



## Features

- ESD Protection for 1 Line with Bi-directional
- Provide ESD protection for the protected line to IEC 61000-4-2 (ESD)  $\pm 15\text{kV}$  (air),  $\pm 12\text{kV}$  (contact)
- Ultra low capacitance: 0.45pF typical
- Ultra low leakage current
- For low operating voltage applications: 5V and below
- 0402 small DFN package saves board space
- Protect one I/O line
- Fast turn-on and Low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- **Green Part**
- **AEC-Q101 qualified**

## Applications

- Hand Held Portable Applications
- Wearable Devices
- Antenna applications
- USB3.0 / USB2.0
- High Definition Multi-media Interface (HDMI)
- Digital Visual Interface (DVI)
- Display Port
- Serial ATA
- Automotive Applications

## Description

AZ9565-01F is a design which includes a bi-directional ESD rated clamping cell to protect high speed data interfaces in an electronic systems. The AZ9565-01F has been specifically designed to protect sensitive components which are connected to data and transmission lines

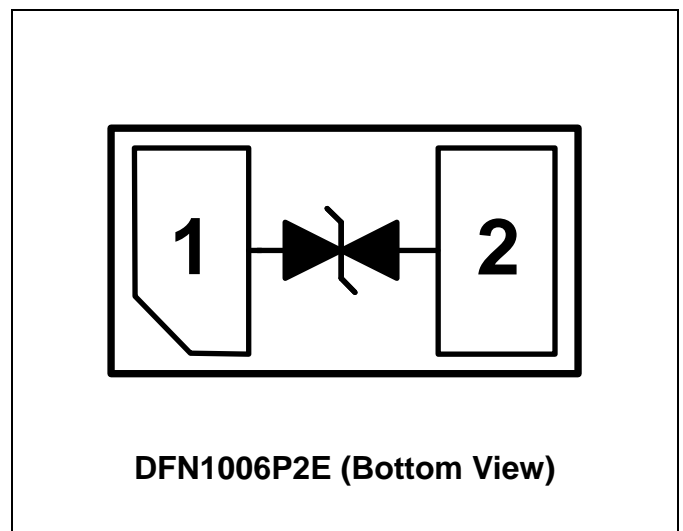
from over-voltage caused by Electrostatic Discharging (ESD).

AZ9565-01F is a unique design which includes proprietary clamping cells with ultra low capacitance in a small package. During transient conditions, the proprietary clamping cells prevent over-voltage on the control/data lines, protecting any downstream components.

AZ9565-01F is bi-directional and may be used on lines where the signal swings above and below ground.

AZ9565-01F 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 DC Voltage	$V_{DC}$	$\pm 5.5$	V
ESD per IEC 61000-4-2 (Air)	$V_{ESD}$	$\pm 15$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 12$	kV
Lead Soldering Temperature	$T_{SOL}$	260 (10 sec.)	$^{\circ}C$
Operating Temperature	$T_{OP}$	-55 to +125	$^{\circ}C$
Storage Temperature	$T_{STO}$	-55 to +150	$^{\circ}C$

