



General Description

The AFEA6V8UD 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 AFEA6V8UD consists of eight low capacitance steering diodes and a TVS diode in a SLP package. Each channel of AFEA6V8UD 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 $\pm 15\text{kV}$.

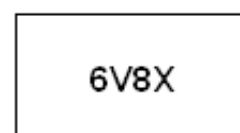
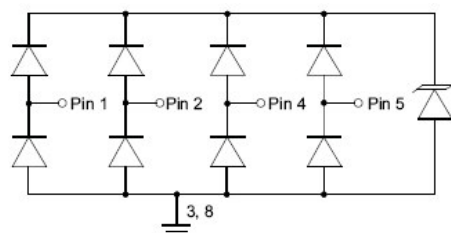
Features

- Stand off Voltage: 5 V
- Peak Power up to 180 Watts @ 8 x 20 us Pulse
- Low Leakage current IEC61000-4-2
- Level 4 ESD Protection IEC61000-4-4
- Level 4 EFT Protection
- Low capacitance: 0.35 pF typical

Mechanical Characteristics

- DFN(length=2.5mm) Package
- Molding compound flammability rating: UL94V-0
- Packaging: Tape and Reel per EIA 481

Pin Description (DFN-10)



6V8=Device Code
X=Month Code(A~Z)

Application

- High Definition Multi-Media Interface 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
AFE6V8UDFN10RG	WYW	DFN-10	Tape & Reel	3000 EA

- ※ W Specific Device Code
- ※ YW Date Code (y=year;w=week)
- ※ AFE6V8UDFN10RG : 7" Tape & Reel ; Pb- Free ; Halogen- Free

Absolute Maximum Ratings

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Peak Pulse Power(tp = 8/20_s)	PPP	180	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	T _{OP}	-55 ~ 125	°C

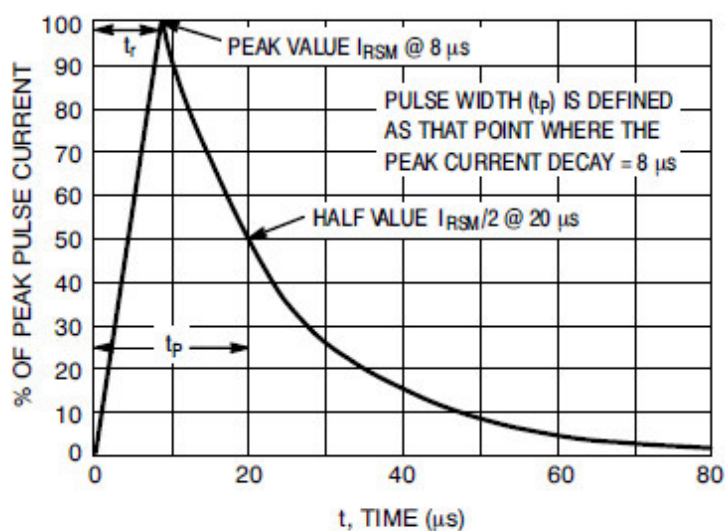
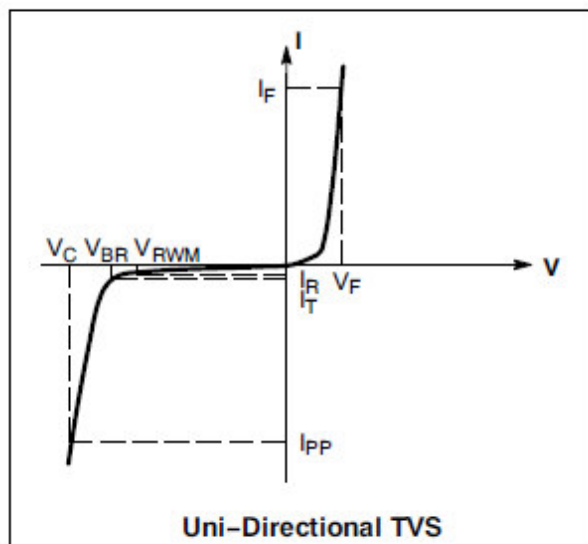
Electrical Characteristics

(T_A=25°C Unless otherwise noted)

Symbol	Conditions	Min.	Typ	Max.	Unit
I _R	V _{RWM} =5V, Pin5 to 2			1	μA
V _F	I _F = 10mA	0.4	0.8	1.5	V
V _{BR}	I _T =1mA, Pin5 to 2	6	7		V
V _C	I _{PP} =1A, tp = 8/20us, note 1&2 Any I/O pin to Ground			15	V
C _j	V _R = 0V, f = 1MHz Any I/O pin to Ground		0.7	1	pF
	V _R = 0V, f = 1MHz Between I/O pins		0.35		



