



## 0.08 General Description

The AFE1065P is a 7-channel ultra low capacitance rail clamp ESD protection diodes array. Each channel consists of a pair of ESD diodes that steer positive or negative ESD current to either the positive or negative rail. A Zener diode is integrated in to the array between the positive and negative supply rails.

In the typical applications, the negative rail pin (assigned as GND) is connected with system ground. The Positive ESD current is steered to the ground through an ESD diode and Zener diode and the positive ESD voltage is clamped to the Zener voltage.

The AFE1065P is idea to protect high speed data lines.

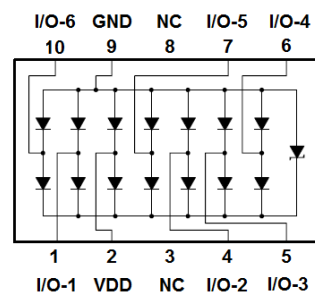
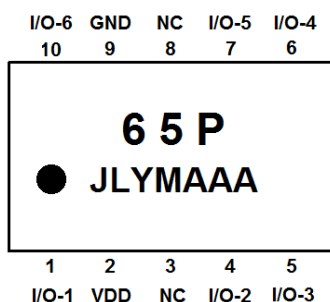
## Features

- 7 channels of ESD protection
- Provides ESD protection to IEC61000-4-2 level 4  
±15 KV air discharge  
± 8 KV contact discharge
- Channel I/O to GND capacitance: 0.4pF(Max)
- Channel I/O to I/O capacitance: 0.25pF(Max)
- Low clamping voltage
- 5V low operating voltage
- Improved Zener structure
- DFN-10-4.1X2X0.5-0.80 package
- ROHS compliant

## Application

- High Speed Communication Line Protection
- USB 3.0 Power and Data Line Protection
- Monitors and Flat Panel Displays Notebook Computers
- Video Line Protection & Base Stations
- HDSL, IDSL Secondary IC Side Protection
- Microcontroller Input Protection
- LCD and camera modules
- 10/100/1000 Ethernet

## Pin Description ( DFN-10-4.1X2X0.5-0.80 )



## Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFE1065PFN10RG	65PM	DFN-10-4.1X2X0.5-0.80	Tape & Reel	3000 EA

- ※ 65P : Product Code
- ※ J : Factory Code
- ※ L : Halogen- Free Code
- ※ Y : Year Code
- ※ M : Month Code
- ※ AAA : Lot Code
- ※ AFE1065PFN10RG : 7" Tape & Reel ; Pb- Free ; Halogen- Free



**ABSOLUTE MAXIMUM RATINGS**

(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Peak Pulse Power ( t <sub>p</sub> = 8/20 μs )	P <sub>pk</sub>	150	W
Peak Pulse Current ( t <sub>p</sub> = 8/20 μs )	I <sub>PP</sub>	5	A
ESD per IEC 61000 – 4 – 2 (Air )	V <sub>ESD1</sub>	±15	KV
ESD per IEC 61000 – 4 – 2 (Contact )	V <sub>ESD2</sub>	±8	KV
Operating Junction Temperature	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C

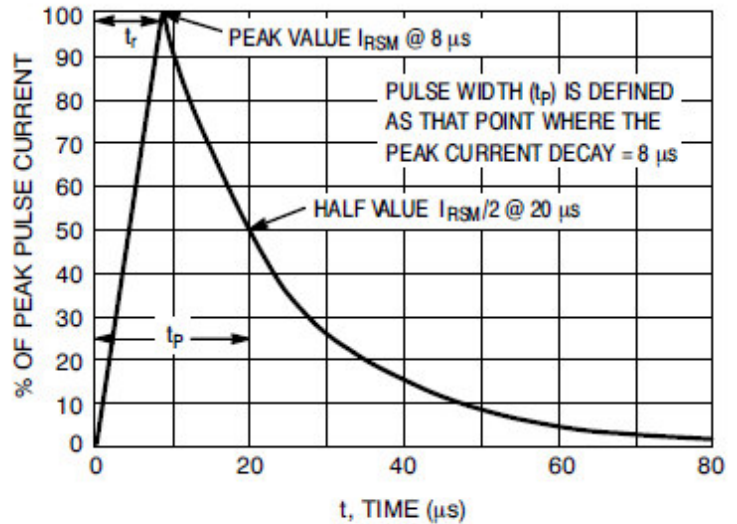
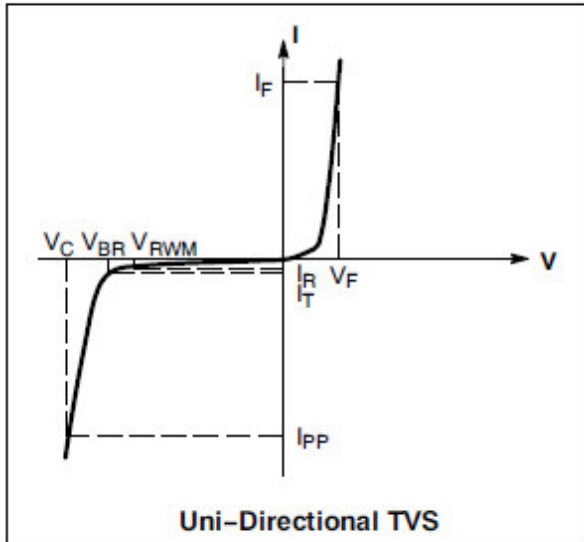
**ELECTRICAL CHARACTERISTICS**

