

Features

- ESD protection for one line with uni-direction
- 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) 140A (8/20μs)
- Suitable for, **20V and below**, operating voltage applications
- 2.0mm x 1.8mm DFN package saves board space
- High surge protection
- 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

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

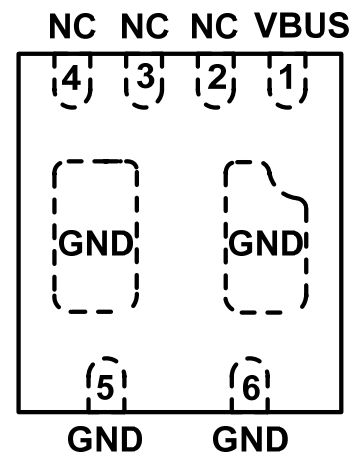
Description

AZ4920-01F 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 AZ4920-01F 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).

AZ4920-01F 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.

AZ4920-01F may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

Pin Configuration



DFN2018P6E (TOP View)

Circuit Diagram

Pin-1 (VBUS)



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)	140	A
Operating Voltage (Pin-1 to GND)	V_{DC}	21	V
ESD per IEC 61000-4-2 (Air)	V_{ESD-1}	± 30	kV
ESD per IEC 61000-4-2 (Contact)	V_{ESD-2}	± 30	kV
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}	Pin-1 to GND, $T = 25^\circ\text{C}$.			20	V
Reverse Leakage Current	I_{Leak}	$V_{RWM} = 20\text{V}$, $T = 25^\circ\text{C}$, pin-1 to GND.			0.5	μA
Reverse Breakdown Voltage	V_{BV}	$I_{BV} = 1\text{mA}$, $T = 25^\circ\text{C}$, pin-1 to GND.	21.8		24.5	V
Forward Voltage	V_F	$I_F = 15\text{mA}$, $T = 25^\circ\text{C}$, GND to pin-1.	0.5		1	V
Surge Clamping Voltage (Note 1)	$V_{CL-surge}$	$I_{PP} = 5\text{A}$, $t_p = 8/20\mu\text{s}$, $T = 25^\circ\text{C}$, pin-1 to GND.		24	26	V
		$I_{PP} = 100\text{A}$, $t_p = 8/20\mu\text{s}$, $T = 25^\circ\text{C}$, pin-1 to GND.		32	35	V
		$I_{PP} = 140\text{A}$, $t_p = 8/20\mu\text{s}$, $T = 25^\circ\text{C}$, pin-1 to GND.		36	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, pin-1 to GND.		23.5		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+8kV, $T = 25^\circ\text{C}$, contact mode, pin-1 to GND.		0.04		Ω
Channel Input Capacitance	C_{IN}	$V_{IN} = 0\text{V}$, $f = 1\text{MHz}$, $T = 25^\circ\text{C}$, pin-1 to GND.		650	800	pF

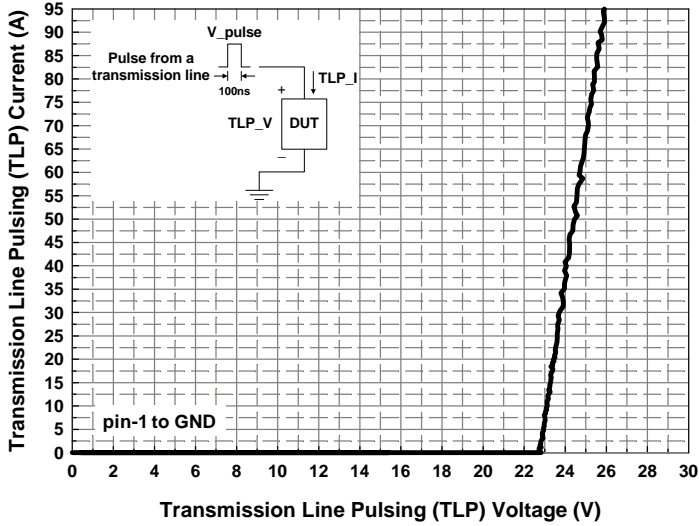
Note 1: The Peak Pulse Current measured conditions: $t_p = 8/20\mu\text{s}$, 2Ω source impedance.

