

### Features

- Transient protection for high-speed data lines  
IEC61000-4-2(ESD)  $\pm 15\text{kV}$  (Air)  
 $\pm 15\text{kV}$  (Contact)  
IEC61000-4-5(Surge) 4A (8/20 $\mu\text{s}$ )
- 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: 0.01 $\mu\text{A}$  @  $V_{\text{RWM}}$  (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  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) ( $\pm 15\text{kV}$  air,  $\pm 15\text{kV}$  contact discharge), IEC61000-4-5 (Surge) (4A, 8/20 $\mu\text{s}$ ), 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.

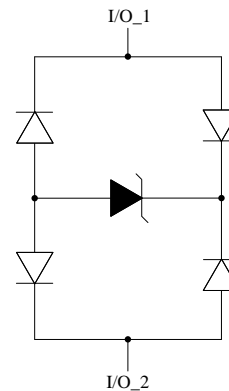
### Applications

- 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)

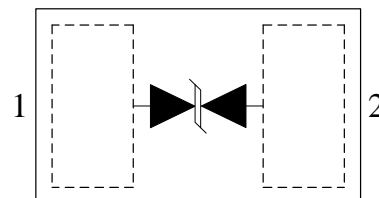
### Mechanical Characteristics

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

### Circuit Diagram



### Pin Configuration



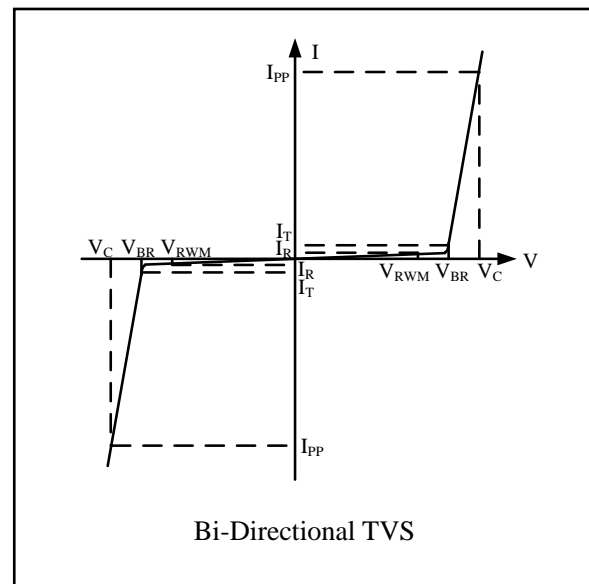
DFN0.6\*0.3-2  
(Top View)

## Absolute Maximum Rating

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

## Electrical Characteristics ( $T_A = 25^{\circ}C$ )

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 @ $I_F$



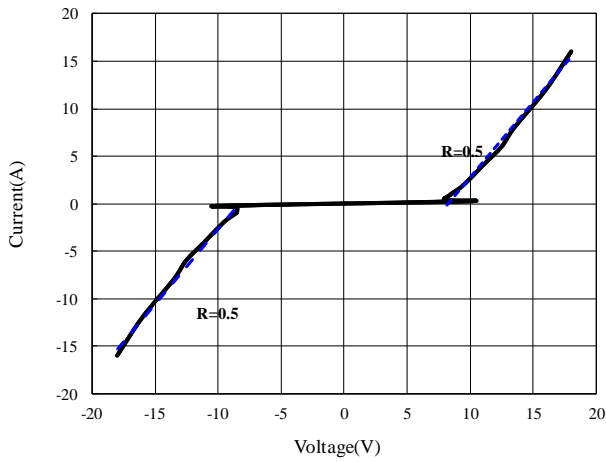
Symbol	Test Condition	Minimum	Typical	Maximum	Units
$V_{RWM}$				5.5	V
$I_R$	$V_{RWM} = 5.0V, T_A = 25^{\circ}C$		0.01	0.1	$\mu A$
$V_{BR}$	$I_T = 5mA$	5.5		7.5	V
$V_C^1$	$I_{PP} = 4A, t_p = 8/20\mu s$		14		V
$V_C^1$	$I_{PP} = 16A, t_p = 10/100ns$		18		V
$R_{DYN}^{1,2}$	$t_p = 10/100ns$		0.5		$\Omega$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

### NOTES

<sup>1</sup>Guaranteed by design and not subject to production test.

<sup>2</sup> $R_{DYN}$  calculated based on  $I_{PP}=8A$  to  $I_{PP}=16A, t_p = 10/100ns$ .

