

## Single Line Uni-directional Transient Voltage Suppressor

### DESCRIPTION

The GSD12VHHU TVS diode is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebooks, and PDA's. It offers superior electrical characteristics such as low clamping voltage, low leakage current and high surge capability. It is designed to protect sensitive electronic components which are connected to power lines, from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lighting.

The GSD12VHHU is in a DFN2020-3L package and will protect one unidirectional line. It may be used to provide ESD protection up to  $\pm 30\text{kV}$  (Contact and air discharge) according to IEC61000-4-2, and used to protect USB voltage bus pin (8/20 us) according to IEC61000-4-5.

### FEATURES

- ✧ Transient protection for high-speed data lines  
IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (Contact)  
 $\pm 30\text{kV}$  (Air)
- ✧ Peak power dissipation: 5760W (8/20 $\mu\text{s}$ )
- ✧ Working voltages : 12V
- ✧ Low leakage current
- ✧ Low clamping voltage
- ✧ Ultra-small package (2.0mm $\times$ 2.0mm $\times$ 0.5mm)
- ✧ Solid-state silicon-avalanche technology

### MACHANICAL DATA

- ✧ DFN2020-3L package
- ✧ Flammability Rating: UL 94V-0
- ✧ High temperature soldering guaranteed:  
260 $^{\circ}\text{C}$ /10s
- ✧ Packaging: Tape and Reel
- ✧ Reel size: 7 inch

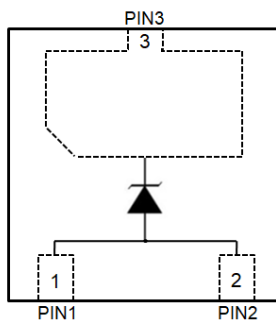
### ORDERING INFORMATION

- ✧ Device: GSD12VHHU
- ✧ Package: DFN2020-3L
- ✧ Marking: T12 003
- ✧ Material: Halogen free and RoHS compliant
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 3,000pcs

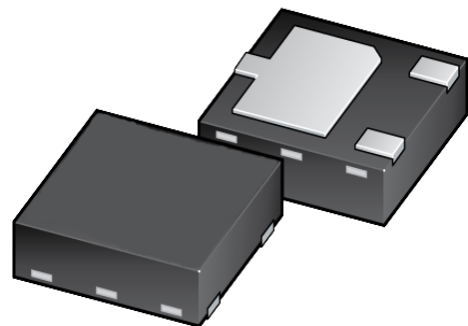
### APPLICATIONS

- ✧ Power lines
- ✧ Personal digital assistants (PDA's)
- ✧ Microprocessors based equipment
- ✧ Notebooks, Desktops, and Servers
- ✧ Cell phone Handsets and Accessories
- ✧ Portable Electronics
- ✧ Peripherals

### PIN CONFIGURATION



### PACKAGE OUTLINE



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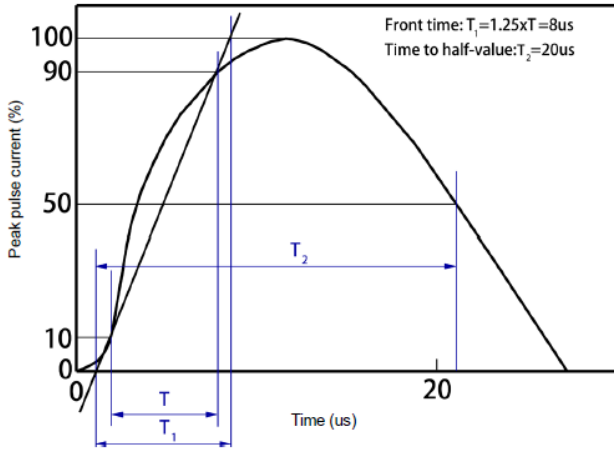
### ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value	Units
$V_{ESD}$	ESD per IEC 61000-4-2 (Contact)	$\pm 30$	kV
	ESD per IEC 61000-4-2 (Air)	$\pm 30$	
$P_{PP}$	Peak Pulse Power (8/20 $\mu$ s)	5760	W
$T_{OPT}$	Operating Temperature	-55~125	$^{\circ}$ C
$T_{STG}$	Storage Temperature	-55~150	$^{\circ}$ C
$T_L$	Lead Soldering Temperature	260(10sec)	$^{\circ}$ C

