



SY205270DWC

Single Line TVS Diode for ESD Protection

General Description

The SY205270DWC is a single-line, uni-directional transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for various applications.

The device protects sensitive electronic components from ESD and other transient overcurrent events. It complies with IEC 61000-4-2 (ESD) standards ($\pm 30\text{kV}$ air, $\pm 30\text{kV}$ contact discharge) and IEC 61000-4-5 (surge) standards (12A, 8/20 μs).

The SY205270DWC is available in a DFN1.0x0.6-2L package with an operating voltage of 20V.

Features

- Operating Voltage: 20V and Below
- Transient Protection for a Single Line
 - IEC61000-4-2(ESD) $\pm 30\text{kV}$ (Air) $\pm 30\text{kV}$ (Contact)
 - IEC61000-4-5(Surge) 12A (8/20 μs)
- Protects One Data, Control or Power Line
- Capacitance: 85pF(Typical)
- Low Leakage Current: 0.01 μA @ V_{RWM} (Typical)
- Low Clamping Voltage

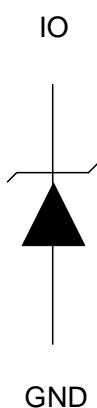
Applications

- USB V_{BUS} Lines Protection
- Desktops, Servers, and Notebooks
- Smart Phones
- Microprocessor Based Equipment
- Portable Instrumentation

Mechanical Characteristics

- DFN1.0x0.6-2L Package
- Marking: Device Code, Date Code
- Packaging: Tape and Reel

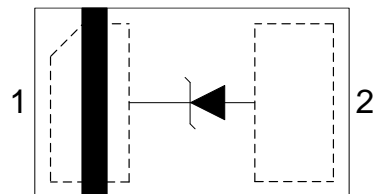
Circuit Diagram



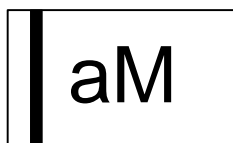
Ordering Information

Pinout (Top View)

Part Number	Package type	Top Mark
SY205270DWC	DFN1.0x0.6-2L	aM



Marking Codes



Note: "a" is device code, fixed.

"M" is date code.

Absolute Maximum Rating(Note 1)				
Parameter	Symbol	Min	Max	Unit
Peak Pulse Current (8/20μs)	I _{PP}		12	A
Peak Pulse Power (8/20μs)	P _{PK}		450	W
ESD per IEC 61000-4-2 (Air)	V _{ESD}	-30	30	kV
ESD per IEC 61000-4-2 (Contact)		-30	30	
Junction Temperature	T _J	-40	+125	°C
Storage Temperature	T _{STG}	-55	+150	°C

Electrical Characteristics (IO referenced to GND, T _A = 25°C (Note 2))						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Nominal Reverse Operating Voltage	V _{RWM}				20	V
Reverse Leakage Current at V _{RWM}	I _R	V _{RWM} = 20V			0.1	μA
Reverse Breakdown Voltage at I _T	V _{BR}	I _T = 1mA	22		28	V
Forward Voltage at I _F	V _F	I _F = 1mA	0.4		1.2	V
Clamping Voltage at I _{PP} (Note 3)	V _C	I _{PP} = 12A, t _p = 8/20μs		33		V
Clamping Voltage at I _{PP} (Note 3)	V _C	I _{PP} = 16A, t _p = 10/100ns		26		V
Dynamic Resistance (Notes 3, 4)	R _{DYN}	t _p = 10/100ns		0.08		Ω
Parasitic Capacitance (Note 3)	C _{ESD}	V _R = 0V, f = 1MHz		85	110	pF

Note 1: Stresses beyond the "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2: Unless otherwise stated, limits are 100% production tested under pulsed load conditions such that T_A ≅ T_J = 25°C. Limits over the operating temperature range (see recommended operating conditions) and relevant voltage range(s) are guaranteed by design, test, or statistical correlation.

Note 3: Guaranteed by design or statistical correlation and not production tested.

Note 4: R_{DYN} calculated based on I_{PP}=8A to I_{PP}=16A, t_p = 10/100ns.

