SY205226DWC

Ultra-Low Capacitance TVS Protection

General Description

SY205226DWC is a low-capacitance transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With a typical capacitance of 0.4pF, SY205226DWC is designed to protect against over-voltage and over-current transient events. It complies with IEC61000-4-2 (ESD) (±30kV air, ±30kV contact discharge), IEC61000-4-5 (Surge) (6A, 8/20μs).

Each SY205226DWC device can protect one data line. The SY205226DWC is available in a small DFN1.0x0.6-2 package.

Features

- Protects One Data, Control, or Power Line
- Low Capacitance: 0.4pF (Typical)
- Low Leakage Current: 0.01μA @ V_{RWM} (Typical)
- Low Clamping Voltage
- For Operating Voltage of 3.3V and Below
- Transient Protection for High-Speed Data Lines
  - IEC 61000-4-2 (ESD) ±30kV (Air)±30kV (Contact)
  - IEC 61000-4-5 (Surge) 6A (8/20 μs)
- Package Optimized for High-Speed Lines
- Ultra-Small Package: DFN1.0×0.6-2
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge.

Applications

- Serial ATA
- PCI Express
- Desktops, Servers, and Notebooks
- MDDI Ports
- USB2.0, 3.0, and 3.1
- Display Ports
- HDMI 1.3, 1.4, 2.0, and 2.1
- Digital Visual Interfaces (DVI)

Mechanical Characteristics

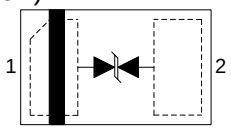
- Package: DFN1.0×0.6-2
- Marking: Device Code, Date Code
- Packaging: Tape and Reel

Circuit Diagram

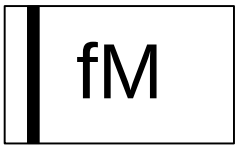
Ordering Information

Part Number	Package Type	Top Mark
SY205226DWC	DFN1.0×0.6-2 RoHS Compliant and Halogen Free	fM

Pinout (Top View)



Marking Codes



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

Note 2: "M" is date code.

Absolute Maximum Rating				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Maximum Peak Pulse Current (8/20μs)	I_{PP}		6	A
Maximum Peak Pulse Power (8/20μs)	P_{PK}		48	W
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}		-3.3		3.3	V
Reverse Leakage Current @ V_{RWM}	I_R	V_{RWM} = 3.6V, T_A = 25°C		0.01	0.1	μA
Triggering Voltage @ I_{t1}	V_{t1} (1)	I_{t1} = 1μA	3.7			V
Holding Voltage @ I_h	V_h	I_h = 100mA	3.3		6.0	V
Clamping Voltage @ I_{PP}	V_C (1)	I_{PP} = 6A, t_p = 8/20μs		8.0		V
Clamping Voltage @ I_{PP}	V_C (1)	I_{PP} = 16A, t_p = 10/100ns		8.5		V
Dynamic Resistance	R_{DYN}(1,2)	t_p = 10/100ns		0.25		Ω
Parasitic Capacitance	C_{ESD}(1)	V_R = 1.65V, f = 1MHz		0.40	0.50	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.

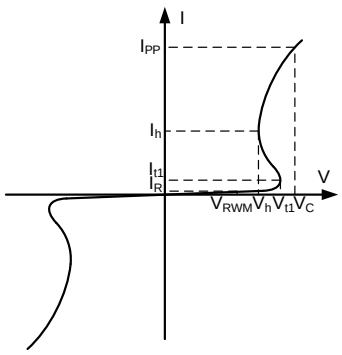
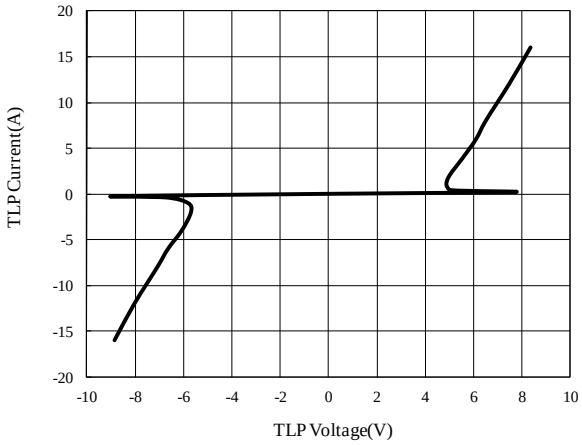


