



## Features

- ESD Protect for 1 Line with Bi-directional
- Provide ESD protection for the protected line to IEC 61000-4-2 (ESD)  $\pm 20\text{kV}$  (air),  $\pm 18\text{kV}$  (contact) IEC 61000-4-4 (EFT) 40A (5/50ns) Cable Discharge Event (CDE)
- **0201 small DFN package** saves board space
- Protect one I/O line or one power line
- Fast turn-on and Low clamping voltage
- For operating voltage of **24V and below**
- 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 Ports Protection
- Control Signal Lines Protection
- Power lines on PCB Protection
- Latchup Protection

## Description

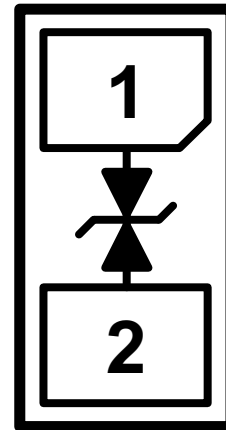
AZ4A24-01F is a design which includes one Bi-directional ESD rated clamping cell to protect one power line, or one control line, or one low speed data line in an electronic systems. The AZ4A24-01F has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage and latch-up caused by Electrostatic Discharging (ESD), Electrical Fast Transients (EFT), and Cable Discharge Event (CDE).

AZ4A24-01F 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.

AZ4A24-01F 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



**DFN0603P2Y (Bottom View)**  
**(0.6mm x 0.3mm x 0.3mm)**



## SPECIFICATIONS

| ABSOLUTE MAXIMUM RATINGS        |           |               |             |
|---------------------------------|-----------|---------------|-------------|
| PARAMETER                       | SYMBOL    | RATING        | UNITS       |
| Operating Supply Voltage        | $V_{DC}$  | $\pm 26.4$    | V           |
| ESD per IEC 61000-4-2 (Air)     | $V_{ESD}$ | $\pm 20$      | kV          |
| ESD per IEC 61000-4-2 (Contact) |           | $\pm 18$      |             |
| Lead Soldering Temperature      | $T_{SOL}$ | 260 (10 sec.) | $^{\circ}C$ |
| Operating Temperature           | $T_{OP}$  | -55 to +85    | $^{\circ}C$ |
| Storage Temperature             | $T_{STO}$ | -55 to +150   | $^{\circ}C$ |

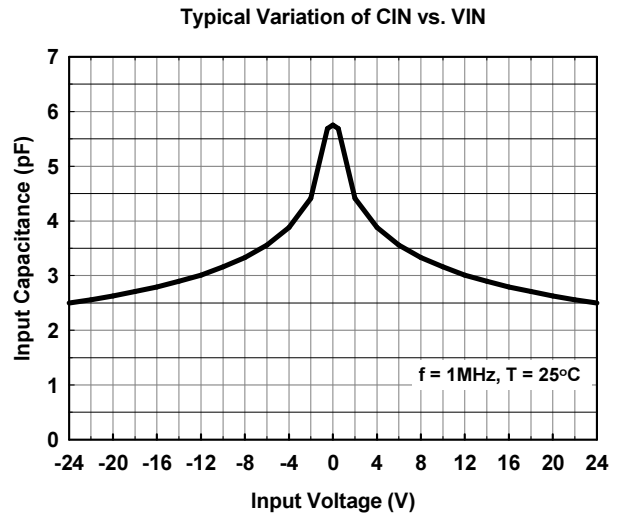
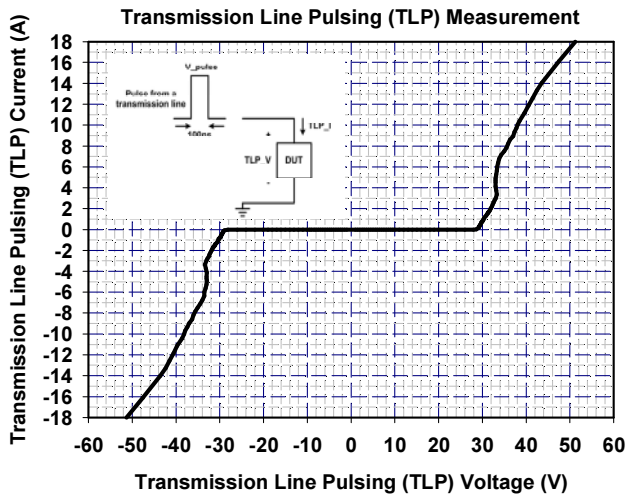
| ELECTRICAL CHARACTERISTICS     |               |  |      |     |      |          |
|--------------------------------|---------------|--|------|-----|------|----------|
| PARAMETER                      | SYMBOL        | CONDITIONS   | MIN  | TYP | MAX  | UNITS    |
| Stand-Off Voltage              | $V_{RWM}$     | $T=25^{\circ}C$ .  | -24  |     | 24   | V        |
| Leakage Current                | $I_{Leak}$    | $V_{RWM} = \pm 24V, T=25^{\circ}C$   |      |     | 0.1  | $\mu A$  |
| Breakdown Voltage              | $V_{BV}$      | $I_{BV} = 1mA, T=25^{\circ}C$  | 26.8 |     | 31.3 | V        |
| ESD Clamping Voltage (Note 1)  | $V_{clamp}$   | IEC 61000-4-2 +8kV ( $I_{TLP} = 16A$ ),<br>$T=25^{\circ}C$ , Contact mode. |      | 48  |      | V        |
| ESD Dynamic Turn-on Resistance | $R_{dynamic}$ | IEC 61000-4-2, 0~+8kV, $T=25^{\circ}C$ ,<br>Contact mode                   |      | 1.2 |      | $\Omega$ |
| Channel Input Capacitance      | $C_{IN}$      | $V_R = 0V, f = 1MHz, T=25^{\circ}C$ .                                      |      | 5.8 | 9    | 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



