



**THE DATASHEET OF  
AZ2025-04S**





## Features

- ESD Protect for 4 Lines 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)
- Small SOT23-5L package saves board space
- Protect four I/O lines or four power lines
- Fast turn-on and Low clamping voltage
- Low operating voltage:  $< 5\text{V}$
- 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

AZ2025-04S is a design which includes four bi-directional surge rated clamping cells to protect four power lines, or four control lines, or four low speed data lines in an electronic systems. The AZ2025-04S 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).

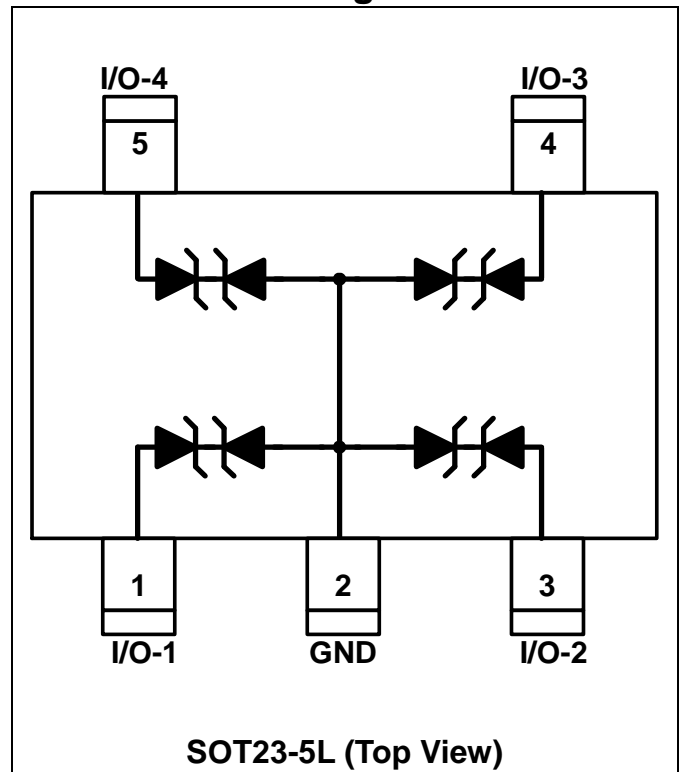
AZ2025-04S is a unique design which includes proprietary clamping cells in a single package. During transient conditions, the proprietary

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

AZ2025-04S is bi-directional and may be used on lines where the signal swings above and below ground.

AZ2025-04S 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

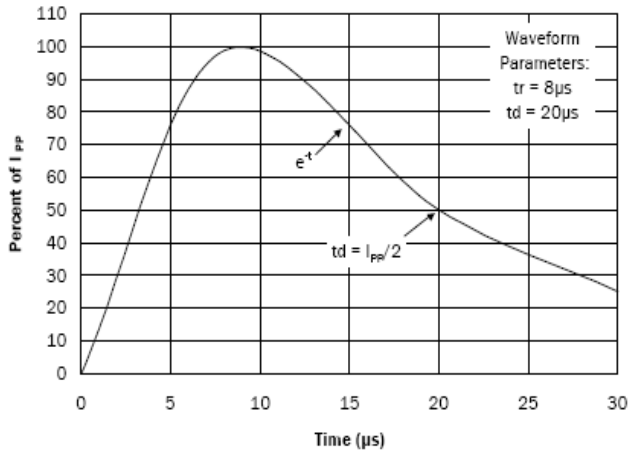
| ABSOLUTE MAXIMUM RATINGS                              |                    |               |       |
|---|--------------------|---------------|-------|
| PARAMETER   | PARAMETER          | RATING        | UNITS |
| Peak Pulse Current (tp =8/20us)                       | I <sub>PP</sub>    | 8.5           | A     |
| Operating Supply Voltage (Pin-1, -3, -4, -5 to Pin-2) | V <sub>DC</sub>    | 6             | V     |
| ESD per IEC 61000-4-2 (Air)                           | V <sub>ESD-1</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>  | Pin-1, -3, -4, -5 to Pin-2, T=25 °C                                   |      |      | 5   | V     |
| Reverse Leakage Current    | I <sub>Leak</sub> | V <sub>RWM</sub> = 5V, T=25 °C. Pin-1, -3, -4, -5 to Pin-2.           |      |      | 2.5 | μA    |
| Reverse Breakdown Voltage  | V <sub>BV</sub>   | I <sub>BV</sub> = 1mA, T=25 °C. Pin-1, -3, -4, -5 to Pin-2.           | 6.1  |      | 9   | V     |
| Clamping Voltage           | V <sub>CL</sub>   | I <sub>PP</sub> =5A, tp=8/20us, T=25 °C. Pin-1, -3, -4, -5 to Pin-2.  |      | 7    | 8   | V     |
| Clamping Voltage           | V <sub>CL</sub>   | I <sub>PP</sub> =7A, tp=8/20us, T=25 °C. Pin-1, -3, -4, -5 to Pin-2.  |      | 8    | 9   | V     |
| ESD Holding Voltage        | V <sub>hold</sub> | IEC 61000-4-2 6kV, T=25 °C, Contact mode, Pin-1, -3, -4, -5 to Pin-2. |      | 10.5 |     | V     |
| Channel Input Capacitance  | C <sub>IN</sub>   | V <sub>R</sub> = 0V, f = 1MHz, T=25 °C. Pin-1, -3, -4, -5 to Pin-2.   |      | 12   | 15  | pF    |

