



## Features

- ESD Protection for 1 Line with Bi-directional
- Provide ESD protection for the protected line to IEC 61000-4-2 (ESD)  $\pm 16\text{kV}$  (air),  $\pm 16\text{kV}$  (contact) IEC 61000-4-4 (EFT) 40A (5/50ns) Cable Discharged Event (CDE)
- Suitable for, **12V and below**, operating voltage applications
- **0402 small DFN 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

- Cellular Handsets and Accessories
- Small Panel Modules
- PDA's
- Portable Devices
- Digital Cameras
- Touch Panels
- Notebooks and Handhelds
- MP3 players
- Peripherals

## Description

AZ4212-01F 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 AZ4212-01F has been specifically designed to protect sensitive components which are connected to data and transmission lines from

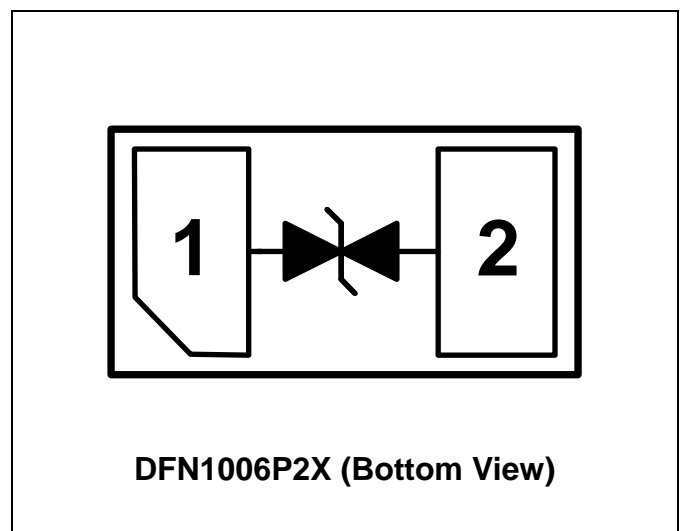
over-voltage caused by Electrostatic Discharging (ESD), Electrical Fast Transients (EFT), and Cable Discharge Event (CDE).

AZ4212-01F 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.

AZ4212-01F is bi-directional and may be used on lines where the signal swings above and below ground.

