

General Description

The AFE6V8UF is 4-channel very low capacitance ESD transient voltage suppressor which provides a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge. It is particularly well-suited to protect systems with high speed communication lines from ESD, EFT, and lightning.

The AFE6V8UF consists of two low capacitance steering diodes and a TVS diode in SOT-23-6L package. Each channel of AFE6V8UF could safely dissipate ESD strikes of $\pm 15\text{kV}$ air discharge as well as $\pm 8\text{kV}$ contact discharge, meeting the requirement of the IEC 61000-4-2 international standard. Using the MIL-STD-883 (Method 3015) specification for Human Body Model (HBM) ESD, the device provides protection for contact discharges to greater than $\pm 15\text{kV}$.

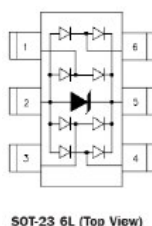
Features

- Stand-off Voltage: 5 V
- Peak Power up to 300 Watts @ 8 x 20 us Pulse
- Low Leakage current IEC61000-4-2
- Level 4 ESD Protection IEC61000-4-2
- Level 4 EFT Protection
- Low capacitance: 0.7 pF typical

Mechanical Characteristics

- SOT-23-6L Package
- Molding compound flammability rating: UL 94V-0
- Packaging: Tape and Reel per EIA 481

Pin Description (SOT-23-6L)



6V8U=Specific Device Code
YWW=Date Code (y=year;w=week)

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFE6V8UFS26RG	6V8U YWW	SOT-23-6L	Tape & Reel	3000 EA

- ※ 6V8U Specific Device Code
- ※ YWW Specific Date Code (y=year;w=week)
- ※ AFE6V8UFS26RG : 7" Tape & Reel ; Pb- Free ; Halogen- Free



Absolute Maximum Ratings

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Peak Pulse Power(tp = 8/20µs)	P _{PP}	300	W
ESD Per IEC 61000-4-2 (Air) ESD Per IEC 61000-4-2 (Contact)	V _{PP}	±15 ±8	KV
Maximum Lead Temperature for soldering during 10s	T _L	260	°C
Storage Temperature Range	T _{stg}	-55 ~ +125	°C
Operating Temperature Range	Top	-55 ~ +125	°C

Electrical Characteristics

(TA=25°C Unless otherwise noted, Device for 5.0V Reverse Stand-off Voltage)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Maximum Reverse Leakage Current @ VRWM	I _R	V _{RWM} = 5V, Pin5 to 2			5.0	µA
Forward Voltage @ I _F	V _F	I _F = 10mA	0.4	0.8	1.5	V
Breakdown Voltage @ I _T	V _{BR}	I _T = 1mA, Pin5 to 2	6.0	7.0		V
Clamping Voltage @ I _{PP}	V _C	I _{PP} =1A, tp = 8/20µs Any I/O pin to Ground			12.0	V
Junction Capacitance	C _j	V _R = 0V, f = 1MHz Any I/O pin to Ground		1.2	1.5	pF
		V _R = 0V, f = 1MHz Between I/O pins		0.7		pF

Electrical Parameter

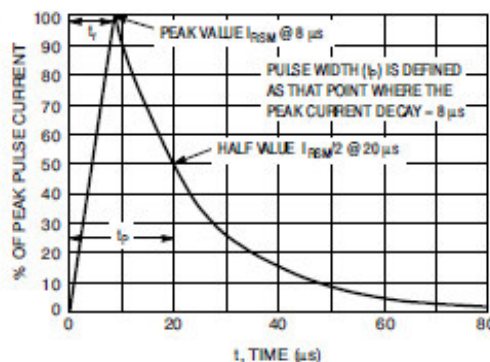
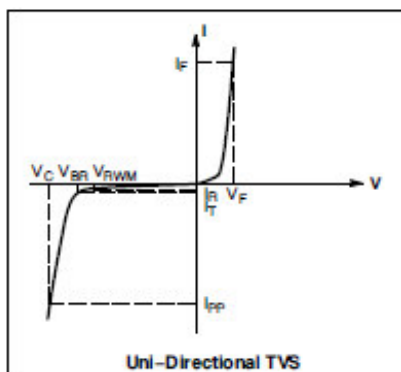
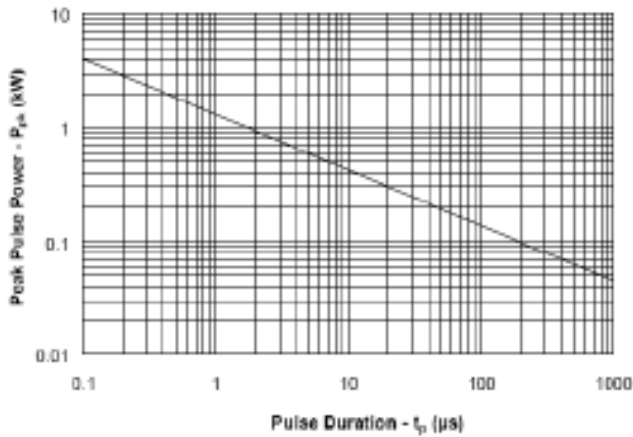


