Features

- ESD Protect for 1 Line with Unidirectional.
- Provide ESD protection for a line to
  IEC 61000-4-2 (ESD) ±30kV (air/contact),
  IEC 61000-4-5 (Lightning) 58A (8/20μs)
- Suitable for, **20V and below,** operating voltage applications
- Ultra Small 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

- Power Supply Protection
- USB Power Delivery
- Cellular Handsets and Accessories
- Small Panel Modules
- PDA's
- Portable Devices
- Digital Cameras
- Touch Panels
- Notebooks and Handhelds
- Hard Disk Drive
- Peripherals

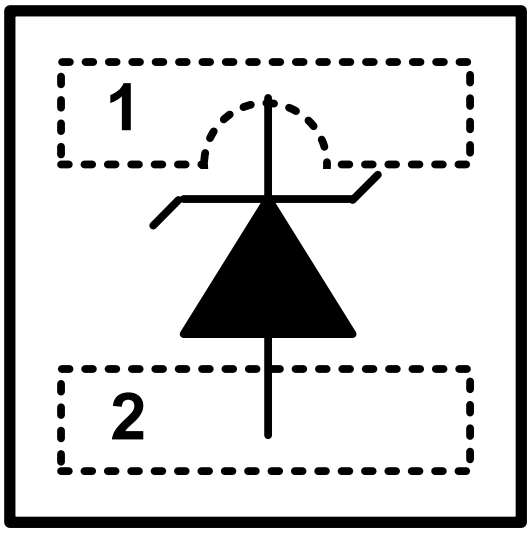
Description

AZ4020-01F is a design which includes a unidirectional surge rated clamping cell to protect one power line, or one control line, or one low speed data line in an electronic systems. The AZ4020-01F has been specifically designed to protect sensitive components which are connected to power and control lines from over-voltage damage and latch-up caused by Electrostatic Discharging (ESD), Electrical Fast Transients (EFT), Lightning, and Cable Discharge Event (CDE).

AZ4020-01F 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.

AZ4020-01F 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



DFN2020P2E (TOP View)
(2.0mm x 2.0mm x 0.5mm)

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	**SYMBOL**	**RATING**	**UNITS**
Peak Pulse Current (tp =8/20μs)	I_{PP-1} (Note 1) I_{PP-2} (Note 2)	100 58	A
Operating Supply Voltage (pin-1 to pin-2)	V_{DC}	22	V
pin-1 to pin-2 ESD per IEC 61000-4-2 (Air) pin-1 to pin-2 ESD per IEC 61000-4-2 (Contact)	V_{ESD-1} V_{ESD-2}	±30 ±30	kV kV
Lead Soldering Temperature	T_{SOL}	260 (10 sec.)	°C
Operating Temperature	T_{OP}	-55 to +85	°C
Storage Temperature	T_{STO}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS						
PARAMETER	**SYMBOL**	**CONDITIONS**	**MINI**	**TYP**	**MAX**	**UNITS**
Reverse Stand-Off Voltage	V_{RWM}	pin-1 to pin-2, T=25 °C.			20	V
Reverse Leakage Current	I_{Leak}	V_{RWM} = 20V, T=25 °C, pin-1 to pin-2.			0.2	μA
Reverse Breakdown Voltage	V_{BV}	I_{BV} = 1mA, T=25 °C, pin-1 to pin-2	22.8		28	V
Forward Voltage	V_F	I_F = 15mA, T=25 °C, pin-2 to pin-1	0.6	0.8	1.0	V
Surge Clamping Voltage (Note 2)	$V_{CL-surge}$	I_{PP}=5A, tp=8/20μs, T=25 °C, pin-1 to pin-2		24		V
		I_{PP}=58A, tp=8/20μs, T=25 °C, pin-1 to pin-2		31		V
ESD Clamping Voltage (Note 3)	V_{clamp}	IEC 61000-4-2 +8kV (I_{TLP} = 16A), T=25 °C, Contact mode, pin-1 to pin-2.		25		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+8kV, T=25 °C, Contact mode, pin-1 to pin-2.		0.04		Ω
Channel Input Capacitance	C_{IN}	V_R = 0V, f = 1MHz, T=25 °C, pin-1 to pin-2.		650	750	pF

