

Features

- ESD protect for one line with bi-directional
- Provide transient protection for the protected line to
IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (air), $\pm 30\text{kV}$ (contact)
IEC 61000-4-5 (Lightning) 2.5A (8/20 μs)
- **Ultra-low capacitance: 0.6pF typical**
- **0402 small DFN package** saves board space
- Fast turn-on and low clamping voltage
- Suitable for, **24V and below**, operating voltage applications
- Solid-state silicon-avalanche and active circuit triggering technology
- **Green part**
- **AEC-Q101 qualified**

Applications

- Automotive applications
- Antenna ESD protection
- Near Field Communication (NFC)
- RF signal ESD protection
- Hand held portable applications
- High speed data interface

Description

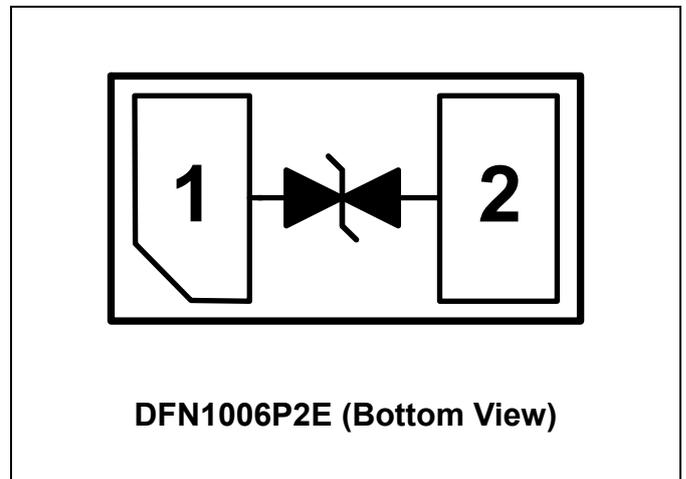
AZ9024-01F is a design which includes a bi-directional ESD rated clamping cell to protect high speed data interfaces in an electronic system. The AZ9024-01F has been specifically designed to protect sensitive components which are connected to data and transmission lines from over-voltage caused by Electrostatic Discharging (ESD).

AZ9024-01F 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.

AZ9024-01F is bi-directional and may be used on lines where the signal swings above and below ground.

AZ9024-01F 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

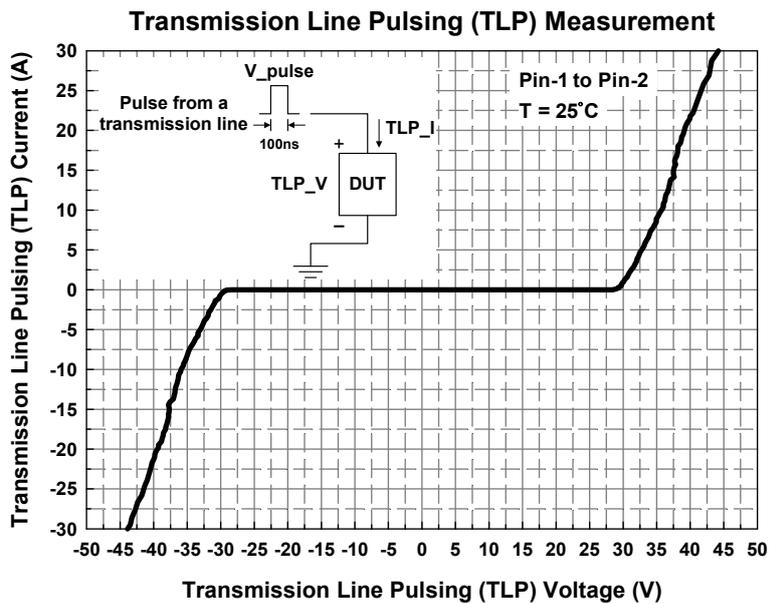
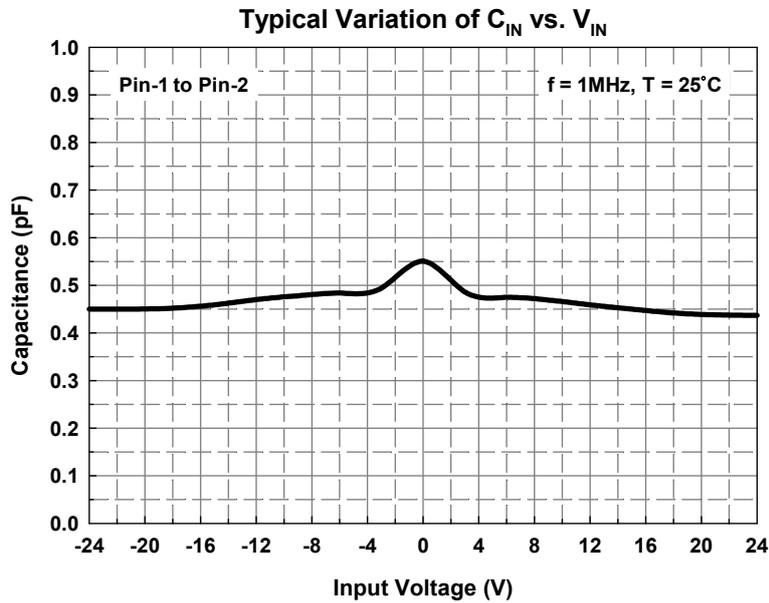
Absolute Maximum Ratings			
Parameter	Symbol	Rating	Unit
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	2.5	A
Operating Voltage	V_{DC}	± 26	V
ESD per IEC 61000-4-2 (Air)	V_{ESD-1}	± 30	kV
ESD per IEC 61000-4-2 (Contact)	V_{ESD-2}	± 30	
Lead Soldering Temperature	T_{SOL}	260 (10 sec.)	$^{\circ}C$
Operating Temperature	T_{OP}	-55 to +125	$^{\circ}C$
Storage Temperature	T_{STO}	-55 to +150	$^{\circ}C$

