

Features

- ESD/EFT/Surge protection for one line with bi-direction
- Provide transient protection for one line to
IEC 61000-4-2 (ESD) $\pm 16\text{kV}$ (air) / $\pm 13\text{kV}$ (contact)
IEC 61000-4-4 (EFT) 50A (5/50ns)
IEC 61000-4-5 (Lightning) 10A (8/20 μs)
- Suitable for, **5V 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
- Handheld portable applications
- Computer interfaces protection
- Microprocessors protection
- Serial and parallel port protection
- Control signal lines protection
- Power lines on PCB protection
- Latchup protection

Description

AZ5C25-01B 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 AZ5C25-01B has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage caused by Electrostatic

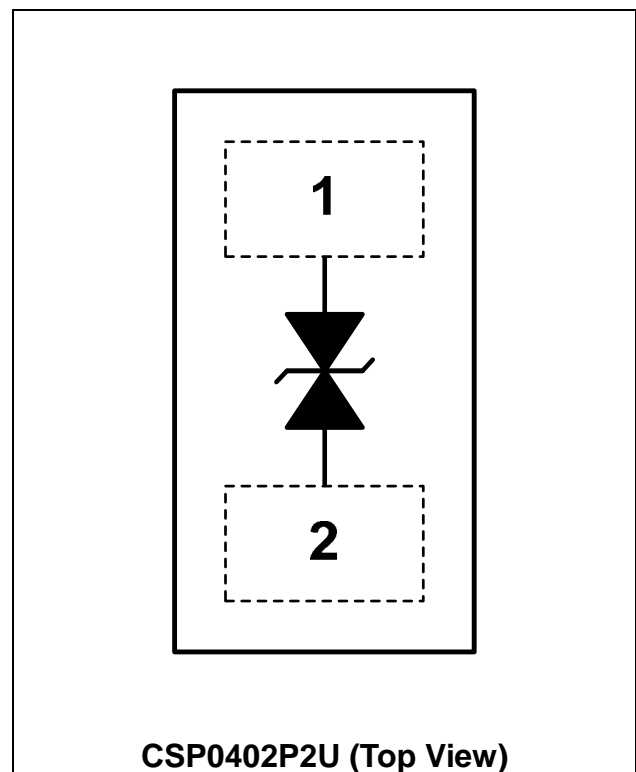
Discharging (ESD), Electrical Fast Transients (EFT), and Lightning.

AZ5C25-01B 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.

AZ5C25-01B is bi-direction and may be used on lines where the signal swings above and below ground.

AZ5C25-01B 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 ($T_A = 25^\circ\text{C}$, unless otherwise specified) | | | |
|---|-------------|---------------|------------------|
| PARAMETER | SYMBOL | RATING | UNIT |
| Peak Pulse Current ($t_p = 8/20\mu\text{s}$) | I_{PP} | 10 | A |
| Operating Voltage | V_{DC} | ± 5.5 | V |
| ESD per IEC 61000-4-2 (Air) | V_{ESD-1} | ± 16 | kV |
| ESD per IEC 61000-4-2 (Contact) | V_{ESD-2} | ± 13 | |
| 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} | $T = 25^\circ\text{C}$. | -5 | | 5 | V |
| Reverse Leakage Current | I_{Leak} | $V_{RWM} = \pm 5.0\text{V}$, $T = 25^\circ\text{C}$. | | | 100 | nA |
| Reverse Breakdown Voltage | V_{BV} | $I_{BV} = 1\text{mA}$, $T = 25^\circ\text{C}$. | 6 | | 9 | V |
| Surge Clamping Voltage | $V_{CL-surge}$ | $I_{PP} = 5\text{A}$, $t_p = 8/20\mu\text{s}$, $T = 25^\circ\text{C}$. | | 5.6 | | V |
| ESD Clamping Voltage (Note 1) | V_{CL-ESD} | IEC 61000-4-2 +8kV ($I_{TLP} = 16\text{A}$), contact mode, $T = 25^\circ\text{C}$. | | 6.0 | | V |
| ESD Dynamic Turn-on Resistance | $R_{dynamic}$ | IEC 61000-4-2 0~+8kV, contact mode, $T = 25^\circ\text{C}$. | | 0.03 | | Ω |
| Channel Input Capacitance | C_{IN} | $V_{IN} = 0\text{V}$, $f = 1\text{MHz}$, $T = 25^\circ\text{C}$. | | 14 | 18 | pF |

