

### Description

The SY205228DWC is a low-capacitance transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 25pF, the SY205228DWC is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD) ( $\pm 30\text{kV}$  air,  $\pm 30\text{kV}$  contact discharge), IEC 61000-4-5 (Surge) (7.5A, 8/20 $\mu\text{s}$ ), etc.

The SY205228DWC uses ultra-small DFN1.0x0.6-2 package. Each SY205228DWC device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

### Features

- Transient Protection for High-speed Data Lines
  - IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (Air)  $\pm 30\text{kV}$  (Contact)
  - IEC 61000-4-5 (Surge) 7.5A (8/20 $\mu\text{s}$ )
- Package Optimized for High-speed Lines
- Ultra-small Package (1.0mmx0.6mmx0.55mm)
- Protects One Data, Control or Power Line
- Low Capacitance: 25pF (Typical)
- Low Leakage Current: 0.01 $\mu\text{A}$  @  $V_{\text{RWM}}$  (Typical)
- Low Clamping Voltage
- Each I/O Pin can Withstand Over 1000 ESD Strikes for  $\pm 8\text{kV}$  Contact Discharge

### Applications

- Desktops, Servers and Notebooks
- Cellular Phones
- MP3 Ports
- Digital Camera Ports

### Mechanical Characteristics

- DFN1.0x0.6-2 Package
- Marking: Part Number
- Packaging: Tape and Reel

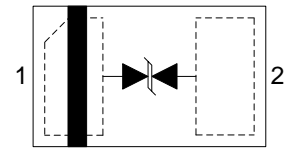
### Circuit Diagram



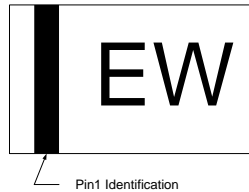
## Ordering Information

Part Number	Package Type	Top Mark
SY205228DWC	DFN1.0x0.6-2 RoHS Compliant and Halogen Free	EW

## Pinout (Top View)



## Marking Codes



**Note 1:** “E” is device code, fixed.

**Note 2:** “W” is date code.

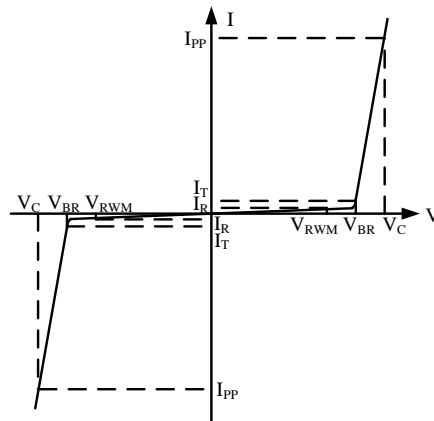
### Absolute Maximum Rating

Parameter	Symbol	Min	Max	Unit
Maximum Peak Pulse Current (8/20μs)	$I_{PP}$		7.5	A
Maximum Peak Pulse Power (8/20μs)	$P_{PK}$		210	W
ESD per IEC 61000-4-2 (Air)	$V_{ESD}$	-30	30	kV
ESD per IEC 61000-4-2 (Contact)				
Operating Temperature	$T_{OPT}$	-40	+125	°C
Storage Temperature	$T_{STG}$	-55	+150	°C

### Electrical Characteristics $T_A = 25^{\circ}\text{C}$

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Nominal Reverse Working Voltage	$V_{RWM}$				12	V
Reverse Leakage Current @ $V_{RWM}$	$I_R$	$V_{RWM} = 12\text{V}$ , $T = 25^{\circ}\text{C}$ Between I/O_1 and I/O_2		0.01	0.1	μA
Reverse Breakdown Voltage @ $I_T$	$V_{BR}$	$I_T = 1\text{mA}$ Between I/O_1 and I/O_2	13.3		18	V
Clamping Voltage @ $I_{PP}$	$V_C (1)$	$I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$ Between I/O_1 and I/O_2			20	V
Clamping Voltage @ $I_{PP}$	$V_C (1)$	$I_{PP} = 7.5\text{A}$ , $t_p = 8/20\mu\text{s}$ Between I/O_1 and I/O_2			28	V
Parasitic Capacitance	$C_{ESD}(1)$	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ Between I/O_1 and I/O_2		25	30	pF