Electrical Characteristics						
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	V_{RWM}	$T=25^{\circ}C$.	-24		24	V
Reverse Leakage Current	I_{Leak}	$V_{RWM} = \pm 24V, T=25^{\circ}C$.			0.5	μA
Reverse Breakdown Voltage	V_{BV}	$I_{BV} = 1mA, T=25^{\circ}C$.	26.2		33.5	V
ESD Clamping Voltage (Note 1)	V_{CL-ESD}	IEC 61000-4-2 +8kV ($I_{TLP} = 16A$), contact mode, $T=25^{\circ}C$.		39		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2, 0~+8kV, contact mode, $T=25^{\circ}C$.		0.5		Ω
Channel Input Capacitance	C_{IN}	$V_R = 0V, f = 1MHz, T=25^{\circ}C$.		0.6	1	pF
		$V_R = 0V, f = 1MHz, T=125^{\circ}C$.			1.5	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 AZ9024-01F is designed to protect one line against system ESD pulses by clamping it to an acceptable reference. It provides bi-directional protection.

The usage of the AZ9024-01F 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 AZ9024-01F 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 AZ9024-01F.
- Place the AZ9024-01F 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.

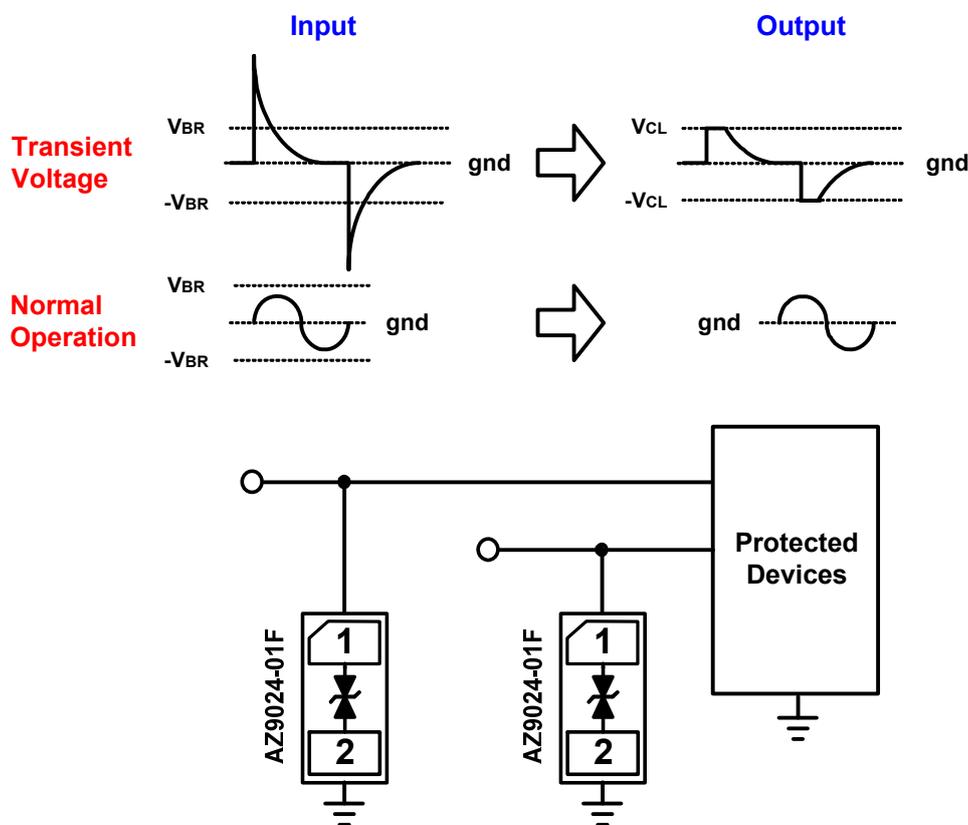
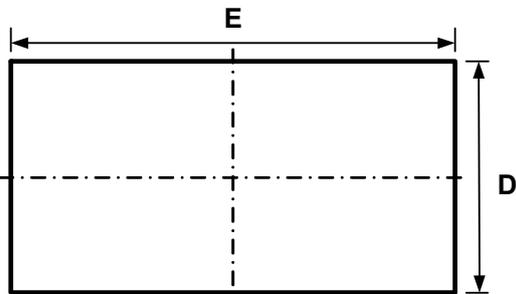


