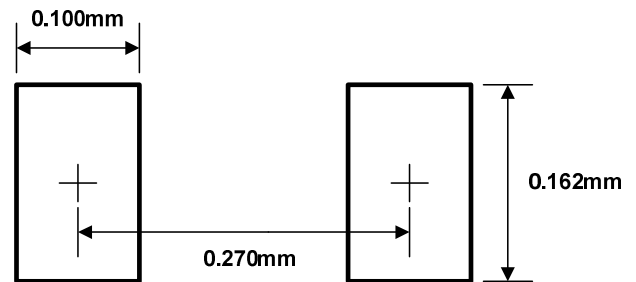
### CSP0402P2U PACKAGE DIAGRAMS



## PACKAGE DIMENSIONS

| SYMBOL    | MILLIMETERS |       |       |
|-----------|-------------|-------|-------|
|           | MIN.        | NOM.  | MAX.  |
| <b>E</b>  | 0.415       | 0.440 | 0.465 |
| <b>D</b>  | 0.210       | 0.235 | 0.260 |
| <b>A</b>  | 0.145       | 0.170 | 0.195 |
| <b>A1</b> | 0.008       | 0.011 | 0.014 |
| <b>b1</b> | 0.084       | 0.090 | 0.096 |
| <b>b2</b> | 0.149       | 0.155 | 0.161 |
| <b>e1</b> | 0.270BSC    |       |       |

## LAND LAYOUT


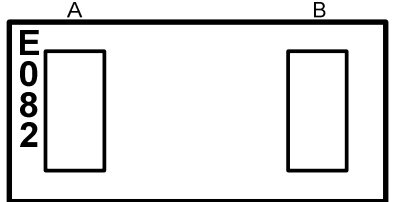


### Notes:

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

| Part Number                    | Marking Index  | Device Code and Location   |
|--------------------------------|--|--|
| AZ5C23-01B.R7G<br>(Green Part) |  <p>(Top View Side)</p> |  <p>(Bottom View Side)</p> |

Notes

- Green means Pb-free, RoHS, and Halogen free compliant.
- The marking index is on the top view side of the device. The device code is on the pad side (bottom view side).

### Ordering Information

| PN#            | Material | Type | Reel size | MOQ         | MOQ/internal box     | MOQ/carton               |
|----------------|----------|------|-----------|-------------|----------------------|--------------------------|
| AZ5C23-01B.R7G | Green    | T/R  | 7 inch    | 15,000/reel | 4 reels = 60,000/box | 6 boxes = 360,000/carton |

### Revision History

| Revision            | Modification Description |
|---------------------|--------------------------|
| Revision 2018/03/13 | Formal Release.          |
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