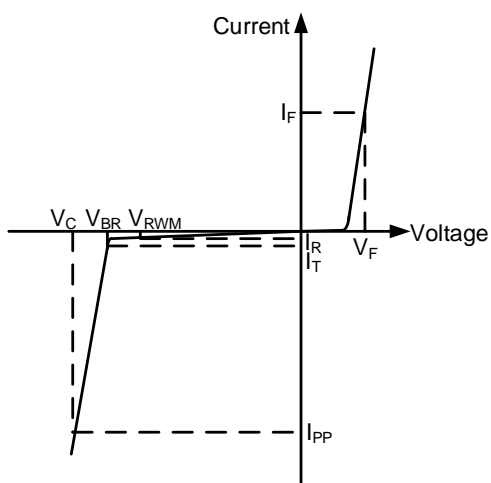
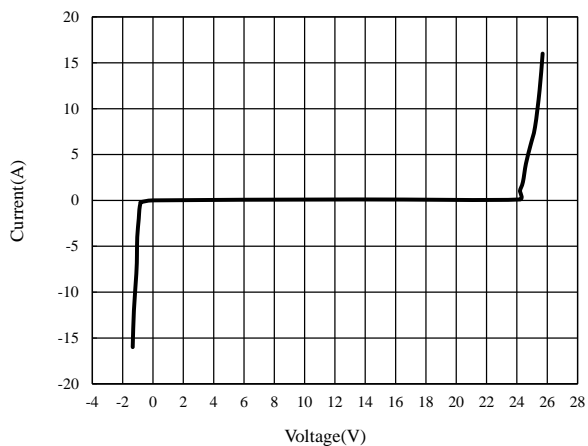