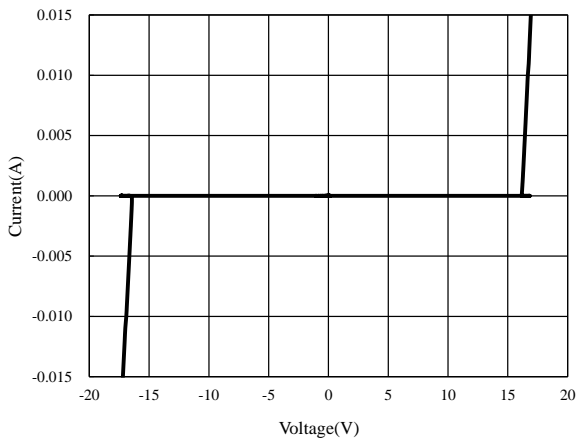
**Note 1:** Guaranteed by design and not subject to production test.



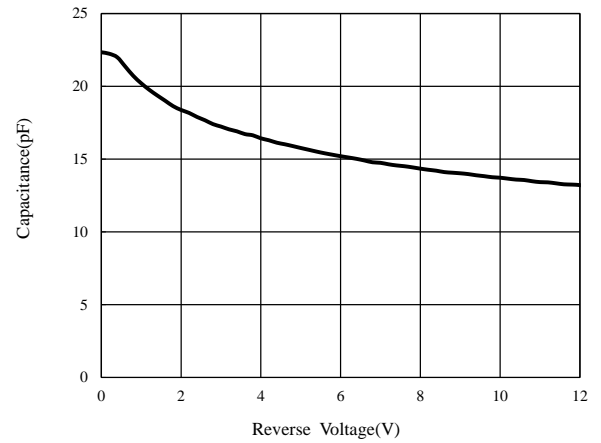
**Figure 1. Bi-directional TVS**

## Typical Characteristics

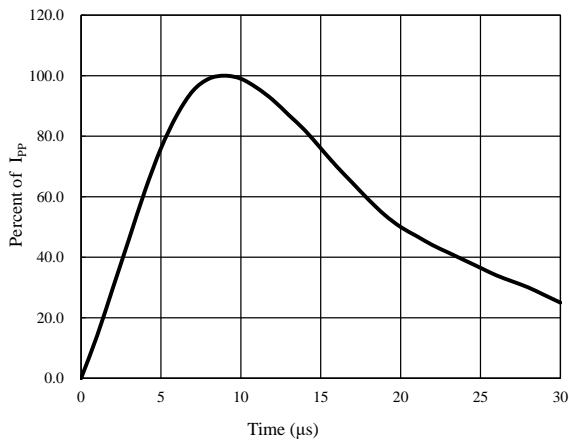
### Voltage Sweeping of I/O\_1 to I/O\_2