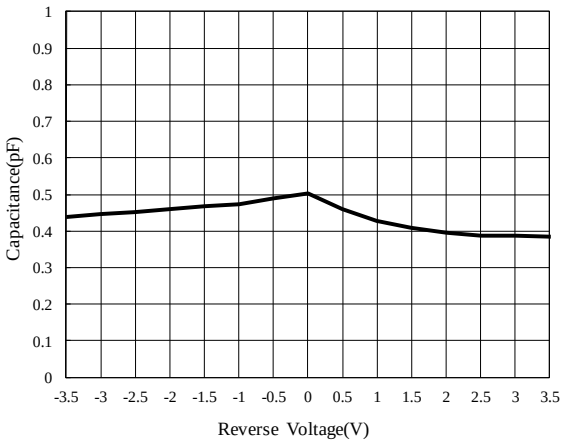
Figure 1. Bi-directional TVS

Typical Characteristics

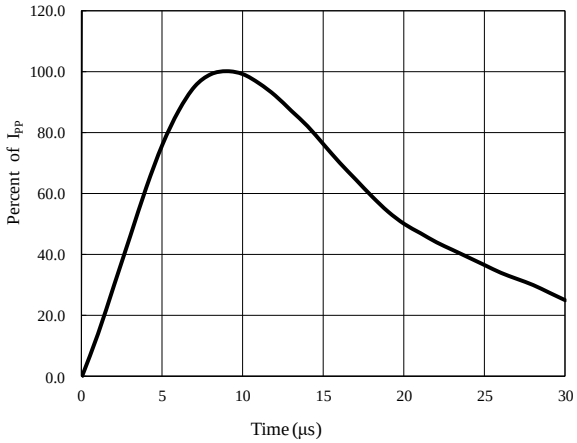
TLP Measurement



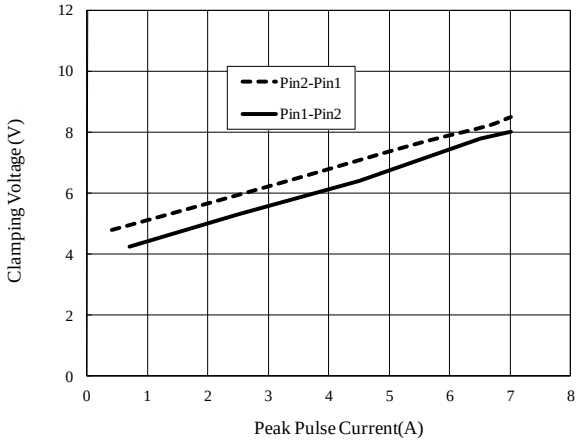
Capacitance vs. Voltage



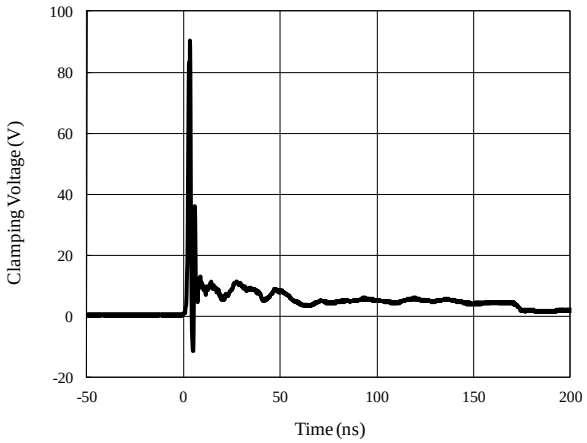
Pulse Waveform



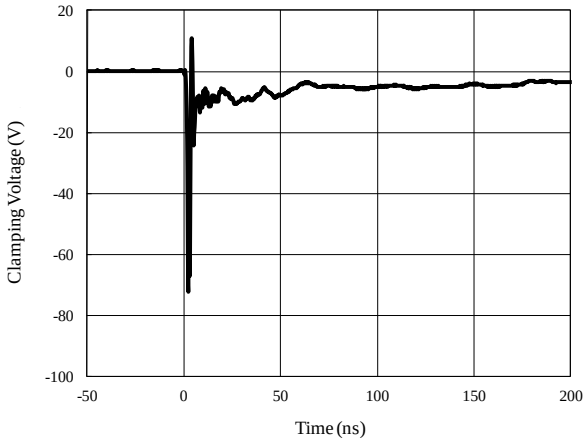
Clamping Voltage vs. Peak Pulse Current



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)



