SYT21A05DXC

Ultra-Low Capacitance TVS Protection

Features

- Transient protection for high-speed data lines
  IEC61000-4-2(ESD) ±20kV (Air)
  ±20kV(Contact)
  IEC61000-4-5(Surge) 9A (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 line
- Ultra Low capacitance: 0.2pF
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV contact discharge

Description

SYT21A05DXC 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 0.2pF only, SYT21A05DXC is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC61000-4-2 (ESD) (±20kV air, ±20kV contact discharge), IEC61000-4-5 (Surge) (9A, 8/20μs), etc.

SYT21A05DXC uses ultra-small DFN0.6*0.3-2 package. Each SYT21A05DXC device can protect one high-speed data line. The combined features of ultra-low capacitance, ultra-small size and high ESD robustness make SYT21A05DXC ideal for high-speed data ports and high-frequency lines (e.g., USB3.x& DVI) applications. The low clamping voltage of the SYT21A05DXC guarantees a minimum stress on the protected IC.

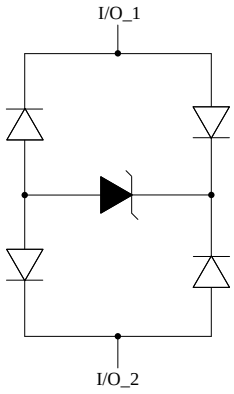
Applications

- USB Type-C
- USB2.0&3.x
- HDMI 1.3, 1.4, 2.0 and 2.1.
- Serial ATA
- PCI Express
- Desktops, Servers and Notebooks
- Display Ports
- Digital Visual Interfaces (DVI)

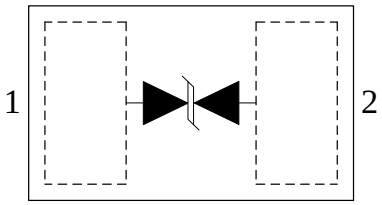
Mechanical Characteristics

- DFN0.6*0.3-2 package
- Marking: Device code
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



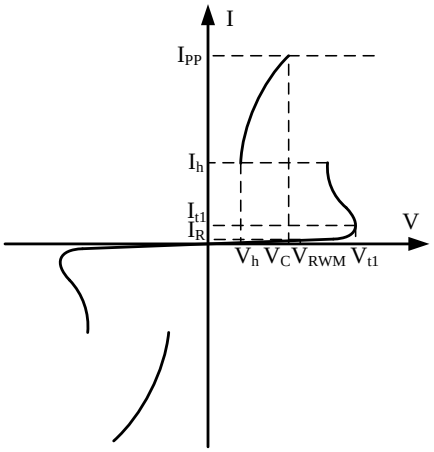
DFN0.6x0.3-2
(Top View)

Absolute Maximum Rating

Symbol	Parameter	Value	Units
I_{PP}	Maximum Peak Pulse Current (8/20μs)	9	A
P_{PK}	Maximum Peak Pulse Power (8/20μs)	55	W
V_{ESD}	ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	±20 ±20	kV
T_{OPT}	Operating Temperature	-40/+85	°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_{t1}	Reverse Triggering Voltage @ I_{t1}
I_{t1}	Test Current for Reverse Triggering
V_h	Holding Voltage
I_h	Holding Current
V_C	Clamping Voltage @ I_{PP}
I_{PP}	Peak Pulse Current
C_{ESD}	Parasitic Capacitance
V_R	Reverse Voltage
f	Small Signal Frequency