(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Reverse Working Voltage	V <sub>RWM</sub>	Any Pin to GND			5	V
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>t</sub> = 1mA Any Pin to GND	6			V
Reverse Leakage Current	I <sub>R</sub>	V <sub>RWM</sub> = 5V , T=25°C Any Pin to GND			1	μA
Positive Clamping Voltage	V <sub>C1</sub>	I <sub>PP</sub> = 1A , t <sub>p</sub> = 8/20 μs Positive pulse Any Pin to GND		8.5	12	V
Negative Clamping Voltage	V <sub>C2</sub>	I <sub>PP</sub> = 1A , t <sub>p</sub> = 8/20 μs Negative pulse Any Pin to GND		1.8		V
Junction Capacitance Between Channel	C <sub>j1</sub>	V <sub>R</sub> = 0V , f = 1MHz Between I/O Pin		0.2	0.25	pF
Junction Capacitance Between I/O to GND	C <sub>j2</sub>	V <sub>R</sub> = 0V , f = 1MHz Any Pin to GND			0.4	pF



**Electrical Parameter**



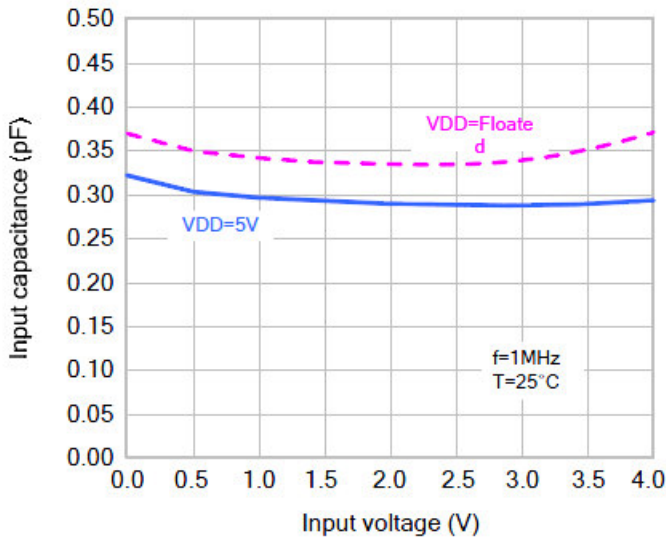
**Figure 1. 8 X 20  $\mu$ s Pulse Waveform**

Symbol	Parameter
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$V_{RWM}$	Working Peak Reverse Voltage
$I_R$	Maximum Reverse Leakage Current @ $V_{RWM}$
$I_T$	Test Current
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$

