SY205248DWD

Single Line TVS Diode for ESD Protection

General Description

SY205248DWD is a single-line transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection in consumer applications. The SY205248DWD is designed to protect sensitive semiconductor components from damage or upset due to ESD and other over-current transient events. It complies with IEC 61000-4-2 (ESD)(±30kV air, ±30kV contact discharge), and IEC 61000-4-5 (surge) 9A (8/20μs).

SY205248DWD can protect one unidirectional line. The SY205248DWD is available in a DFN1.0×0.6-2 package with a working voltage of 24V.

Features

- For Operating Voltage of 24V and Below
- Capacitance: 85pF (Typical)
- Protects One Data, Control, or Power Line
- Low Leakage Current: 0.01μA @ V_{RWM} (Typical)
- Low Clamping Voltage
- Transient Protection for a Single Line.
  - IEC 61000-4-2 (ESD) ±30kV (Air)±30kV (Contact)
  - IEC 61000-4-5 (Surge) 9A (8/20μs)

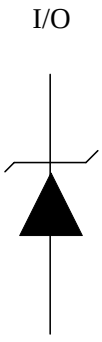
Applications

- VBUS, VBAT
- Desktops, Servers, and Notebooks
- Cellular Phones
- Microprocessor-Based Equipment
- Portable Instrumentation

Mechanical Characteristics

- DFN1.0×0.6-2 Package
- Marking: Device Code, Date Code
- Packaging: Tape and Reel

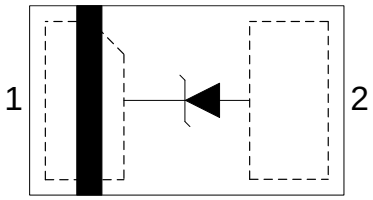
Circuit Diagram



Ordering Information

Part Number	Package Type	Top Mark
SY205248DWD	DFN1.0×0.6-2 RoHS Compliant and Halogen Free	BM

Pinout (Top View)



Marking Codes

Note 1: "B" is device code, fixed.

Note 2: "M" is date code

Absolute Maximum Rating				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Peak Pulse Power (8/20μs)	P_{PK}		320	W
Peak Pulse Current (8/20μs)	I_{PP}		9	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	-30	30	kV
Operating Temperature	T_{OPT}	-40	+125	°C
Storage Temperature	T_{STG}	-55	+150	°C

Electrical Characteristics T_A = 25°C						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ**	**Max**	**Unit**
Nominal Reverse Working Voltage	V_{RWM}				24	V
Reverse Leakage Current @ V_{RWM}	I_R	V_{RWM} = 24V, T_A = 25°C			0.1	μA
Reverse Breakdown Voltage @ I_T	V_{BR}	I_T = 1mA	25		30	V
Forward Voltage @ I_F	V_F	I_F =1mA	0.4		1.2	V
Clamping Voltage @ I_{PP}	V_C(1)	I_{PP} =9A, t_p = 8/20μs		36		V
Clamping Voltage @ I_{PP}	V_C(1)	I_{PP} = 16A, t_p = 10/100ns		30		V
Dynamic Resistance	R_{DYN}(1.2)	t_p = 10/100ns		0.05		Ω
Parasitic Capacitance	C_{ESD}(1)	V_R = 0V, f = 1MHz		85	100	pF

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

Note 2: R_{DYN} calculated based on I_{PP}=8A to I_{PP}=16A, t_p = 10/100ns.