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

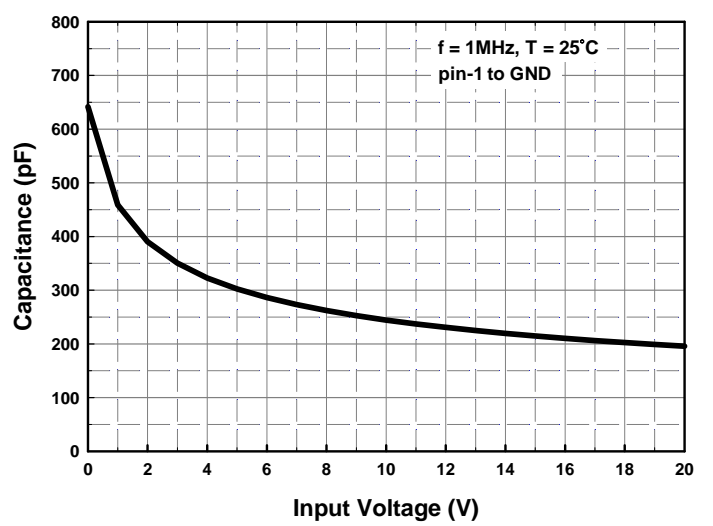
TLP conditions: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 1\text{ns}$.

Typical Characteristics

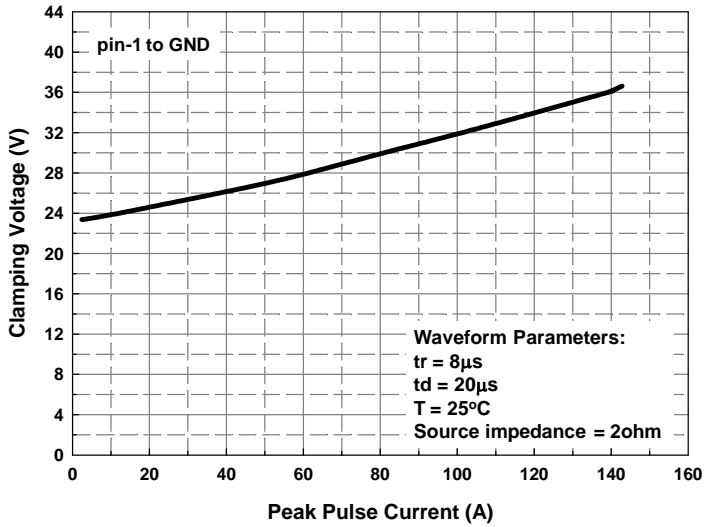
Transmission Line Pulsing (TLP) Measurement



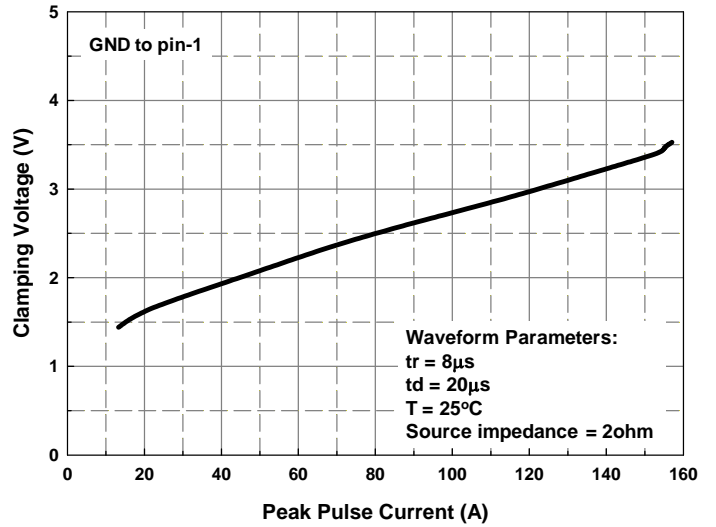
Typical Variation of C_{IN} vs. V_{IN}



Reverse Clamping Voltage vs. Peak Pulse Current



Forward Clamping Voltage vs. Peak Pulse Current



Application Information

The AZ4920-01F is designed to protect one line against system ESD/EFT/Lightning pulses by clamping them to an acceptable reference.