Electrical Parameter

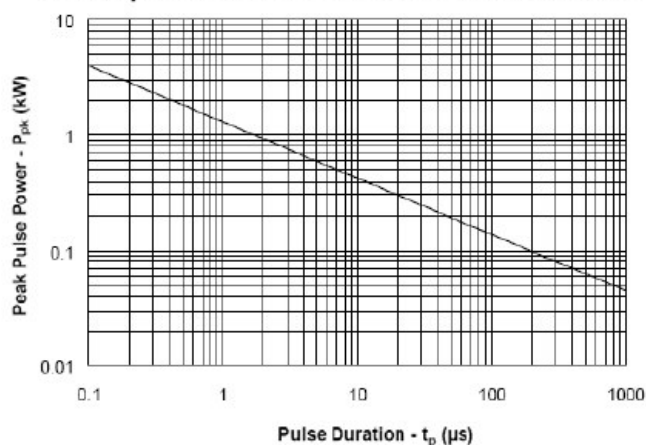


Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
I_T	Test Current
V_{BR}	Breakdown Voltage @ I_T
I_F	Forward Current
V_F	Forward Voltage @ I_F

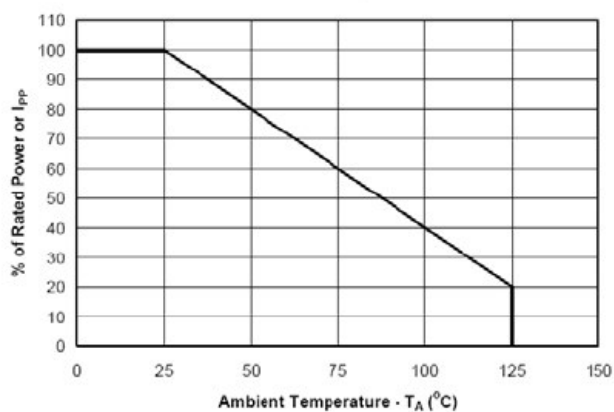


Typical Characteristics

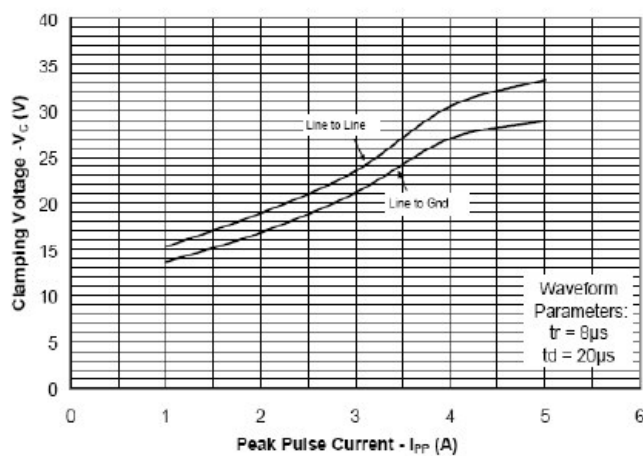
Non-Repetitive Peak Pulse Power vs. Pulse Time