Eye Diagram Measurement for HDMI2.1

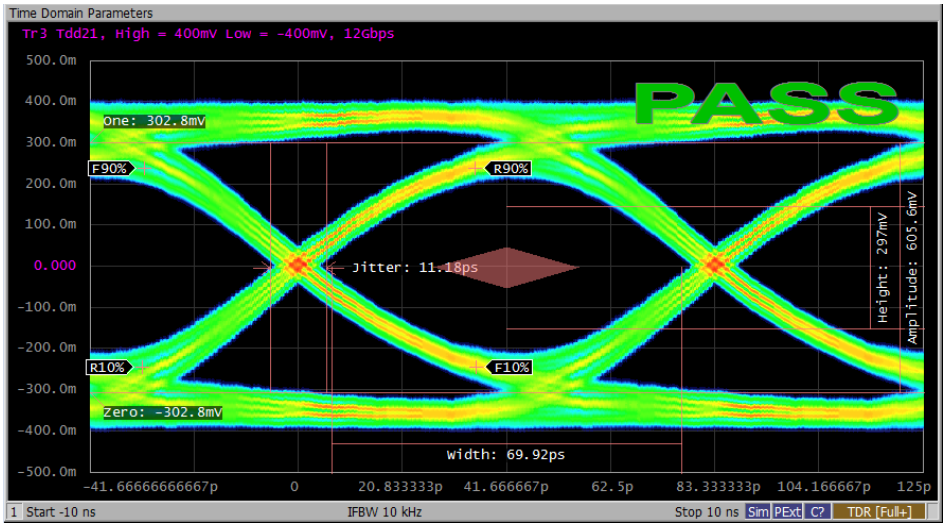


Figure 2. Data Rate 12Gb/s
HDMI 2.1 Eye Diagram without SY205226DWC

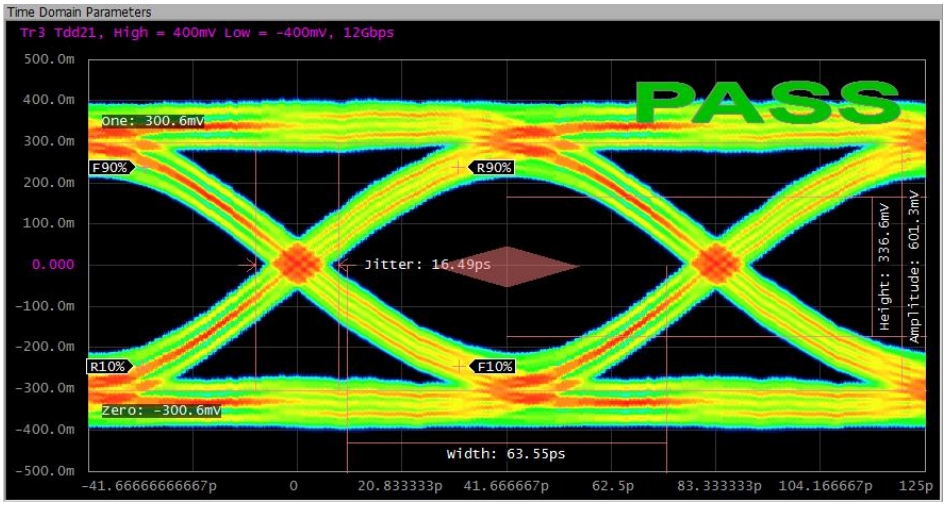


Figure 3. Data Rate 12Gb/s
HDMI 2.1 Eye Diagram with SY205226DWC

Application Information

SY205226DWC is designed to protect one bi-directional data line against over-voltage and over-current transient events by clamping it to an acceptable reference.

The SY205226DWC pin connections are shown in Figure 4. The protected line is connected to Pin1. Pin2 is connected to the GND, which should connect to a ground plane on the board. All path lengths connected to pins of SY205226DWC should be as short as possible to minimize the parasitic inductance.