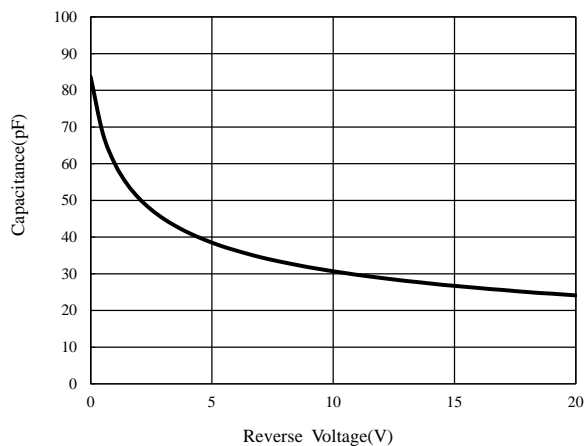
Figure 1. Uni-directional TVS

Typical Characteristics, IO Referenced to GND

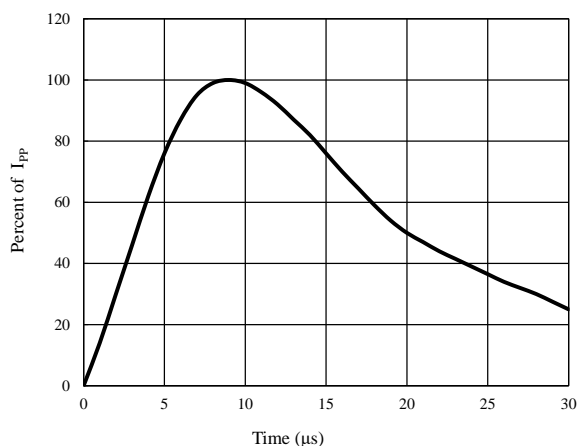
TLP Testing of IO to GND



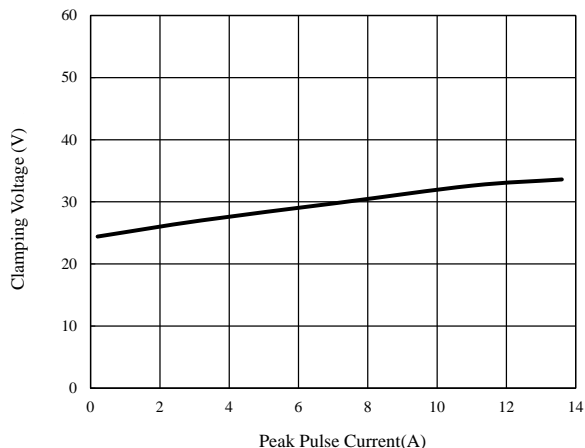
Capacitance vs. Reverse Voltage



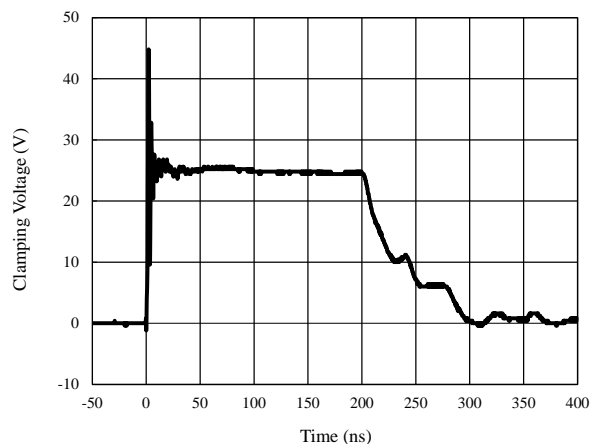
8/20μs Pulse Waveform



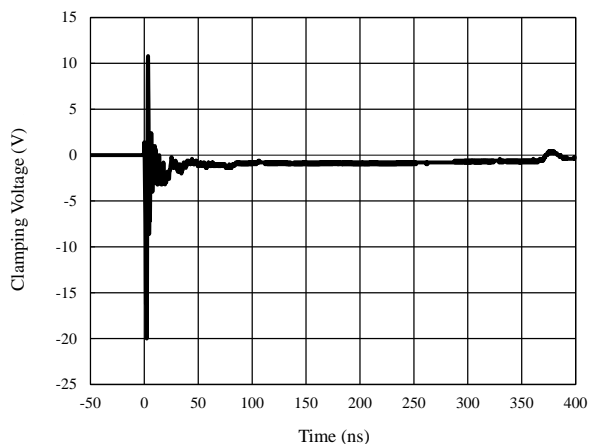
Clamping Voltage vs. Peak Pulse Current



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



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



Application Information

PCB Pin Connections

The SY205270DWC protects one directional data line against overvoltage and overcurrent transient events by clamping it to an acceptable reference.

The SY205270DWC pin connections are shown in Figure 2. The protected line connects to Pin 1, while Pin 2 connects to GND, which should be tied to a ground plane on the board. All path lengths connected to the pins of the SY205270DWC should be as short as possible to minimize parasitic inductance.

