# 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 lighting.

The GSE6V8UD is 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 ±15KV air discharge as well as ±8KV 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 ±15KV.

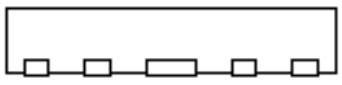
### Features

- 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

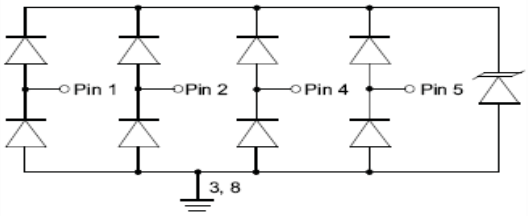
### Applications

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

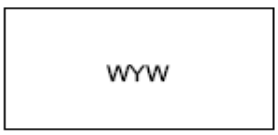
### Packages & Pin Assignments



**( Length = 2.5mm )**
**DFN-10**

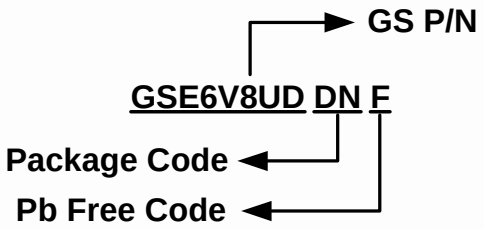



### Marking Information




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

($T_A$=25ºC Unless otherwise noted)

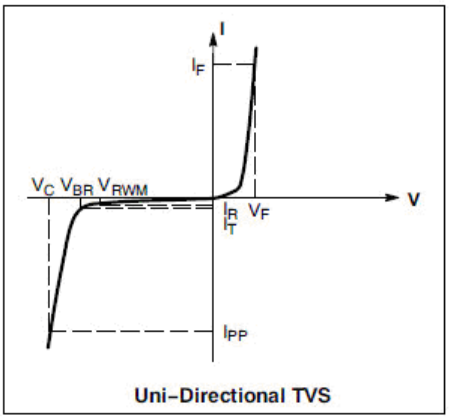
| Symbol | Parameter | Typical | Unit |
|---|---|---|---|
| $P_{PP}$ | Peak Pulse Power ( $t_P$ = 8/20 μs ) | 180 | W |
| $V_{PP}$ | ESD per IEC 61000 – 4 – 2 (Air ) | ±15 | KV |
| $V_{PP}$ | ESD per IEC 61000 – 4 – 2 (Contact ) | ±8 | KV |
| $T_J$ | Operating Junction Temperature | -55 ~ 125 | ºC |
| $T_{STG}$ | Storage Temperature Range | -55 ~ 125 | ºC |
| $T_L$ | Maximum lead temperature for soldering during 10s | 260 | ºC |

## Electrical Characteristics

($T_A$=25ºC Unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{RWM}$ | Reverse Stand – Off Voltage | | | | 5 | V |
| $V_F$ | Forward Voltage @ IF | $I_F$ = 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



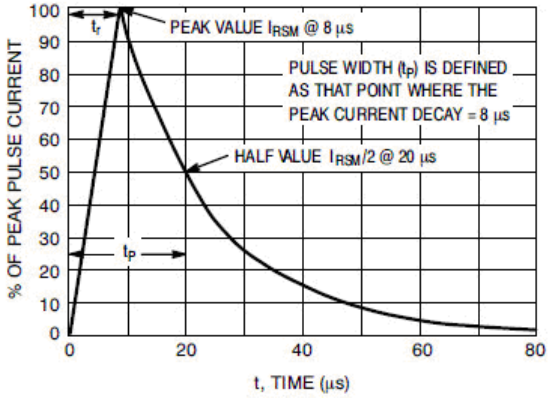
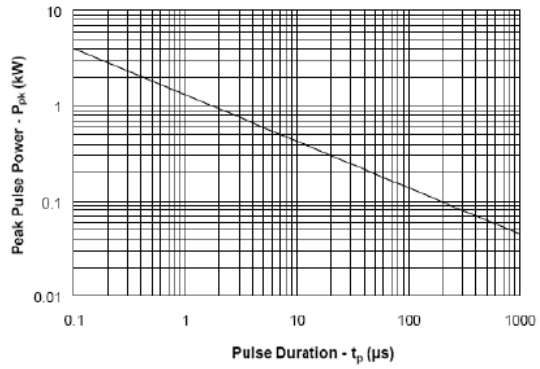