The usage of the AZ4920-01F is shown in Fig. 1. Protected lines, such as data lines, control lines, or power lines, are connected to pin-1. The pin-5, pin-6 and center tabs should be connected directly to a ground plane on the board. All path lengths connected to the pins of AZ4920-01F 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 AZ4920-01F.
- Place the AZ4920-01F 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.

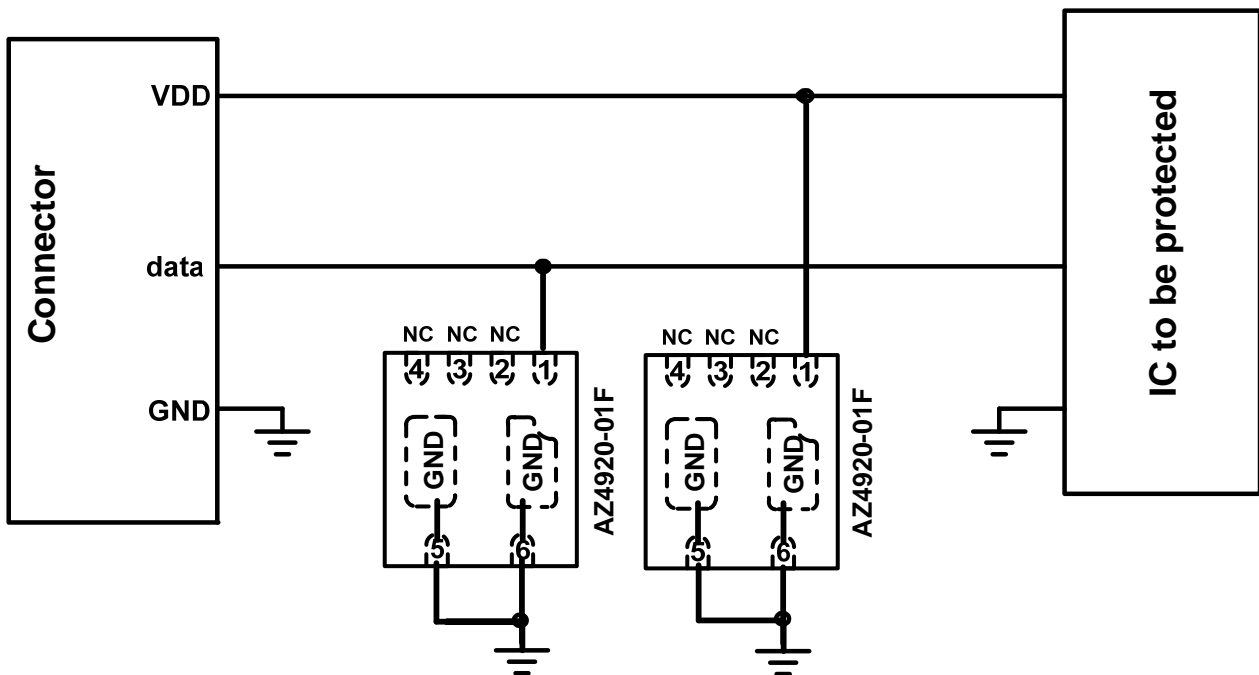


Fig. 1

Fig. 2 shows another simplified example of using low-speed data lines, and power lines from ESD AZ4920-01F to protect the control lines, transient stress.