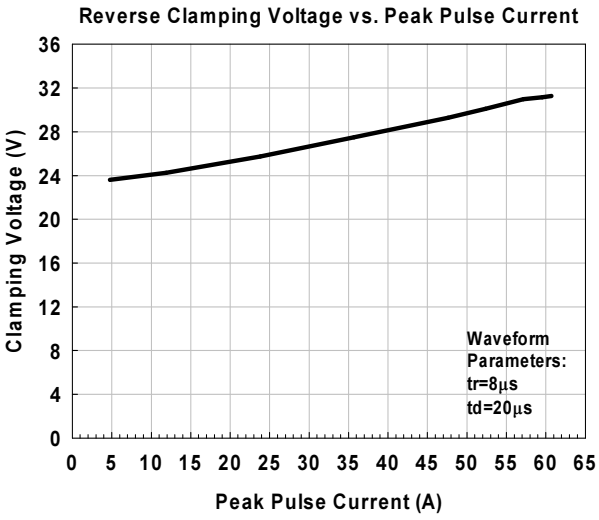
Note 1: The Peak Pulse Current measured conditions: t_p =8/20μs, 2Ω source impedance.

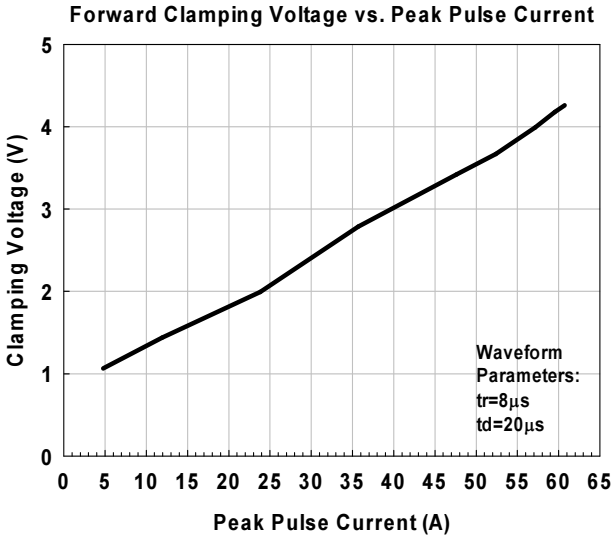
Note 2: The Peak Pulse Current measured conditions: t_p =8/20μs, 42Ω source impedance.

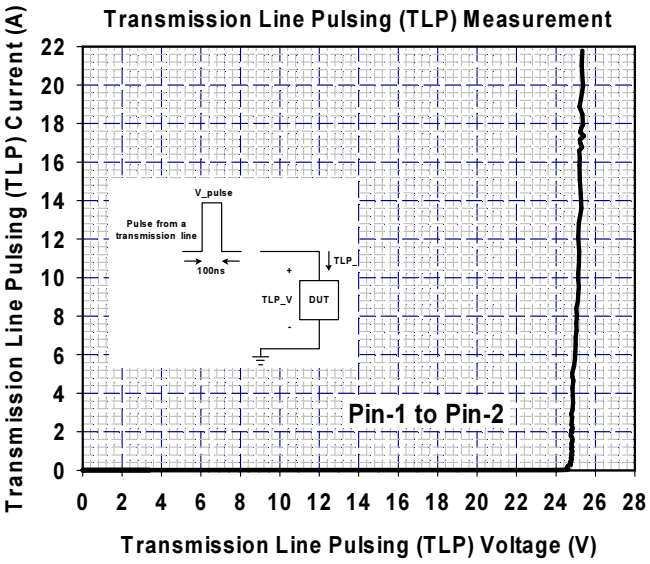
Note 3: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