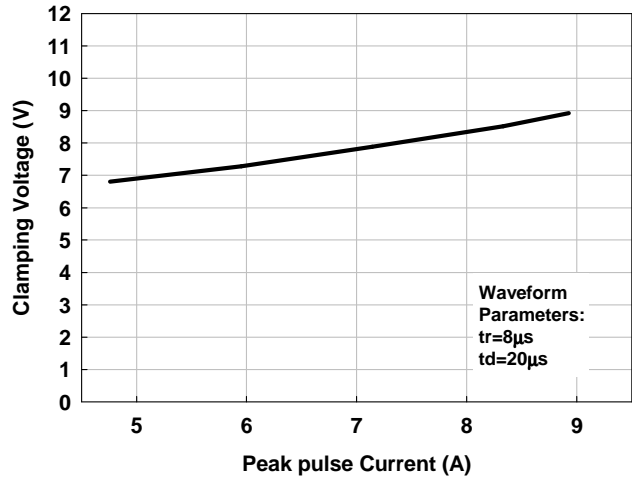


## Typical Characteristics

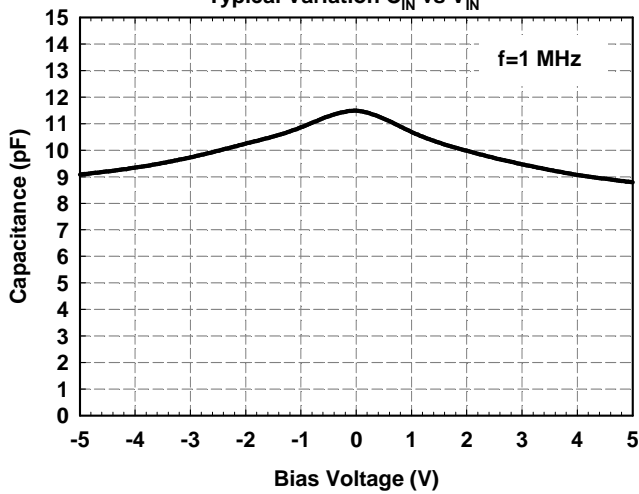
Pulse Waveform



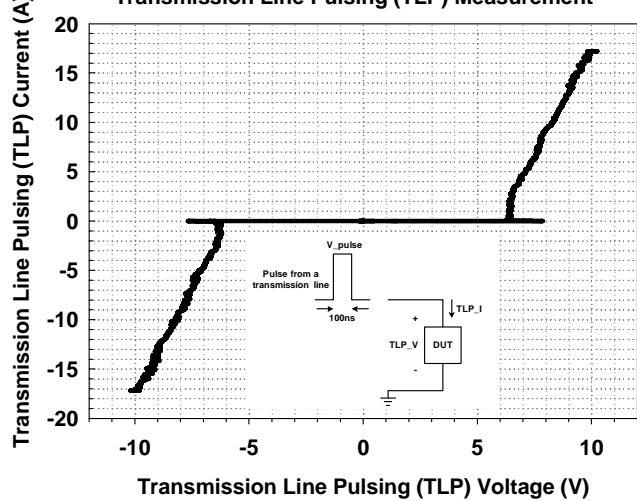
Clamping Voltage vs. Peak Pulse Current



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



Transmission Line Pulsing (TLP) Measurement



## Applications Information

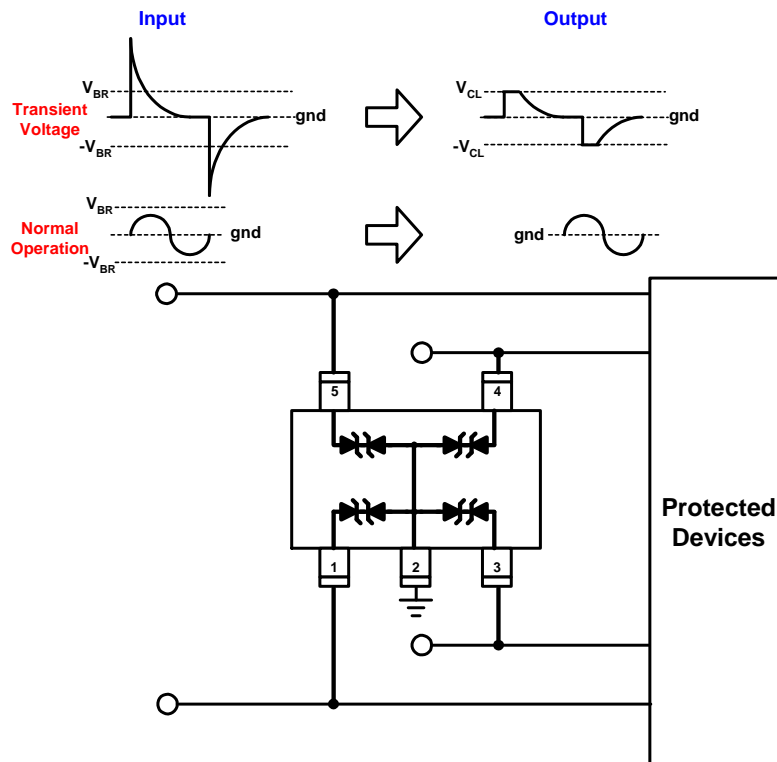
The AZ2025-04S is designed to protect four lines against System ESD/EFT/Lightning pulses by clamping them to an acceptable reference. It provides bi-directional protection.

The usage of the AZ2025-04S is shown in Fig. 1. Protected lines, such as data lines, control lines, or power lines, are connected at pin-1, -3, -4, and -5. The pin 2 is connected to a ground plane on the board. Since AZ2025-04S is bi-directional, these connections can be reversed (protected line to pin 2, ground to pin 1 or 3 or 4 or 5). In order to minimize parasitic inductance in the board traces, all path lengths connected to the pins of AZ2025-04S 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 AZ2025-04S.
- Place the AZ2025-04S 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.