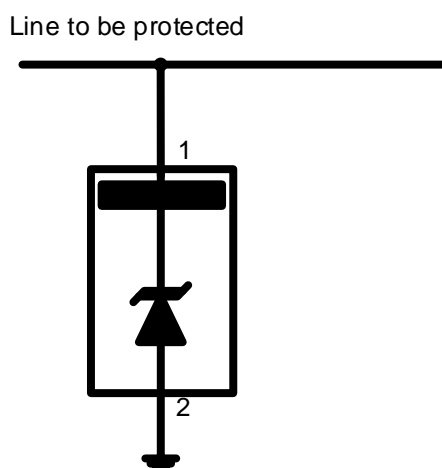


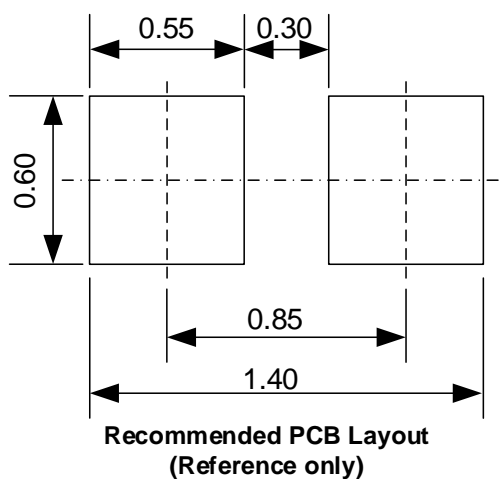
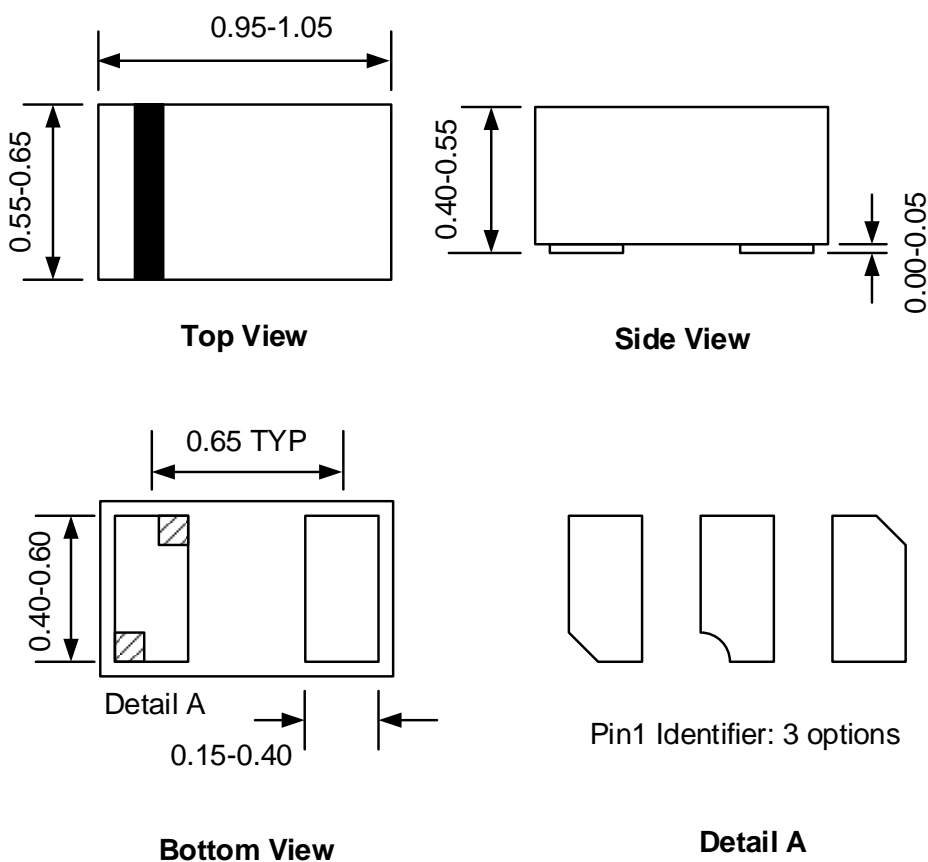
Figure 2. ESD/Surge Protection Circuit

PCB Layout Guidelines

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

- Place SY205270DWC as close to the connector or terminal ports as possible.
- Use a large via to connect the SY205270DWC pin to the ground.
- Avoid running signals near board edges.
- The SY205270DWC should be placed near the protected line.
- The distance between the SY205270DWC ground pin and the GND reference path should be as short as possible.

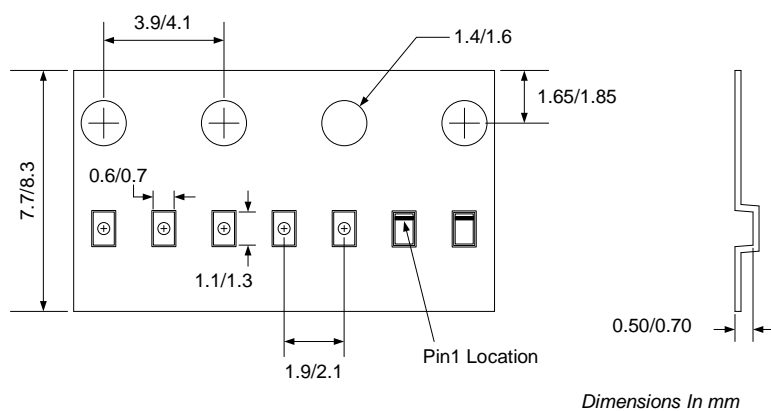
DFN1.0x0.6-2L Package Outline



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

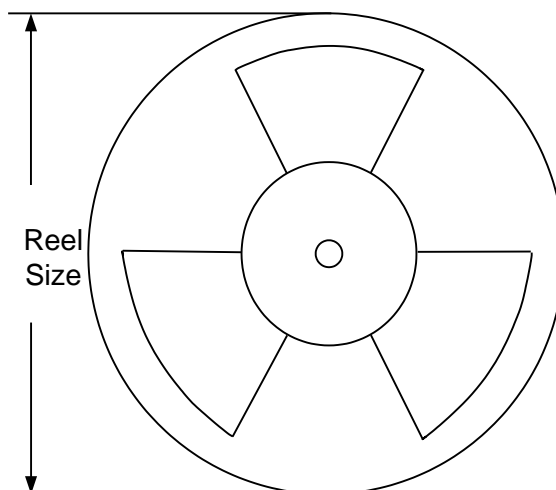
Tape and Reel Information

Tape Dimensions and Pin 1 Orientation



Feeding direction →

Reel Dimensions



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



Revision History

The revision history provided is for informational purposes 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
1.0	Jun. 05, 2024	Initial Release	

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