SYT01A05DXC
Ultra-Low Capacitance TVS Protection

Features

- Transient protection for high-speed data lines
  IEC61000-4-2(ESD) ±15kV (Air)
  ±15kV (Contact)
  IEC61000-4-5(Surge) 4A (8/20μs)
- For 5V and below operating voltage
- Package optimized for high-speed lines
- Ultra-small package (0.6mm*0.3mm*0.3mm)
- Protects one data, control or power line
- Ultra Low capacitance: 0.15pF
- Low leakage current: 0.01μA @ V_{RWM} (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge

Description

SYT01A05DXC 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 0.15pF only, SYT01A05DXC is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC61000-4-2 (ESD) (±15kV air, ±15kV contact discharge), IEC61000-4-5 (Surge) (4A, 8/20μs), etc.

SYT01A05DXC uses ultra-small DFN0.6*0.3-2L package. Each SYT01A05DXC device can protect one high-speed data line. The combined features of ultra-low capacitance, ultra-small size and high ESD robustness make SYT01A05DXC ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications. The low clamping voltage of the SYT01A05DXC guarantees a minimum stress on the protected IC.

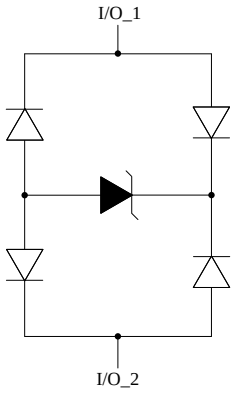
Applications

- 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)

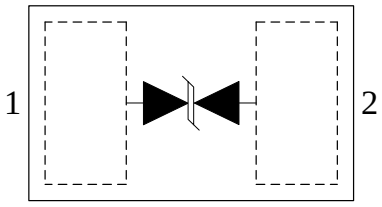
Mechanical Characteristics

- DFN0.6*0.3-2 package
- Flammability Rating: UL 94V-0
- Marking: Device code
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



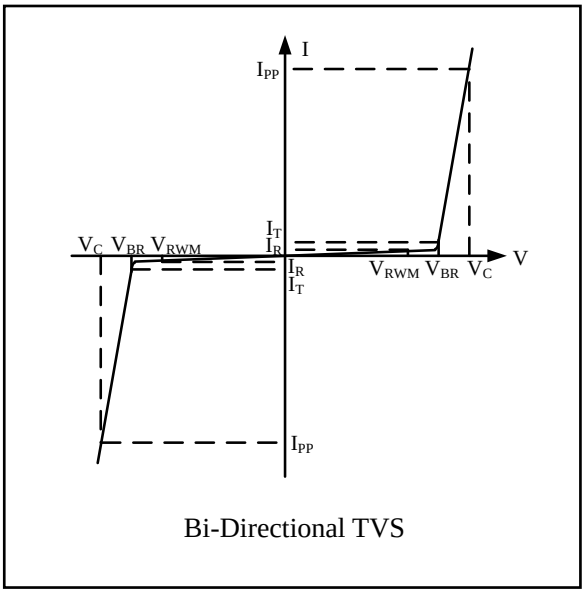
DFN0.6*0.3-2
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
P_{PK}	Peak Pulse Power (t_p=8/20μs)	55	Watts
I_{PP}	Maximum Peak Pulse Current (8/20μs)	4	A
V_{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±15 ±15	kV
T_{OPT}	Operating Temperature	-40/+125	°C
T_{STG}	Storage Temperature	-55/+150	°C

Electrical Characteristics (T_A = 25°C)

Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Reverse Breakdown Voltage @ I_T
I_T	Test Current for Reverse Breakdown
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Maximum Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal Frequency
I_F	Forward Current
V_F	Forward Voltage @ I_F



