Alfa-MOS Technology

AFE1025Q

2-Line ESD Protection
Low Capacitance Bi-direction TVS

General Description

The AFE1025Q is a 2-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 respectively positive or negative rail. And the capacitance of channel to ground is 1.2pF. A zener diode is integrated in the array between the positive and negative supply rails. In the typical applications, the negative rail pin is connected with the ground of the circuit protected. Thus, the positive ESD current is steered to the ground through the internal zener diode to protect the power supply of the circuit protected. AFE1025Q is ideal to protect high speed data lines.

Features

- 2-channel ESD protection
- Provide ESD protection meeting IEC61000-4-2(ESD)

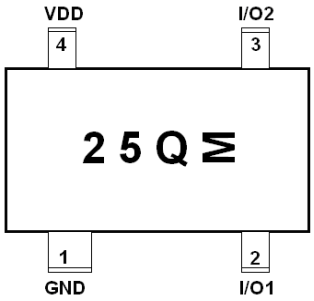
  ±15 KV air discharge
  ±10 KV contact discharge

- Super low capacitance between input and ground is no more than 1.4 pF
- Capacitance between I/O pins is no more than 0.7pF
- Low clamping voltage
- 5V low operating voltage
- Reliable silicon device avalanche breakdown structure
- Optimized package for easy high speed data lines PCB layout

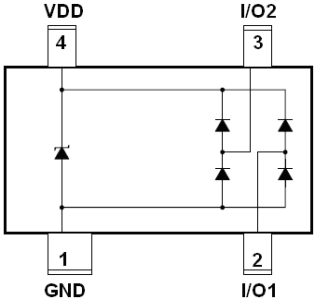
Application

- USB 2.0 Power and Data Line Protection
- Monitors and Flat Panel Displays
- Digital Visual Interface (DVI)
- 10/100/1000 Ethernet
- Video Graphics Cards
- Set-top box

Pin Description (SOT-143)



Schematic & PIN Configuration(SOT-143)



Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFE1025QS14RG	25QM	SOT-143	Tape & Reel	3000 EA

※ 25Q Parts Code
※ M Month Code
※ AFE1025QS14RG : 7” Tape & Reel ; Pb- Free ; Halogen- Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Peak Pulse Power (t_p = 8/20 μs)	P_{pk}	150	W
Peak Pulse Current (t_p = 8/20 μs)	I_{PP}	5	A
ESD per IEC 61000 – 4 – 2 (Air)	V_{ESD1}	±15	KV
ESD per IEC 61000 – 4 – 2 (Contact)	V_{ESD2}	±12	KV
Operating Junction Temperature	T_J	-55 ~ 125	℃
Storage Temperature Range	T_{STG}	-55 ~ 150	℃

