



## Features

- ESD Protect for 6 high-speed I/O channels
- Provide ESD protection for each channel to  
IEC 61000-4-2 (ESD)  $\pm 15\text{kV}$  (air)  
IEC 61000-4-2 (ESD)  $\pm 10\text{kV}$  (contact)
- **For low operating voltage of 1.5V and below**
- **Ultra low capacitance: 0.35pF typical**
- Fast turn-on and low clamping voltage
- Array of ESD rated diodes with internal equivalent TVS (Transient Voltage Suppression) diode
- Solid-state silicon-avalanche and active circuit triggering technology
- Simplified layout for high-speed differential signaling channels
- **Green part**

## Applications

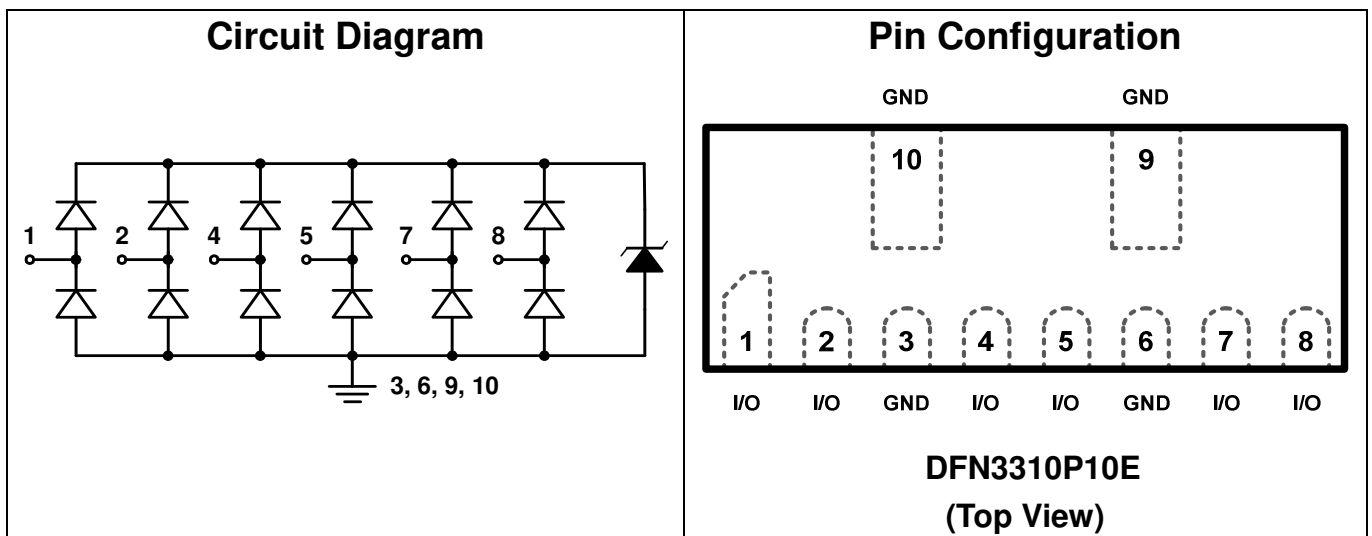
- Thunderbolt interface
- Consumer Electronics
- Mobile Devices

## Description

AZ108S-06F is a design which includes ESD rated clamping cell arrays to protect high speed data interfaces. The AZ108S-06F has been specifically designed to protect sensitive components which are connected to data and transmission lines from over-voltage damage caused by Electrostatic Discharging (ESD).

AZ108S-06F is a unique design which includes ESD rated, ultra low capacitance steering diodes and a unique design of clamping cell which is an equivalent TVS diode in a single package. During transient conditions, the steering diodes direct the transient to either the internal ESD line or ground line. The internal unique design of clamping cell prevents over-voltage on the internal ESD line and on the I/O line, which is protecting any downstream components.

AZ108S-06F 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).





## SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	SYMBOL	RATING	UNITS
Operating Supply Voltage (I/O pin to GND)	$V_{DC}$	1.65	V
ESD per IEC 61000-4-2 (Air)	$V_{ESD-1}$	±15	kV
ESD per IEC 61000-4-2 (Contact)	$V_{ESD-2}$	±10	
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	$V_{RWM}$	I/O pin to Ground, $T = 25\text{ }^{\circ}\text{C}$ .			1.5	V
Reverse Leakage Current	$I_{CH-Leak}$	$V_{RWM} = 1.5\text{V}$ , $V_{GND} = 0\text{V}$ , I/O pin to Ground, $T = 25\text{ }^{\circ}\text{C}$ .			0.5	$\mu\text{A}$
Reverse DC Breakdown Voltage	$V_{BV}$	$I_{BV} = 1\text{mA}$ , I/O pin to Ground, $T = 25\text{ }^{\circ}\text{C}$ .	4.5		7.5	V
Forward Voltage	$V_F$	$I_F = 15\text{mA}$ , Ground to I/O pin, $T = 25\text{ }^{\circ}\text{C}$ .	0.6		1.2	V
ESD Clamping Voltage (Note 1)	$V_{clamp}$	IEC 61000-4-2 +8kV ( $I_{TLP} = 16\text{A}$ ), Contact mode, I/O pin to Ground, $T = 25\text{ }^{\circ}\text{C}$ .		7.0		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+8kV, $T = 25\text{ }^{\circ}\text{C}$ , Contact mode, I/O pin to Ground.		0.3		$\Omega$
Channel Input Capacitance	$C_{IN}$	$V_{GND} = 0\text{V}$ , $V_{IN} = 1.0\text{V}$ , $f = 1\text{MHz}$ , $T = 25\text{ }^{\circ}\text{C}$ , any I/O pin to Ground.		0.35	0.5	pF
Channel to Channel Input Capacitance	$C_{CROSS}$	$V_{GND} = 0\text{V}$ , $V_{IN} = 1.0\text{V}$ , $f = 1\text{MHz}$ , $T = 25\text{ }^{\circ}\text{C}$ , between I/O pins.		0.03	0.08	pF

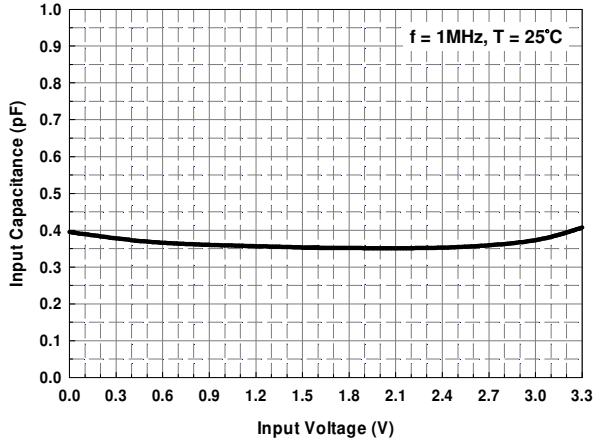
Note 1: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

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

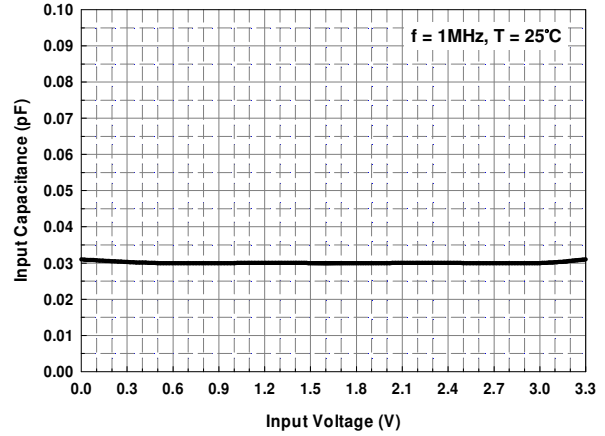


## Typical Characteristics

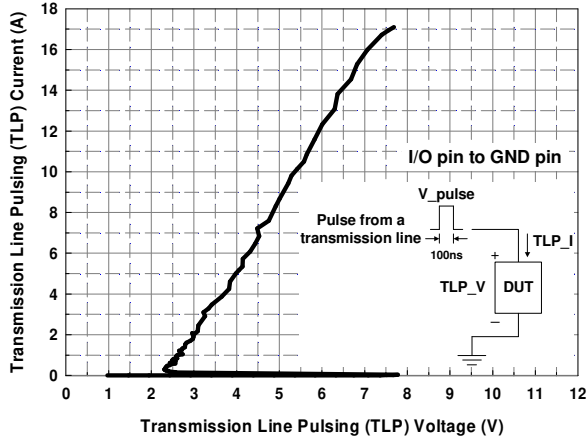
Typical Variation of  $C_{IN}$  vs.  $V_{IN}$



Typical Variation of  $C_{IO-to-IO}$  vs.  $V_{IN}$



Transmission Line Pulsing (TLP) Measurement



## Applications Information

### A. Device Connection

The AZ108S-06F is designed to protect 6 high-speed data lines from transient over-voltage (such as ESD stress pulse). The device connection of AZ108S-06F is shown in the Fig. 1. In Fig. 1, the 6 protected high-speed data lines are connected to the ESD protection pins (pin1, pin2, pin4, pin5, pin7 and pin8) of AZ108S-06F. The AZ108S-06F is designed for allowing the

traces to run straight through the device to simplify the PCB layout. The ground pin (pin3, pin6, pin9 and pin10) of AZ108S-06F is a negative reference pin. This pin should be directly connected to the GND rail of PCB. To get minimum parasitic inductance, the path length should keep as short as possible.