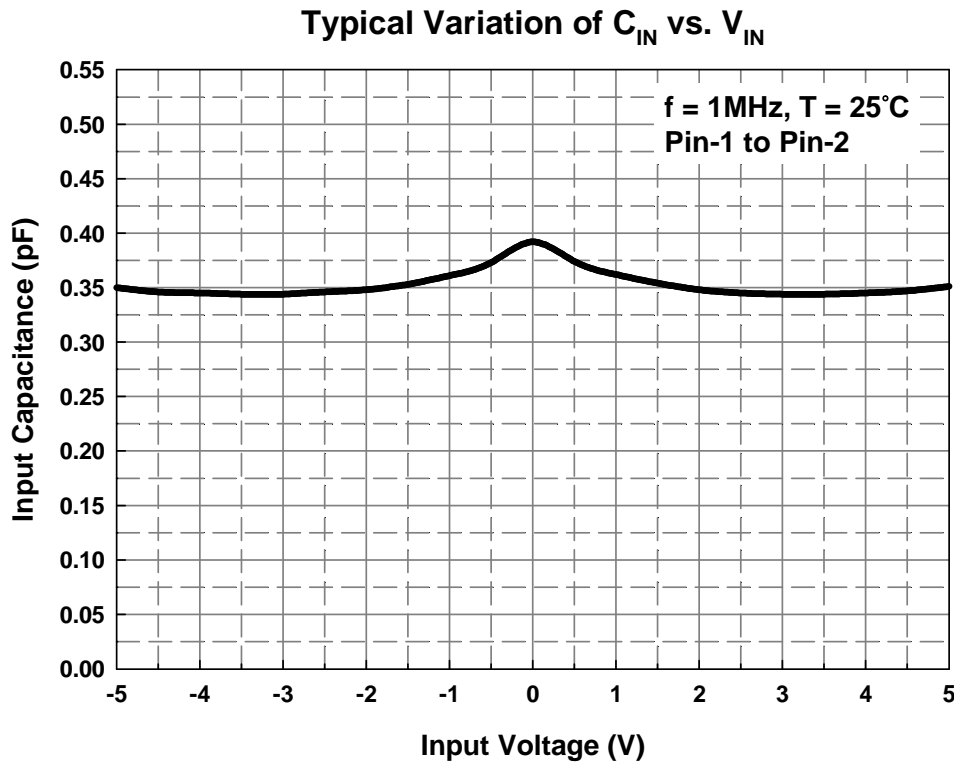
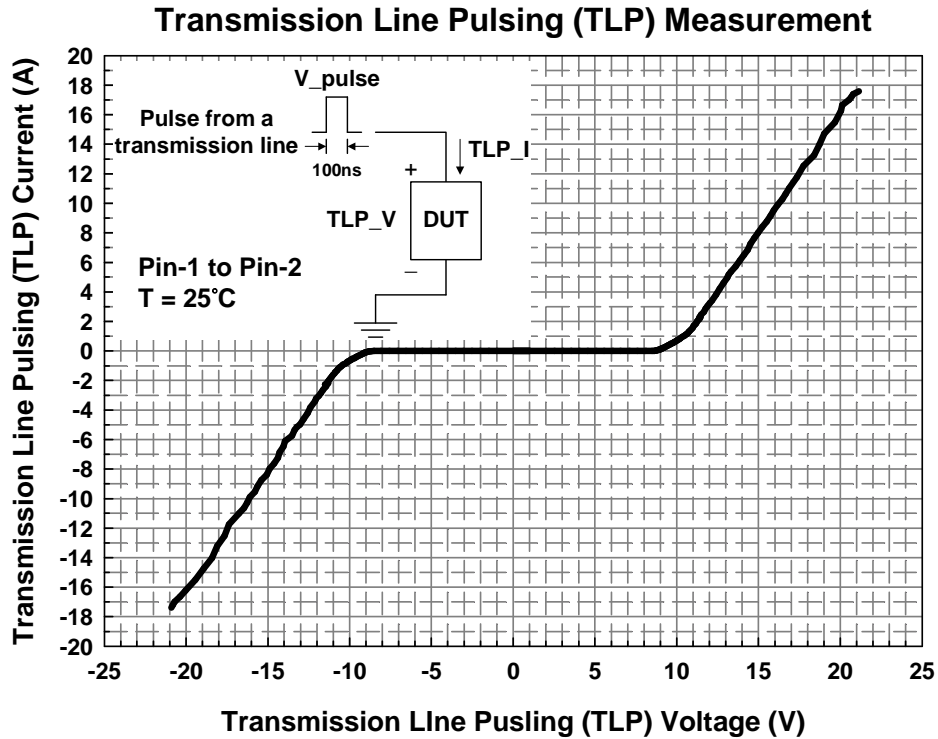
ELECTRICAL CHARACTERISTICS						
PARAMETER	SYMBOL	CONDITIONS	MINI	TYP	MAX	UNITS
Stand-Off Voltage	$V_{RWM}$	$T=25^{\circ}C$ .	-5		5	V
Leakage Current	$I_{Leak}$	$V_{RWM} = \pm 5V, T=25^{\circ}C$ .			100	nA
Breakdown Voltage	$V_{BV}$	$I_{BV} = 1mA, T=25^{\circ}C$ .	7		10	V
ESD Clamping Voltage (Note 1)	$V_{clamp}$	IEC 61000-4-2 +8kV ( $I_{TLP} = 16A$ ), Contact mode, $T=25^{\circ}C$ .		20		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+8kV, $T=25^{\circ}C$ , Contact mode.		0.6		$\Omega$
Input Capacitance	$C_{IN}$	$V_R = 0V, f = 1MHz, T=25^{\circ}C$ .		0.45	0.6	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 AZ9565-01F is designed to protect one line against System ESD pulse by clamping it to an acceptable reference. It provides bi-directional protection.

The usage of the AZ9565-01F 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 AZ9565-01F 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 AZ9565-01F.
- Place the AZ9565-01F 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.