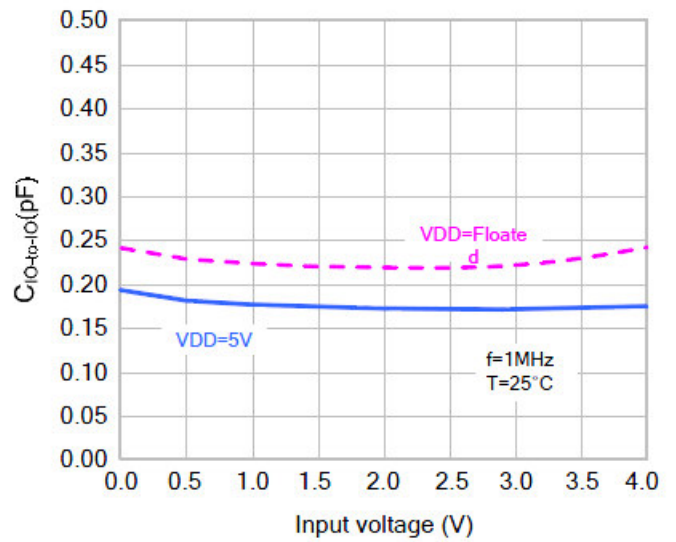


## Typical Characteristics

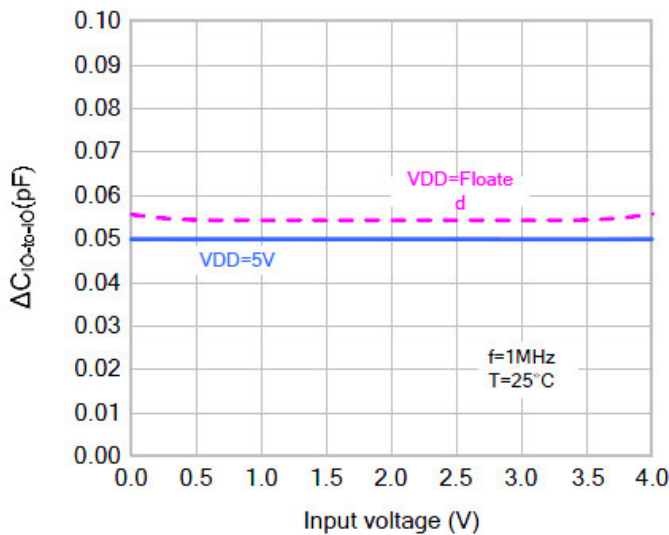
Typical curve of  $C_{IN}$  following  $V_{IN}$



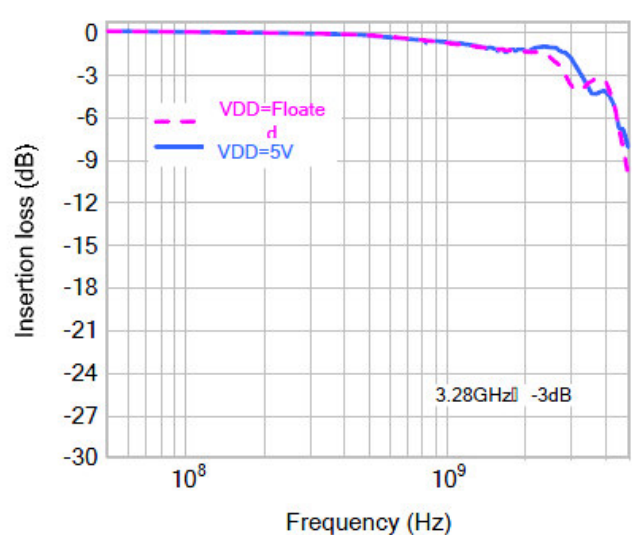
Typical curve of  $C_{I/O-to-I/O}$  following  $V_{IN}$



