

## Features

- ESD protection for one line with uni-directional
- Provide transient protection for one line to  
**IEC 61000-4-2 (ESD) ±30kV (air/contact)**  
**IEC 61000-4-4 (EFT) 80A (5/50ns)**  
**IEC 61000-4-5 (Lightning) 130A (8/20μs)**
- Suitable for, **22V and below**, operating voltage applications
- 2.0mm x 2.0mm DFN package saves board space
- High surge protection
- Fast turn-on and low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- **Green part**

## Applications

- USB Power Delivery
- Power supply protection
- Cellular handsets and accessories
- Panel modules
- Portable devices
- Touch panels
- Notebooks and handhelds
- Peripherals

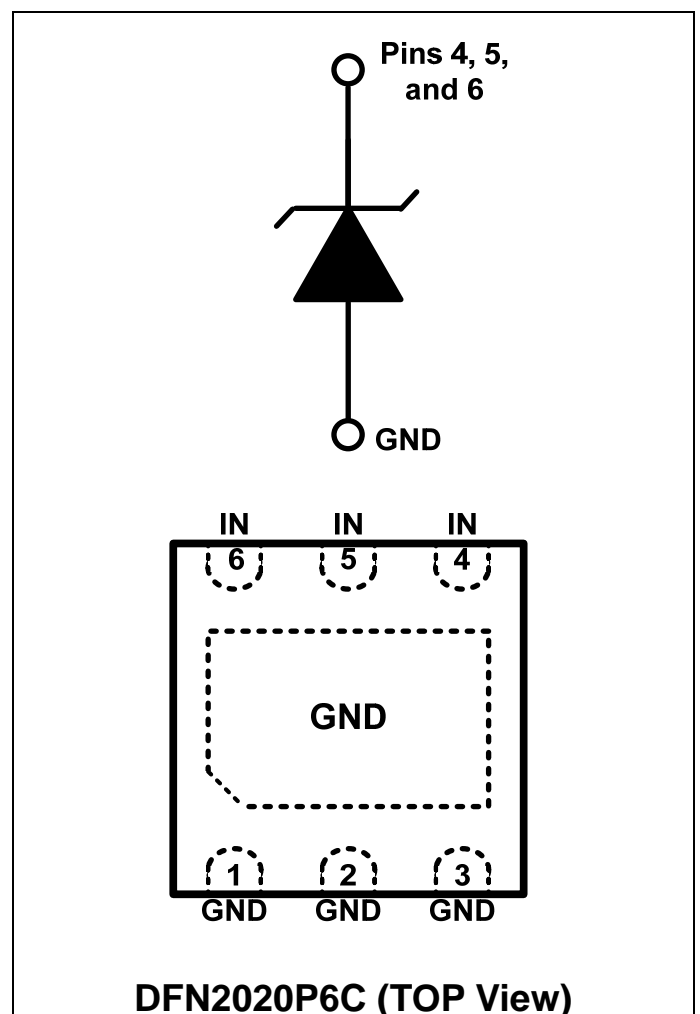
## Description

AZ4922-01F is a design which includes a uni-directional surge rated clamping cell to protect one power line, one control line, or one low-speed data line in an electronic system. The AZ4922-01F has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage caused by Electrostatic Discharging (ESD), Electrical Fast Transient (EFT), Lightning, and Cable Discharge Event (CDE).

AZ4922-01F 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, control lines, or data lines, protecting any downstream component.