AZ4212-01F 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





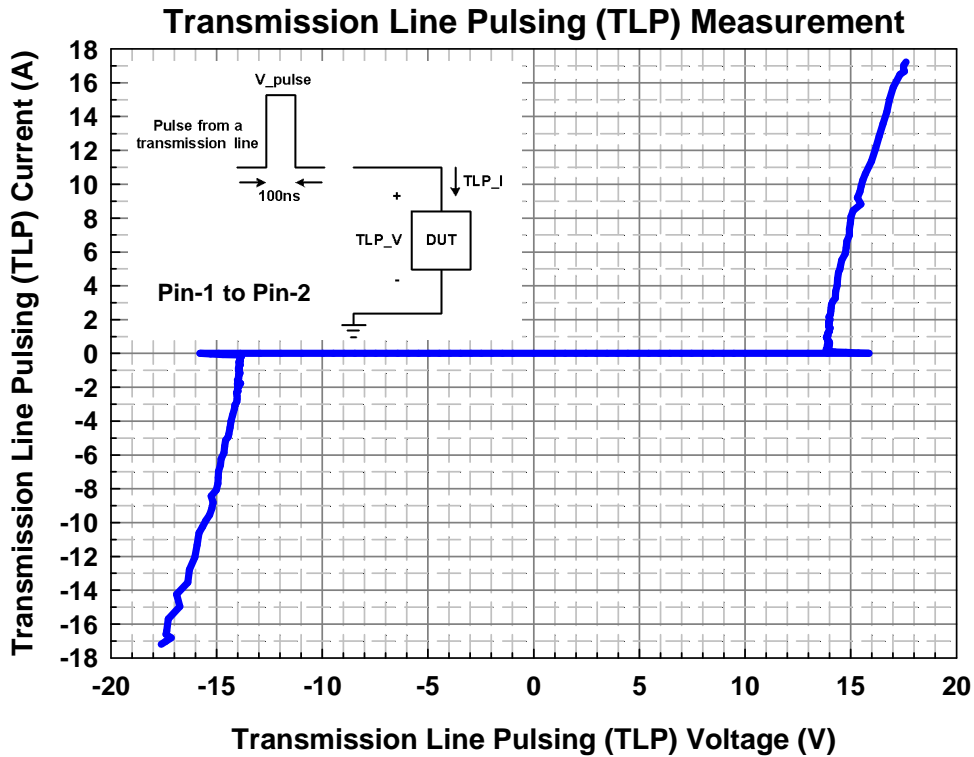
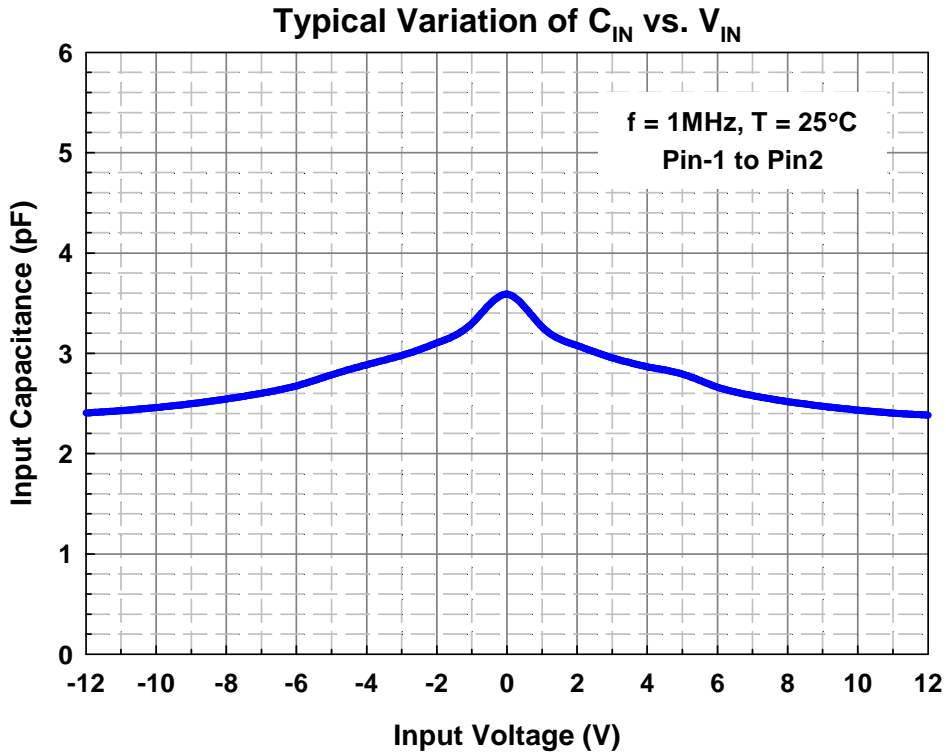
## SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	SYMBOL	RATING	UNITS
Operating Supply Voltage	$V_{DC}$	$\pm 13.2$	V
ESD per IEC 61000-4-2 (Air)	$V_{ESD}$	$\pm 16$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 16$	kV
Lead Soldering Temperature	$T_{SOL}$	260 (10 sec.)	$^{\circ}C$
Operating Temperature	$T_{OP}$	-40 to +85	$^{\circ}C$
Storage Temperature	$T_{STO}$	-55 to +150	$^{\circ}C$

ELECTRICAL CHARACTERISTICS						
PARAMETER	SYMBOL	CONDITIONS	MINI	TYP	MAX	UNITS
Stand-Off Voltage	$V_{RWM}$	$T=25^{\circ}C$	-12		12	V
Leakage Current	$I_{Leak}$	$V_{RWM} = \pm 12V, T=25^{\circ}C.$			0.5	$\mu A$
Breakdown Voltage	$V_{BV}$	$I_{BV} = 1mA, T=25^{\circ}C.$	13.7		16	V
ESD Clamping Voltage	$V_{clamp}$	IEC 61000-4-2 +6kV $T=25^{\circ}C, \text{Contact mode.}$		18		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+6kV, $T=25^{\circ}C, \text{Contact mode.}$		0.25		$\Omega$
Input Capacitance	$C_{IN}$	$V_R = 0V, f = 1MHz,$ $T=25^{\circ}C.$		3.6	5.0	pF



## Typical Characteristics





## Applications Information

The AZ4212-01F is designed to protect one line against System ESD / EFT / CDE pulse by clamping it to an acceptable reference. It provides bi-directional protection.

The usage of the AZ4212-01F 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 AZ4212-01F 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 AZ4212-01F.
- Place the AZ4212-01F 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.