**Figure 1. 8 X 20 µs Pulse Waveform**

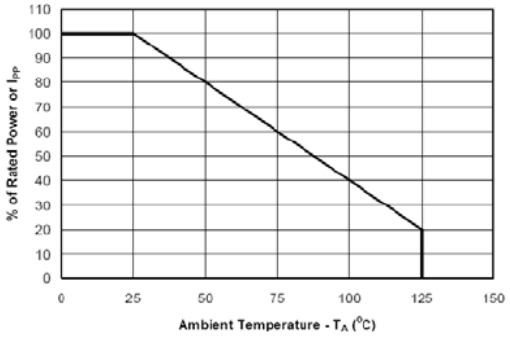
| Symbol | Parameter |
|---|---|
| $I_{PP}$ | Maximum Reverse Peak Pulse Current |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |
| $V_{RAM}$ | Working Peak Reverse Voltage |
| $I_R$ | Maximum Peak Reverse Leakage Current @ $V_{RAM}$ |
| $I_T$ | Test Current |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_F$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

## Typical Performance Characteristics

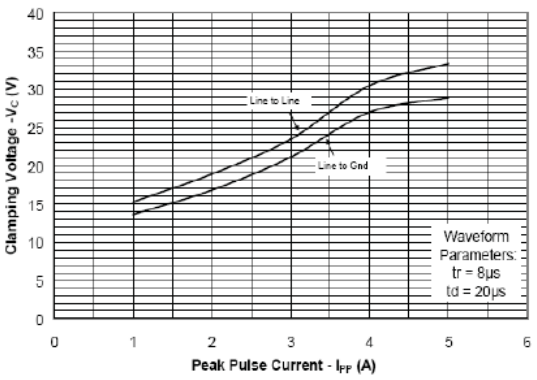
**Non-Repetitive Peak Pulse Power vs. Pulse Time**



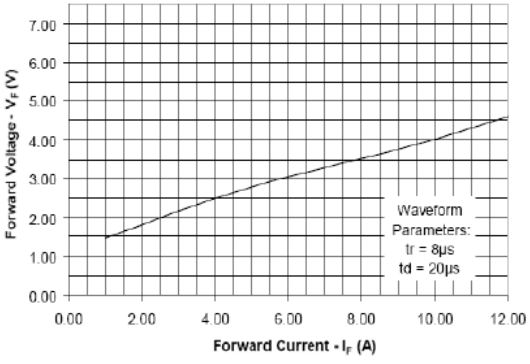

**Power Derating Curve**




**Clamping Voltage vs. Peak Pulse Current**

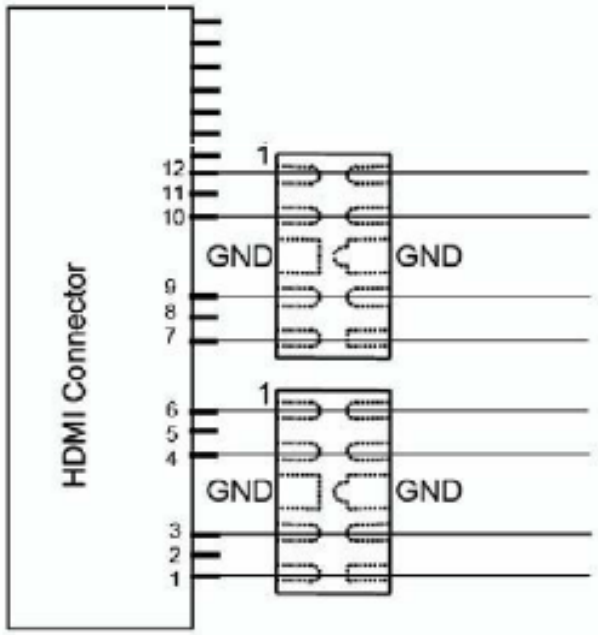



**Forward Voltage vs. Forward Current**



## 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 pins2, 4, and 5 also. Ground is connected at pins3 and 8. One large ground pad should be used in lieu of two separate pads.