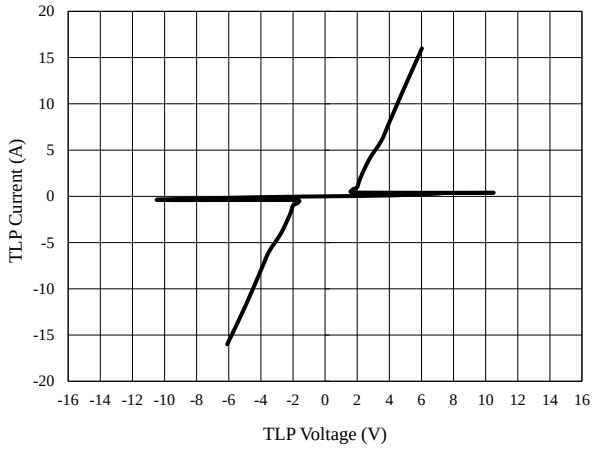
Bi-Directional TVS

Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}		-5		5	V
I_R	V_R = 5V, T_A = 25°C		0.1		μA
V_{t1}	I_{t1} = 1mA	5.5	10		V
V_h	I_h=100mA	1.2		3	V
V_C[1]	I_{PP} = 16A, t_p = 10/100ns		6		V
V_C[1]	I_{PP} = 9A, t_p = 8/20us		6		V
R_{DYN}[1,2]	t_p = 10/100ns		0.23		Ω
C_{ESD}[1]	V_R = 1V, f = 1MHz		0.2	0.25	pF

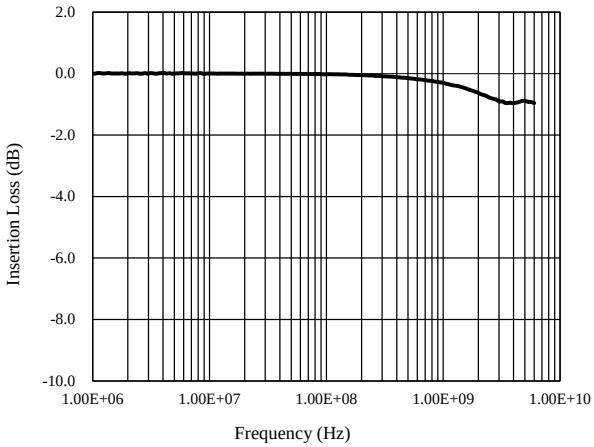
NOTES [1]Guaranteed by design and not subject to production test.