AZ4922-01F may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

## Circuit Diagram / Pin Configuration



## Specifications

Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)			
Parameter	Symbol	Rating	Unit
Peak Pulse Current ( $t_p = 8/20\mu\text{s}$ )	$I_{PP}$ (Note 1)	130	A
Operating Voltage (IN to GND)	$V_{DC}$	22.5	V
ESD per IEC 61000-4-2 (Air)	$V_{ESD-1}$	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)	$V_{ESD-2}$	$\pm 30$	
Lead Soldering Temperature	$T_{SOL}$	260 (10 sec.)	$^\circ\text{C}$
Operating Temperature	$T_{OP}$	-55 to +125	$^\circ\text{C}$
Storage Temperature	$T_{STO}$	-55 to +150	$^\circ\text{C}$

Electrical Characteristics						
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	$V_{RWM}$	IN to GND, $T = 25^\circ\text{C}$ .			22	V
Reverse Leakage Current	$I_{Leak}$	$V_{RWM} = 22\text{V}$ , $T = 25^\circ\text{C}$ , IN to GND.			0.5	$\mu\text{A}$
Reverse Breakdown Voltage	$V_{BV}$	$I_{BV} = 1\text{mA}$ , $T = 25^\circ\text{C}$ , IN to GND.	22.8		25	V
Forward Voltage	$V_F$	$I_F = 1\text{mA}$ , $T = 25^\circ\text{C}$ , GND to IN.	0.5		0.7	V
Surge Clamping Voltage (Note 1)	$V_{CL-surge}$	$I_{PP} = 5\text{A}$ , $t_p = 8/20\mu\text{s}$ , $T = 25^\circ\text{C}$ , IN to GND.		24.5	25.5	V
		$I_{PP} = 40\text{A}$ , $t_p = 8/20\mu\text{s}$ , $T = 25^\circ\text{C}$ , IN to GND.		27	28	V
		$I_{PP} = 130\text{A}$ , $t_p = 8/20\mu\text{s}$ , $T = 25^\circ\text{C}$ , IN to GND.		36.5	39	V
ESD Clamping Voltage (Note 2)	$V_{CL-ESD}$	IEC 61000-4-2 +8kV ( $I_{TLP} = 16\text{A}$ ), $T = 25^\circ\text{C}$ , contact mode, IN to GND.		24.5		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+8kV, $T = 25^\circ\text{C}$ , contact mode, IN to GND.		0.03		$\Omega$
Channel Input Capacitance	$C_{IN}$	$V_{IN} = 0\text{V}$ , $f = 1\text{MHz}$ , $T = 25^\circ\text{C}$ , IN to GND.		650	800	pF

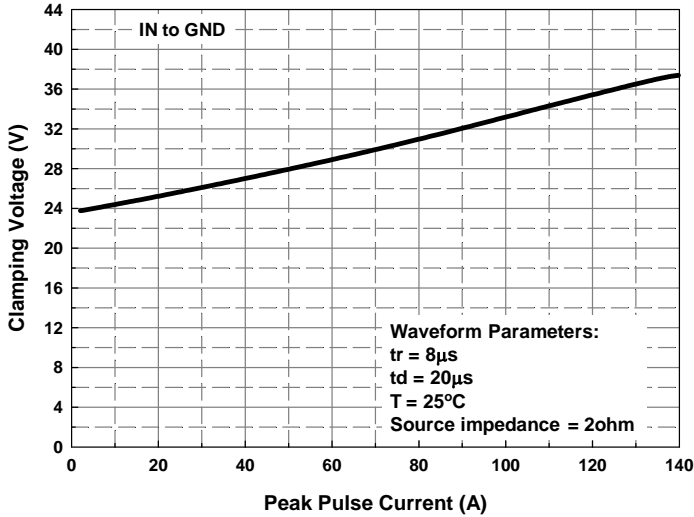
Note 1: The Peak Pulse Current measured conditions:  $t_p = 8/20\mu\text{s}$ ,  $2\Omega$  source impedance.