Typical curve of  $\Delta C_{I/O-to-I/O}$  following  $V_{IN}$



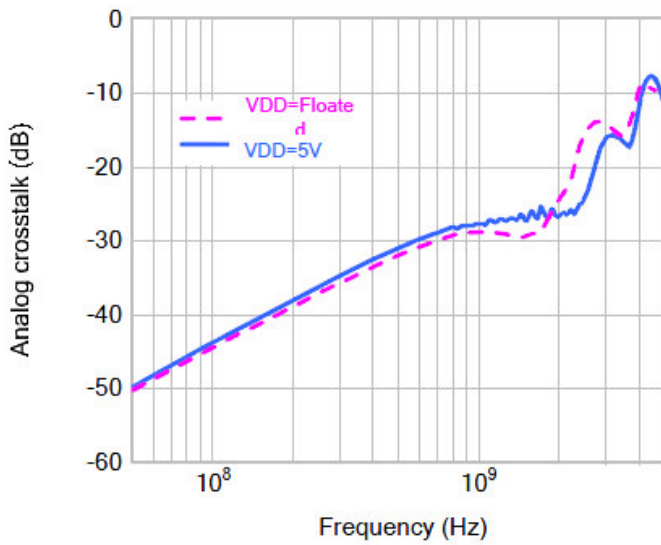
Insertion loss  $S_{21}(I/O-to-GND)$



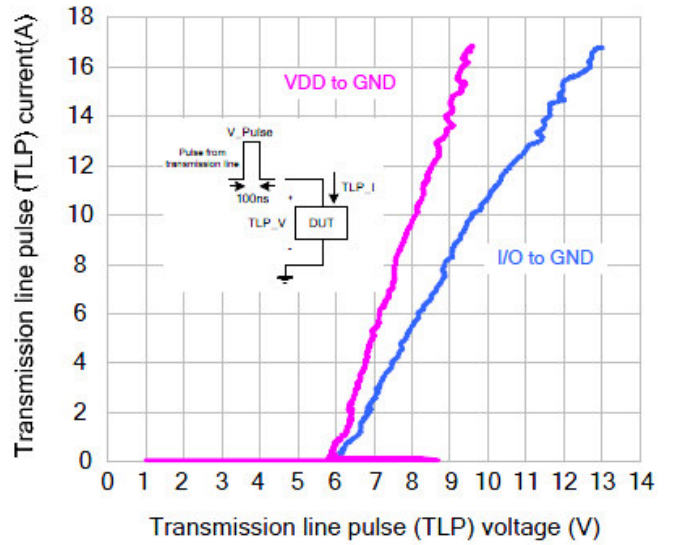


**Typical Characteristics**

Analog crosstalk

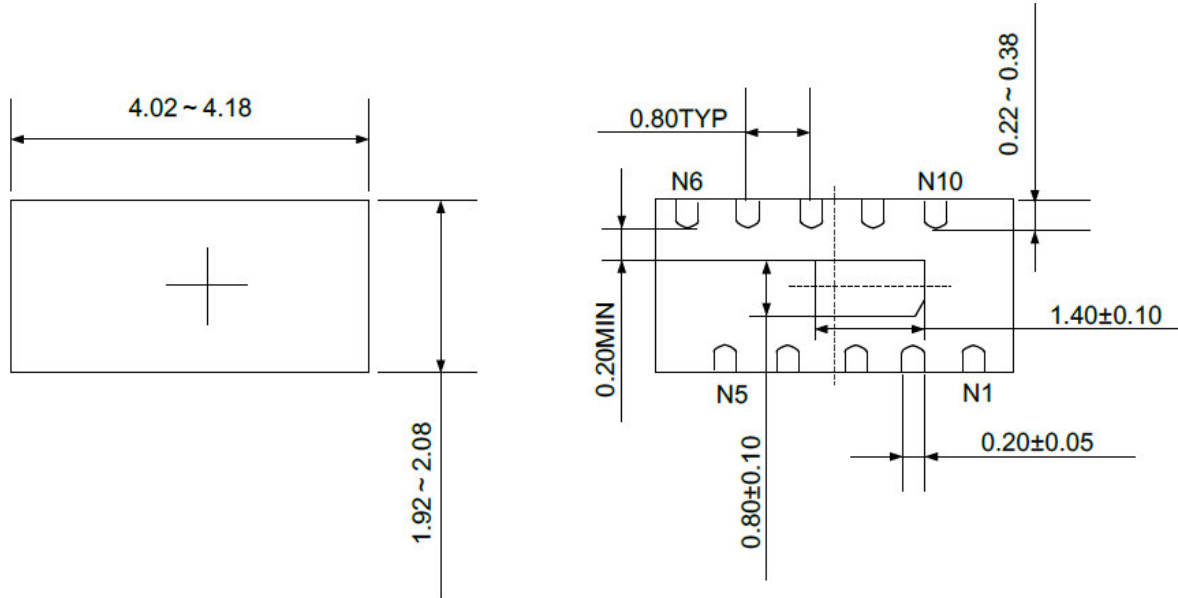


Transmission line pulse (TLP)



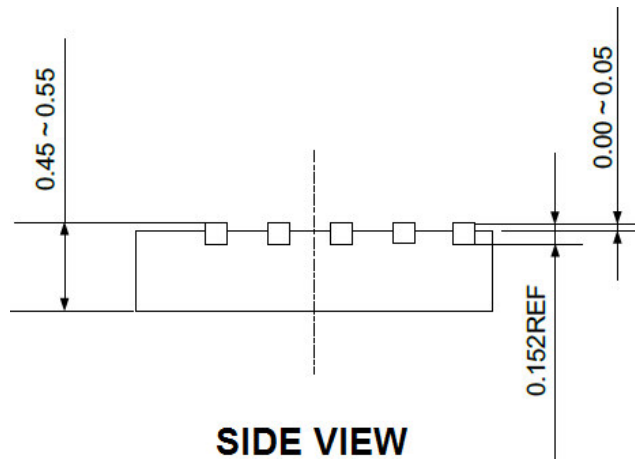


**Package Information ( DFN-10-4.1X2X0.5-0.80 )**



**TOP VIEW**

**BOTTOM VIEW**



**SIDE VIEW**

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