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

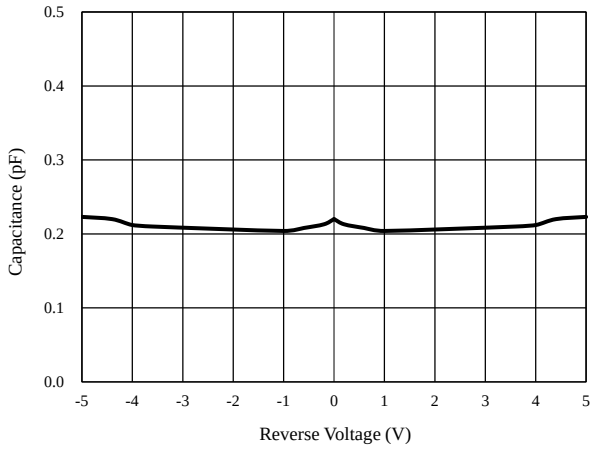
TLP Testing of I/O to I/O



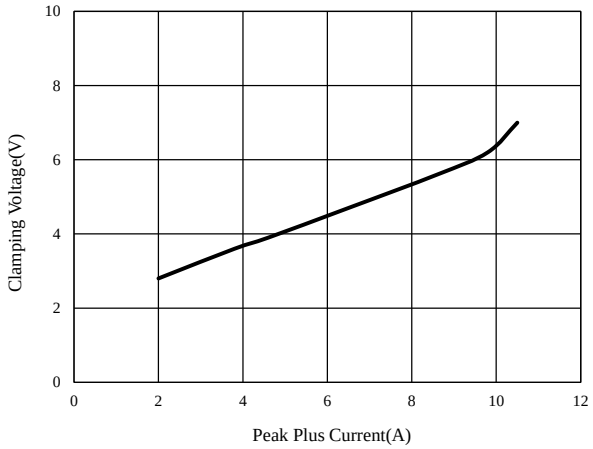
Insertion Loss S21 of I/O to I/O



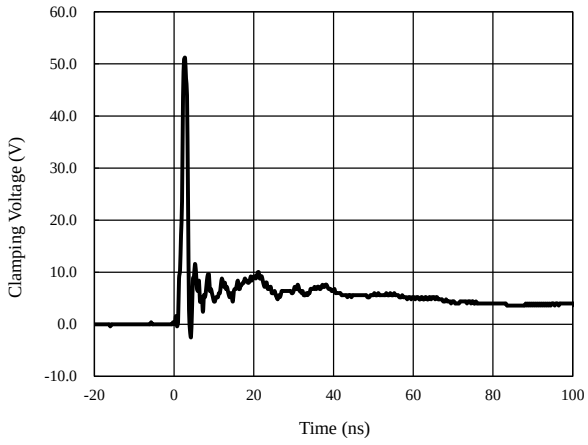
Capacitance vs. Voltage of I/O to I/O



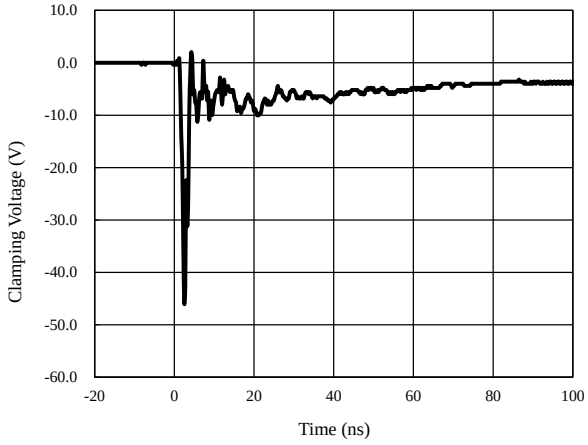
Clamping Voltage vs. Peak Pulse Current (8/20μs)



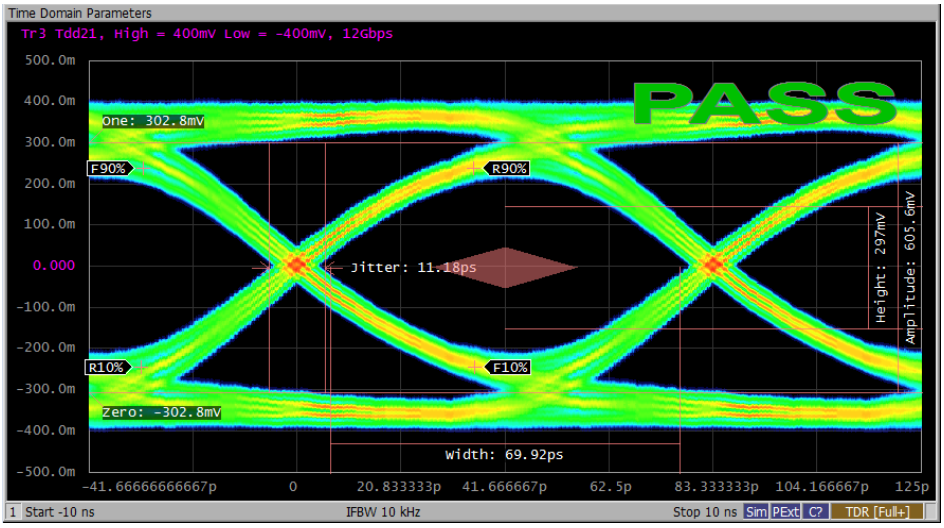
ESD Clamping of I/O to I/O (+8kV Contact per IEC 61000-4-2)