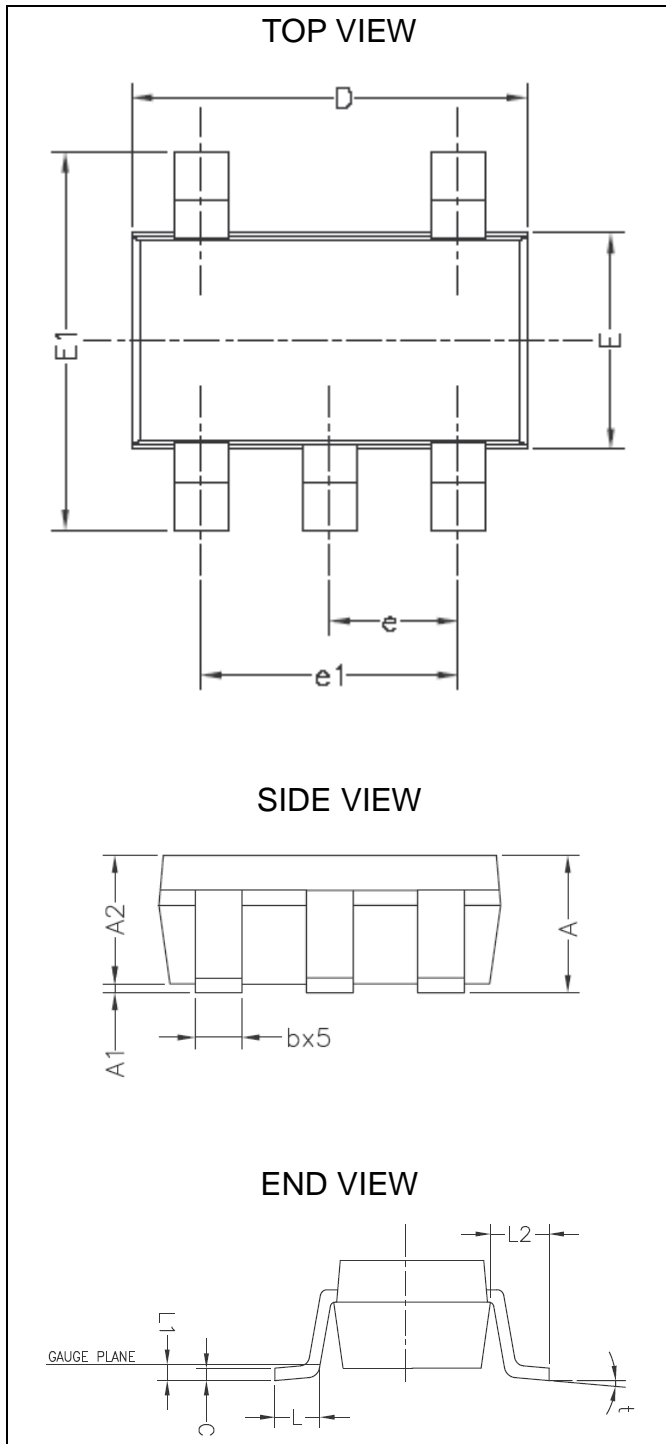


**Fig. 1**

## Mechanical Details

### SOT23-5L

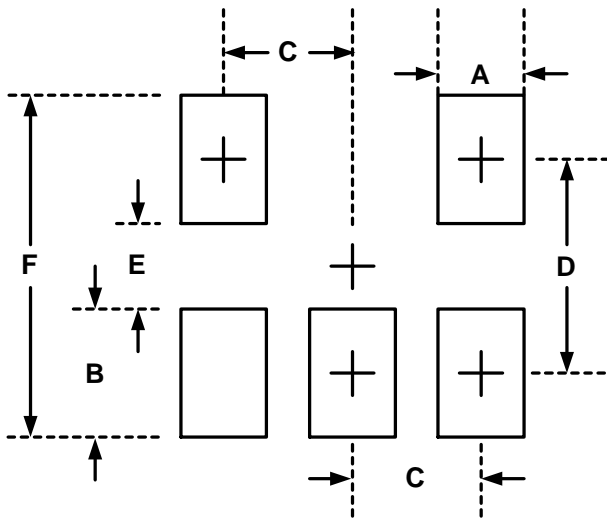
#### PACKAGE DIAGRAMS



#### PACKAGE DIMENSIONS

| Symbol    | Millimeters |      | Inches   |       |
|-----------|-------------|------|----------|-------|
|           | MIN.        | MAX. | MIN.     | MAX.  |
| <b>A</b>  | 0.95        | 1.45 | 0.037    | 0.057 |
| <b>A1</b> | 0           | 0.15 | 0.000    | 0.006 |
| <b>A2</b> | 0.9         | 1.3  | 0.035    | 0.051 |
| <b>b</b>  | 0.3         | 0.5  | 0.012    | 0.020 |
| <b>C</b>  | 0.08        | 0.21 | 0.003    | 0.008 |
| <b>D</b>  | 2.72        | 3.12 | 0.107    | 0.123 |
| <b>E</b>  | 1.4         | 1.8  | 0.055    | 0.071 |
| <b>E1</b> | 2.6         | 3    | 0.102    | 0.118 |
| <b>e</b>  | 0.95BSC     |      | 0.037BSC |       |
| <b>e1</b> | 1.8         | 2    | 0.071    | 0.079 |
| <b>L</b>  | 0.3         | 0.6  | 0.012    | 0.024 |
| <b>L1</b> | 0.2BSC      |      | 0.008BSC |       |
| <b>L2</b> | 0.6REF      |      | 0.024REF |       |
| <b>ϕ</b>  | 0           | 8    | 0        | 8     |

## LAND LAYOUT

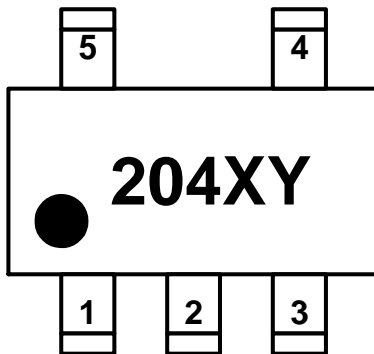


| Dimensions |            |        |
|------------|------------|--------|
| Index      | Millimeter | Inches |
| A          | 0.60       | 0.024  |
| B          | 1.10       | 0.043  |
| C          | 0.95       | 0.037  |