## Applications Information

The AZ4A24-01F 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 AZ4A24-01F 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 AZ4A24-01F 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 AZ4A24-01F.
- Place the AZ4A24-01F 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.

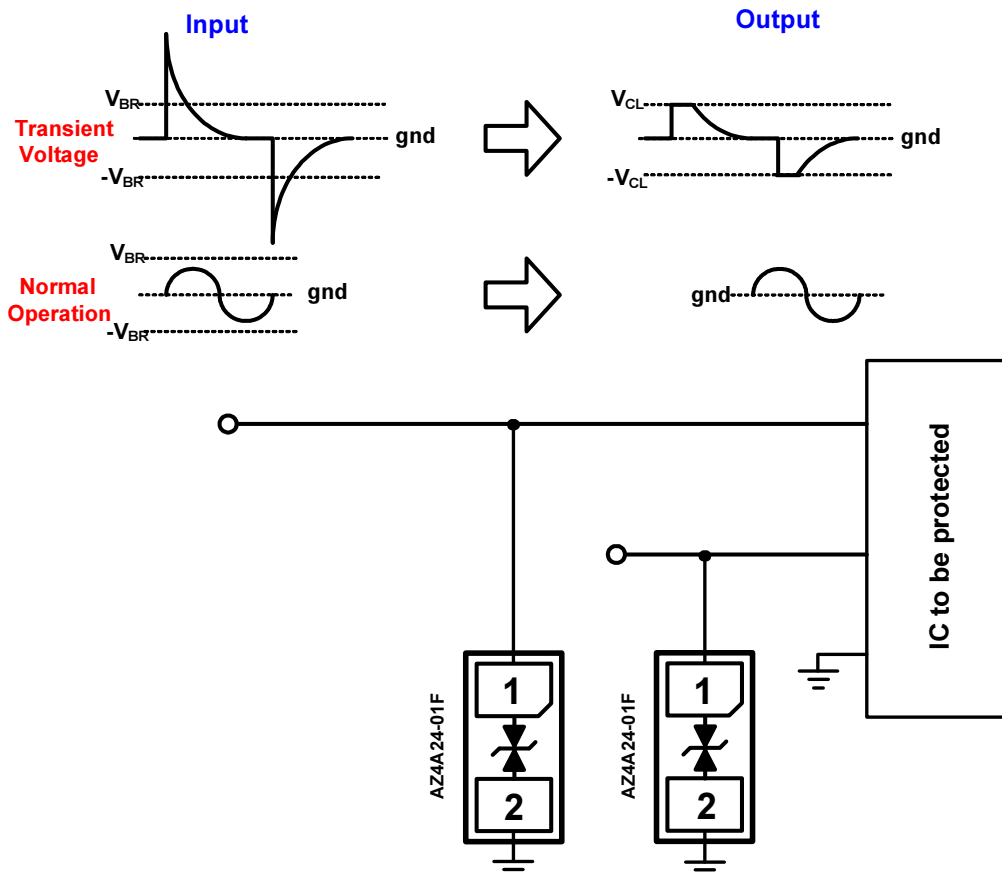


Fig. 1

Fig. 2 shows another simplified example of using AZ4A24-01F to protect the control line, low speed data line, and power line from ESD transient stress.

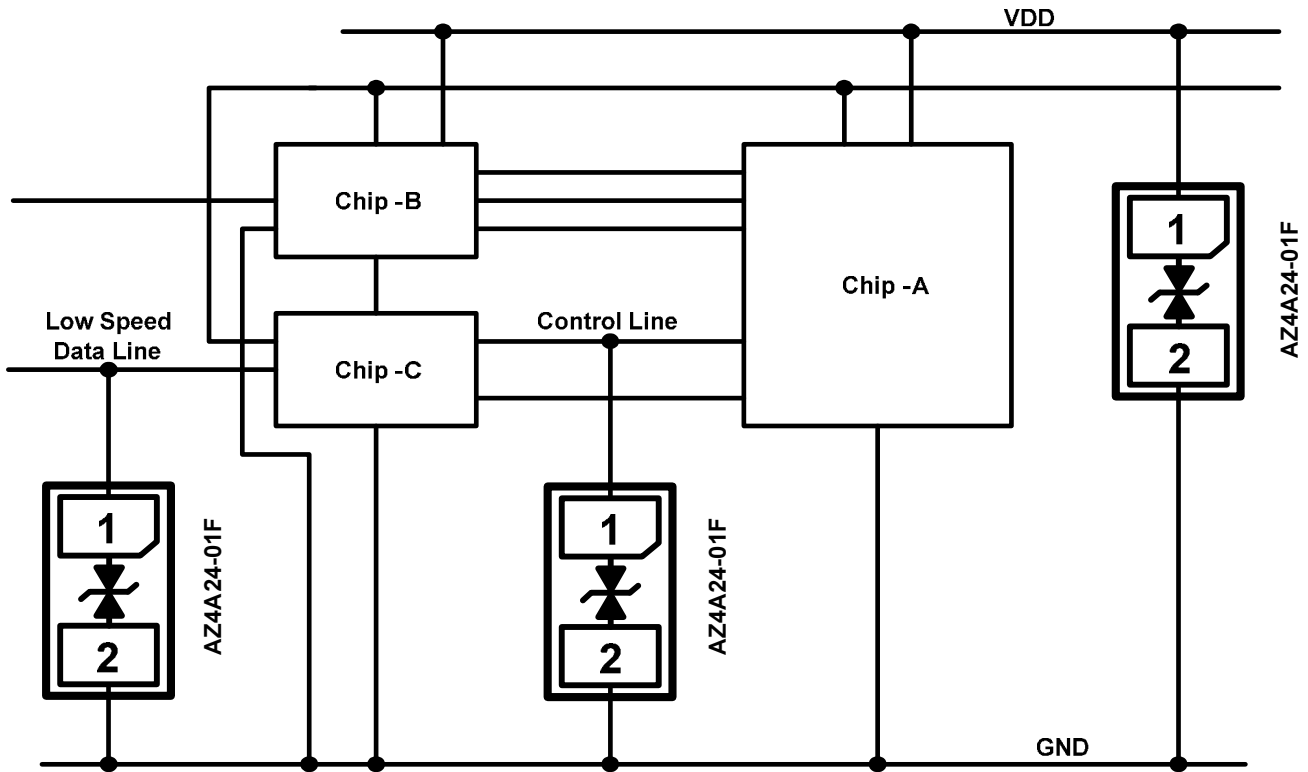
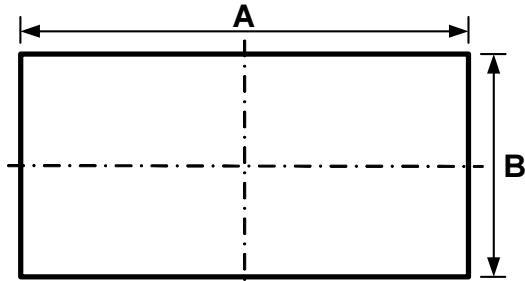