Bi-Directional TVS

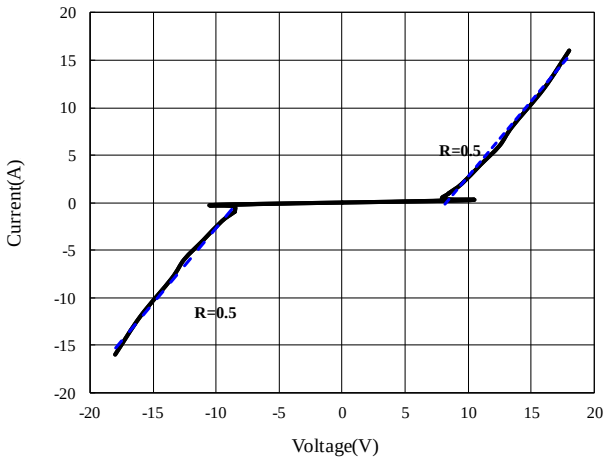
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.5	V
I_R	V_{RWM} = 5.0V, T_A = 25°C		0.01	0.1	μA
V_{BR}	I_T = 5mA	5.5		7.5	V
V_C[1]	I_{PP} = 4A, t_p = 8/20μs		14		V
V_C[1]	I_{PP} = 16A, t_p = 10/100ns		18		V
R_{DYN}[1,2]	t_p = 10/100ns		0.5		Ω
C_{ESD}[1]	V_R = 0V, f = 1MHz		0.15	0.20	pF

NOTES

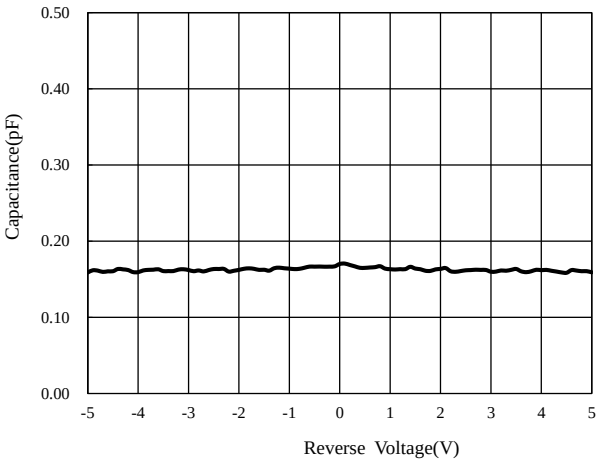
[1]Guaranteed by design and not subject to production test.