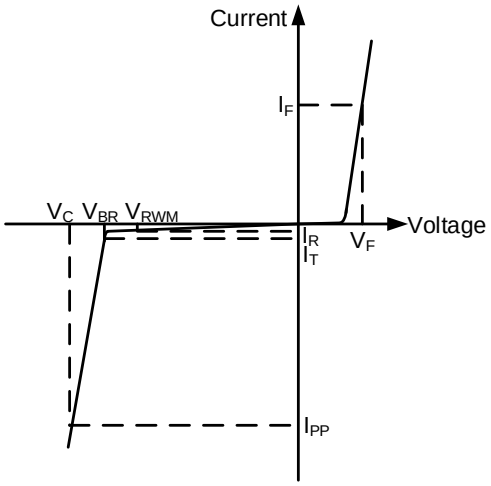
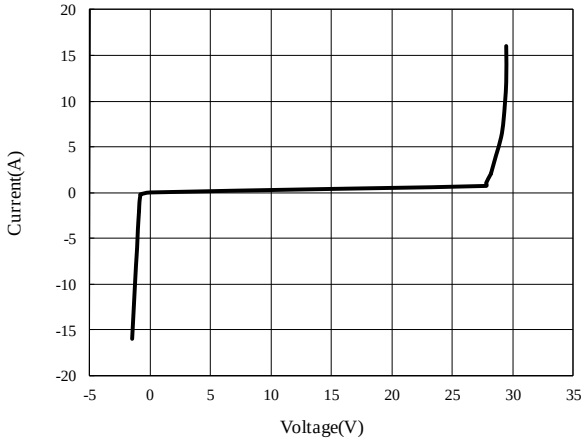