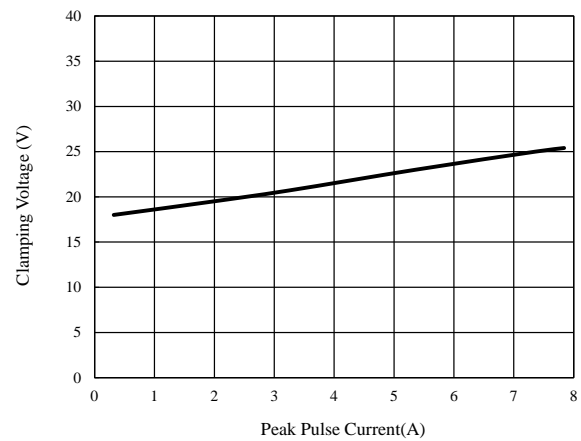
### Capacitance vs. Voltage



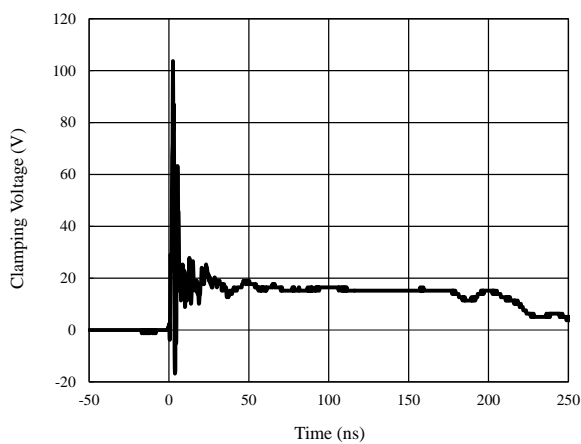
### Pulse Waveform



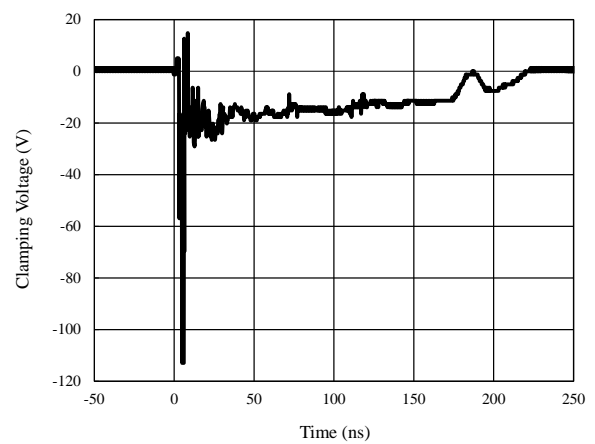
### Clamping Voltage vs. Peak Pulse Current



### ESD Clamping of I/O\_1 to I/O\_2 (+8kV Contact per IEC 61000-4-2)



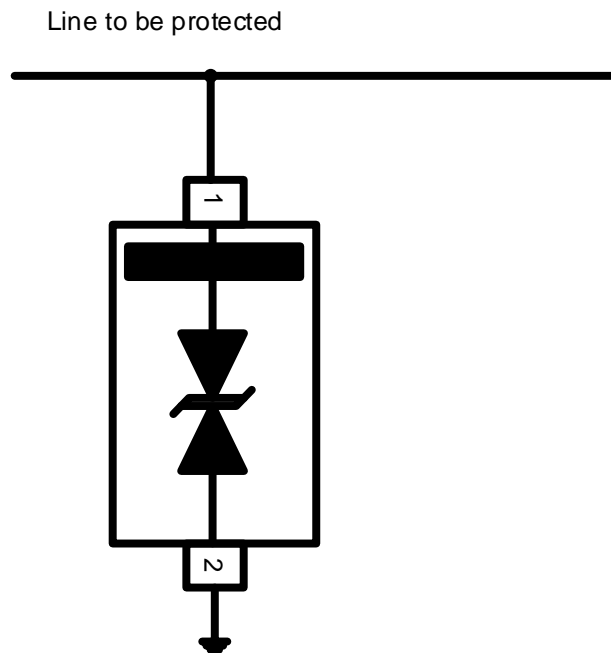
### ESD Clamping of I/O\_1 to I/O\_2 (-8kV Contact per IEC 61000-4-2)



## Application Information

The SY205228DWC protects one bidirectional data line against over-voltage and over-current transient events by clamping it to an acceptable reference.

The SY205228DWC pin connections are shown in Figure 2. The protected line is connected at Pin1 while Pin2 is connected to GND, which should connect to a ground plane on the board. All path lengths connected to pins of SY205228DWC should be as short as possible to minimize the parasitic inductance.