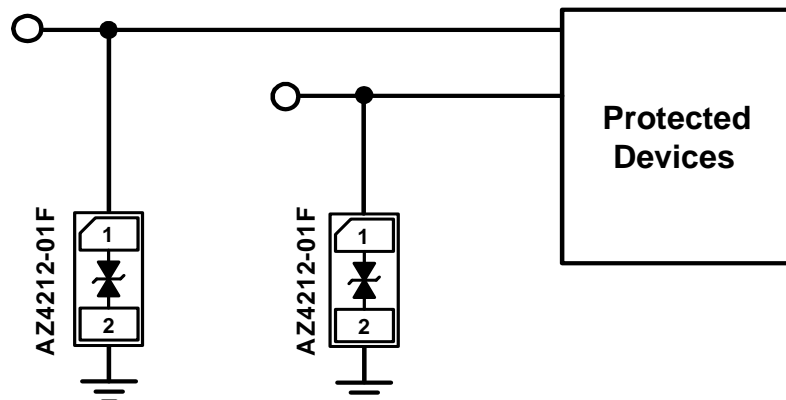
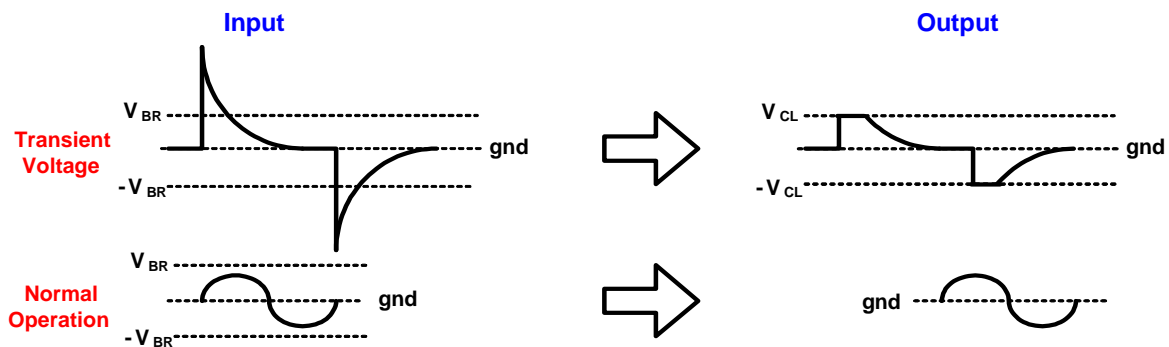


Fig. 1



Fig. 2 shows another simplified example of using AZ4212-01F to protect the control line, low speed data line, and power line from ESD transient stress.

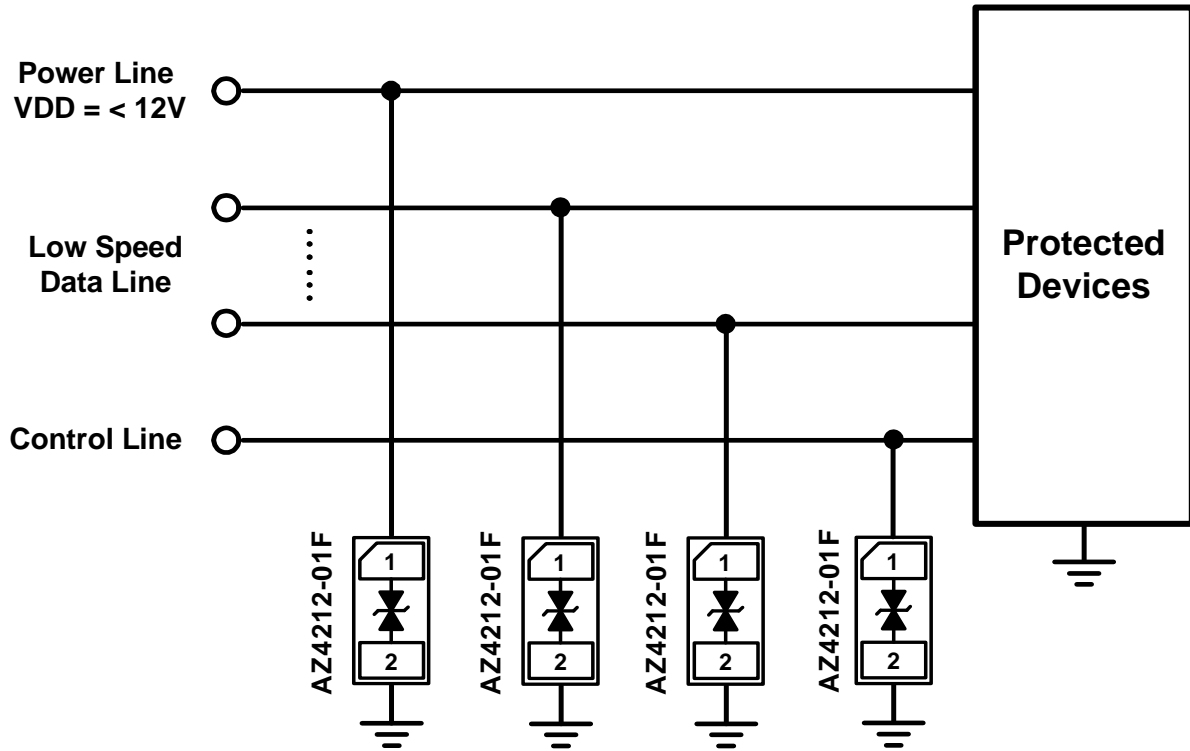
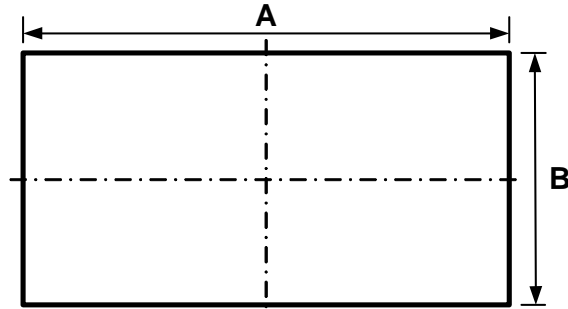


