## Features

- ESD Protect for 4 Lines with Bi-directional
- Provide ESD protection for the protected line to
  **IEC 61000-4-2 (ESD) ±20kV (air), ±12kV (contact)**
  **IEC 61000-4-4 (EFT) 40A (5/50ns)**
  **IEC 61000-4-5 (Lightning) 7A (8/20μs)**
  **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: < 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

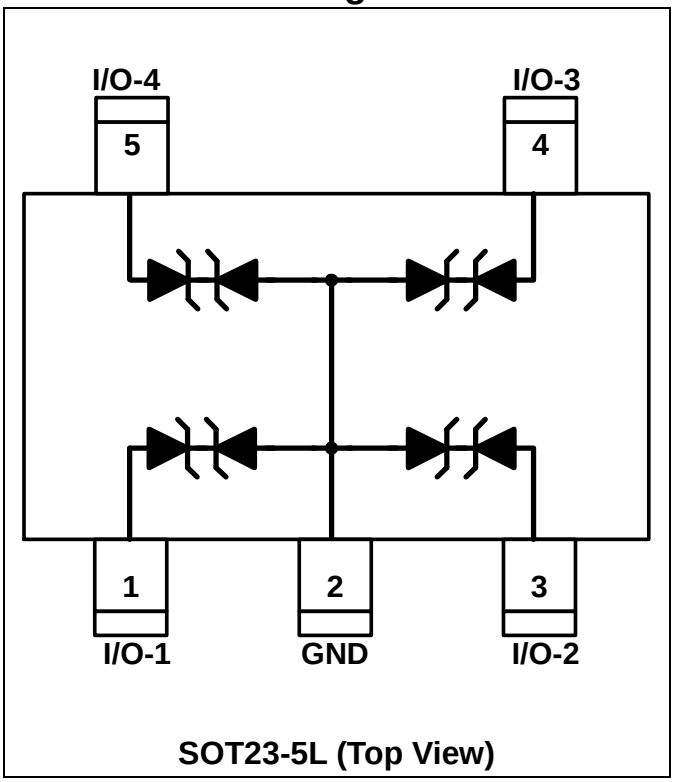
AZ2025-04S is a design which includes four bi-directional surge rated clamping cells to protect four power lines, or four control lines, or four low speed data lines in an electronic systems. The AZ2025-04S has been specifically designed to protect sensitive components which are connected to power and 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 (±15kV air, ±8kV contact discharge).