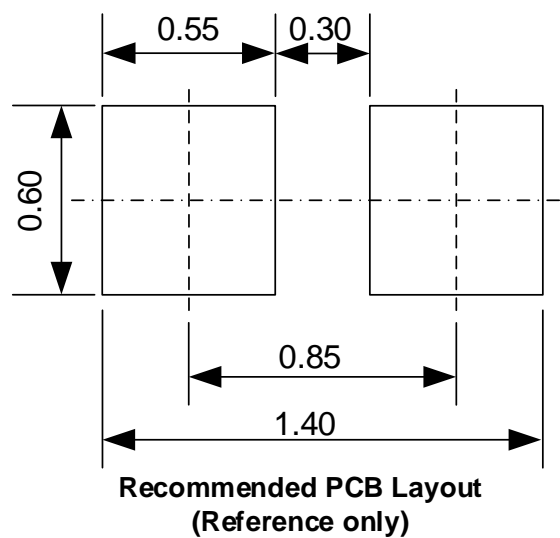
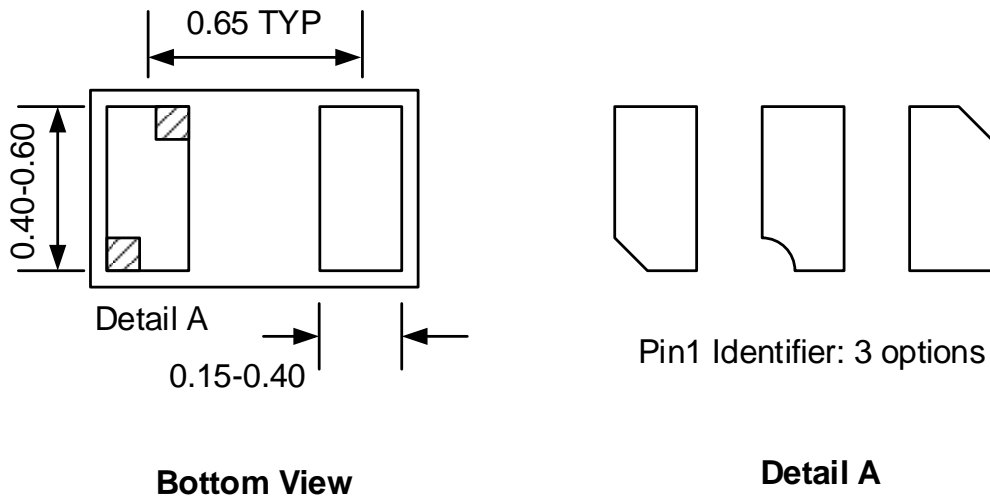
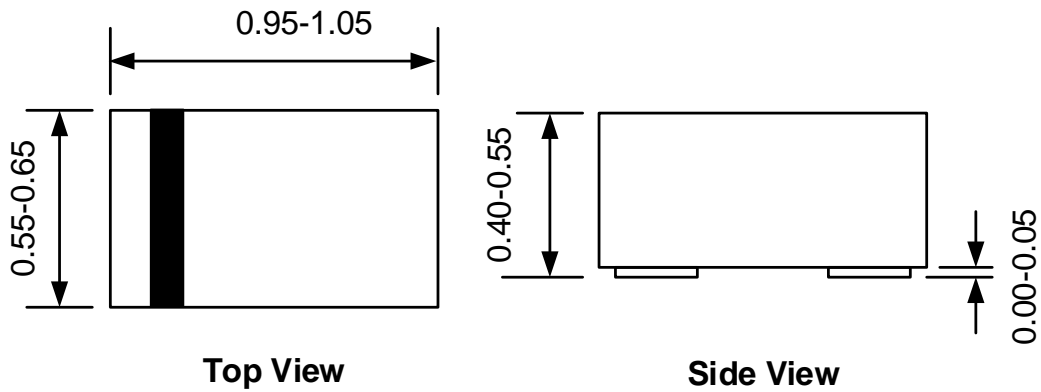
**Figure 2. ESD/Surge Protection Circuit**

## PCB Layout Guidelines

For optimum ESD protection and circuit performance, the following circuit board guidelines are recommended:

- Place SY205228DWC as close to the connector or terminal ports as possible.
- Use a large via to connect the SY205228DWC pin to the ground.
- Avoid running signals near board edges.
- The SY205228DWC should be placed near the protected line.
- The distance between the SY205228DWC ground pin and the GND reference path should be as short as possible.