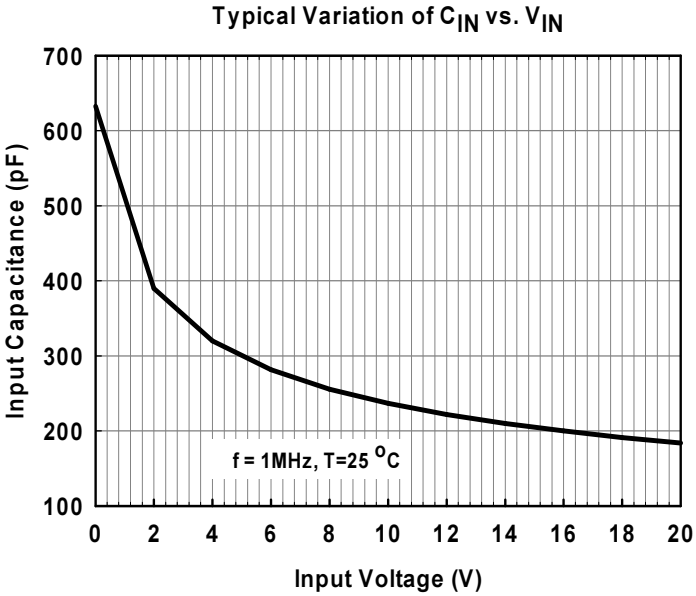
TLP conditions: Z_0= 50Ω, t_p= 100ns, t_r= 1ns.

Typical Characteristics









Applications

The AZ4020-01F is designed to protect one line against System ESD/EFT/Lightning pulses by clamping them to an acceptable reference.

The usage of the AZ4020-01F is shown in Fig. 1. Protected lines, such as data lines, control lines, or power lines, are connected at pin 1. The pin 2 should be connected directly to a ground plane on the board. All path lengths connected to the pins of AZ4020-01F 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, good circuit board is critical. Thus, the following guidelines are recommended:

- Minimize the path length between the protected lines and the AZ4020-01F.
- Place the AZ4020-01F 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.

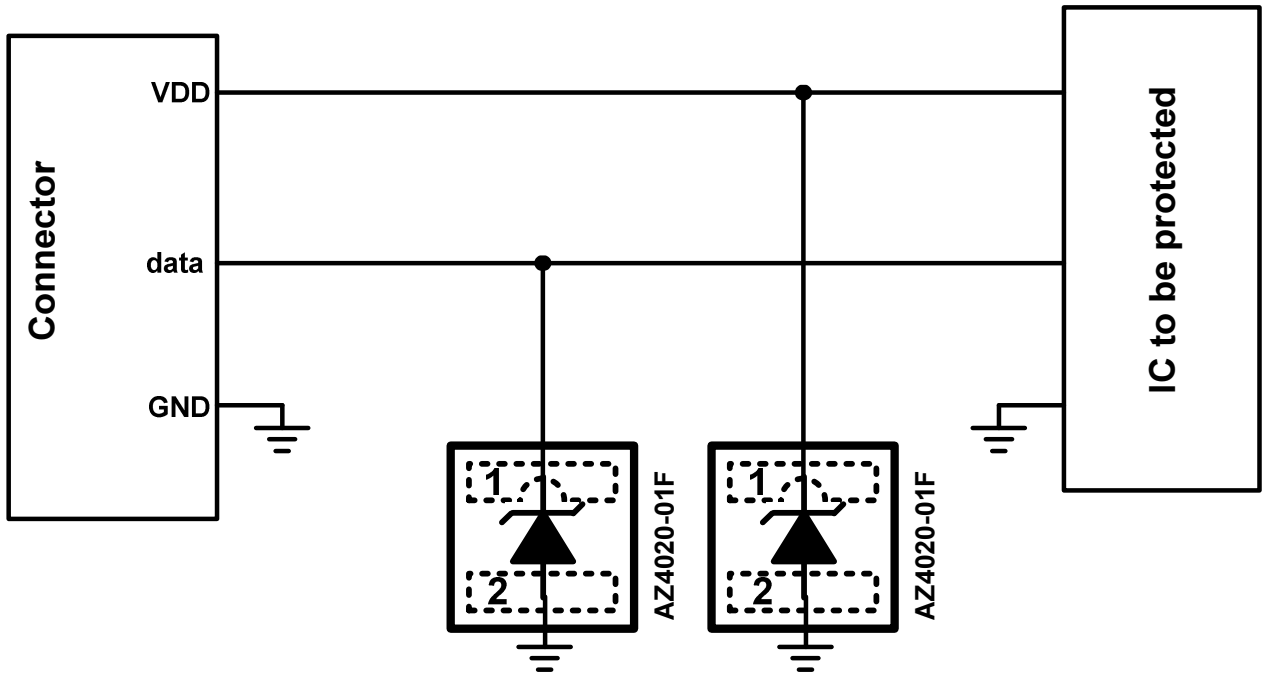


Fig. 1

Fig. 2 shows another simplified example of using AZ4020-01F to protect the control lines, low speed data lines, and power lines from ESD transient stress.