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

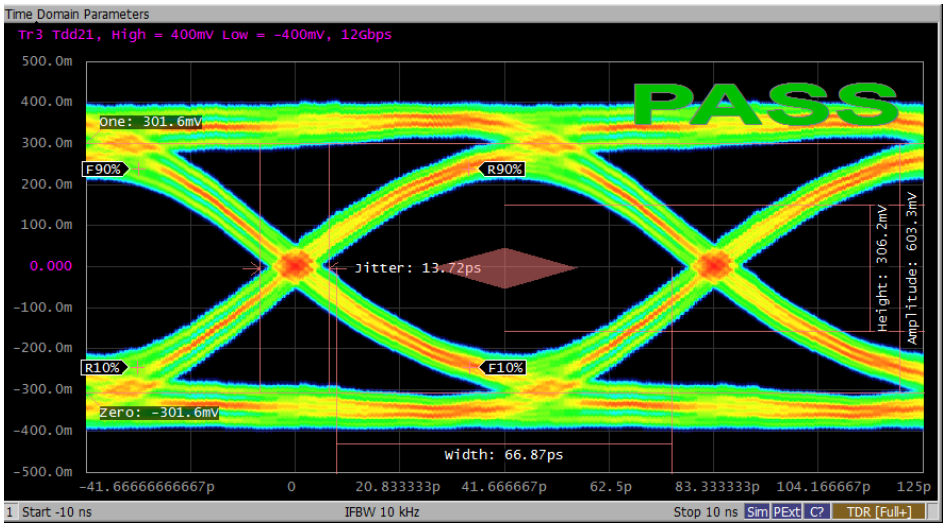


Eye Diagram Measurement For HDMI2.1



Data rate 12Gb/s

HDMI2.1 Eye Diagram without SYT21A05DXC

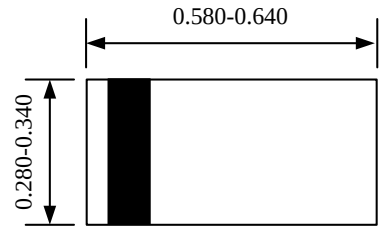


Data rate 12Gb/s

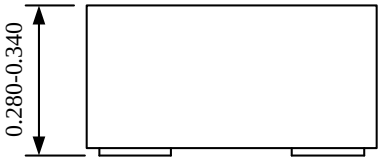
HDMI2.1 Eye Diagram with SYT21A05DXC

Package Outline

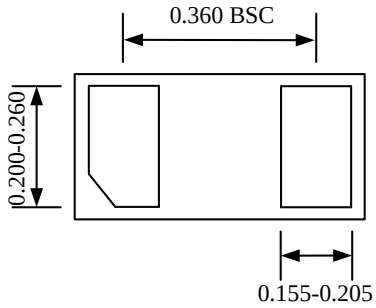
- DFN0.6*0.3-2 package



Top View



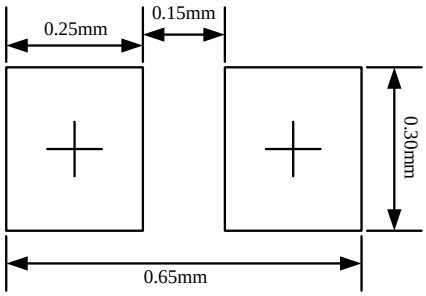
Side View



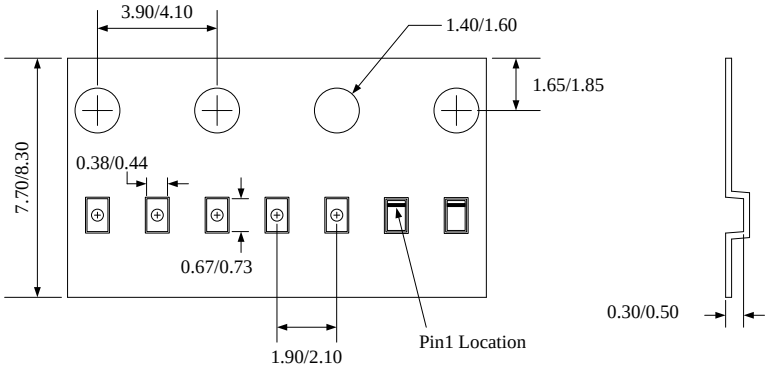
Bottom View

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

PCB Layout Pattern

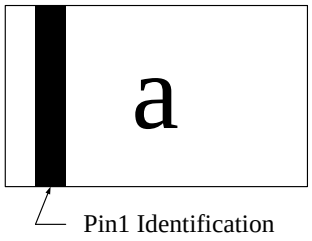


Tape and Reel Specification



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

Marking Codes



Ordering Information

Part Number	Working Voltage	Quantity Per Reel	Reel Size
SYT21A05DXC	5V	10,000	7 Inch

Note:

(1) "a" is device code, fixed.

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