Figure 1. 8 X 20 µs Pulse Waveform

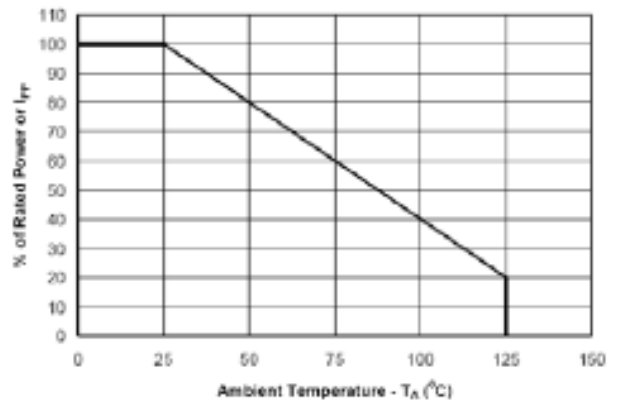


Typical Characteristics

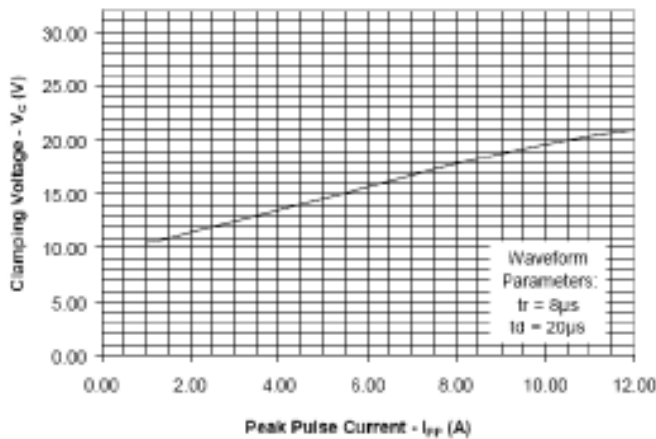
Non-Repetitive Peak Pulse Power vs. Pulse Time