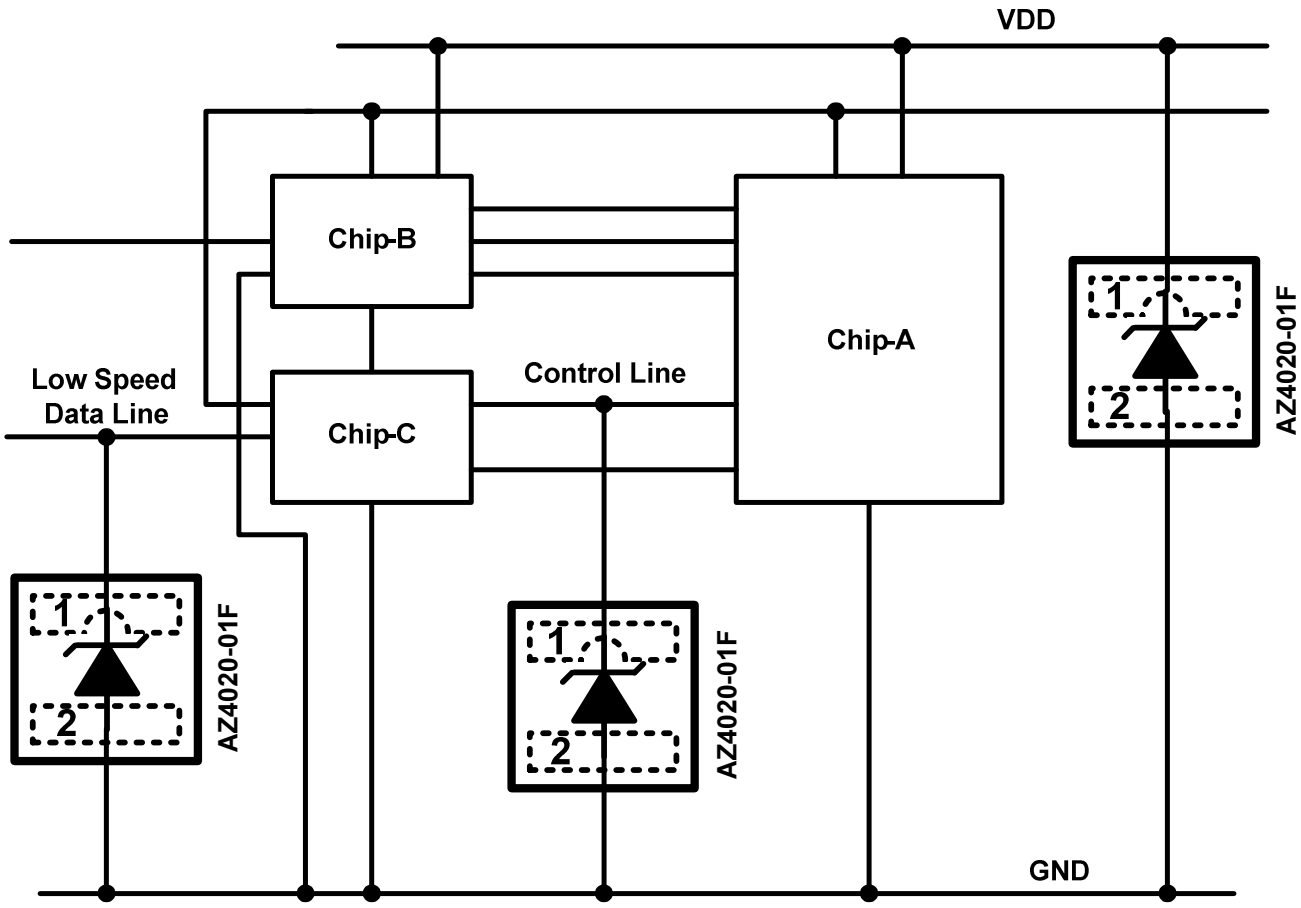
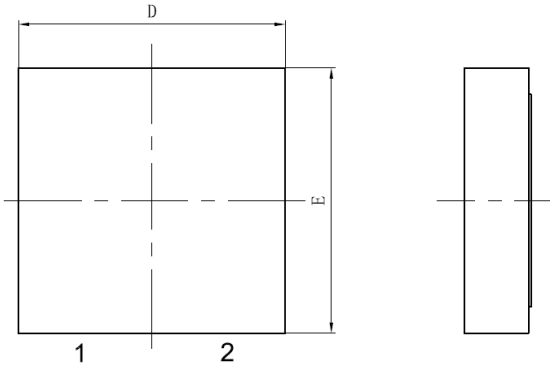