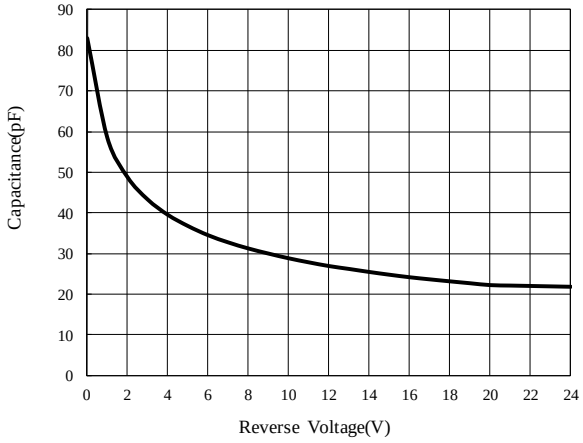
Figure 1. Uni-directional TVS

Typical Performance Characteristics

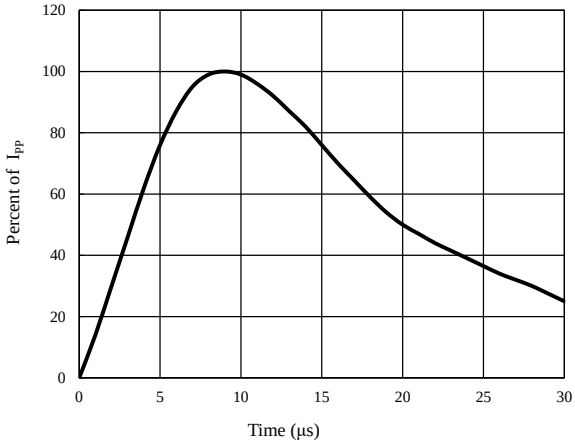
TLP Testing of I/O to GND



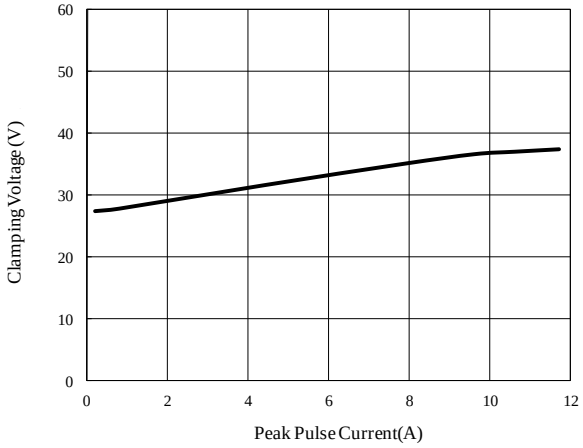
Capacitance vs. Reverse Voltage



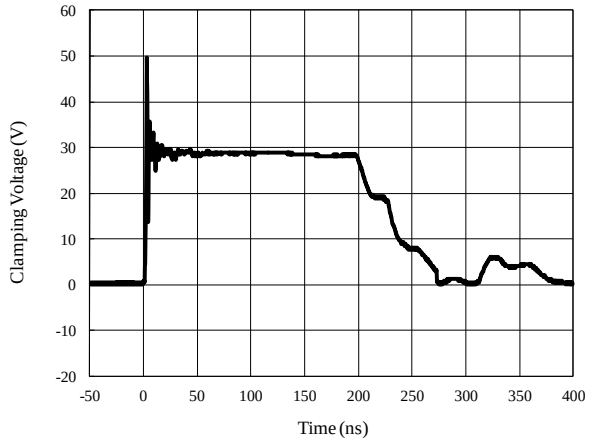
8/20μs Pulse Waveform



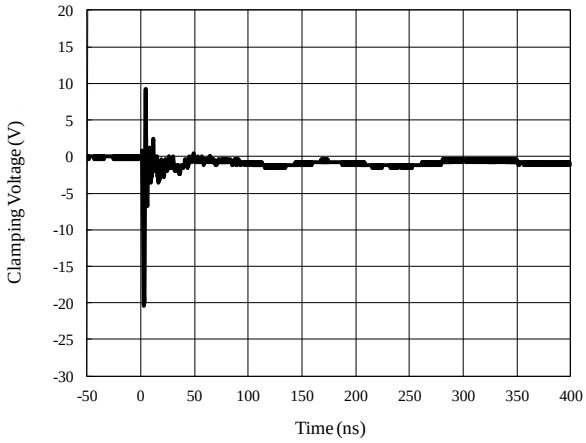
Clamping Voltage vs. Peak Pulse Current



ESD Clamping of I/O to GND (+8kV Contact per IEC 61000-4-2)



ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)



Application Information

The SY205248DWD protects one bidirectional data line against over-voltage and over-current transient events by clamping it to an acceptable reference.

The SY205248DWD 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 SY205248DWD should be as short as possible to minimize the parasitic inductance.

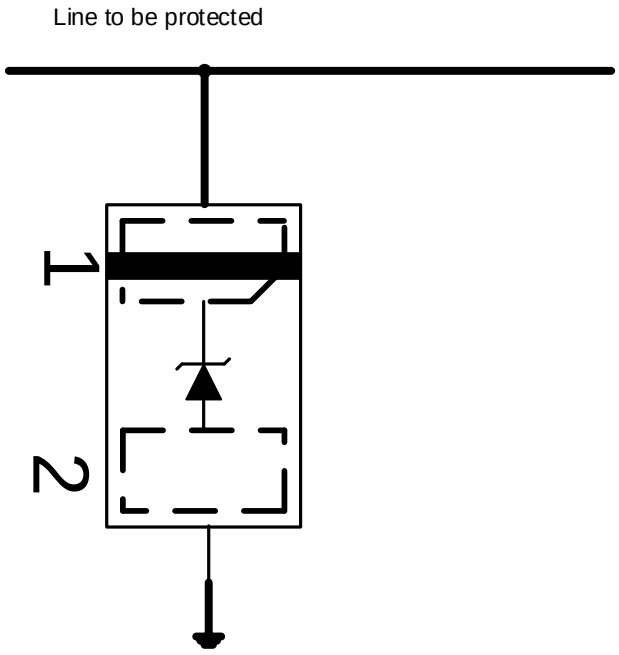


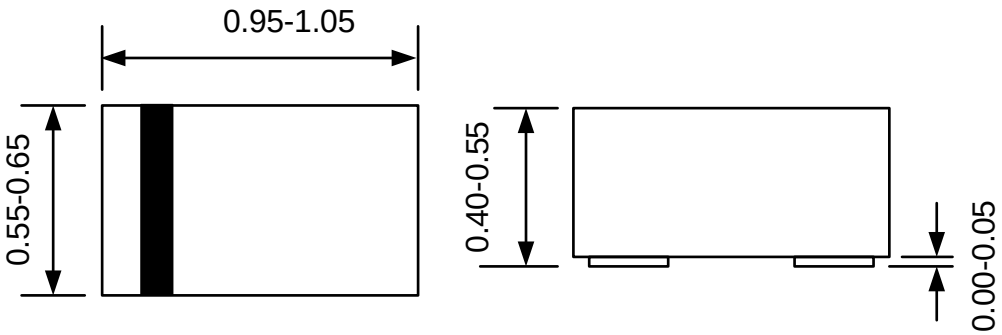
Figure 2. ESD/Surge Protection Circuit

PCB Layout Guidelines

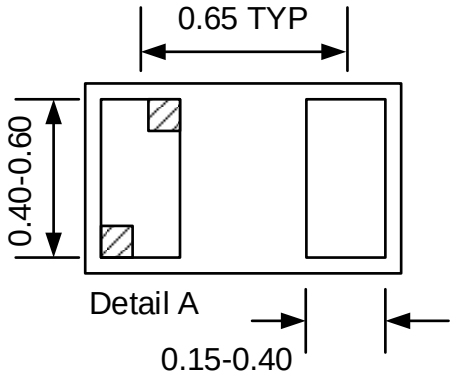
For optimum ESD protection and circuit performance, the following circuit board guidelines are recommended:

