

GSE6V8UD

Ultra Low Capacitance 4-Channel ESD Protection Array

Product Description

The GSE6V8UD 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 GSE6V8UD consists of eight low capacitance steering diodes and a TVS diode in a SLP package. Each channel of GSE6V8UD 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
- DFN(length=2.5mm) Package
- Molding compound flammability rating: UL94V-0
- Packaging: Tape and Reel per EIA 481
- RoHS Compliant, 100%Pb & Halogen Free

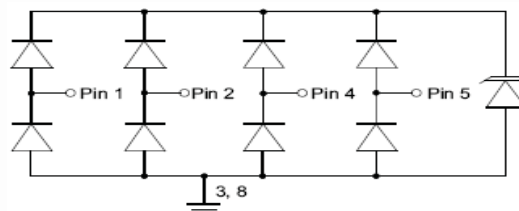
Applications

- 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
- HDSD, IDSL Secondary IC Side Protection
- Microcontroller Input Protection
- LCD and camera modules
- 10/100/1000 Ethernet

Packages & Pin Assignments



(Length = 2.5mm)
DFN-10

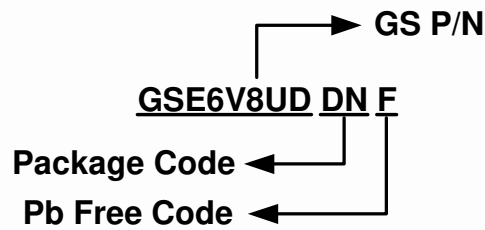


Marking Information



W=Specific Device Code
YW =Date Code (y=year,w=week)

Ordering Information



Part Number	Package	Part Marking	Unit	Quantity
GSE6V8UDDNF	DFN-10	WYW	Tape & Reel	3000 EA

Absolute Maximum Ratings

(T_A=25°C Unless otherwise noted)

Symbol	Parameter	Typical	Unit
P _{PP}	Peak Pulse Power (t _p = 8/20 μs)	180	W
V _{PP}	ESD per IEC 61000 – 4 – 2 (Air)	±15	KV
V _{PP}	ESD per IEC 61000 – 4 – 2 (Contact)	±8	KV
T _J	Operating Junction Temperature	-55 ~ 125	°C
T _{STG}	Storage Temperature Range	-55 ~ 125	°C
T _L	Maximum lead temperature for soldering during 10s	260	°C

Electrical Characteristics

(T_A=25°C Unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{RWM}	Reverse Stand – Off Voltage				5	V
V _F	Forward Voltage @ I _F	I _F = 10mA	0.4	0.8	1.5	V
V _{BR}	Reverse Breakdown Voltage	I _T = 1mA, Pin5 to 2	6.0	7.0		V
I _R	Reverse Leakage Current	V _{RWM} = 5V, Pin5 to 2			1	μA
V _C	Clamping Voltage	I _{pp} = 1A, t _p = 8/20 μs, note 1&2 Any I/O pin to Ground			15	V
C _J	Junction Capacitance	V _R = 0V, f = 1MHz Any I/O pin to Ground		0.7	1.0	pF
		V _R = 0V, f = 1MHz Between I/O pins		0.35		

Electrical Parameter

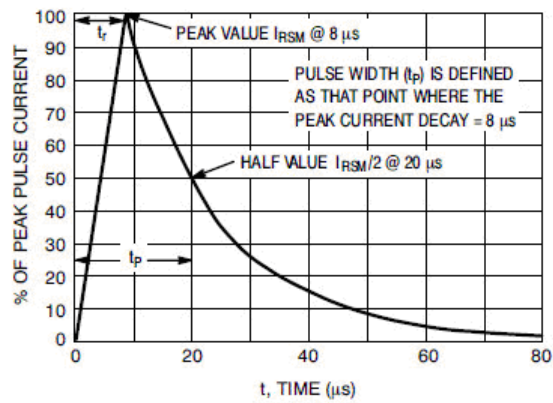
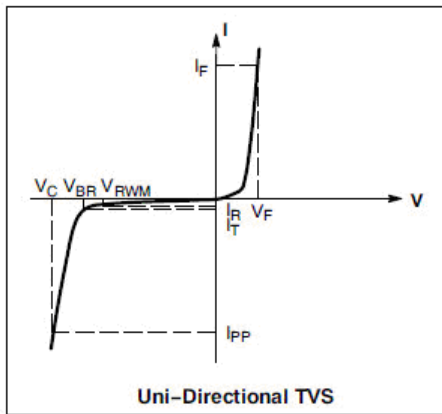
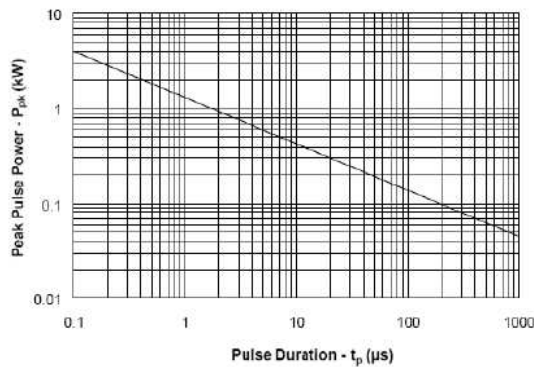