Fig. 2

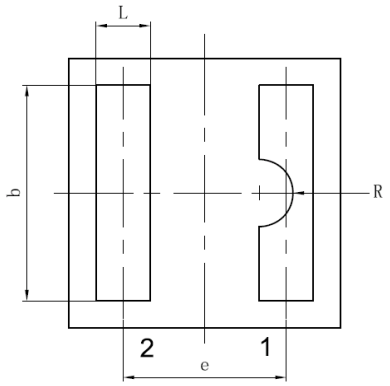
Mechanical Details

DFN2020P2E

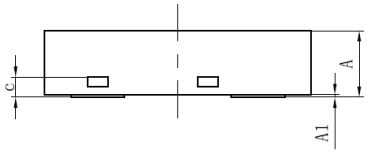
PACKAGE DIAGRAMS



TOP VIEW



BOTTOM VIEW

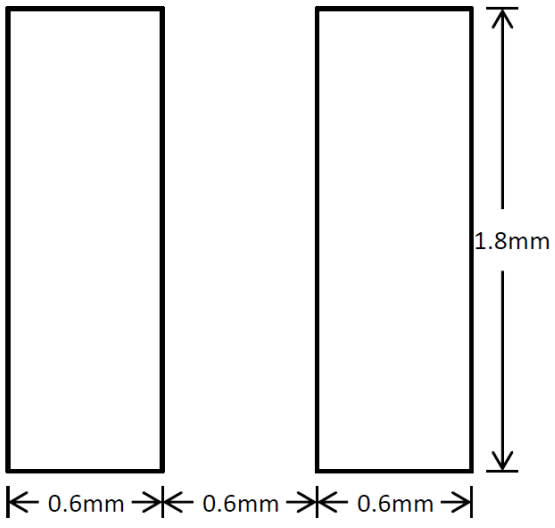


SIDE VIEW

PACKAGE DIMENSIONS

Symbol	Millimeters		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	-	0.02	0.05
b	1.55	1.60	1.65
c	0.10	0.15	0.20
D	1.90	2.00	2.10
e	1.20BSC		
E	1.90	2.00	2.10
L	0.35	0.40	0.45
R	0.20	0.25	0.30

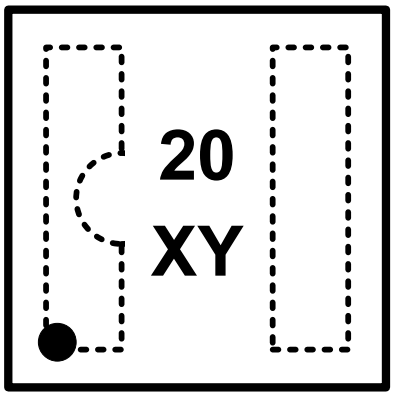
Land Layout



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



20 = Device Code
X = Date Code
Y = Control Code

Part Number	Marking Code
AZ4020-01F.R7G (Green Part)	20 XY

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

Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ4020-01F.R7G	Green	T/R	7 inch	3,000/reel	4 reel= 12,000/box	6 box =72,000/carton

Revision History

Revision	Modification Description
Revision 2014/11/28	Preliminary release.
Revision 2015/09/01	Add the ordering information.
Revision 2017/02/24	Formal release.