| D          | 2.50       | 0.098  |
| E          | 1.40       | 0.055  |
| F          | 3.60       | 0.141  |

### 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



204 = Device Code  
X = Date Code  
Y = Control Code

| Part Number                        | Marking Code |
|------------------------------------|--------------|
| AZ2025-04S                         | 204XY        |
| <b>AZ2025-04S<br/>(Green part)</b> | <b>222XY</b> |

## Ordering Information

| PN#            | Material | Type | Reel size | MOQ/interal box   | MOQ/carton          |
|----------------|----------|------|-----------|-------------------|---------------------|
| AZ2025-04S.R7G | Green    | T/R  | 7 inch    | 4 reel=12,000/box | 6 box=72,000/carton |



## Revision History

| Revision            | Modification Description  |
|---------------------|---|
| Revision 2007/08/08 | Original Release.   |
| Revision 2008/09/29 | Add the marking code for Green part.                            |
| Revision 2008/12/26 | Update the PACKAGE DIMENSIONS.                                  |
| Revision 2008/12/29 | Correct the typo at $V_{DC}$ .                                  |
| Revision 2011/06/18 | 1. Update the Company Logo.<br>2. Add the Ordering Information. |
|                     |   |
|                     |   |

## Looking for pricing, stock, or lifecycle information?

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