



Features

- ESD/Surge protection for one automotive LIN bus line
- Provide transient protection for one line to **IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (air), $\pm 30\text{kV}$ (contact)** **IEC 61000-4-5 (Lightning) 8A (8/20 μs) Cable Discharge Event (CDE)**
- Provide ISO 7637-3
Pulse 3a: -600V
Pulse 3b: +600V
- Fast turn-on and low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- **Green part**
- **AEC-Q101 qualified**

Applications

- Automotive application
- LIN bus application
- Power management system
- Industrial control
- Portable instrumentation
- Peripherals

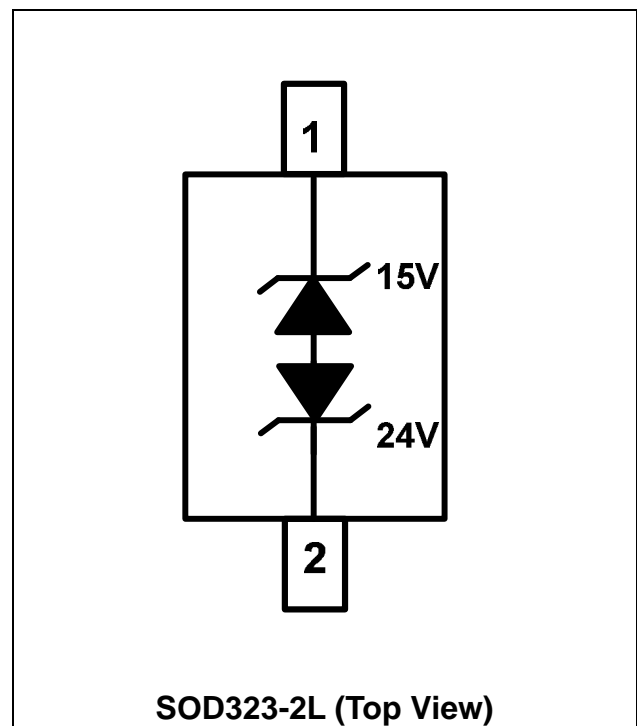
Description

AZ9824-01L 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 AZ9824-01L 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), Lightning, and Cable Discharge Event (CDE).

AZ9824-01L 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.

AZ9824-01L 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 | SYMBOL | RATING | UNIT |
| Peak Pulse Current (tp=8/20μs) | I _{PP} | 8 | A |
| Operating Voltage | V _{DC1} (15V) | 16 | V |
| | V _{DC2} (24V) | 25 | V |
| ESD per IEC 61000-4-2 (Air) | V _{ESD-1} | ±30 | kV |
| ESD per IEC 61000-4-2 (Contact) | V _{ESD-2} | ±30 | |
| 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 | CONDITION | MIN | TYP | MAX | UNIT |
| Reverse Stand-Off Voltage | V _{RWM1} (15V) | Pin-1 to pin-2, T=25°C | | | 15 | V |
| | V _{RWM2} (24V) | Pin-2 to pin-1, T=25°C | | | 24 | V |
| Reverse Leakage Current | I _{Leak} | V _{RWM1} = +15V, T=25°C | | | 100 | nA |
| | | V _{RWM2} = +24V, T=25°C | | | 100 | nA |
| Reverse Breakdown Voltage | V _{BV} | I _{BV} = 1mA, pin-1 to pin-2, T=25°C | 17 | 19 | 21 | V |
| | | I _{BV} = 1mA, pin-2 to pin-1, T=25°C | 25.5 | 28 | 31 | V |
| ESD Clamping Voltage (Note 1) | V _{CL-ESD} | IEC 61000-4-2 +8kV (I _{TLP} = 16A), contact mode, pin-1 to pin-2, T=25°C | | 21 | | V |
| | | IEC 61000-4-2 +8kV (I _{TLP} = 16A), contact mode, pin-2 to pin-1, T=25°C | | 31 | | V |
| ESD Dynamic Turn-on Resistance | R _{dynamic} | IEC 61000-4-2, 0~+8kV, contact mode, T=25°C | | 0.2 | | Ω |