Fig. 2

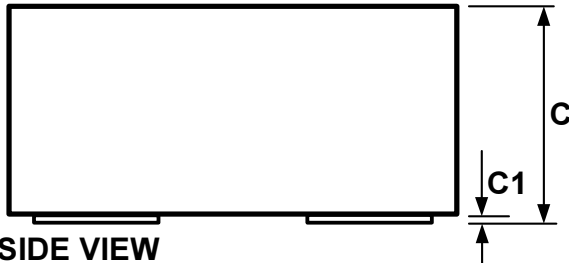


### Mechanical Details

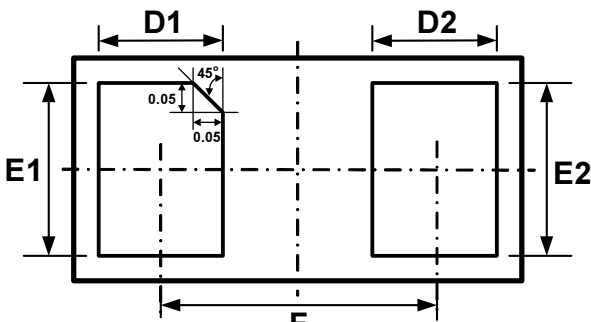
#### DFN0603P2Y PACKAGE DIAGRAMS



TOP VIEW



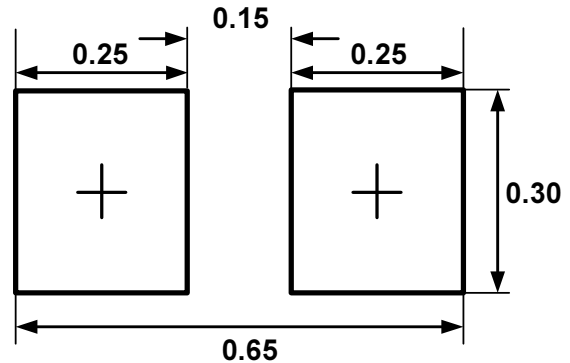
SIDE VIEW



BOTTOM VIEW

| SYMBOL | Millimeters |      |      |
|--------|-------------|------|------|
|        | MIN.        | NOM. | MAX. |
| A      | 0.55        | 0.60 | 0.65 |
| B      | 0.25        | 0.30 | 0.35 |
| C      | 0.28        | 0.30 | 0.32 |
| C1     | 0.00        | 0.02 | 0.05 |
| D1     | 0.13        | 0.18 | 0.23 |
| D2     | 0.14        | 0.19 | 0.24 |
| E1/E2  | 0.20        | 0.25 | 0.30 |
| F      | 0.35        |      |      |

### LAND LAYOUT

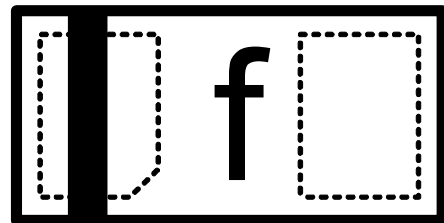


(Unit: mm)

#### 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 Code |
|----------------------------|--------------|
| AZ4A24-01F<br>(Green Part) | f            |

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



## Ordering Information

| PN#            | Material | Type | Reel size | MOQ         | MOQ/internal box   | MOQ/carton            |
|----------------|----------|------|-----------|-------------|--------------------|-----------------------|
| AZ4A24-01F.R7G | Green    | T/R  | 7 inch    | 12,000/reel | 4 reel= 48,000/box | 6 box =288,000/carton |

## Revision History

| Revision            | Modification Description  |
|---------------------|---|
| Revision 2015/03/24 | Preliminary Release.  |
| Revision 2015/09/25 | 1. Update the ESD level per IEC61000-4-2.<br>2. Add the EFT level per IEC61000-4-4. |
| Revision 2015/12/03 | Formal Release.   |
|                     |   |
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