Figure 1. 8 X 20 μs Pulse Waveform

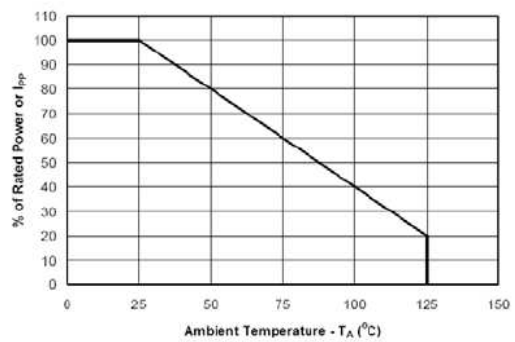
Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RAM}	Working Peak Reverse Voltage
I_R	Maximum Peak Reverse Leakage Current @ V_{RAM}
I_T	Test Current
V_{BR}	Breakdown Voltage @ I_T
I_F	Forward Current
V_F	Forward Voltage @ I_F

Typical Performance Characteristics

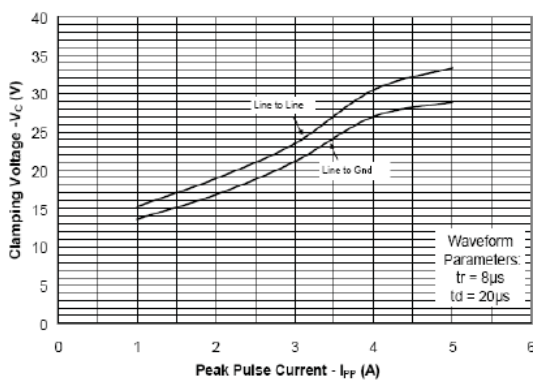
Non-Repetitive Peak Pulse Power vs. Pulse Time



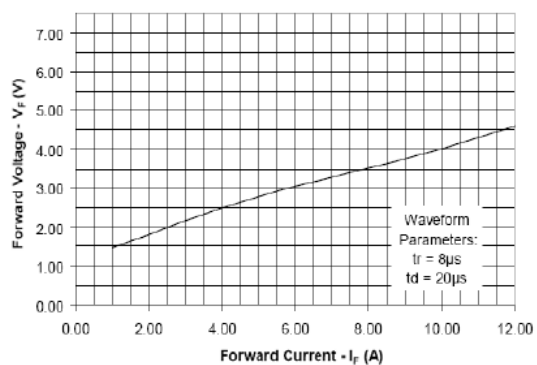
Power Derating Curve



Clamping Voltage vs. Peak Pulse Current

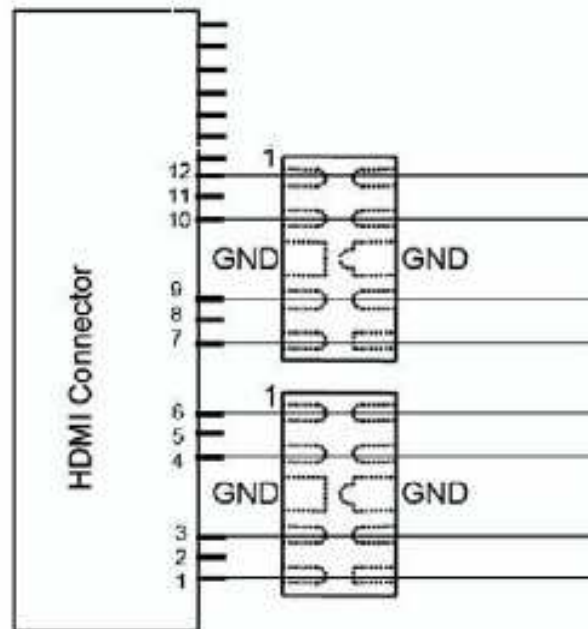


Forward Voltage vs. Forward Current



Schematic & Pin Configuration

As Figure Shown is an example of how to route the high speed differential traces through the GSE6V8UD. 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.