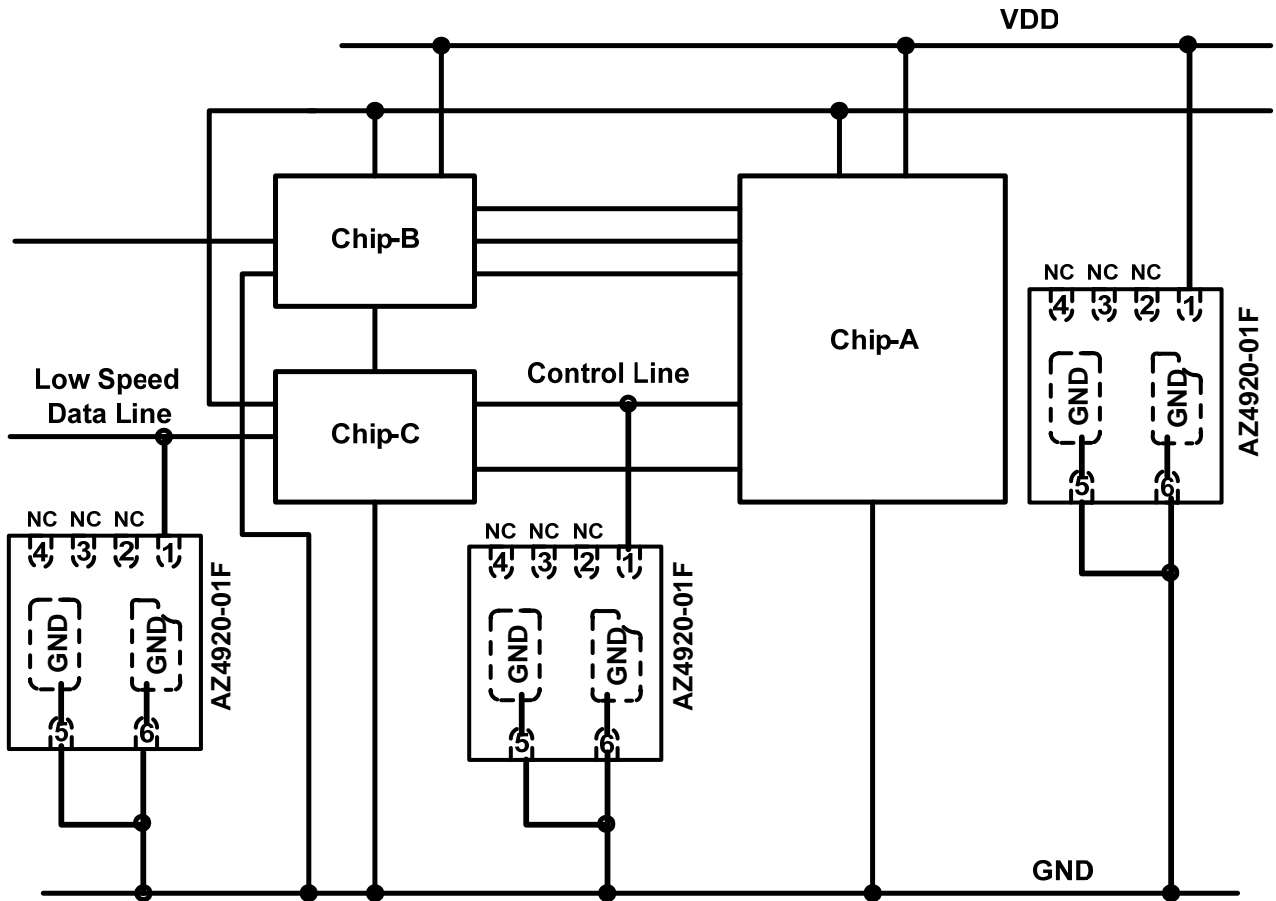


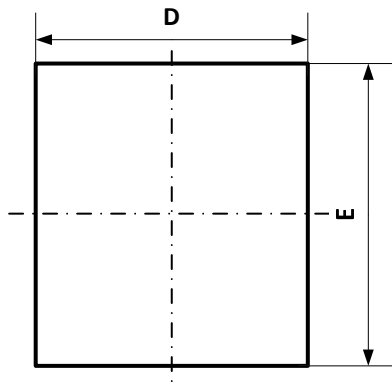
Fig. 2

Mechanical Details

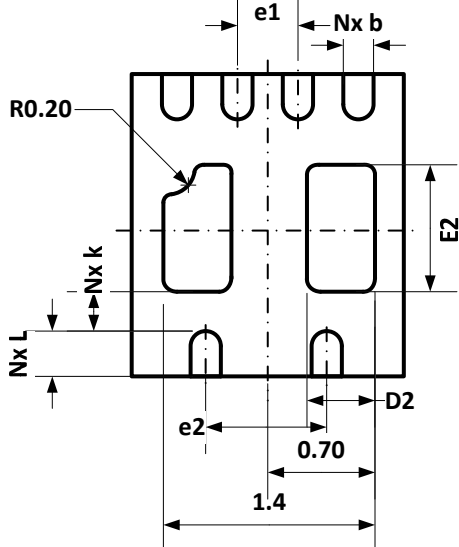
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Package Diagrams

