



### 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  $\pm 15\text{kV}$ .

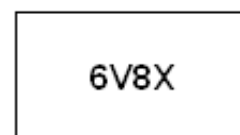
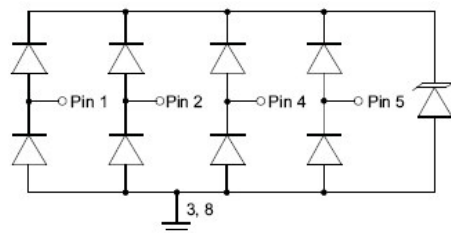
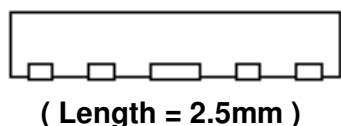
### Features

- 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**

(TA=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)	VPP	±15 ±8	KV
Maximum lead temperature for soldering during 10s	TL	260	°C
Storage temperature range	TSTG	-55 ~ 125	°C
Operating temperature range	TOP	-55 ~ 125	°C

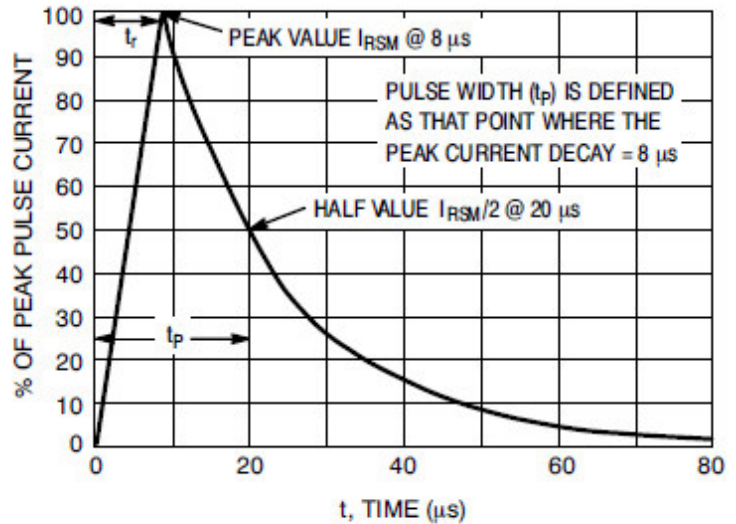
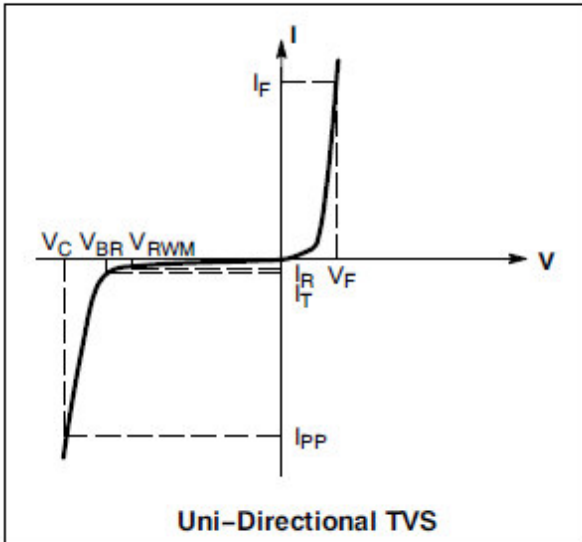
**Electrical Characteristics**

(TA=25°C Unless otherwise noted)

Symbol	Conditions	Min.	Typ	Max.	Unit
IR	VRWM=5V, Pin5 to 2			1	μA
VF	IF= 10mA	0.4	0.8	1.5	V
VBR	IT=1mA, Pin5 to 2	6	7		V
VC	I <sub>PP</sub> =1A, tp = 8/20us, note 1&2 Any I/O pin to Ground			15	V
Cj	VR = 0V, f = 1MHz Any I/O pin to Ground		0.7	1	pF
	VR = 0V, f = 1MHz Between I/O pins		0.35		



**Electrical Parameter**

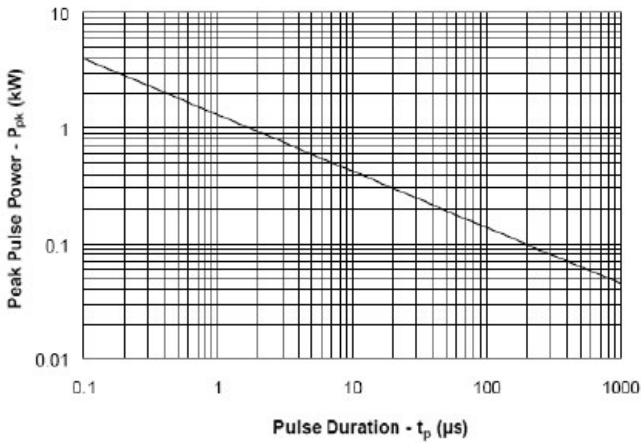


Symbol	Parameter
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$V_{RWM}$	Working Peak Reverse Voltage
$I_R$	Maximum Reverse Leakage Current @ $V_{RWM}$
$I_T$	Test Current
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$