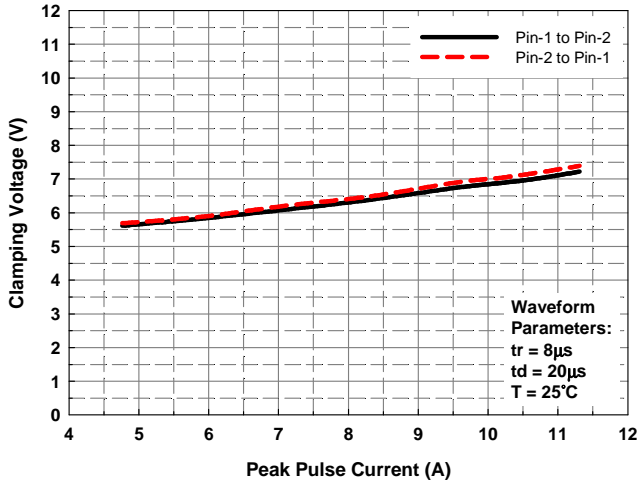
Note 1: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

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

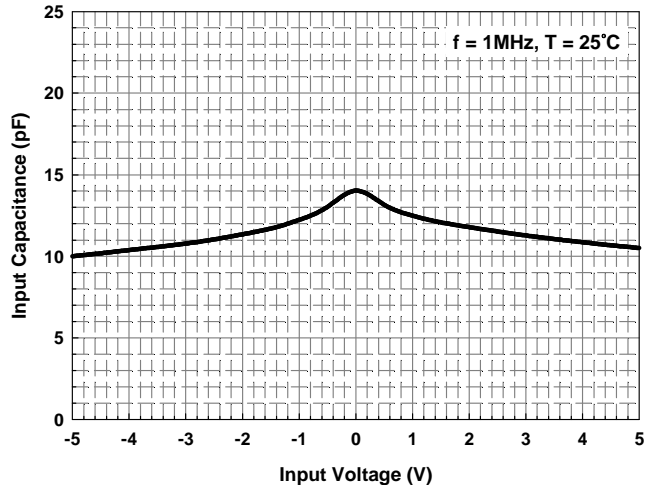


Typical Characteristics

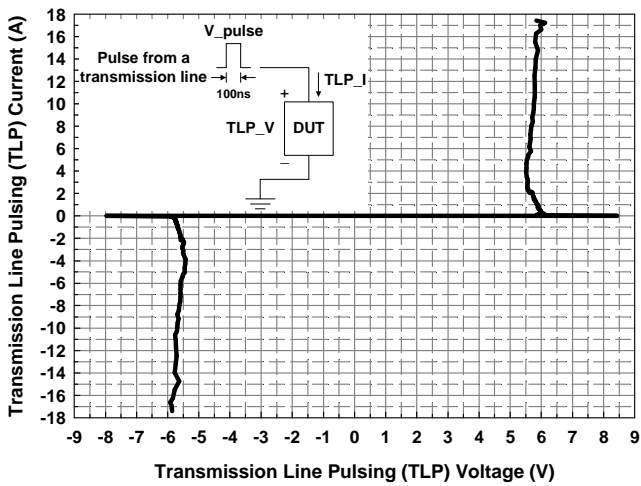
Reverse Clamping Voltage vs. Peak Pulse Current



Typical Variation of C_{IN} vs. V_{IN}



Transmission Line Pulsing (TLP) Measurement





Application Information

The AZ5C25-01B is designed to protect one line against system ESD/EFT/Lightning pulses by clamping it to an acceptable reference. It provides bi-directional protection.