AZ108S-06F can provide ESD protection for 6 I/O signal lines simultaneously. If the number of I/O signal lines is less than 6, the unused I/O pins can be simply left as NC pins.

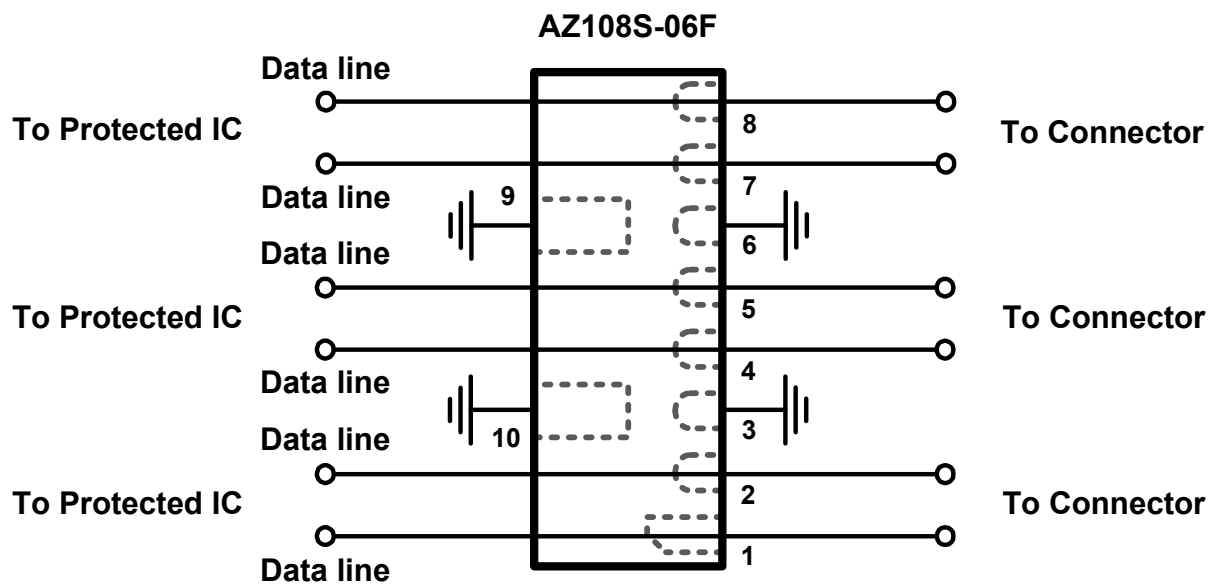
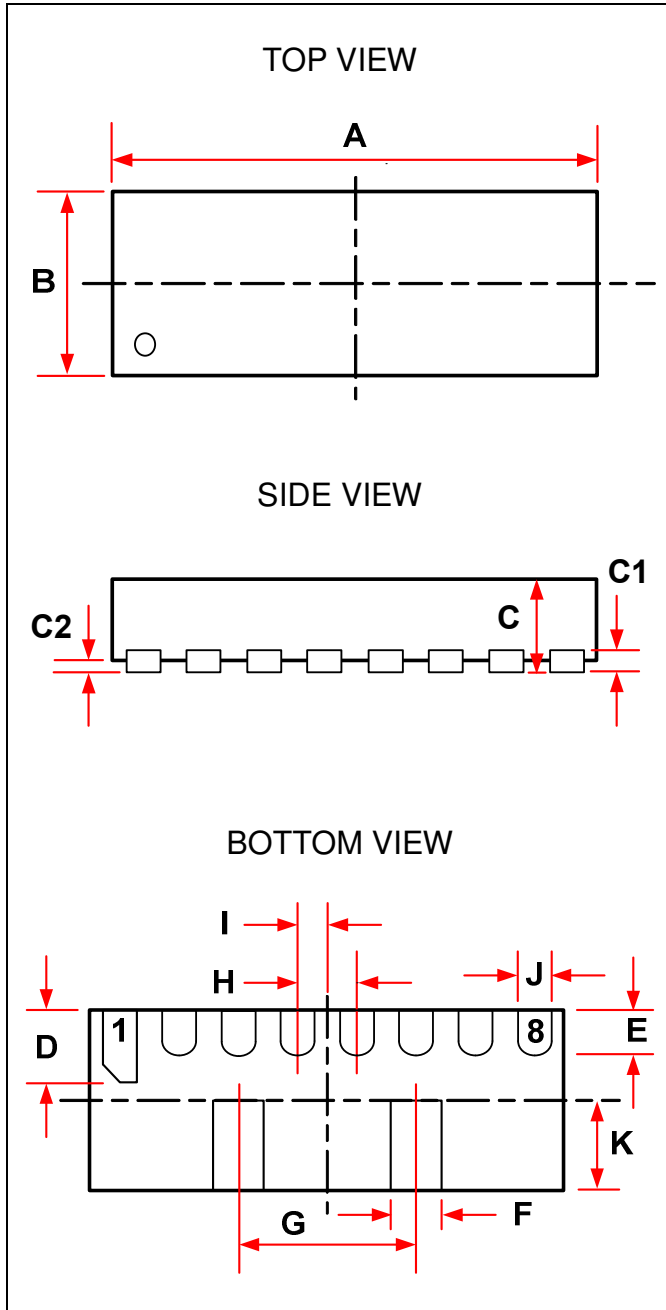


