SYT26A05DVD

Ultra-Low Capacitance TVS Protection

General Description

SYT26A05DVD is an ultra-low capacitance transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.35pF only, SYT26A05DVD is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), (±25kV air, ±25kV contact discharge), IEC 61000-4-5 (Surge) (10A, 8/20μs), etc.

SYT26A05DVD uses ultra-small DFN2.5×1.0-10 package. Each SYT26A05DVD device can protect four high-speed data lines. The combined features of ultra-low capacitance, ultra-small size and high ESD robustness make SYT26A05DVD ideal for high-speed data ports and high-frequency lines (e.g., USB3.x & DVI) applications. The low clamping voltage of the SYT26A05DVD guarantees a minimum stress on the protected IC.

Features

- Transient protection for high-speed data lines
  - IEC61000-4-2(ESD) ±25kV (Air)±25kV (Contact)
  - IEC61000-4-5(Surge) 10A (8/20μs)
- For 5V and below operating voltage
- Ultra-small package:(2.5mm×1.0mm×0.55mm)
- Protects four high-speed data line
- Ultra Low capacitance: 0.35pF（Typical）
- Low clamping voltage

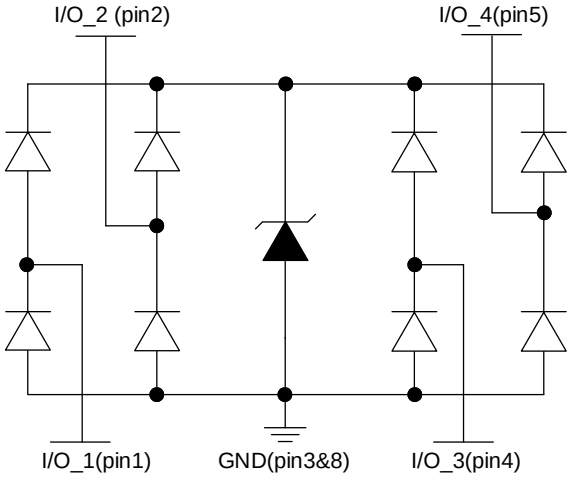
Applications

- USB2.0&3.x,USB Type-C
- HDMI2.0
- V-By-One

Mechanical Characteristics

- DFN2.5×1.0-10 package
- Marking: Device Code, Date code.
- Packaging: Tape and Reel

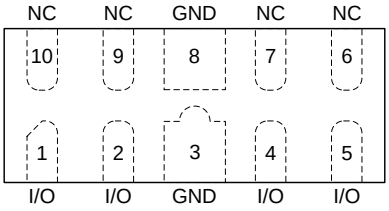
Circuit Diagram



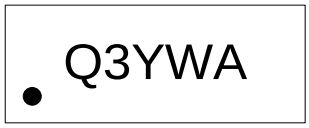
Ordering Information

Part Number	Package Type	Top Mark
SYT26A05DVD	DFN2.5×1.0-10	Q3YWA

Pinout (Top View)



Marking Codes



Note 1: "Q3" is device code, fixed.
Note 2: "YWA" is date code.

Pin Descriptions

Device Pins	Name	Description
1	Input/Output	IO1
2	Input/Output	IO2
3	Ground	GND
4	Input/Output	IO3
5	Input/Output	IO4

Absolute Maximum Rating				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Maximum Peak Pulse Current (8/20μs)	I_{PP}		10	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	-25 -25	25 25	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}		-0.7		5.5	V
Reverse Leakage Current @ V_{RWM}	I_R	V_{RWM} = 5V, T_A = 25°C		0.01	0.1	μA
Reverse Triggering Voltage @ I_{t1}	V_{tl}	I_{tl}= 1mA	6	9	11	V
Holding Voltage @ I_h	V_h	I_h=100mA, Pin1,2,4,5 to Pin3&8	0.8		3	V
Forward Voltage @ I_F	V_F	I_h=1mA, Pin3&8 to Pin1,2,4,5	0.4		1.2	V
Clamping Voltage @ I_{PP}	V_C[1]	I_{PP} = 16A, t_p = 10/100ns		4		V
Clamping Voltage @ I_{PP}	V_C[1]	I_{PP} = 10A, t_p = 8/20us		4.5	6	V
Dynamic Resistance	R_{DYN}[1,2]	t_p = 10/100ns		0.15		Ω
Parasitic Capacitance	C_{ESD}[1]	V_R = 3.3V, f = 1MHz		0.35	0.45	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.