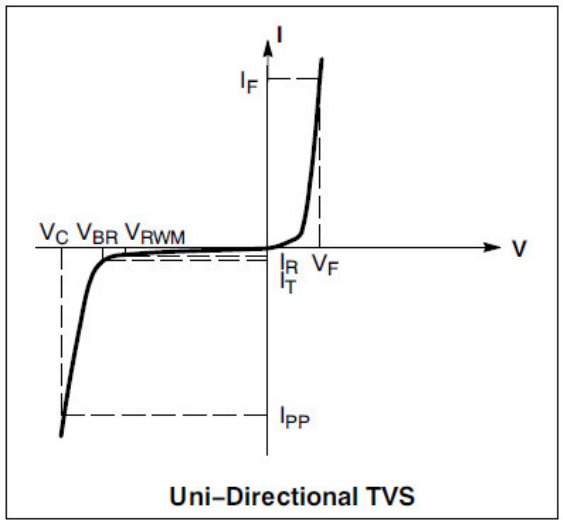
ELECTRICAL CHARACTERISTICS

(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Reverse Working Voltage	V_{RWM}	Any Pin to GND			5	V
Forward Voltage	V_F	I_F =10mA	0.4	0.8	1.5	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA Any Pin to GND	6			V
Reverse Leakage Current	I_R	V_{RWM} = 5V , T=25℃ Any Pin to GND		0.03	1	μA
Positive Clamping Voltage	V_{C1}	I_{PP} = 1A , tp = 8/20 μs Positive pulse Any Pin to GND		8.5	12	V
Negative Clamping Voltage	V_{C2}	I_{PP} = 1A , tp = 8/20 μs Negative pulse Any Pin to GND		1.8		V
Junction Capacitance Between Channel	C_{j1}	V_R = 0V , f = 1MHz Between I/O Pin		0.6	0.7	pF
Junction Capacitance Between I/O to GND	C_{j2}	V_R = 0V , f = 1MHz Any Pin to GND		1.2	1.4	pF

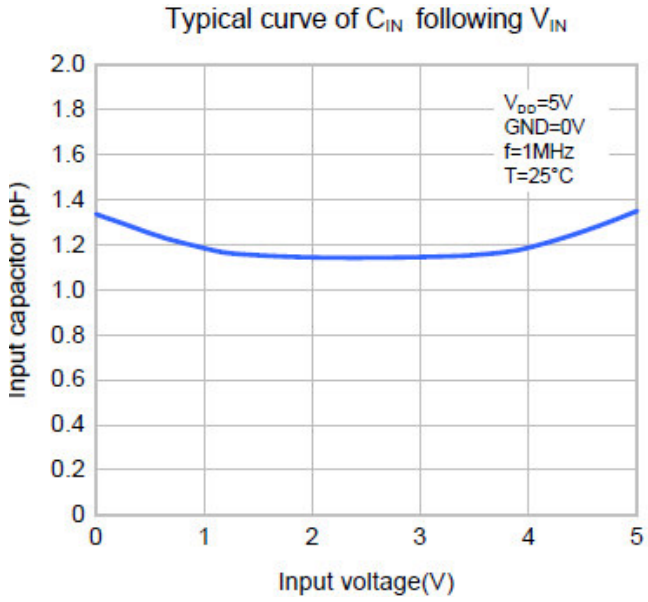
Electronics Parameter

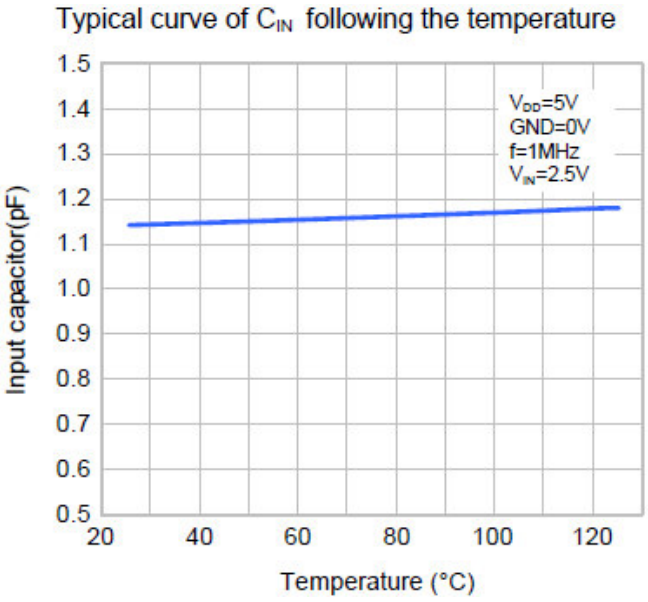
Symbol	Parameter
Vrwm	Peak Reverse Working Voltage
Ir	Reverse Leakage Current @ Vrwm
Vbr	Breakdown Voltage @ It
It	Test Current
Ipp	Maximum Reverse Peak Pulse Current
Vc	Clamping Voltage @ Ipp
Ppk	Peak Power Dissipation
C	Junction Capacitance
If	Forward Current
Vf	Forward Voltage @ If