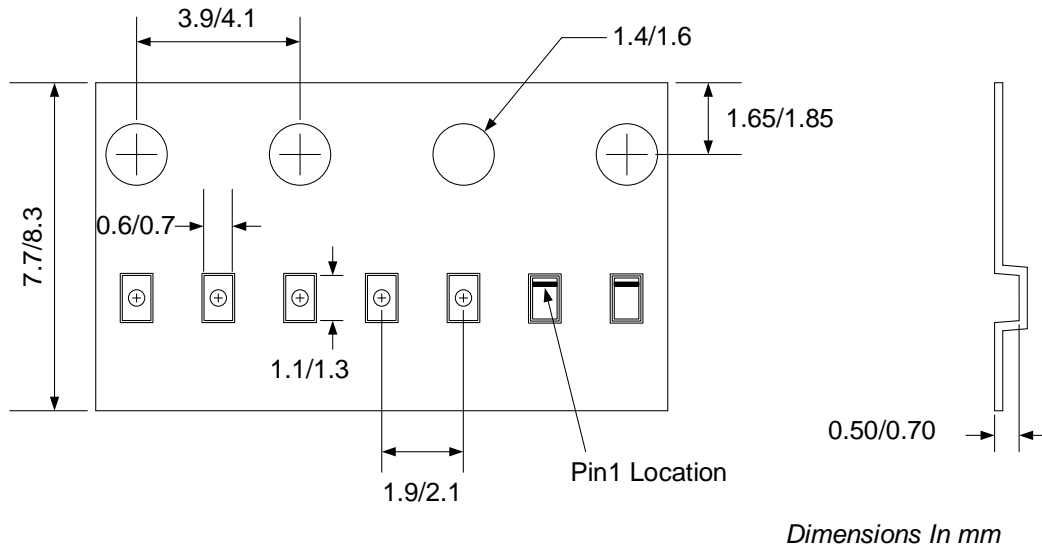
## DFN1.0x0.6-2 Package Outline



**Notes:** All dimension in mm and exclude mold flash & metal burr.

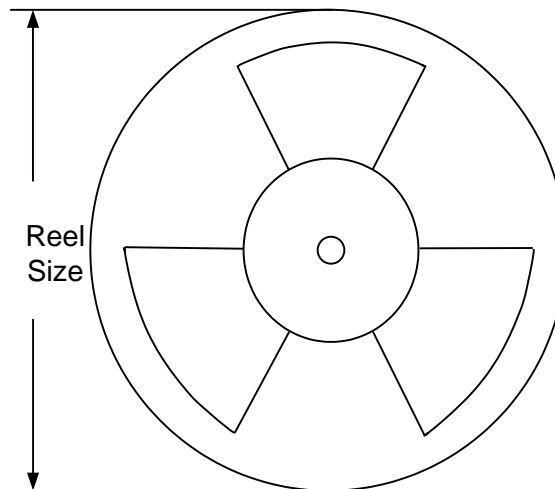
## Tape and Reel Specification

### DFN1.0x0.6-2 Taping Orientation



Feeding direction →

### Carrier Tape & Reel Specification for Packages



Package Types	Tape Width (mm)	Pocket Pitch(mm)	Reel Size (Inch)	Qty per Reel(pcs)
DFN1.0x0.6-2	8	2	7"	10000



## Revision History

The revision history provided is for informational purpose only and is believed to be accurate, however, not warranted. Please make sure that you have the latest revision.

Revision Number	Revision Date	Description	Pages changed
0.9	10/16/2018	Initial Release	
1.0	10/16/2019	Production Release	



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