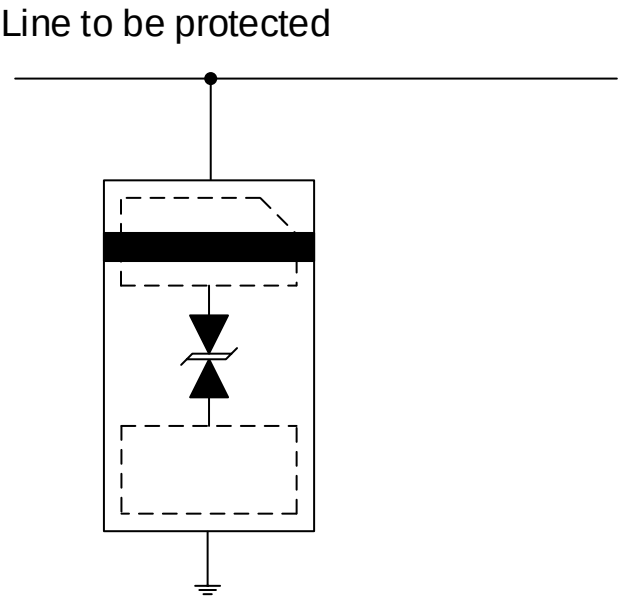


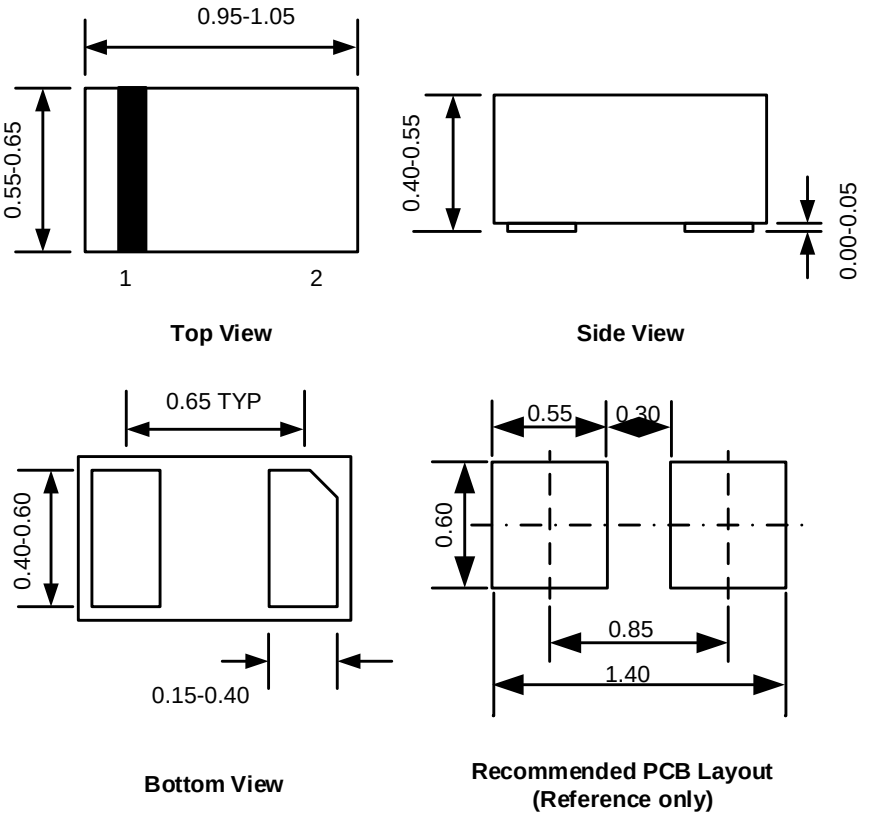
Figure 4. ESD/Surge Protection Circuit

PCB Layout Guidelines

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

- Place SY205226DWC as close to the connector port as possible.
- Use a large via to connect the SY205226DWC pin to the ground.
- Avoid running signals near board edges.
- The distance between the SY205226DWC ground pin and the GND reference path should be as short as possible.

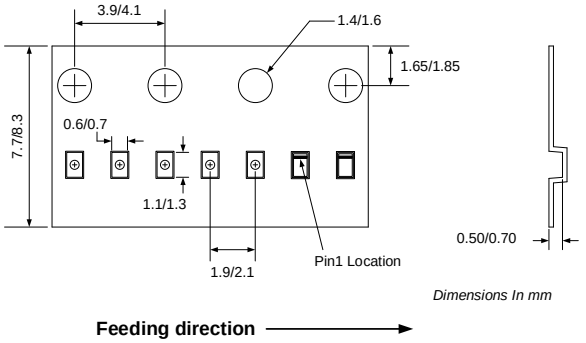
DFN1.0×0.6-2 Package Outline



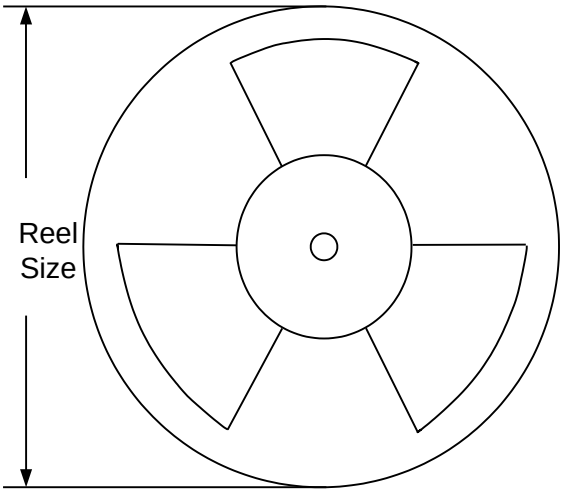
Note: *All dimensions are in millimeters and exclude mold flash and metal burr.*

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	09/04/2020	Initial Release	
1.0	09/04/2021	Production Release	

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