Fig. 1 Data lines connection of AZ108S-06F.



## Mechanical Details

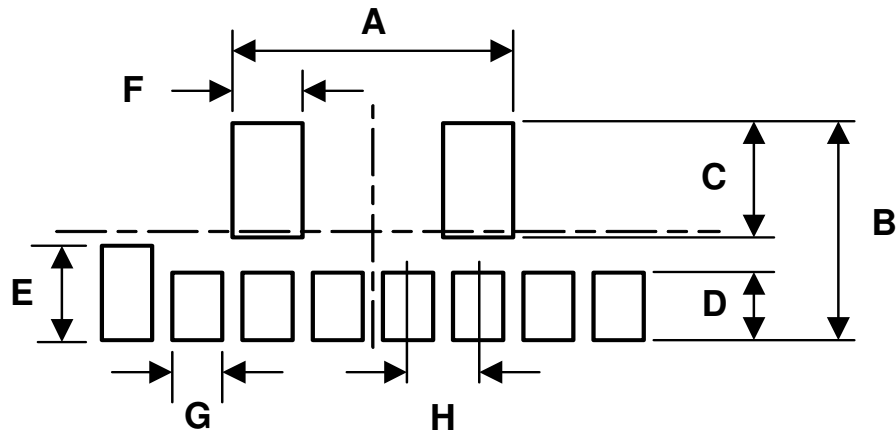
**DFN3310P10E**  
**PACKAGE DIAGRAMS**



**PACKAGE DIMENSIONS**

SYMBOL	Millimeters		
	MIN.	NOM.	MAX.
<b>A</b>	3.250	3.300	3.350
<b>B</b>	0.950	1.000	1.050
<b>C</b>	0.450	0.500	0.550
<b>C1</b>	0.152 REF		
<b>C2</b>	0.000	0.020	0.050
<b>D</b>	0.300	0.350	0.400
<b>E</b>	0.200	0.250	0.300
<b>F</b>	0.300	0.350	0.400
<b>G</b>	1.190 BSC		
<b>H</b>	0.400 BSC		
<b>I</b>	0.200 BSC		
<b>J</b>	0.150	0.200	0.250
<b>K</b>	0.450	0.500	0.550

## LAND LAYOUT

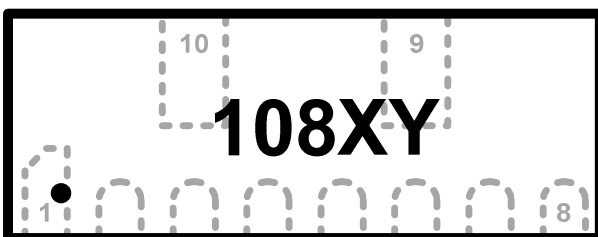


### Notes:

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

Dimensions	
Index	Millimeters
<b>A</b>	1.66
<b>B</b>	1.20
<b>C</b>	0.65
<b>D</b>	0.40
<b>E</b>	0.50
<b>F</b>	0.50
<b>G</b>	0.25
<b>H</b>	0.40

## MARKING CODE



108=Device Code

X=Date Code

Y=Control Code

Part Number	Marking Code
AZ108S-06F.R7G (Green Part)	108XY

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



### Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ108S-06F.R7G	Green	T/R	7 inch	3,000/reel	3 reels = 9,000/box	6 boxes = 54,000/carton

### Revision History

Revision	Modification Description
Revision 2014/07/30	Preliminary Release.
Revision 2016/06/16	<ol style="list-style-type: none"> <li>1. Add the max. value of Reverse DC Breakdown Voltage.</li> <li>2. Update the ESD Clamping Voltage and add the ESD Dynamic Turn-on Resistance.</li> <li>3. Update the Package Dimensions.</li> <li>4. Formal Release.</li> </ol>
Revision 2017/05/22	Update Ordering Information.