## Circuit Diagram / Pin Configuration



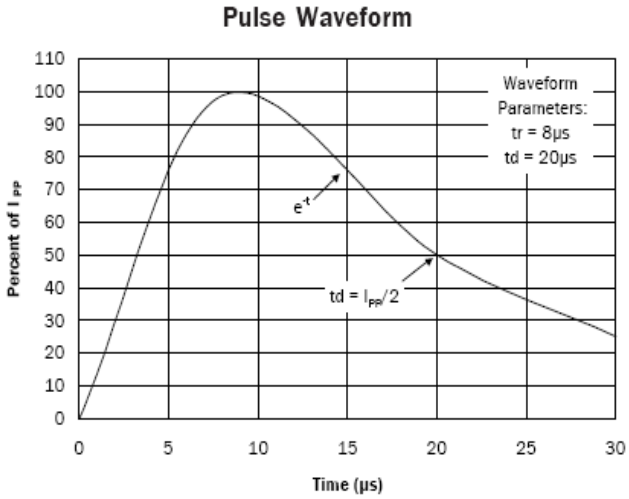

**SOT23-5L (Top View)**

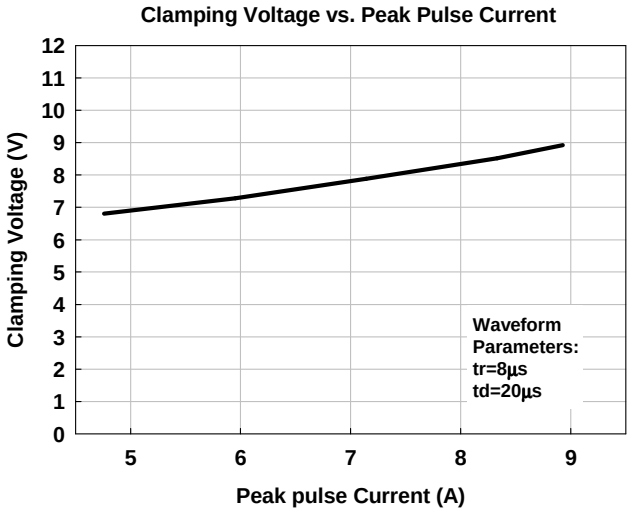
## SPECIFICATIONS

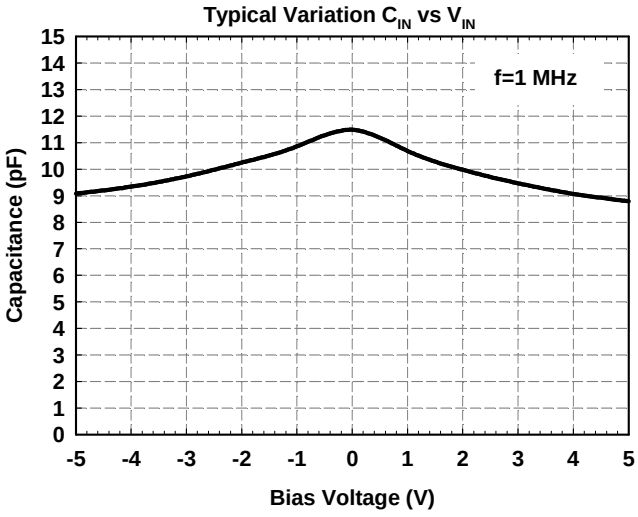
| ABSOLUTE MAXIMUM RATINGS | | | |
|---|---|---|---|
| **PARAMETER** | **PARAMETER** | **RATING** | **UNITS** |
| Peak Pulse Current (tp =8/20us) | $I_{PP}$ | 8.5 | A |
| Operating Supply Voltage (Pin-1, -3, -4, -5 to Pin-2) | $V_{DC}$ | 6 | V |
| ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $V_{ESD-1}$ | ±22<br>±15 | kV |
| Lead Soldering Temperature | $T_{SOL}$ | 260 (10 sec.) | °C |
| Operating Temperature | $T_{OP}$ | -55 to +125 | °C |
| Storage Temperature | $T_{STO}$ | -55 to +150 | °C |