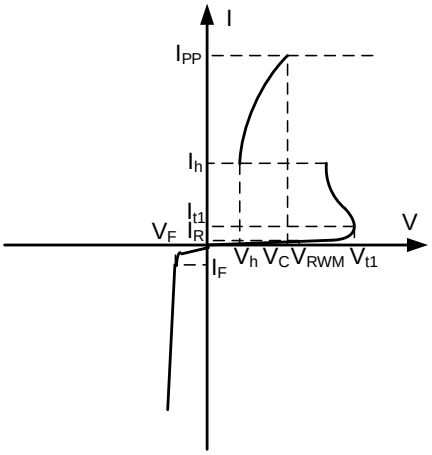
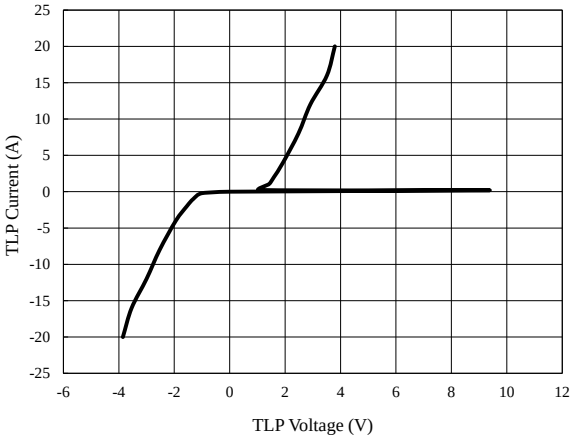


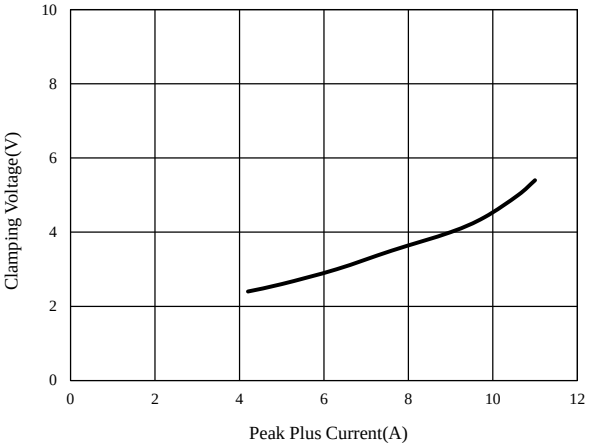
Figure 1. Uni-Directional TVS

Typical Characteristics

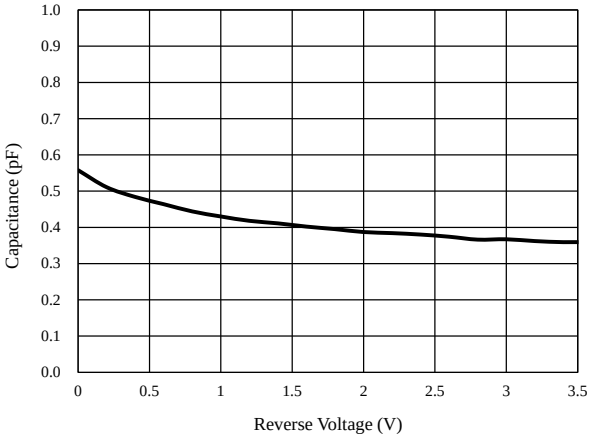
TLP Testing of I/O to GND



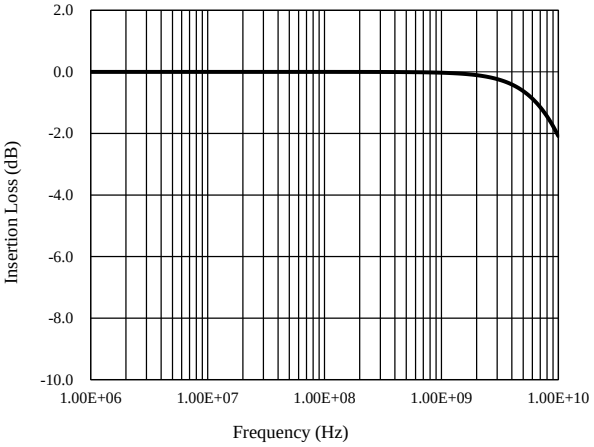
Clamping Voltage vs. Peak Pulse Current (8/20μs)