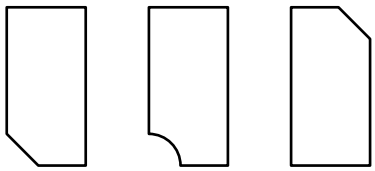
- Place SY205248DWD as close to the connector or terminal ports as possible.
- Use a large via to connect the SY205248DWD pin to the ground.
- Avoid running signals near board edges.
- The SY205248DWD should be placed near the protected line.
- The distance between the SY205248DWD ground pin and the GND reference path should be as short as possible.

DFN1.0×0.6-2 Package Outline

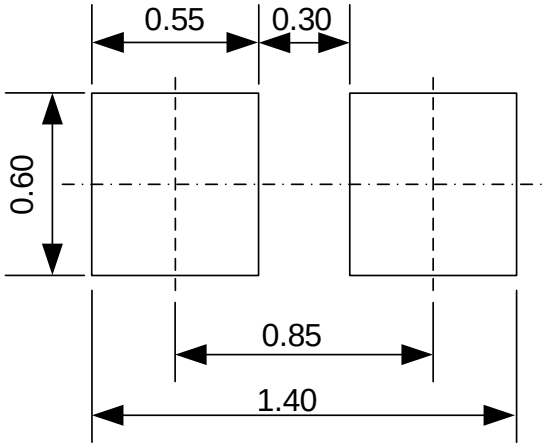


Top View **Side View**





Bottom View **Detail A**

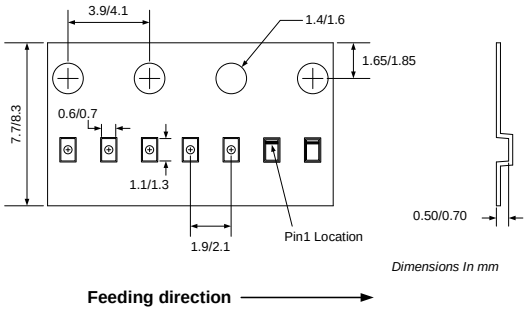


Recommended PCB Layout
(Reference only)

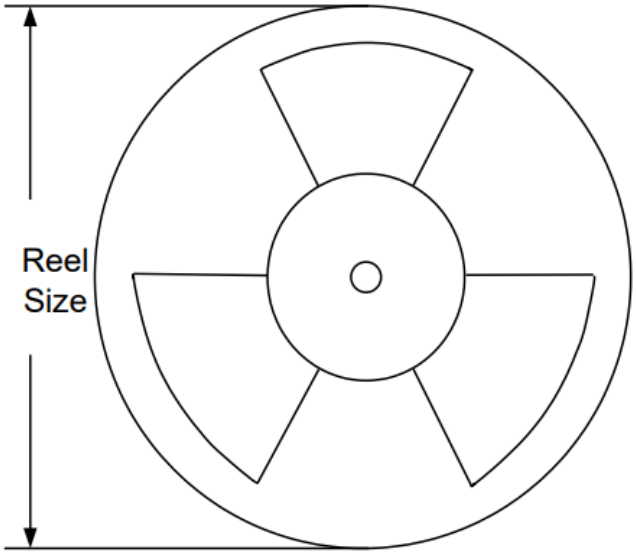
Note: *All dimensions are in millimeters and exclude mold flash and metal burr.*

Tape and Reel Specification

DFN1.0×0.6-2 Taping Orientation



Carrier Tape & Reel Specification for Packages



Package Types	Tape Width (mm)	Pocket Pitch(mm)	Reel Size (Inch)	Qty per Reel(pcs)
DFN1.0×0.6-2	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	07/08/2022	Initial Release	
1.0	07/08/2023	Production Release	

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