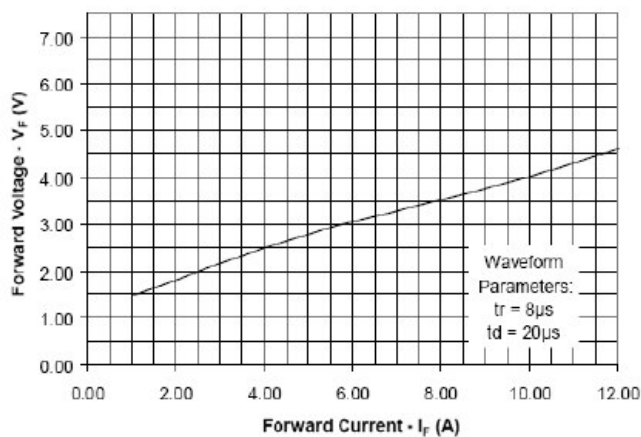
Power Derating Curve



Clamping Voltage vs. Peak Pulse Current



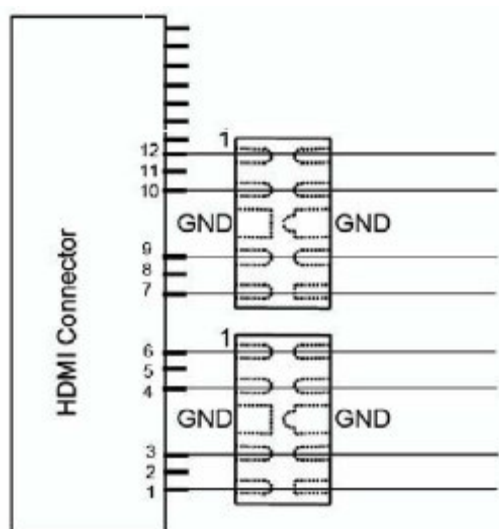
Forward Voltage vs. Forward Current





Schematic & Pin Configuration

As Figure Shown is an example of how to route the high speed differential traces through the AFE6V8UD. The solid line represents the PCB trace. The PCB traces are used to connect the pin pairs for each line (pin 1 to pin 10, pin 2 to pin 9, pin 4 to pin 7, pin 5 to pin 6). For example, line 1 enters at pin 1 and exits at Pin 10 and the PCB trace connects pin 1 and 10 together. This is true for lines connected at pins 2, 4, and 5 also. Ground is connected at pins 3 and 8. One large ground pad should be used in lieu of two separate pads.



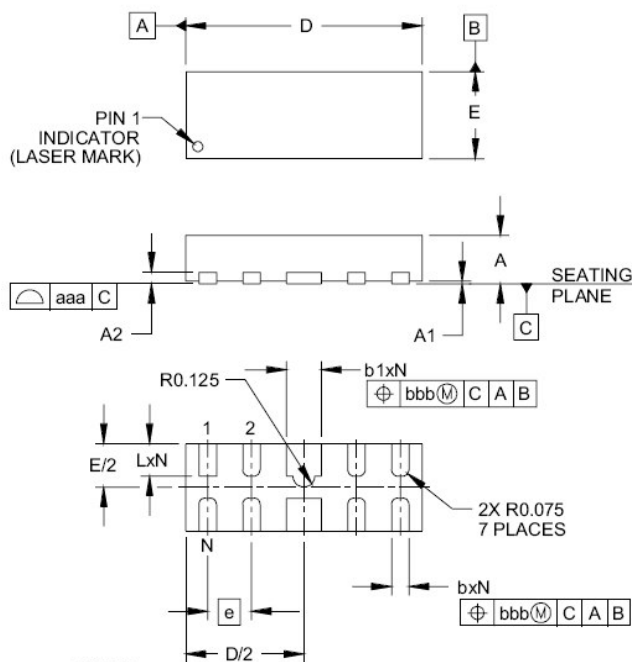
Flow through Layout Using AFE6V8UD

Application Information (Design Recommendations for HDMI Protection)

Adding external ESD protection to HDMI ports can be challenging. First, ESD protection devices have an inherent junction capacitance. However, adding even a small amount of capacitance will cause the impedance of the differential pair to drop. Second , large packages and land pattern requirements cause discontinuities that adversely affect signal integrity. The AFE6V8UD and is specifically designed for protection of high-speed interfaces such as HDMI. They present <0.4pF capacitance between the pairs while being rated to handle +/-8KV ESD contact discharges (15KVair discharge) as outlined in IEC61000-4-2. Each device is in a leadless DFN package that is less than 1.1mm wide. They are designed such that the traces flow straight through the device. The narrow package and flow-through design reduces discontinuities and minimizes impact on signal integrity. This becomes even more critical as signal speeds increase.



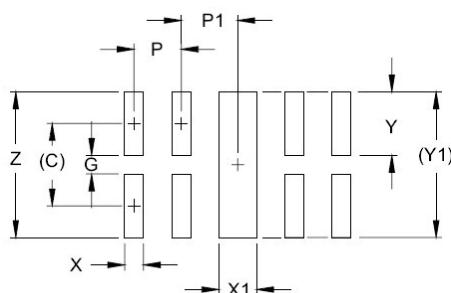
Package Information (DFN-10)



NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.020	.023	.026	0.50	0.58	0.65
A1	0.00	.001	.002	0.00	0.03	0.05
A2		(.005)			(0.13)	
b	.006	.008	.010	0.15	0.20	0.25
b1	.014	.016	.018	0.35	0.40	0.45
D	.094	.098	.102	2.40	2.50	2.60
E	.035	.039	.043	0.90	1.00	1.10
e		.020 BSC			0.50 BSC	
L	.012	.015	.017	0.30	0.38	0.425
N		10			10	
aaa		.003			0.08	
bbb		.004			0.10	



NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.
CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR
COMPANY'S MANUFACTURING GUIDELINES ARE MET.

DIM	INCHES		MILLIMETERS	
C	(.034)		(0.875)	
G	.008		0.20	
P	.020		0.50	
P1	.020		0.50	
X	.008		0.20	
X1	.016		0.40	
Y	.027		0.675	
Y1	(.061)		(1.55)	
Z	.061		1.55	