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

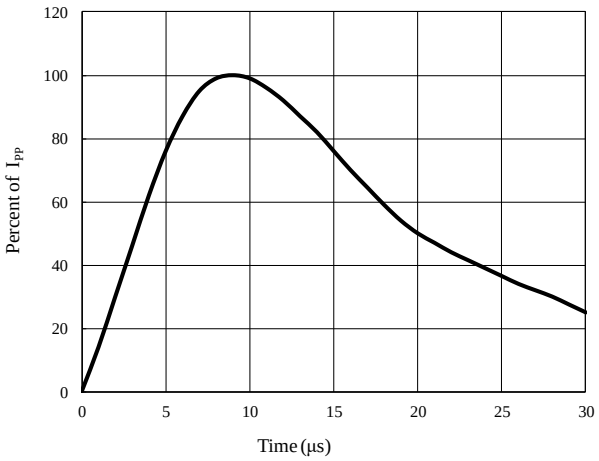
TLP Testing of I/O to I/O



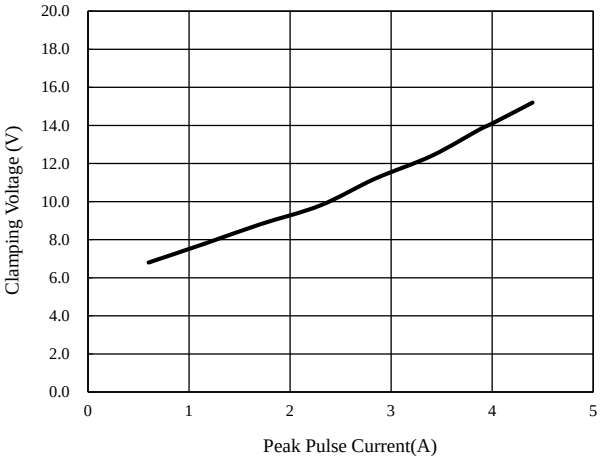
Capacitance vs. Reverse Voltage



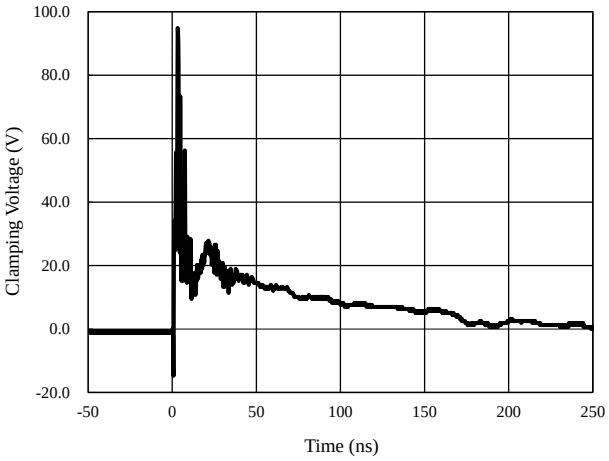
8/20μs Pulse Waveform



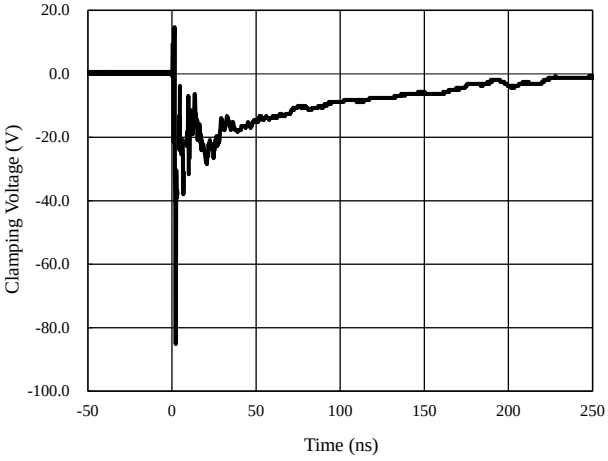
Clamping Voltage vs. Peak Pulse Current (8/20μs)



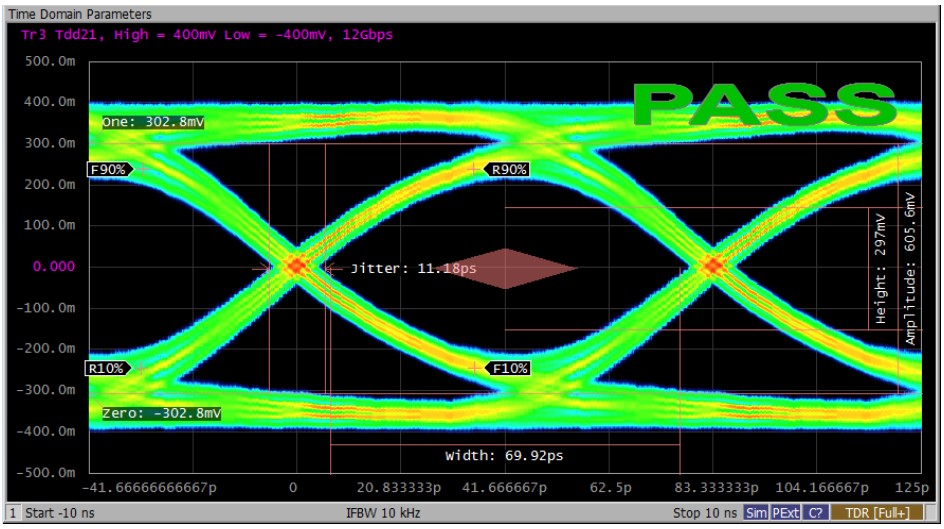
ESD Clamping of I/O to I/O (+8kV Contact per IEC 61000-4-2)