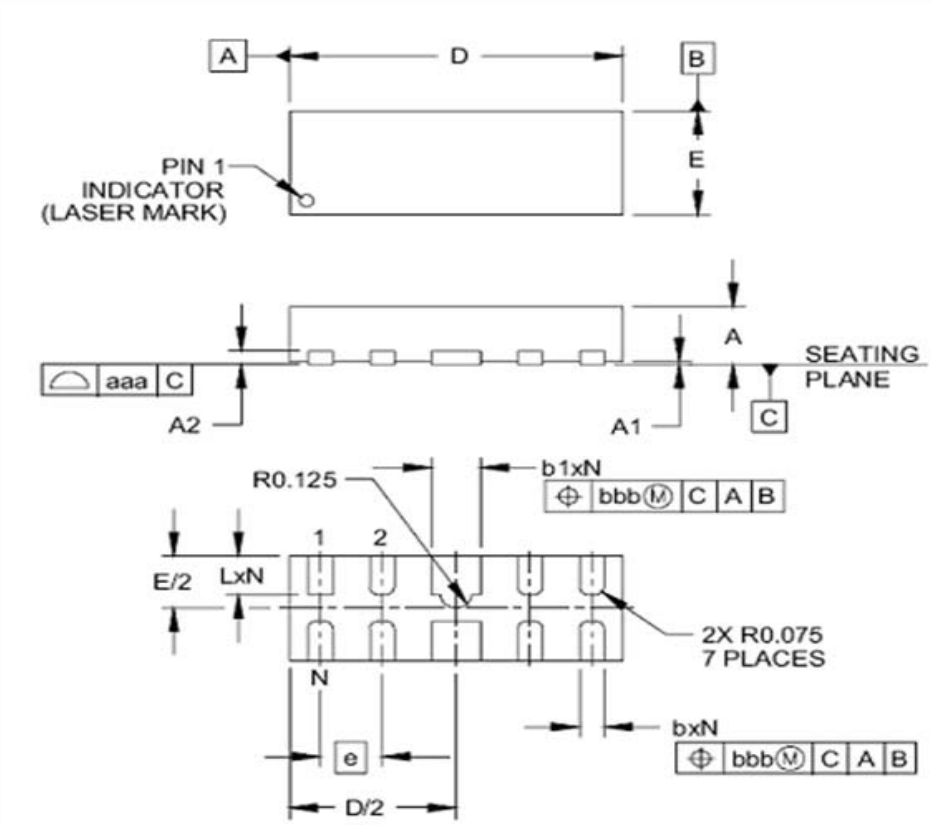

**Flow through Layout Using**

## 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 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 Dimension

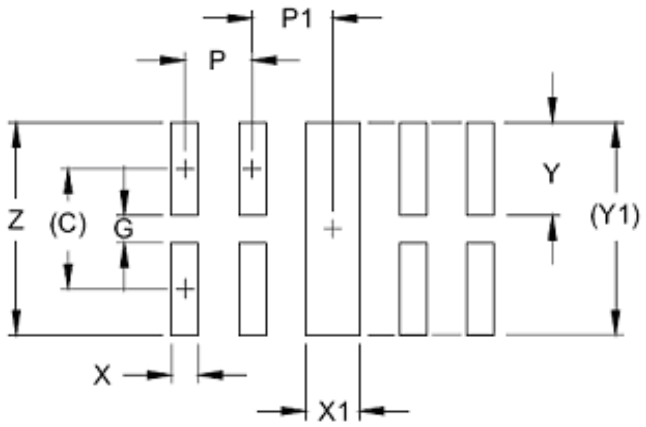
# DFN-10




| 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.

# NOTICE

Information furnished is believed to be accurate and reliable. However Globaltech Semiconductor assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Globaltech Semiconductor. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information without express written approval of Globaltech Semiconductor.

# CONTACT US


| GS Headquarter | |
|---|---|
| | 4F.,No.43-1,Lane11,Sec.6,Minquan E.Rd Neihu District Taipei City 114, Taiwan (R.O.C) |
| | 886-2-2657-9980 |
| | 886-2-2657-3630 |
| | sales_twn@gs-power.com |

| Wu-Xi Branch | |
|---|---|
| | No.21 Changjiang Rd., WND, Wuxi, Jiangsu, China (INFO. &. TECH. Science Park Building A 210 Room) |
| | 86-510-85217051 |
| | 86-510-85211238 |
| | sales_cn@gs-power.com |

| RD Division | |
|---|---|
| | 824 Bolton Drive Milpitas. CA. 95035 |
| | 1-408-457-0587 |