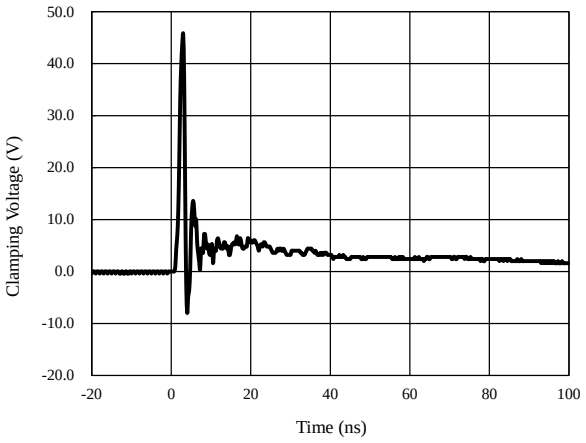
Capacitance vs. Voltage of I/O to GND



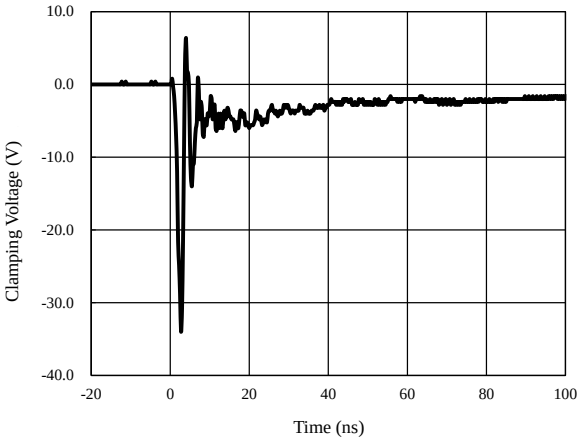
Insertion Loss S21 of I/O to GND



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

Pin Connection in PCB

SYT26A05DVD provides ESD protection for four data lines simultaneously. The pin connection is shown in the figure2 below.

Four parallel data lines, from inner IC to I/O port connector, could connect to SYT26A05DVD four I/O pins directly. Pin 3&8 of SYT26A05DVD is the GND pin, which should connect to the GND of PCB. The wire should be as short as possible in order to minimize the parasitic inductance.

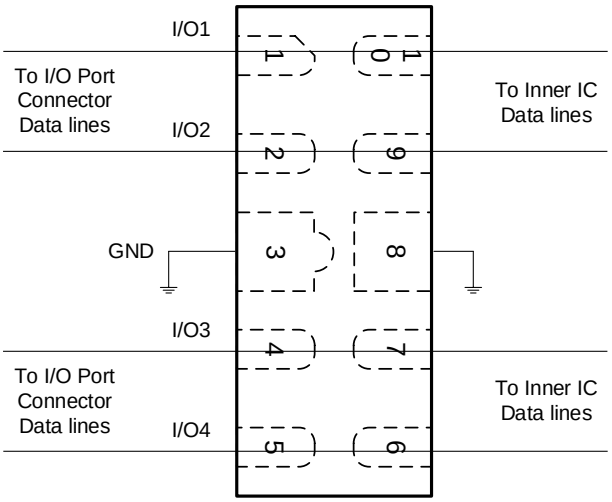


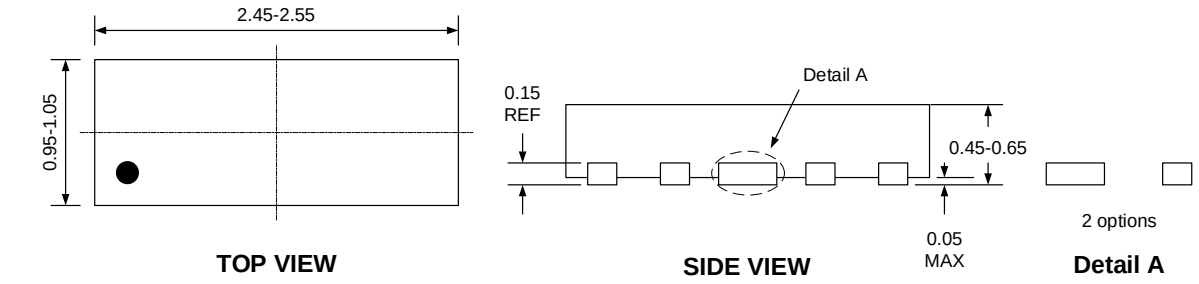
Figure 2 SYT26A05DVD Pin Connection in PCB