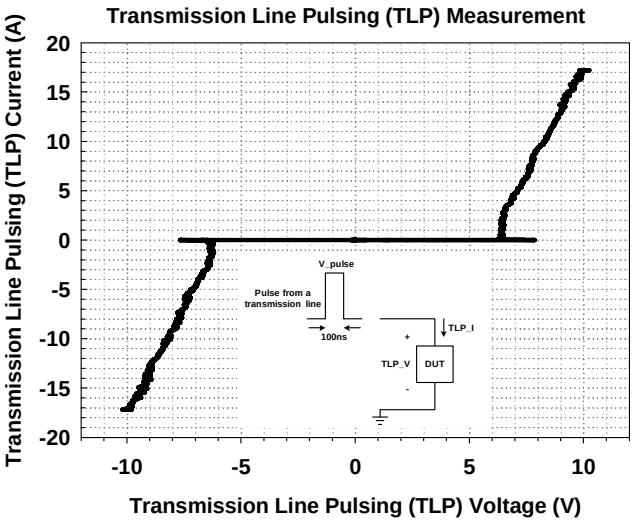
| ELECTRICAL CHARACTERISTICS | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **CONDITIONS** | **MINI** | **TYP** | **MAX** | **UNITS** |
| Reverse Stand-Off Voltage | $V_{RWM}$ | Pin-1, -3, -4, -5 to Pin-2, T=25 °C | | | 5 | V |
| Reverse Leakage Current | $I_{Leak}$ | $V_{RWM}$ = 5V, T=25 °C. Pin-1, -3, -4, -5 to Pin-2. | | | 2.5 | µA |
| Reverse Breakdown Voltage | $V_{BV}$ | $I_{BV}$ = 1mA, T=25 °C. Pin-1, -3, -4, -5 to Pin-2. | 6.1 | | 9 | V |
| Clamping Voltage | $V_{CL}$ | $I_{PP}$=5A, tp=8/20us, T=25 °C. Pin-1, -3, -4, -5 to Pin-2. | | 7 | 8 | V |
| Clamping Voltage | $V_{CL}$ | $I_{PP}$=7A, tp=8/20us, T=25 °C. Pin-1, -3, -4, -5 to Pin-2. | | 8 | 9 | V |
| ESD Holding Voltage | $V_{hold}$ | IEC 61000-4-2 6kV, T=25 °C, Contact mode, Pin-1, -3, -4, -5 to Pin-2. | | 10.5 | | V |
| Channel Input Capacitance | $C_{IN}$ | $V_R$= 0V, f = 1MHz, T=25 °C. Pin-1, -3, -4, -5 to Pin-2. | | 12 | 15 | pF |