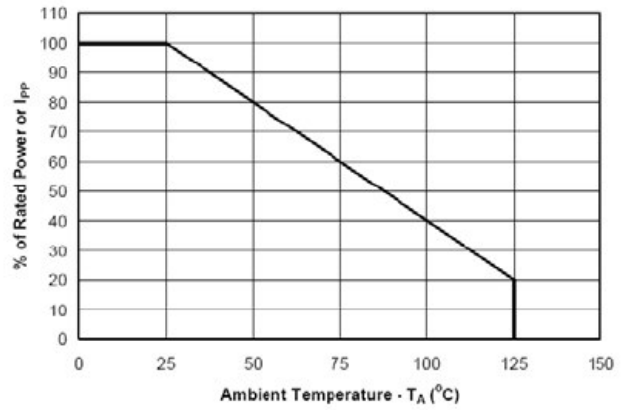


## Typical Characteristics

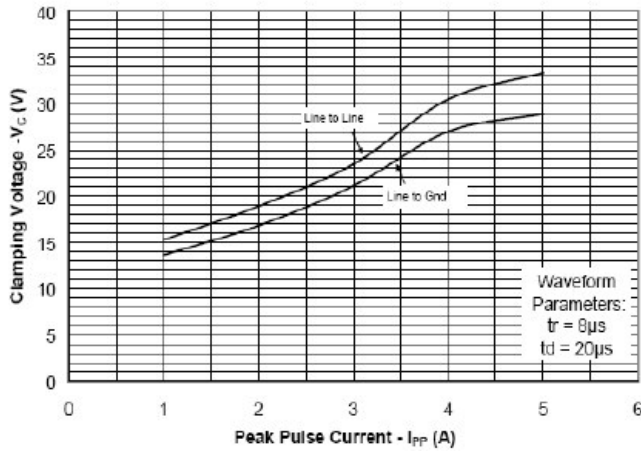
### Non-Repetitive Peak Pulse Power vs. Pulse Time



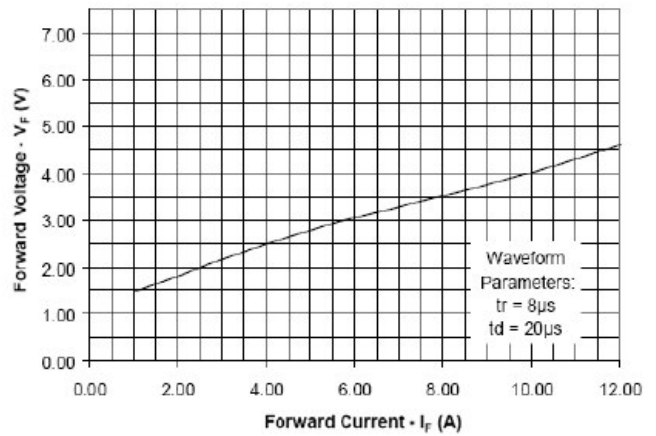
### Power Derating Curve



### Clamping Voltage vs. Peak Pulse Current



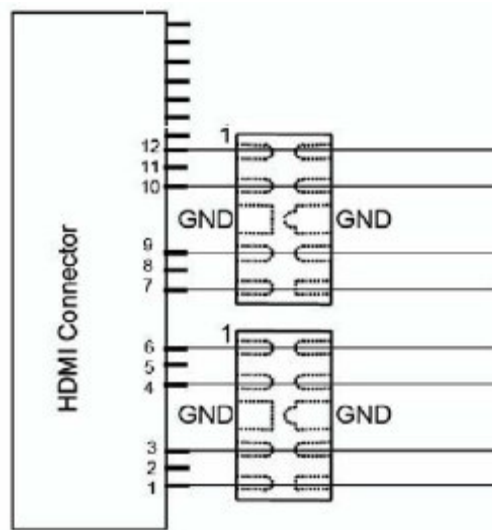
### Forward Voltage vs. Forward Current





### 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.



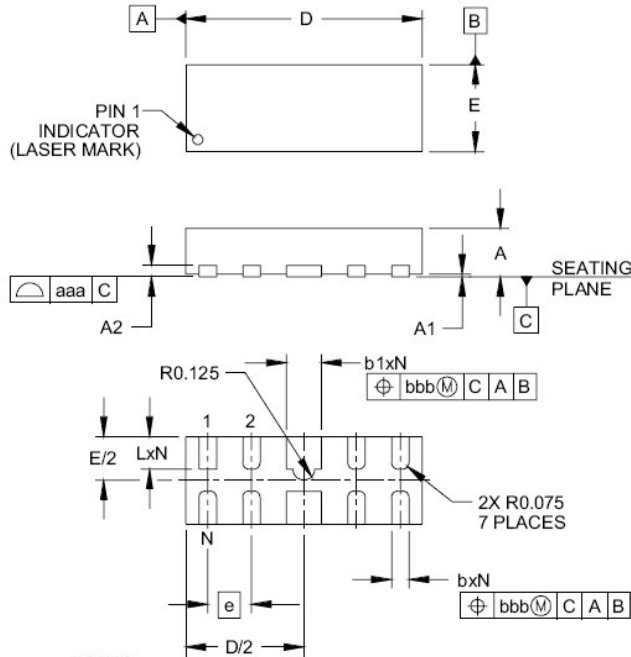
**Flow through Layout Using AFE6V8UD**

### 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.

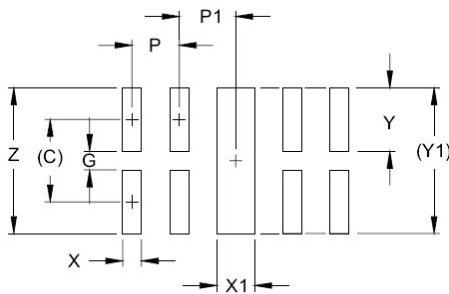


**Package Information ( DFN-10 )**



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).



DIM	DIMENSIONS	
	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

NOTES:  
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).  
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.  
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