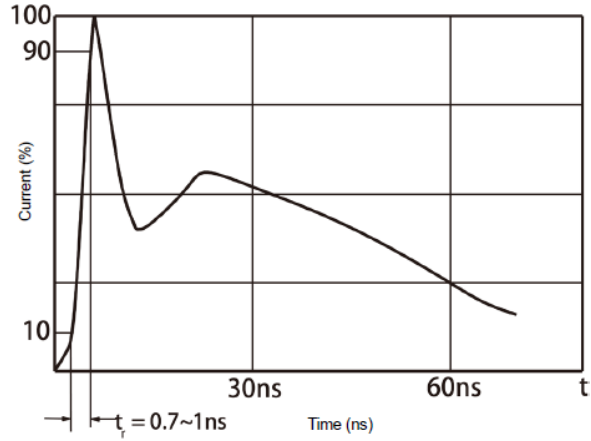
### ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^{\circ}$ C)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{RWM}$	Reverse Working Voltage				12	V
$V_{BR}$	Reverse Breakdown Voltage	$I_T = 1\text{mA}$	13.0	14.5	16.0	V
$I_R$	Reverse Leakage Current	$V_{RWM} = 12\text{V}$			1	$\mu$ A
$I_{PP}$	Peak Pulse Current	$t_p = 8/20\mu\text{s}$			180	A
$V_C$	Clamping Voltage	$I_{PP} = 50\text{A}, t_p = 8/20\mu\text{s}$			22	V
		$I_{PP} = 100\text{A}, t_p = 8/20\mu\text{s}$			25	V
		$I_{PP} = 180\text{A}, t_p = 8/20\mu\text{s}$			32	V
$C_J$	Junction Capacitance	$V_R = 0\text{V}, f = 1\text{MHz}$	900	950	1200	pF

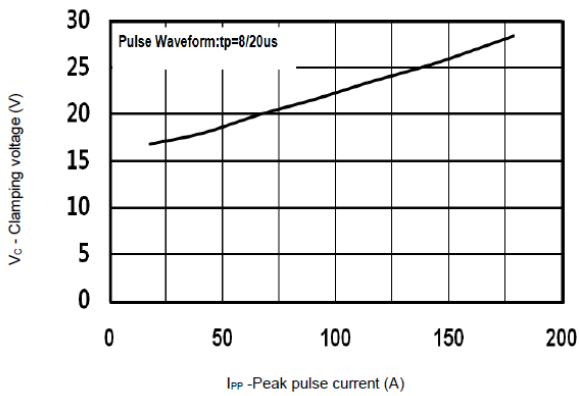
### ELECTRICAL CHARACTERISTICS CURVE



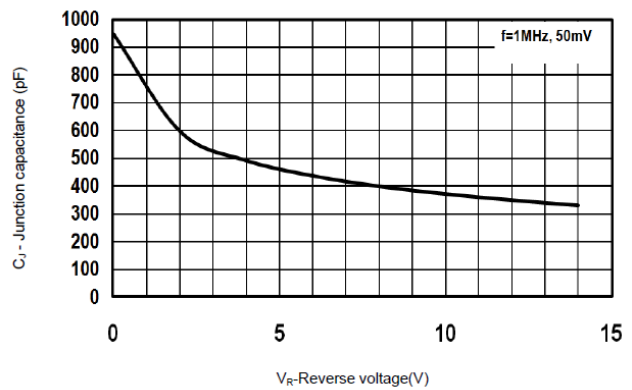
8/20 us waveform per IEC61000-4-5



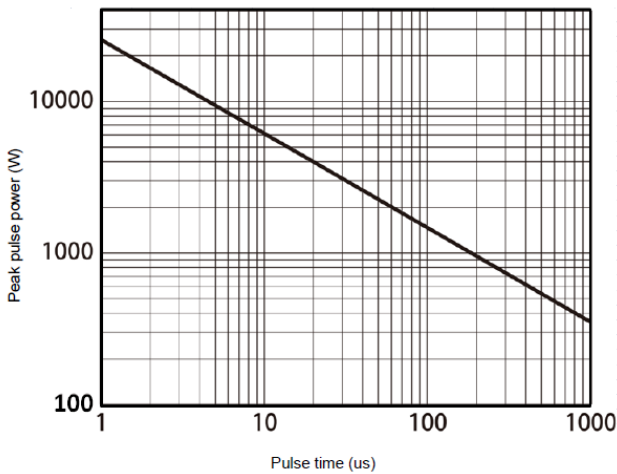
Contact discharge current waveform per IEC61000-4-2