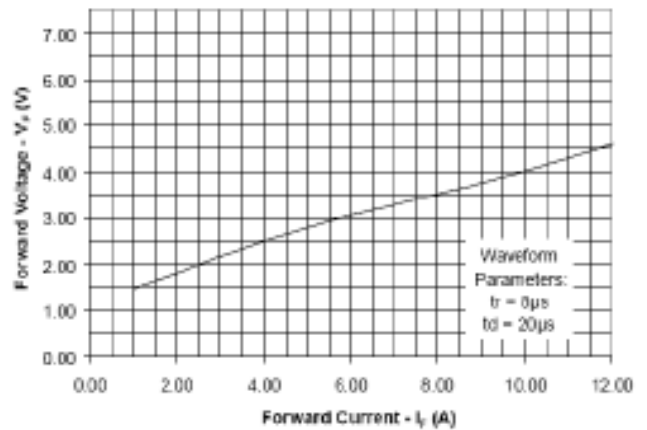
Power Derating Curve



Clamping Voltage vs. Peak Pulse Current



Forward Voltage vs. Forward Current





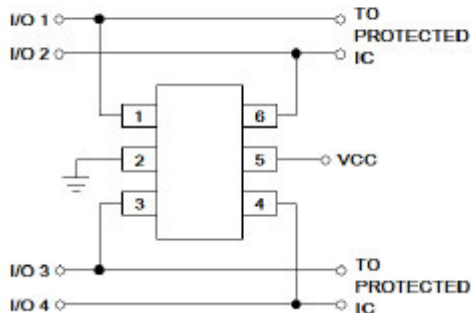
Applications Information

Device connection Options for Protection of Four High-Speed Data Lines

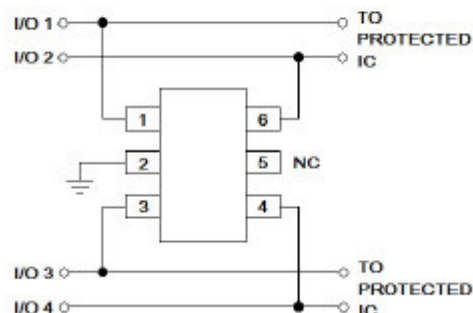
This device is designed to protect data lines by clamping them to a fixed reference. When the voltage on the protected line exceeds the reference voltage the steering diodes are forward biased, conducting the transient current away from the sensitive circuitry. Data lines are connected at pins 1, 3, 4 and 6. Pin 2 should be connected directly to a ground plane. The path length is kept as short as possible to minimize parasitic inductance. The positive reference is connected at pin 5. The options for connecting the positive reference are as follows:

1. To protect data lines and the power line, connect pin 5 directly to the positive supply rail (VCC). In this configuration the data lines are referenced to the supply voltage. The internal TVS diode prevents over-voltage on the supply rail.
2. In applications where the supply rail does not exit the system, the internal TVS may be used as the reference. In this case, pin 5 is not connected. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working voltage of the TVS (plus one diode drop).
3. In applications where complete supply isolation is desired, the internal TVS is again used as the reference and VCC is connected to one of the I/O inputs. An example of this configuration is the protection of a SIM port. The Clock, Reset, I/O, and VCC lines are connected at pins 1, 3, 4, and 6. Pin 2 is connected to ground and pin 5 is not connected.

**Data Line and Power Supply
Protection Using Vcc as reference**

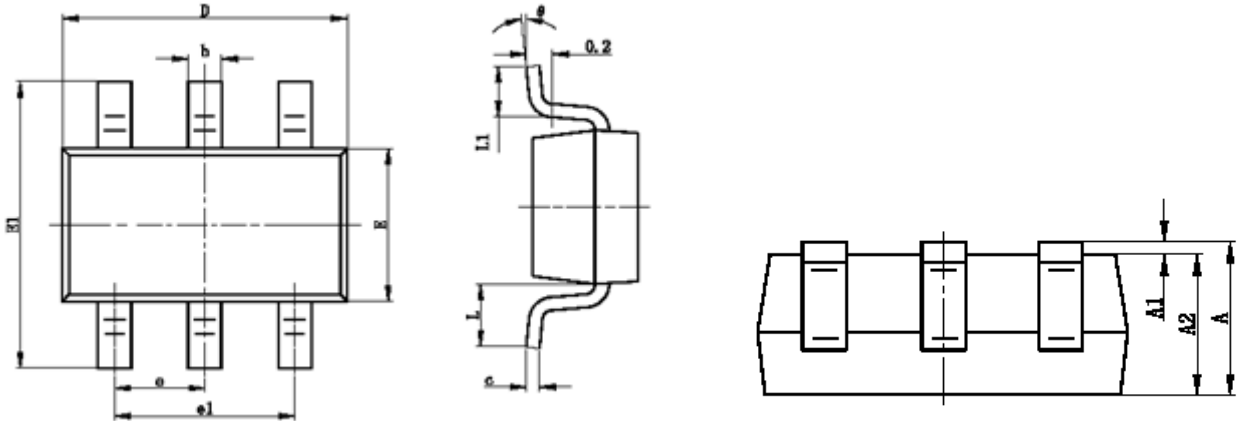


**Data Line Protection Using Internal
TVS Diode as reference**





Package Information (SOT-23-6L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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