Fig. 1

Mechanical Details

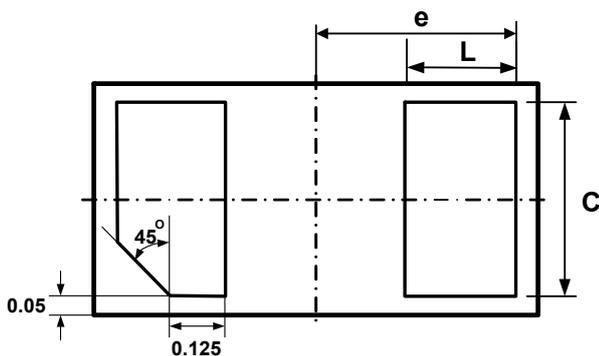
DFN1006P2E Package Diagrams



TOP VIEW



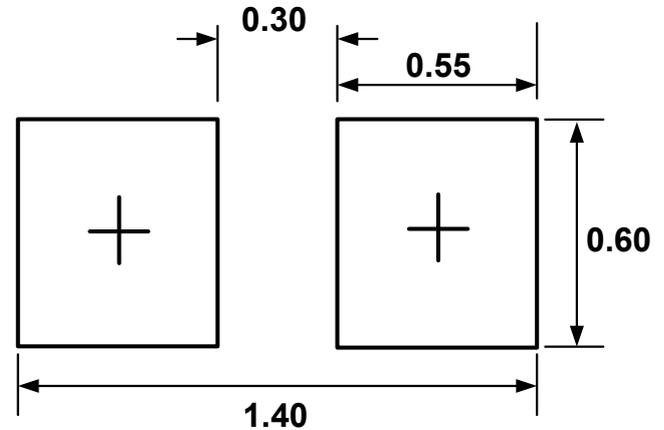
SIDE VIEW



BOTTOM VIEW

SYMBOL	MILLIMETERS	
	MIN.	MAX.
E	0.95	1.05
D	0.55	0.65
A	0.45	0.55
e	0.45 BSC	
L	0.20	0.30
C	0.45	0.55

Land Layout

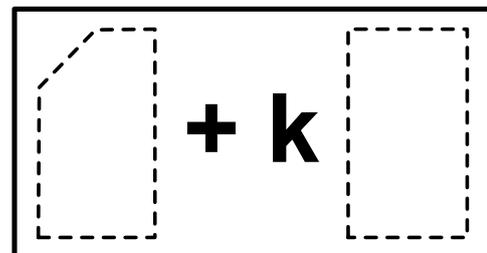


(Unit: mm)

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

k = Device Code

Part Number	Marking Code
AZ9024-01F.R7GR (Green part)	k

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



Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ9024-01F.R7GR	Green	T/R	7 inch	12,000/reel	4 reels = 48,000/box	6 boxes = 288,000/carton

Revision History

Revision	Modification Description
Revision 2021/12/02	Preliminary Release.
Revision 2023/01/17	Formal Release.