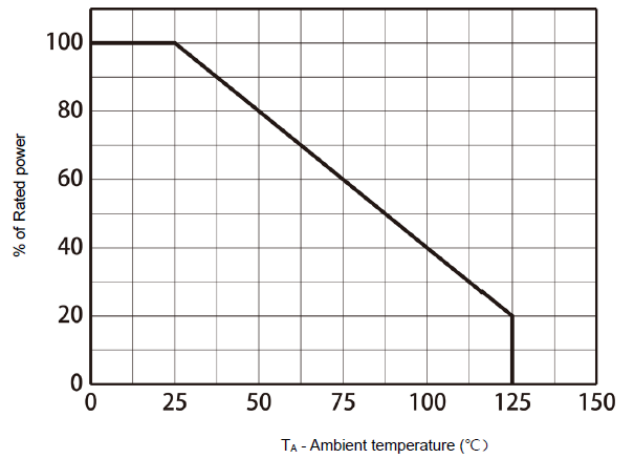
Clamping Voltage vs. Peak pulse current



Capacitance vs. Reverse voltage

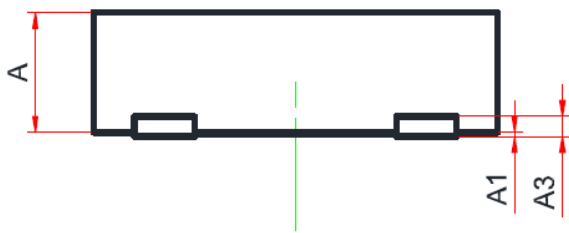
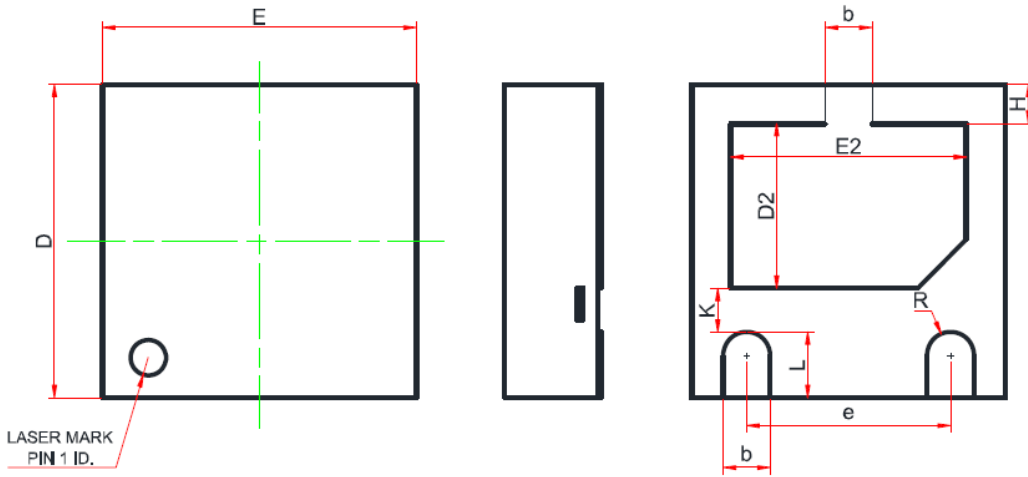


Non-repetitive peak pulse power vs. Pulse time

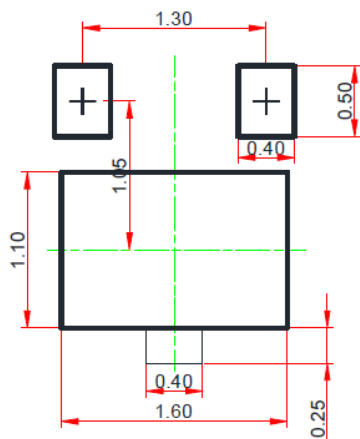


Power derating vs. Ambient temperature

### DFN2020-3L PACKAGE OUTLINE DIMENSIONS



### Recommend Land Pattern (Unit: mm)



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.51	0.55	0.60
A1	0.00	0.02	0.05
A3	0.15 REF.		
b	0.25	0.30	0.35
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	0.85	1.00	1.10
E2	1.35	1.50	1.60
e	1.20	1.30	1.40
H	0.20	0.25	0.30
K	0.20	0.30	0.40
L	0.35	0.40	0.45
R	0.15	-	-

Note:  
This recommended land pattern is for reference purpose only.