Note 2: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

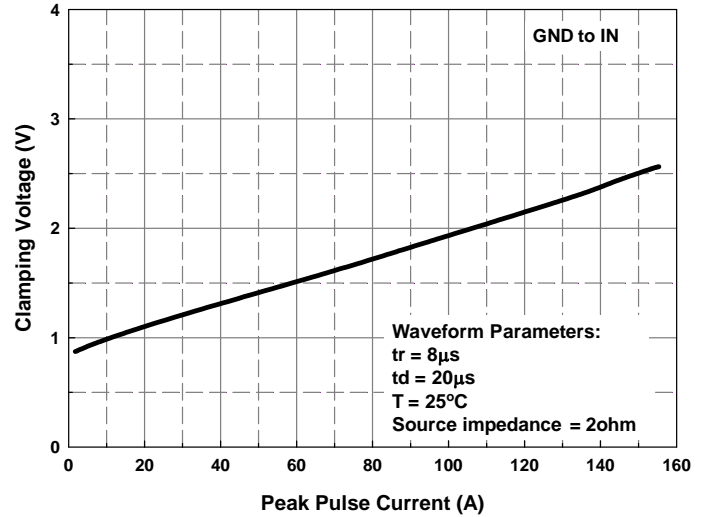
TLP conditions:  $Z_0 = 50\Omega$ ,  $t_p = 100\text{ns}$ ,  $t_r = 1\text{ns}$ .

## Typical Characteristics

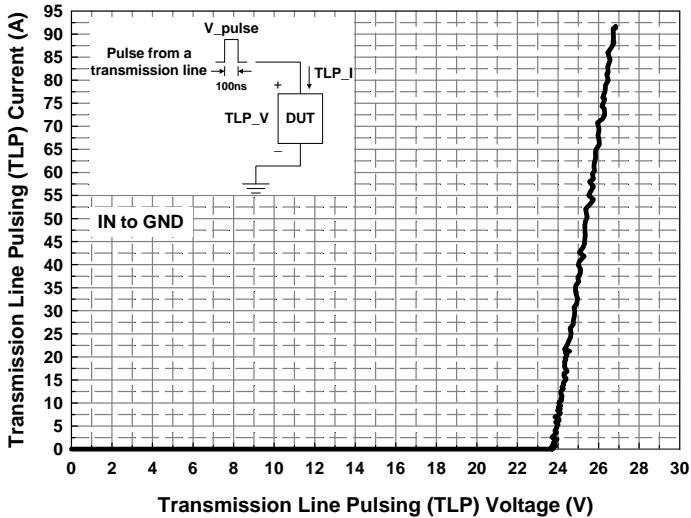
Reverse Clamping Voltage vs. Peak Pulse Current



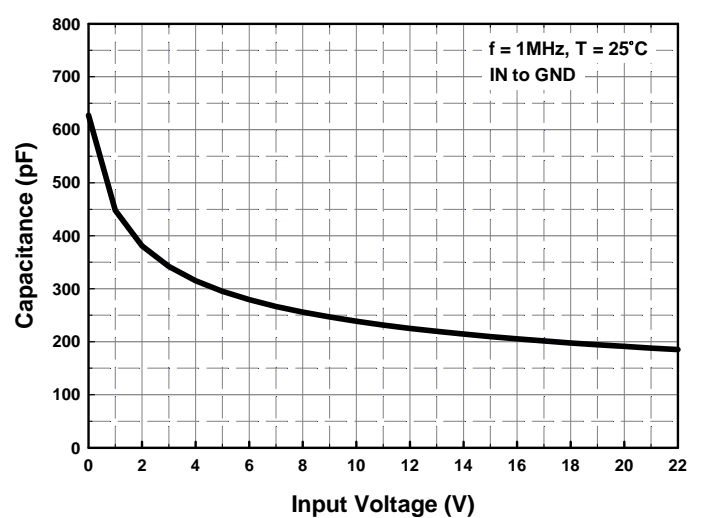
Forward Clamping Voltage vs. Peak Pulse Current



Transmission Line Pulsing (TLP) Measurement



Typical Variation of  $C_{IN}$  vs.  $V_{IN}$



## Application Information

The AZ4922-01F is designed to protect one line against system ESD/EFT/Lightning pulses by clamping them to an acceptable reference.