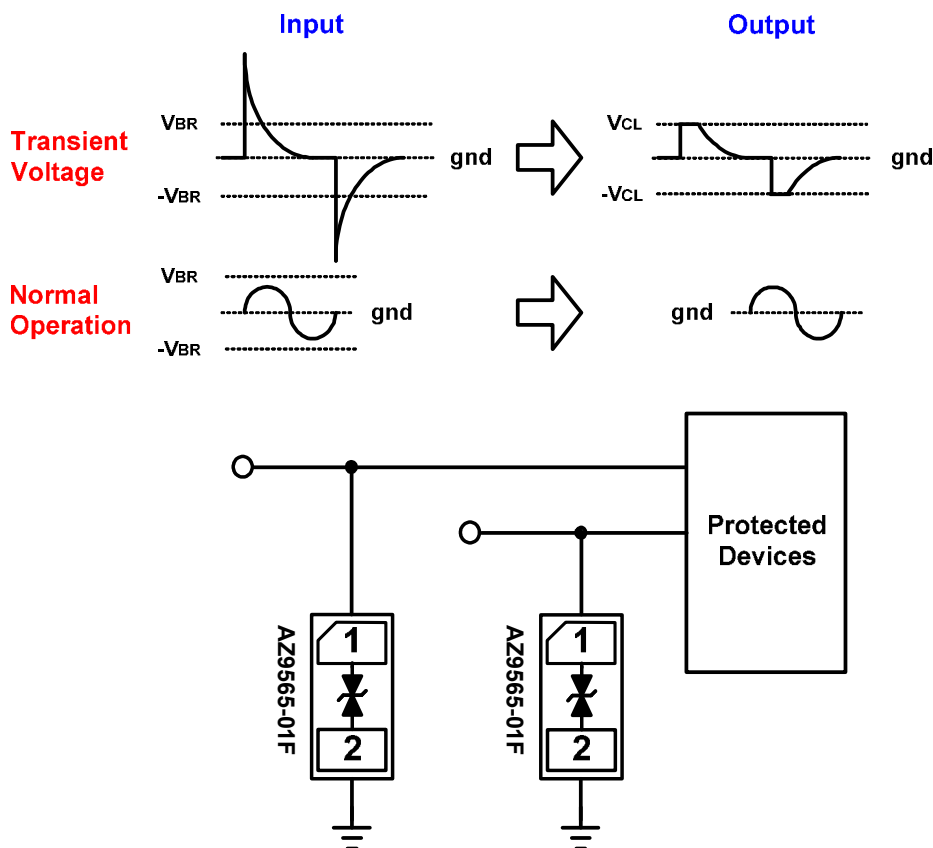
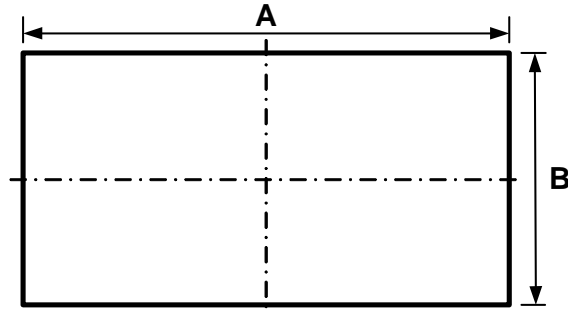


Fig. 1 ESD protection scheme by using AZ9565-01F.



## Mechanical Details

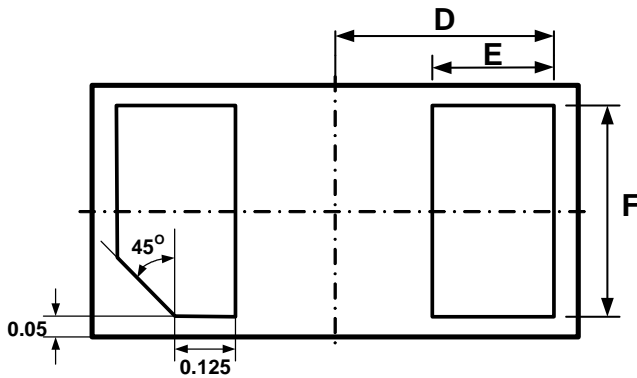
### DFN1006P2E PACKAGE DIAGRAMS



TOP VIEW



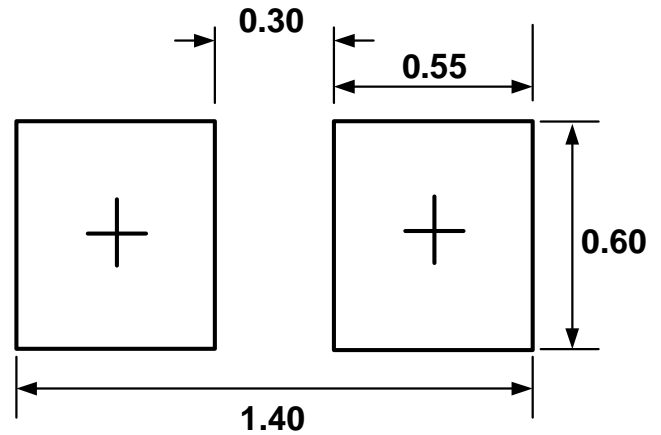
SIDE VIEW



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	0.45	0.60	0.018	0.024
D	0.45BSC		0.018BSC	
E	0.20	0.30	0.008	0.012
F	0.45	0.55	0.018	0.022

## LAND LAYOUT

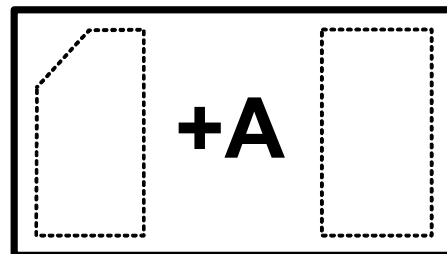


(Unit: mm)

### 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
AZ9565-01F (Green Part)	A

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



### Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ9565-01F.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 2015/11/09	Preliminary Release.
Revision 2016/03/28	Formal Release.