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

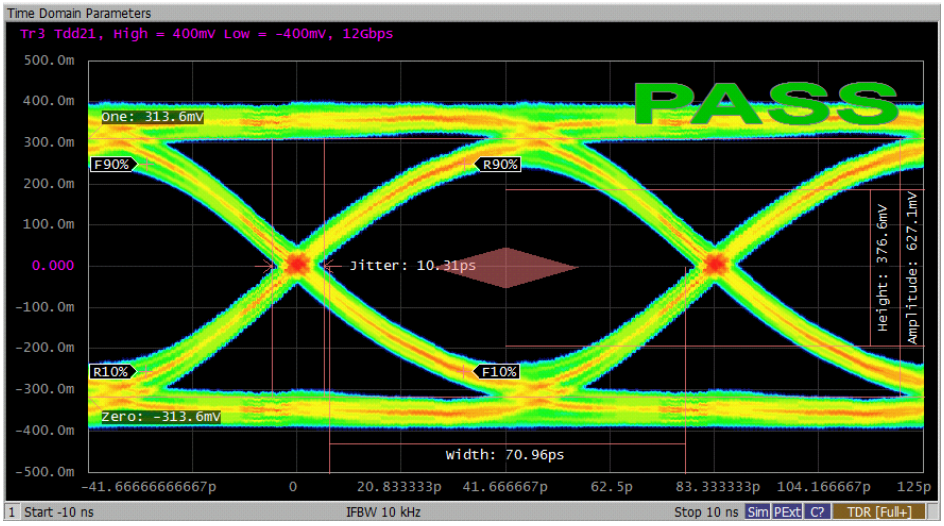


Eye Diagram Measurement for HDMI2.1



Data rate 12Gb/s

HDMI2.1 Eye Diagram without SYT01A05DXC

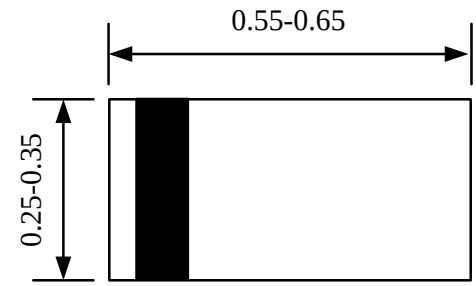


Data rate 12Gb/s

HDMI2.1 Eye Diagram with SYT01A05DXC

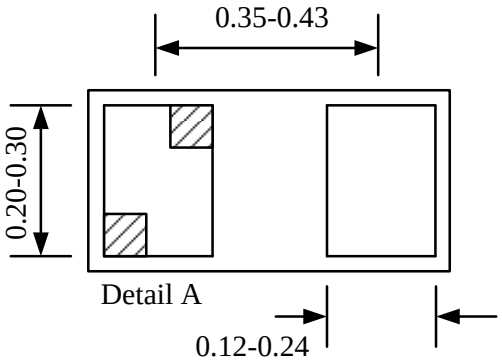
Package Outline

- DFN0.6*0.3-2 package

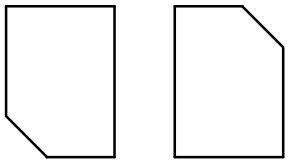


Top View

Side View



Bottom View

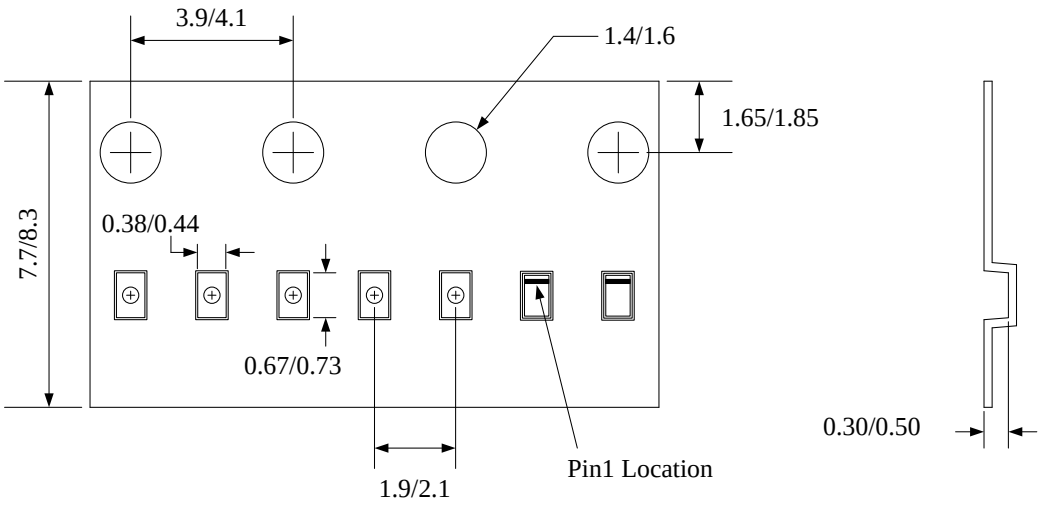


Pin1 Indentifier:Two options

Detail A

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

Tape and Reel Specification

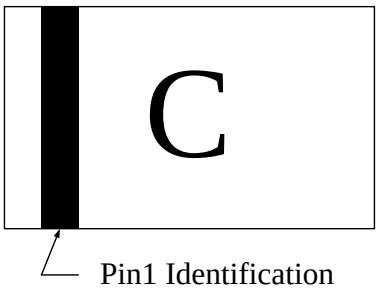


Dimensions In mm

Feeding direction ⟶

Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Trailer * length(mm)	Leader * length (mm)	Qty per reel (pcs)
DFN0.6*0.3-2	8	2	7"	400	400	10000

Marking Codes



Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
SYT01A05DXC	5.0V	10,000	7 Inch

Note:

(1) "C" is the device code.

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