The usage of the AZ4922-01F is shown in Fig. 1. Protected lines, such as data lines, control lines, or power lines, are connected to pin-4, pin-5 and pin-6. The pin-1, pin-2, pin-3 and center tab should be connected directly to a ground plane on the board. All path lengths connected to the pins of AZ4922-01F should be kept as short as possible to minimize parasitic inductance in the board traces.

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 AZ4922-01F.
- Place the AZ4922-01F 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.

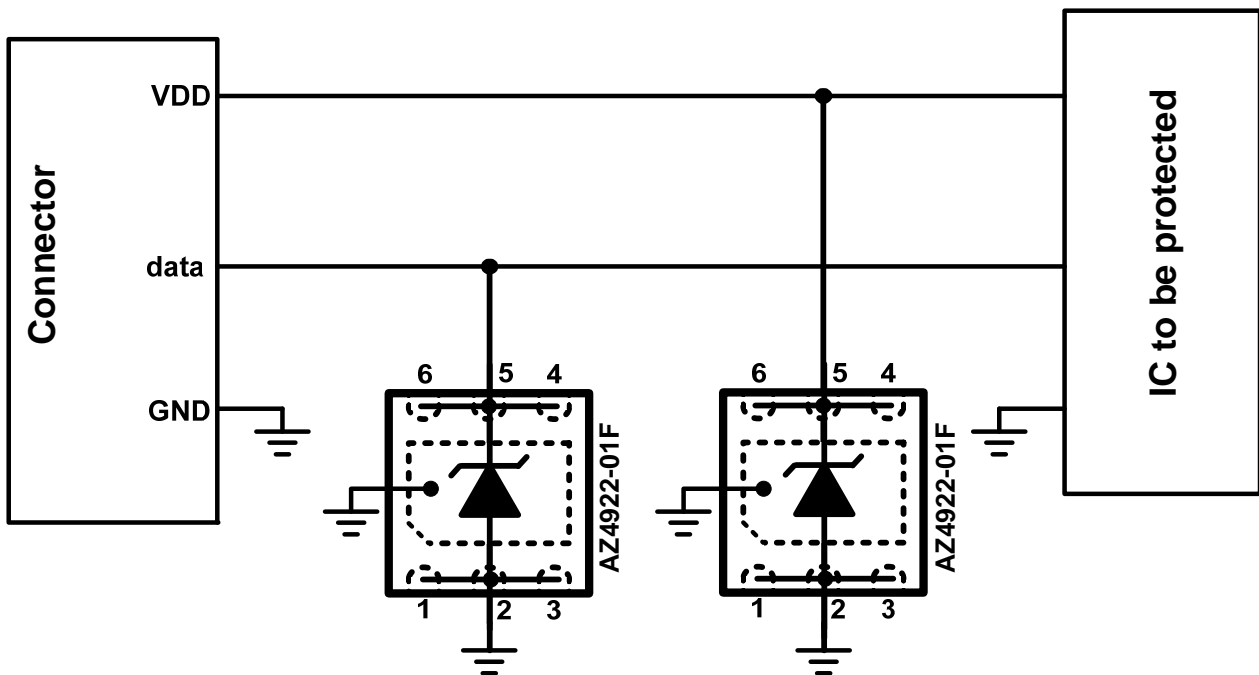


Fig. 1

Fig. 2 shows another simplified example of using low-speed data lines, and power lines from ESD AZ4922-01F to protect the control lines, transient stress.