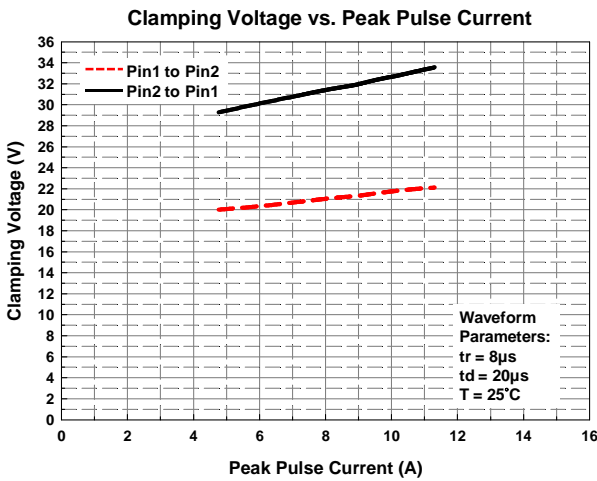
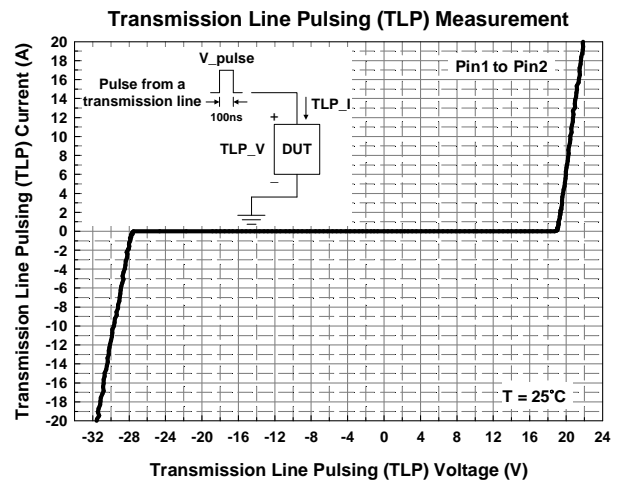
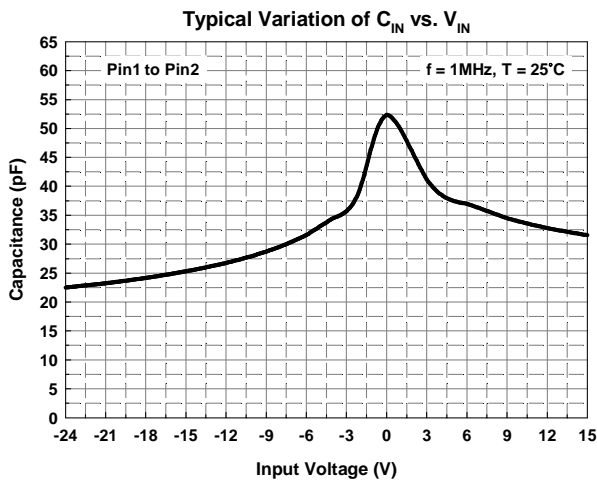
| ELECTRICAL CHARACTERISTICS | | | | | | |
|----------------------------|----------------|---|-----|-----|-----|------|
| PARAMETER | SYMBOL | CONDITION | MIN | TYP | MAX | UNIT |
| Surge Clamping Voltage | $V_{CL-surge}$ | $I_{PP} = 5A, t_p = 8/20\mu s,$ pin-1 to pin-2, $T=25^\circ C$ | | 20 | | V |
| | | $I_{PP} = 8A, t_p = 8/20\mu s,$ pin-1 to pin-2, $T=25^\circ C$ | | 21 | | V |
| | | $I_{PP} = 5A, t_p = 8/20\mu s,$ pin-2 to pin-1, $T=25^\circ C$ | | 29 | | V |
| | | $I_{PP} = 8A, t_p = 8/20\mu s,$ pin-2 to pin-1, $T=25^\circ C$ | | 31 | | V |
| Channel Input Capacitance | C_{IN} | $V_{IN} = 0V, f = 1MHz,$ $T=25^\circ C$ | | 55 | 65 | pF |

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

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



Typical Characteristics



Application Information

The AZ9824-01L is designed to protect one automotive LIN bus line against system ESD/Lightning pulses by clamping it to an acceptable reference. It provides bi-directional protection.

The usage of the AZ9824-01L for LIN bus protection is shown in Fig. 1. The protected line is connected at pin 2. The pin 1 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 AZ9824-01L 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 AZ9824-01L.
- Place the AZ9824-01L 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.