The usage of the AZ5C25-01B 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 AZ5C25-01B 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 AZ5C25-01B.
- Place the AZ5C25-01B 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.

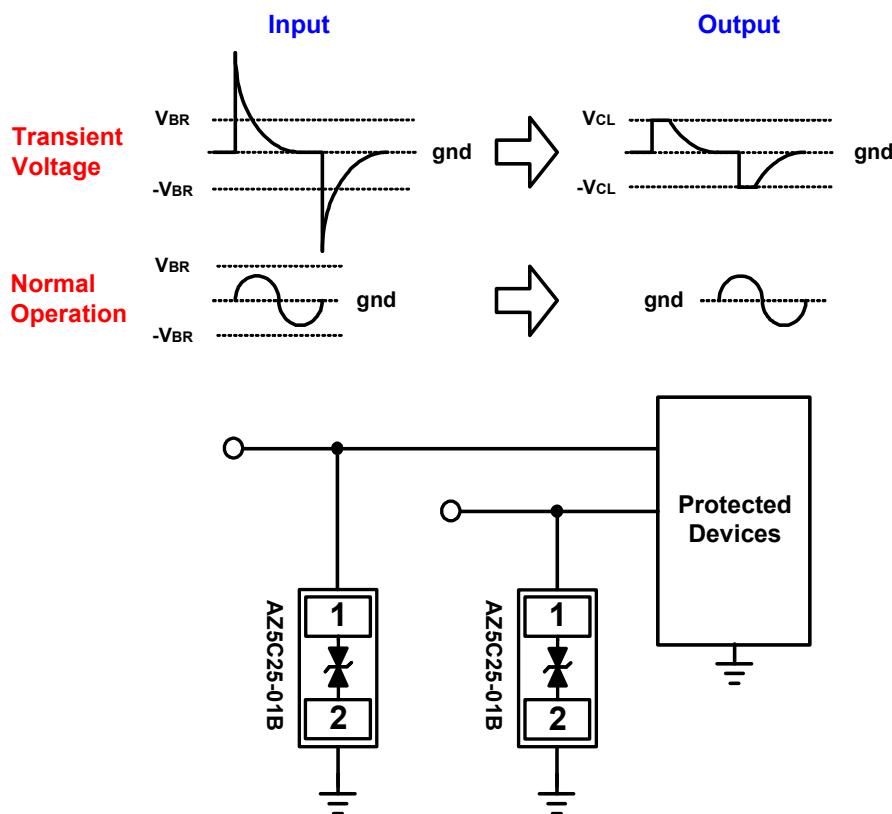


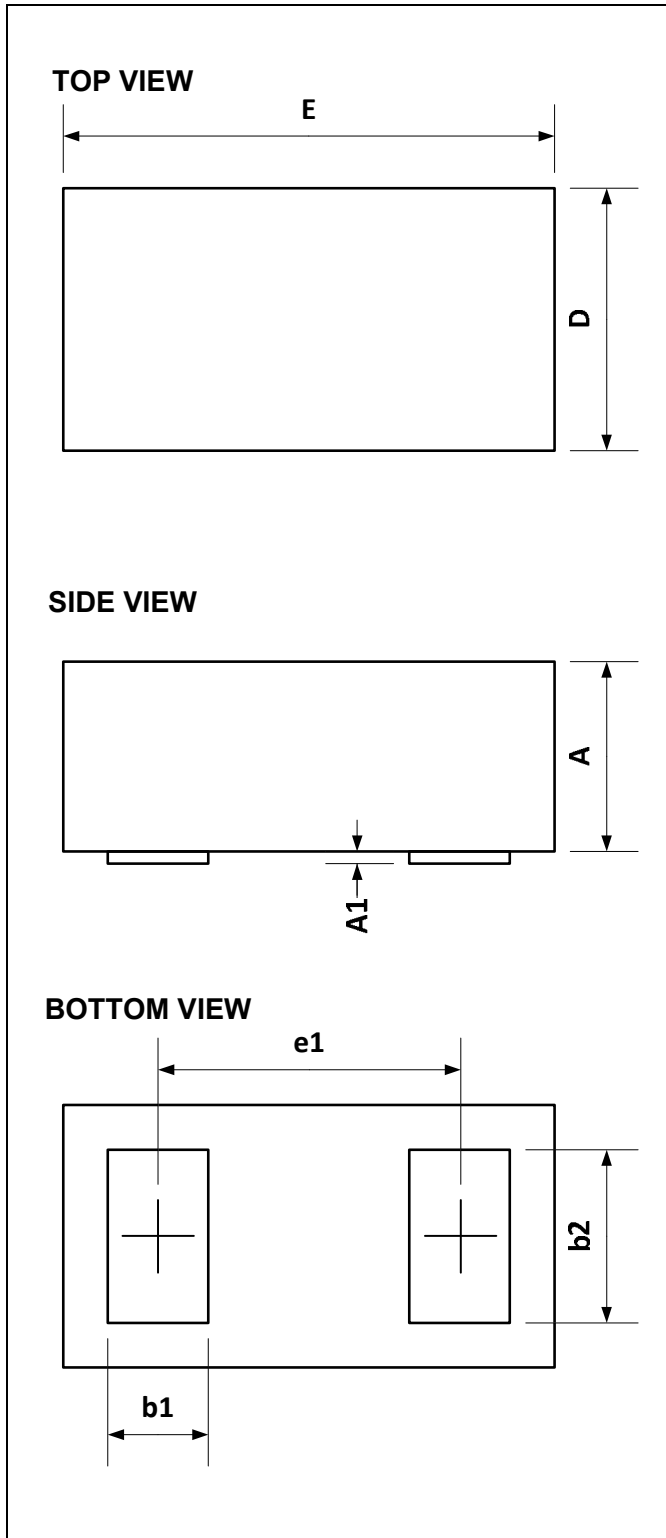
Fig. 1 ESD protection scheme by using AZ5C25-01B.



Mechanical Details

CSP0402P2U

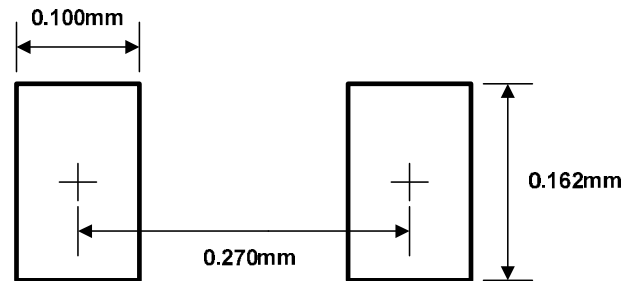
PACKAGE DIAGRAMS



PACKAGE DIMENSIONS

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

LAND LAYOUT

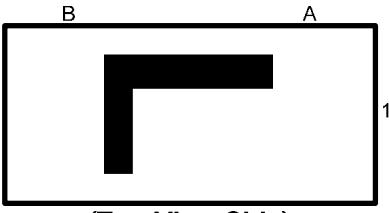
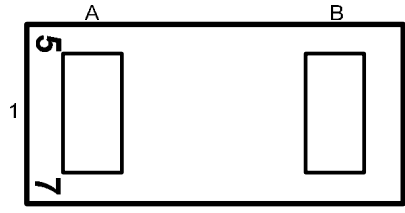


Notes:

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 |
|--------------------------------|--|---|
| AZ5C25-01B.R7G (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 |
|----------------|----------|------|-----------|-------------|----------------------|--------------------------|
| AZ5C25-01B.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 2019/09/25 | Formal Release. |
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