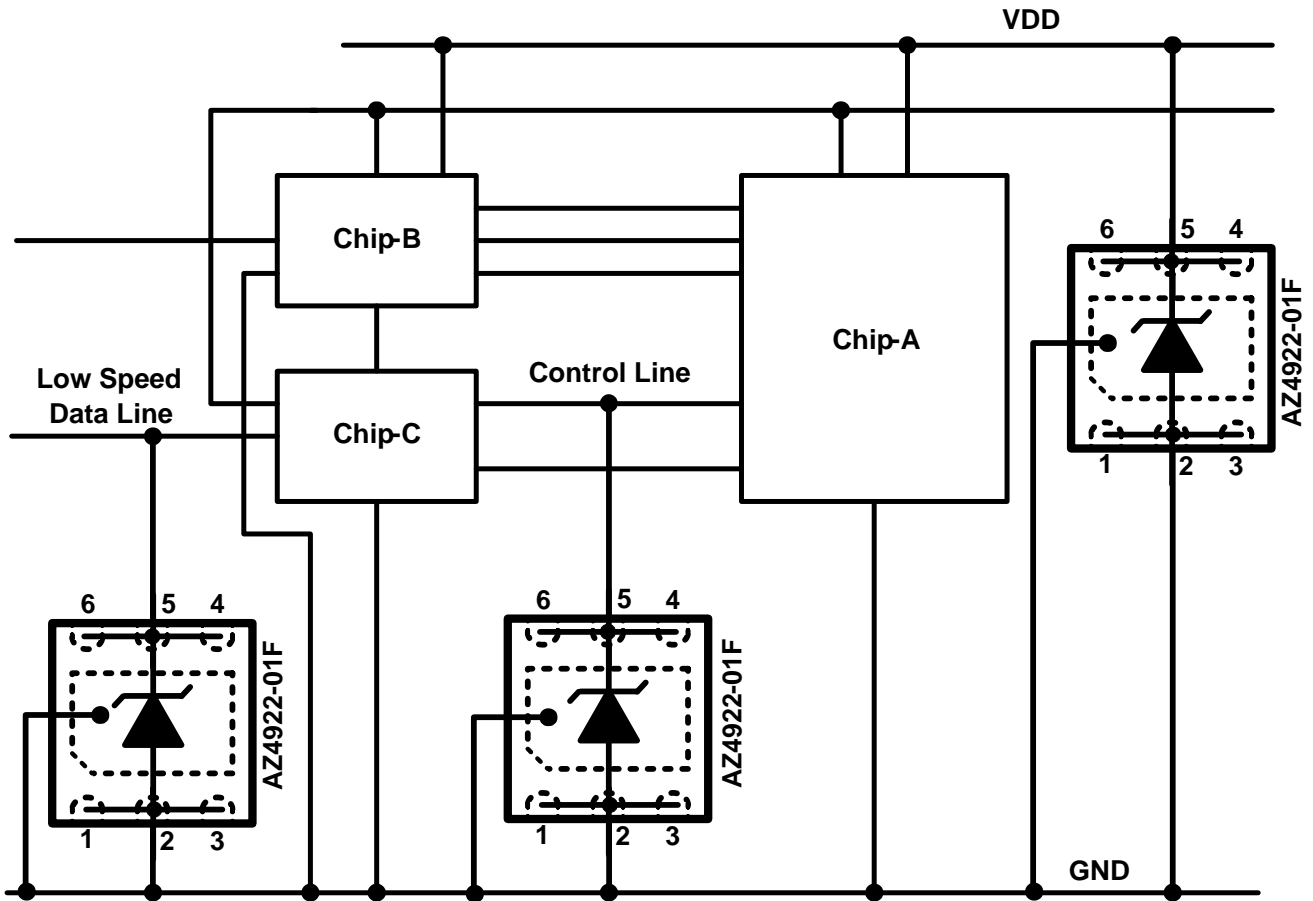


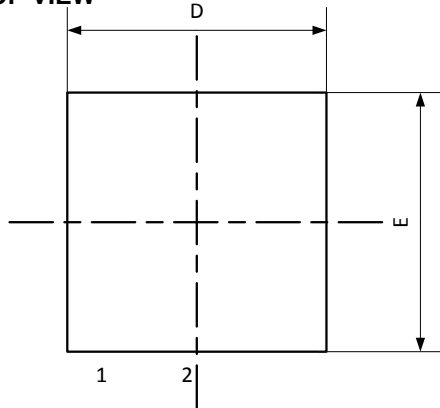
Fig. 2

## Mechanical Details

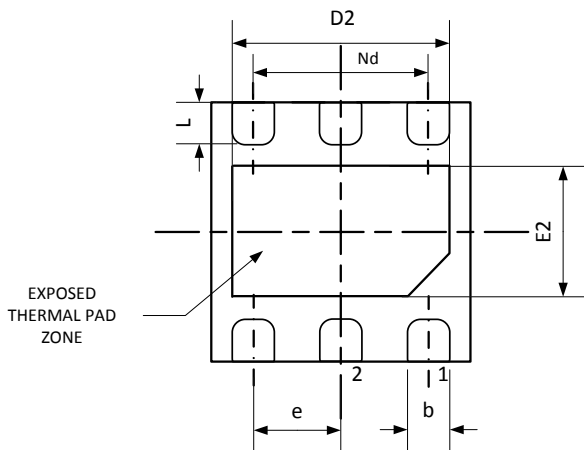
### DFN2020P6C

#### Package Diagrams

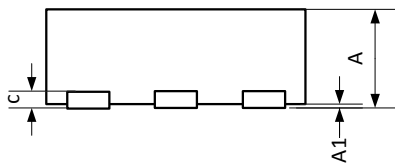
##### TOP VIEW



##### BOTTOM VIEW



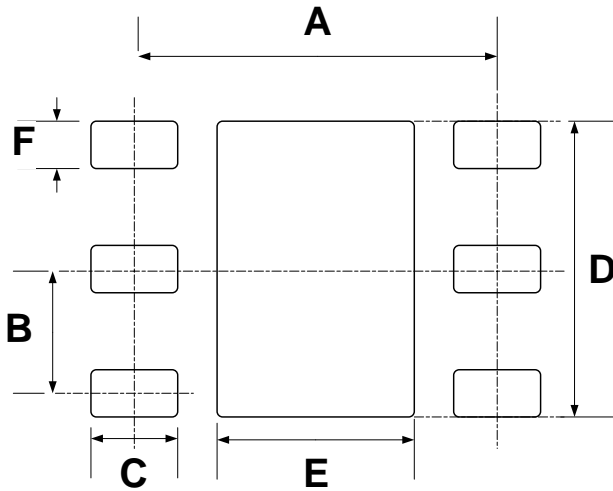
##### SIDE VIEW



#### Package Dimensions

Symbol	Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
A1	-	0.02	0.05
b	0.25	0.30	0.35
c	0.15	0.20	0.25
D	1.90	2.00	2.10
D2	1.50	1.60	1.70
e	0.65 BSC		
Nd	1.30 BSC		
E	1.90	2.00	2.10
E2	0.90	1.00	1.10
L	0.20	0.25	0.30

## Land Layout

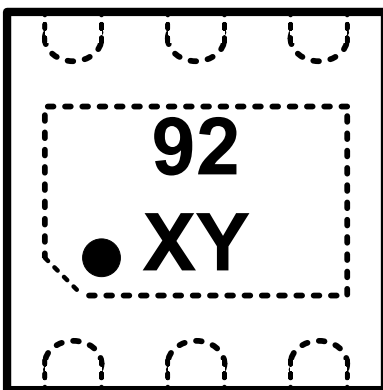


Dimensions		
Index	Millimeter	Inches
A	1.95	0.077
B	0.65	0.026
C	0.45	0.018
D	1.6	0.063
E	1	0.039
F	0.3	0.012

### 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
AZ4922-01F.R7G (Green Part)	92 XY

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

92 = Device Code  
X = Date Code ; Y = Control Code



### Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ4922-01F.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 2023/12/06	Formal Release.