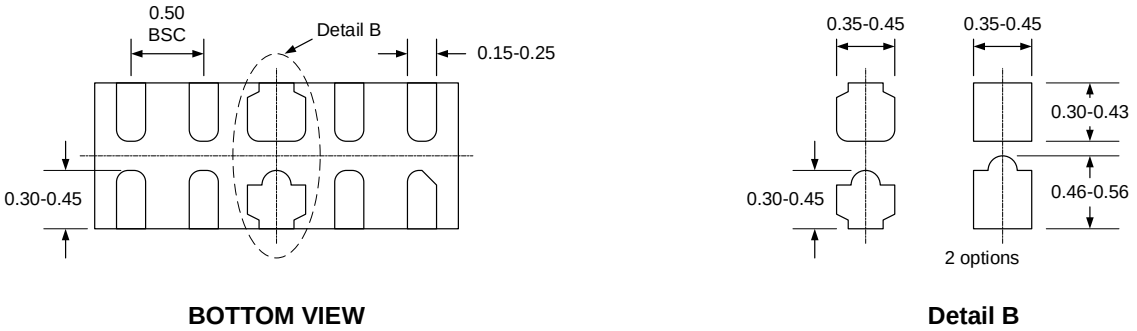
PCB Layout Guidelines

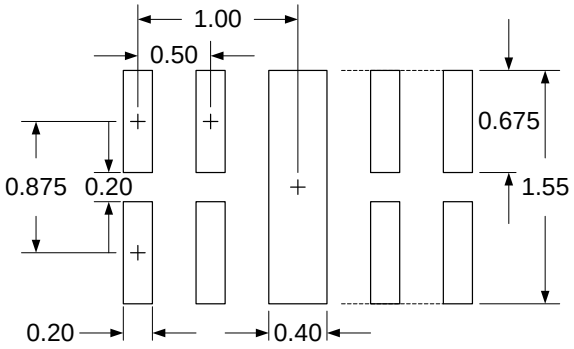
For optimum ESD protection and the whole circuit performance, the following PCB layout guidelines are recommended:

- SYT26A05DVD GND pin to the PCB GND rail path should be as short as possible. It could reduce the ESD transient return path to GND.
- The vias connecting SYT26A05DVD GND pins to the PCB GND should be wide.
- Place SYT26A05DVD as close to the connector port as possible. It could reduce the parasitic inductance and restrict ESD coupling into adjacent traces.
- Avoid running critical signals near board edges.

DFN2.5×1.0-10 Package Outline







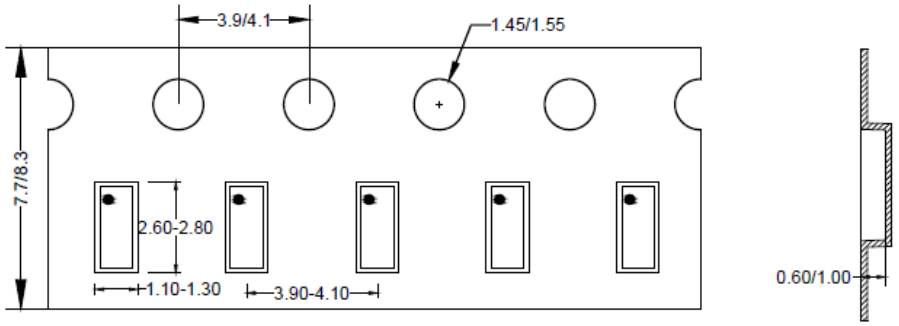
Recommended PCB Layout
(Reference only)

Package Dimensions (Controlling Dimensions are in Millimeters)

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

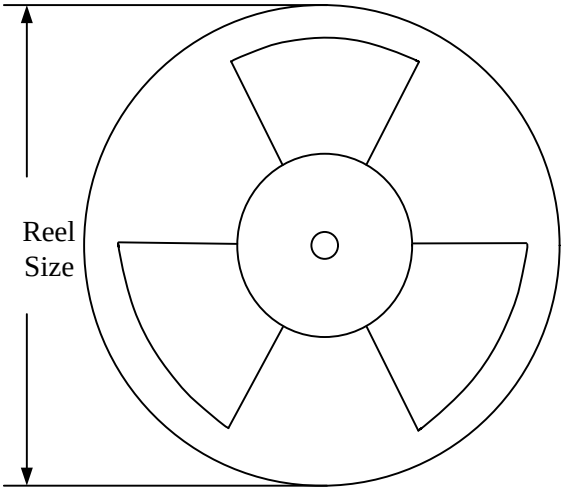
Tape and Reel Specification

DFN2.5×1.0-10 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)
DFN2.5×1.0-10	8	4	7"	3000

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
1.0	Nov 20, 2023	Initial Release	

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