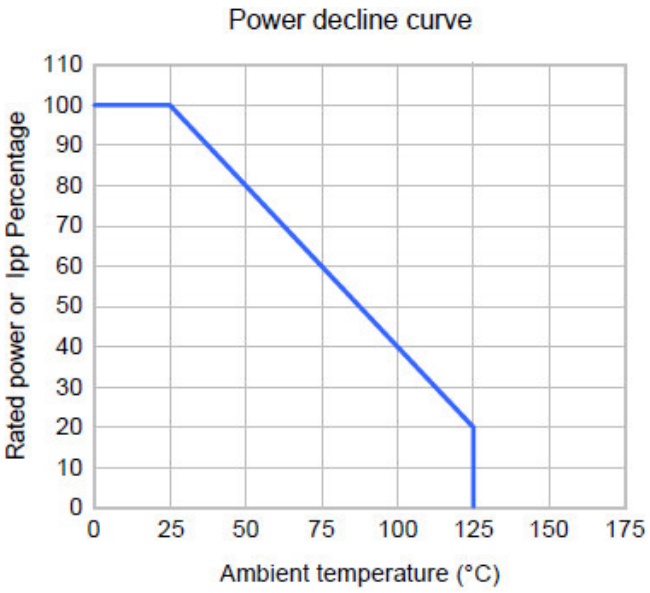
Uni-Directional TVS

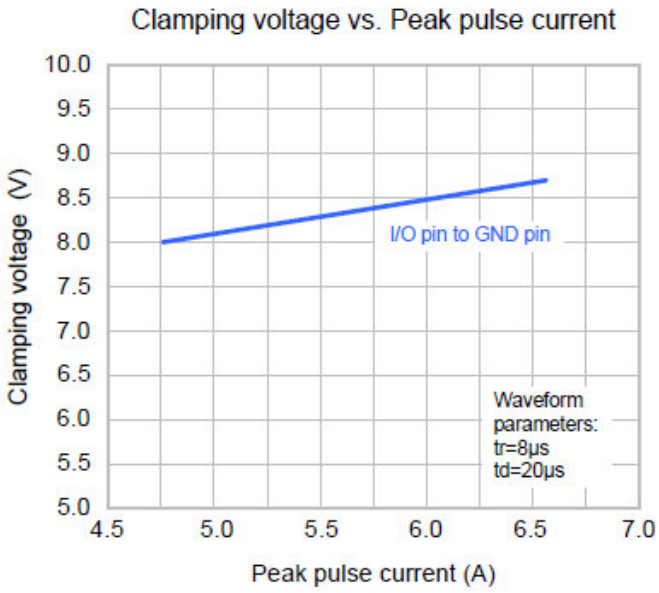
Typical Characteristics

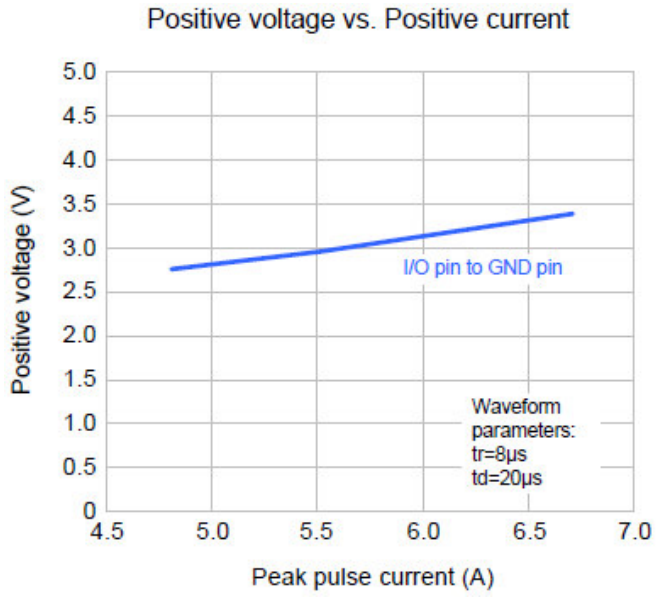


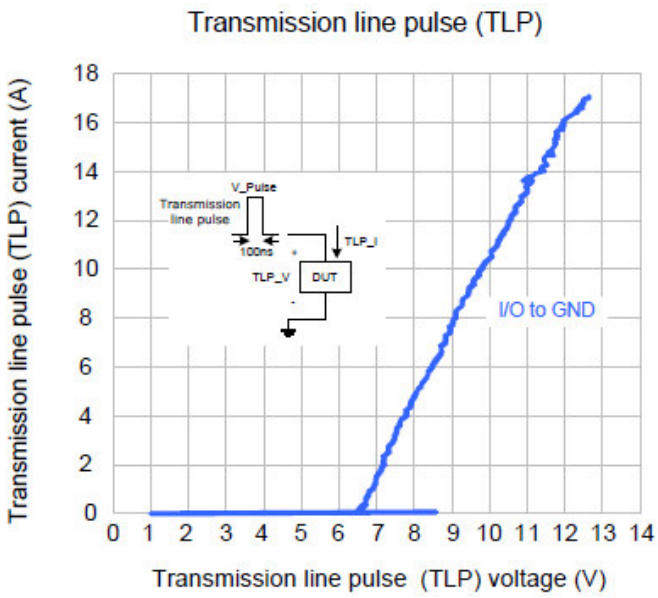


Typical Characteristics