## Typical Characteristics



## 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.

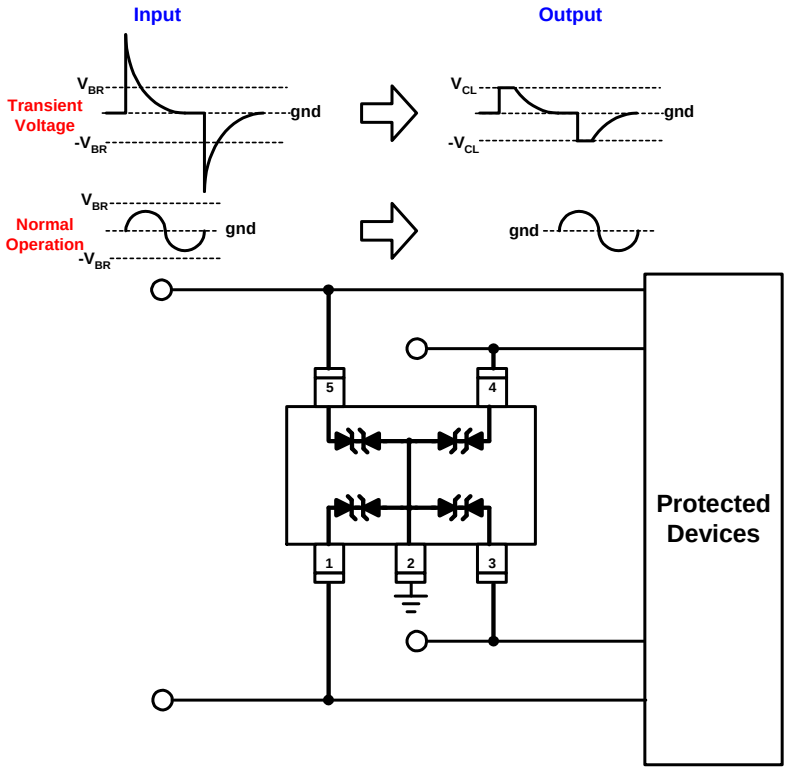


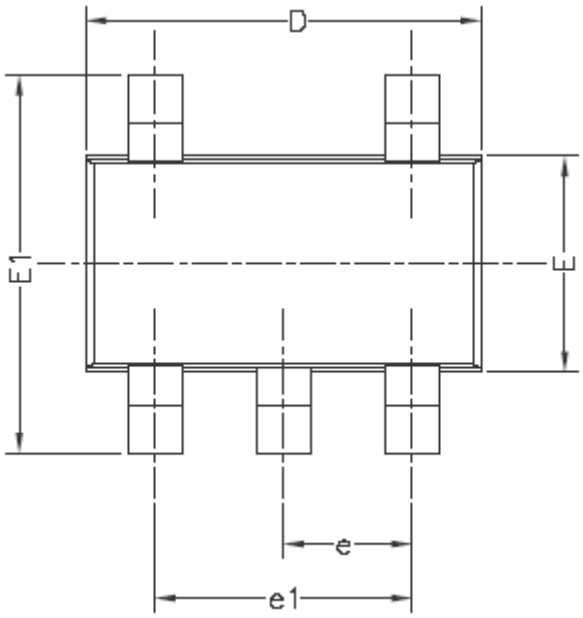

**Fig. 1**

## Mechanical Details

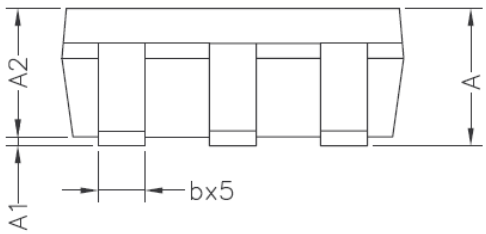
**SOT23-5L**

PACKAGE DIAGRAMS

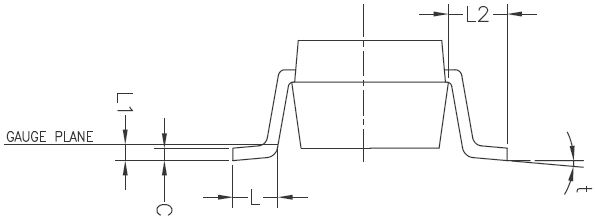
TOP VIEW




SIDE VIEW



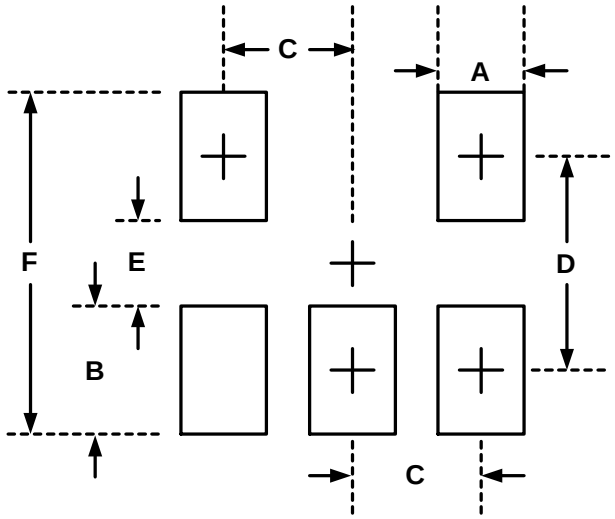

END VIEW




PACKAGE DIMENSIONS

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

## LAND LAYOUT

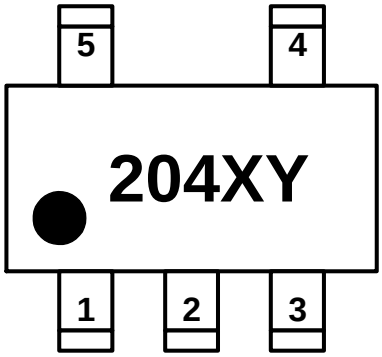



| Dimensions | | |
|---|---|---|
| **Index** | **Millimeter** | **Inches** |
| **A** | 0.60 | 0.024 |
| **B** | 1.10 | 0.043 |
| **C** | 0.95 | 0.037 |
| **D** | 2.50 | 0.098 |
| **E** | 1.40 | 0.055 |
| **F** | 3.60 | 0.141 |

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 |
| **AZ2025-04S (Green part)** | **222XY** |

## 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. |
| | |
| | |