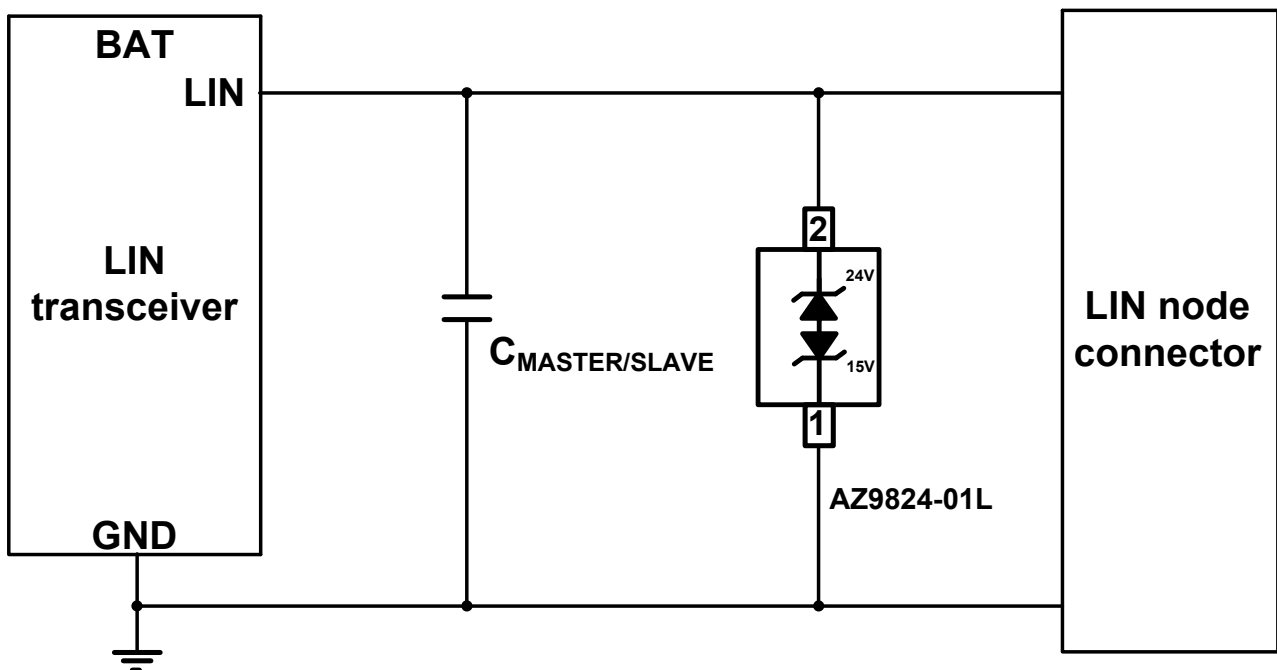
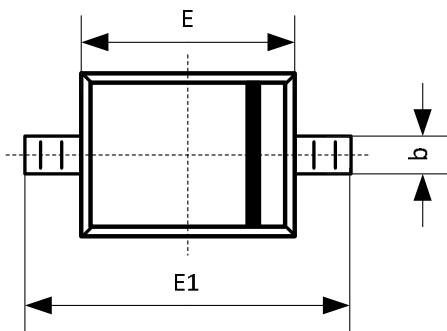


Fig. 1

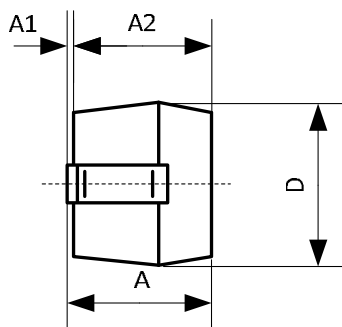
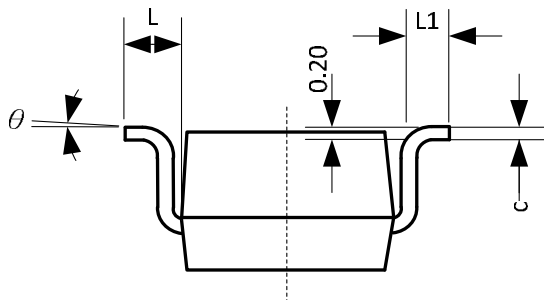
Mechanical Details

SOD323-2L PACKAGE DIAGRAMS

TOP VIEW



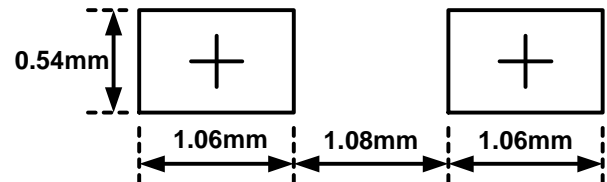
SIDE VIEW



PACKAGE DIMENSIONS

| SYMBOL | MILLIMETERS | |
|--------|-------------|------|
| | MIN. | MAX. |
| A | 0.80 | 1.00 |
| A1 | 0.00 | 0.10 |
| A2 | 0.80 | 0.90 |
| b | 0.25 | 0.35 |
| c | 0.08 | 0.15 |
| D | 1.20 | 1.40 |
| E | 1.60 | 1.80 |
| E1 | 2.50 | 2.70 |
| L | 0.475 REF | |
| L1 | 0.25 | 0.40 |
| θ | 0 | 8 |

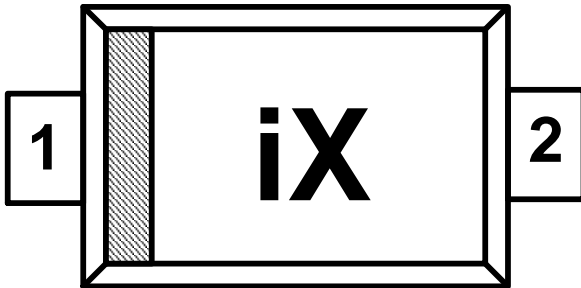
LAND LAYOUT



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



i = Device Code
X = Date Code

| Part Number | Marking Code |
|--------------------------------|--------------|
| AZ9824-01L.R7G (Green Part) | iX |

Note. Green means Pb-free, RoHS, and Halogen free compliant.

Ordering Information

| PN# | Material | Type | Reel size | MOQ | MOQ/internal box | MOQ/carton |
|----------------|----------|------|-----------|------------|--------------------|-----------------------|
| AZ9824-01L.R7G | Green | T/R | 7 inch | 3,000/reel | 4 reels=12,000/box | 6 boxes=72,000/carton |

Revision History

| Revision | Modification Description |
|---------------------|--------------------------|
| Revision 2018/11/07 | Preliminary Release. |
| Revision 2019/08/06 | Formal Release. |
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