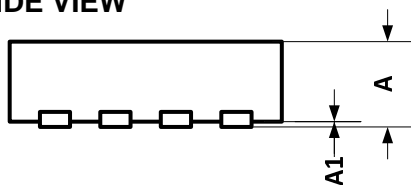
TOP VIEW



BOTTOM VIEW



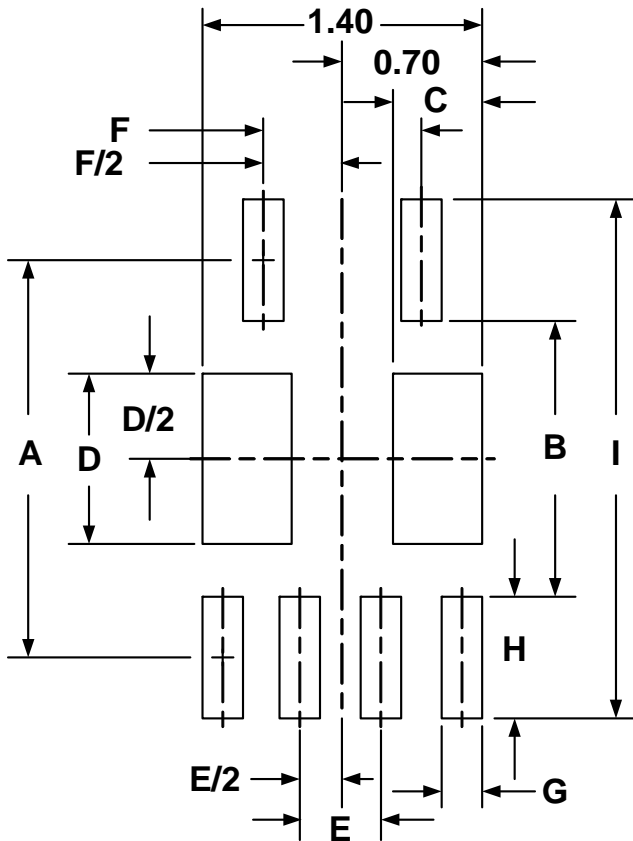
SIDE VIEW



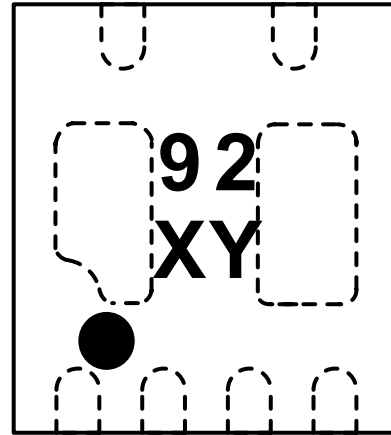
Package Dimensions

Symbol	Millimeters		
	Min.	Nom.	Max.
A	0.51	0.55	0.60
A1	0.00	0.02	0.05
b	0.15	0.20	0.25
D	1.70	1.80	1.90
E	1.90	2.00	2.10
D2	0.30	0.45	0.55
E2	0.69	0.84	0.94
L	0.25	0.30	0.35
k	0.20	-	-
e1	0.40 BSC		
e2	0.80 BSC		
N	6		

Land Layout



Marking code



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

Dimensions	
Index	Millimeter
A	1.95
B	1.35
C	0.45
D	0.84
E	0.40
F	0.80
G	0.20
H	0.60
I	2.55

Notes: This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

Part Number	Marking Code
AZ4920-01F.R7G (Green Part)	92 XY

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



Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ4920-01F.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 2021/05/25	Formal Release.