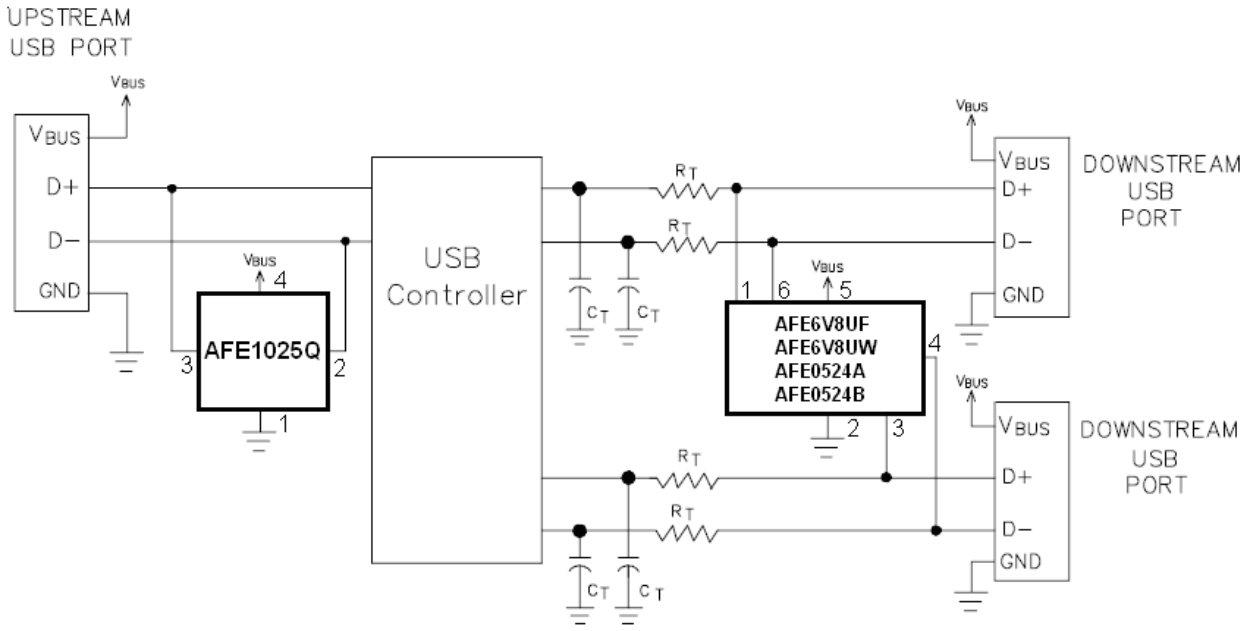




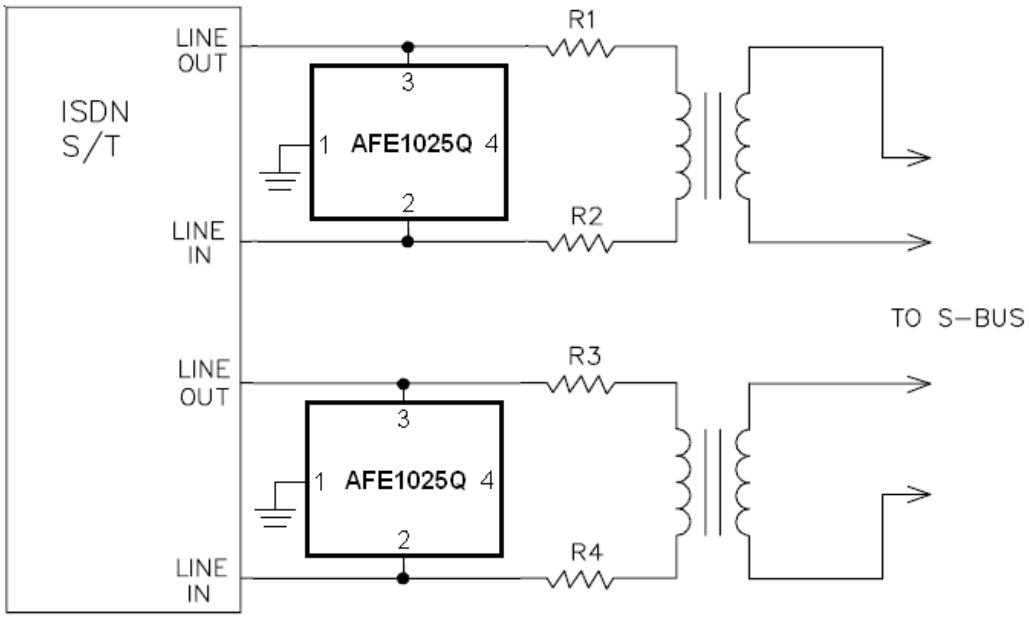




Application Information

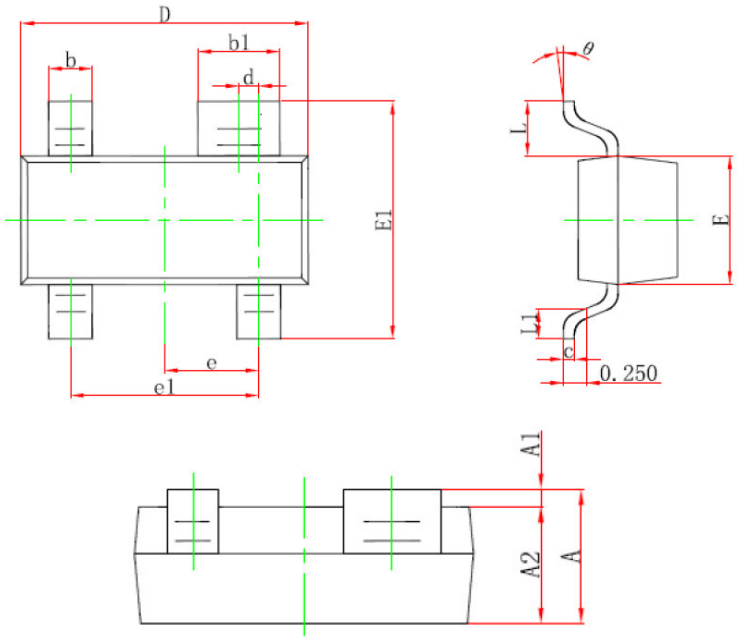


Universal Serial Bus ESD Protection



ISDN S/T Interface Protection

Package Information (SOT-143)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
b1	0.750	0.900	0.030	0.035
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
d	0.200 TYP.		0.008 TYP.	
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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