Fig. 2



## Mechanical Details

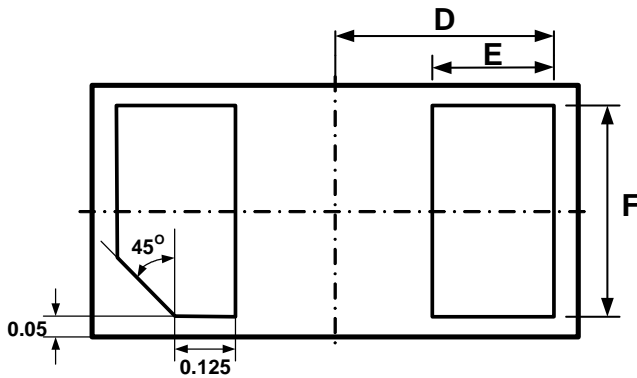
### DFN1006P2X PACKAGE DIAGRAMS



TOP VIEW



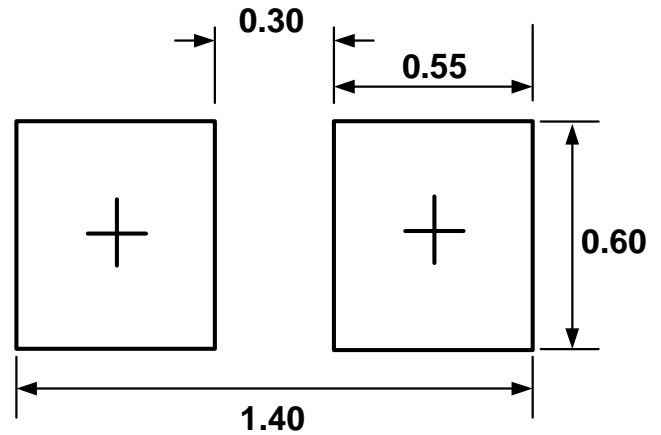
SIDE VIEW



BOTTOM VIEW

Symbol	Millimeters		Inches	
	min	max	min	max
A	0.95	1.05	0.037	0.041
B	0.55	0.65	0.022	0.026
C	0.40	0.55	0.016	0.022
D	0.45		0.018	
E	0.20	0.30	0.008	0.012
F	0.45	0.55	0.018	0.022

## LAND LAYOUT

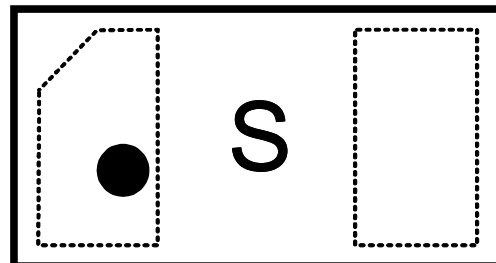


(Unit: mm)

### 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



Top View

Part Number	Marking Code
AZ4212-01F (Green part)	S

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



## Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ4212-01F.R7GR	Green	T/R	7 inch	12,000/reel	4 reel=48,000/box	6 box=288,000/carton

## Revision History

Revision	Modification Description
Revision 2013/09/10	Formal Release.
Revision 2013/10/14	Update the max. value of $V_{BV}$ .
Revision 2014/05/26	Add the ordering information.
Revision 2014/12/24	Update the ordering information.