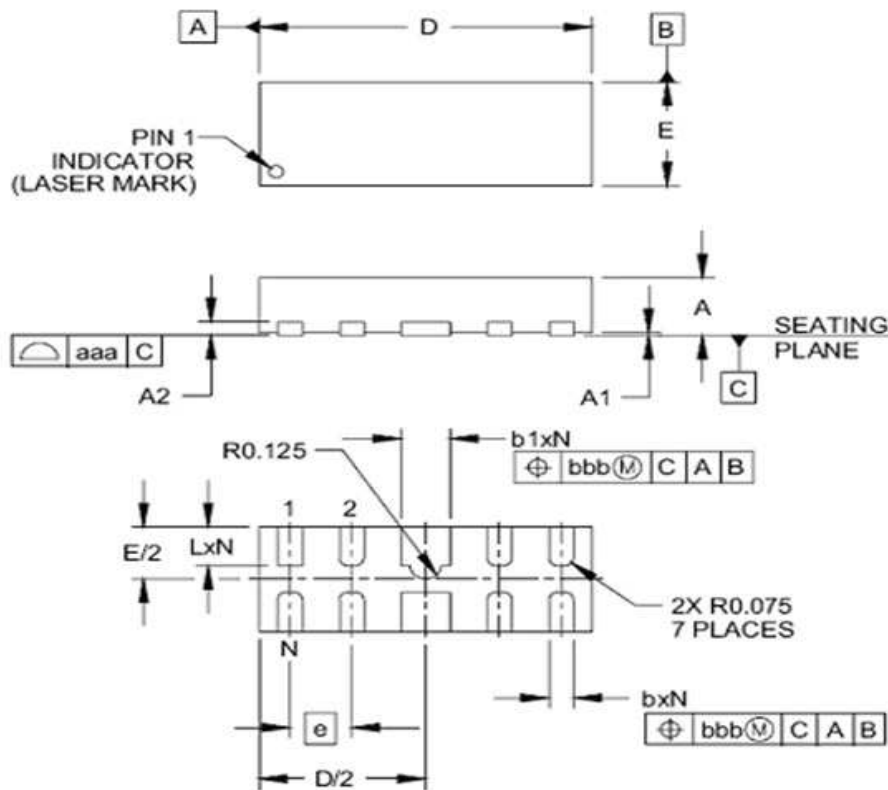
Flow through Layout Using

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 GSE6V8UD is specifically designed for protection of high-speed interfaces such as HDMI. They present $<0.4\text{pF}$ capacitance between the pairs while being rated to handle $\pm 8\text{KV}$ 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 Dimension

DFN-10

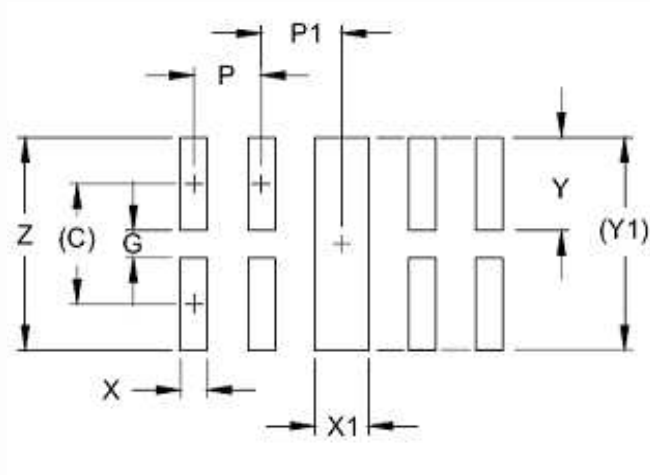


Dimensions

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

NOTES:1.Controlling dimensions are in millimeters(angles in degrees).

Package Dimension (continue)



Dimensions		
Symbol	Millimeters	Inches
C	(0.875)	(.034)
G	0.20	.008
P	0.50	.020
P1	0.50	.020
X	0.20	.008
X1	0.40	.016
Y	0.675	.027
Y1	(1.55)	(.061)
Z	1.55	.061





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.



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