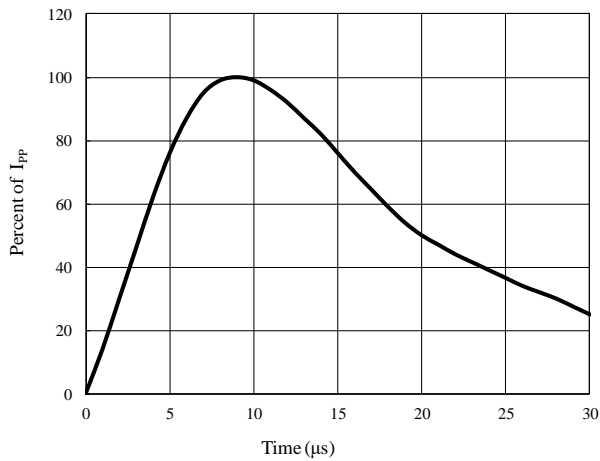
### TLP Testing of I/O to I/O



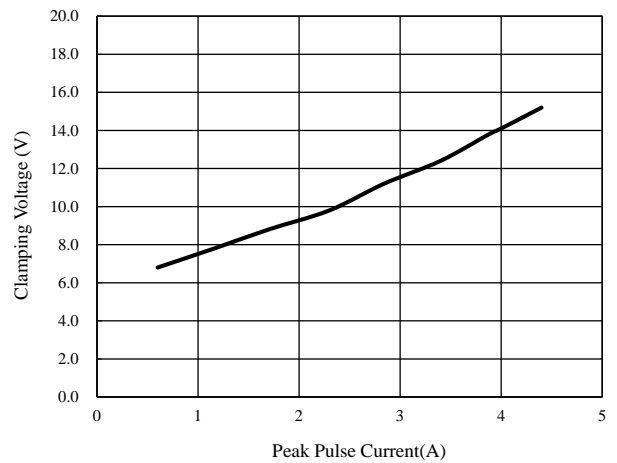
### Capacitance vs. Reverse Voltage



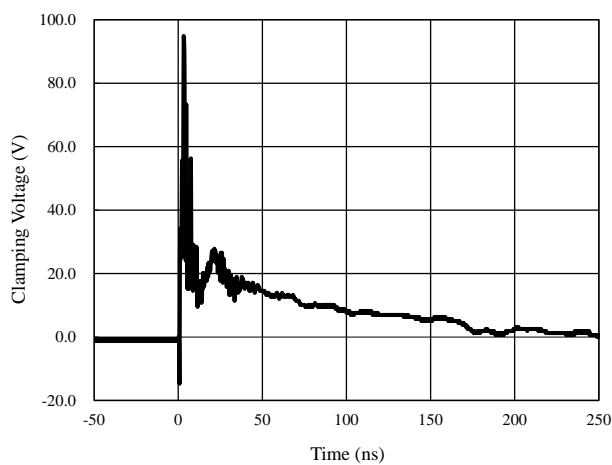
### 8/20µs Pulse Waveform



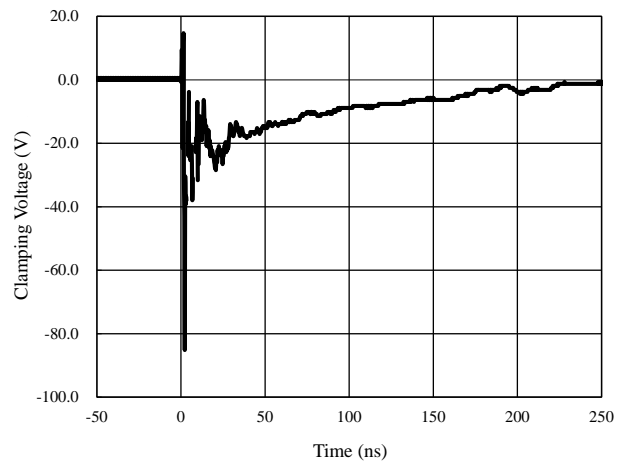
### Clamping Voltage vs. Peak Pulse Current (8/20µs)



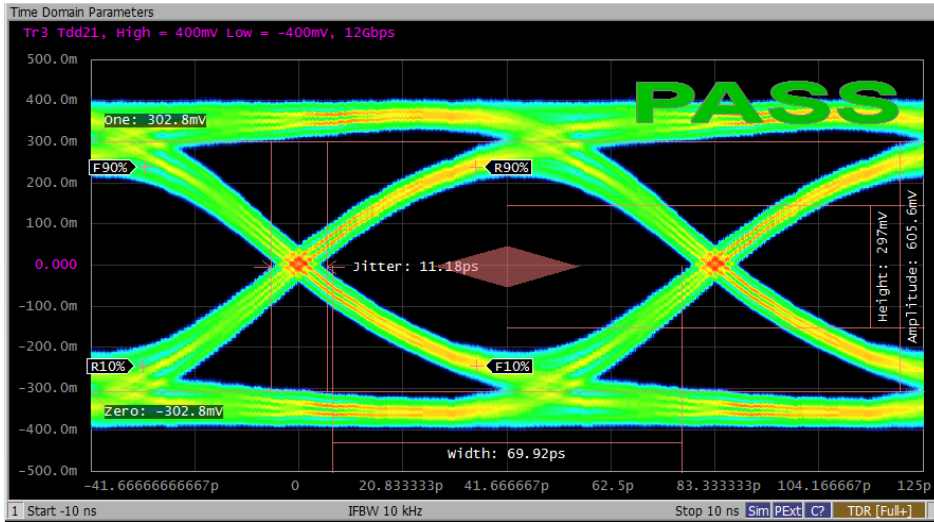
### ESD Clamping of I/O to I/O (+8kV Contact per IEC 61000-4-2)



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

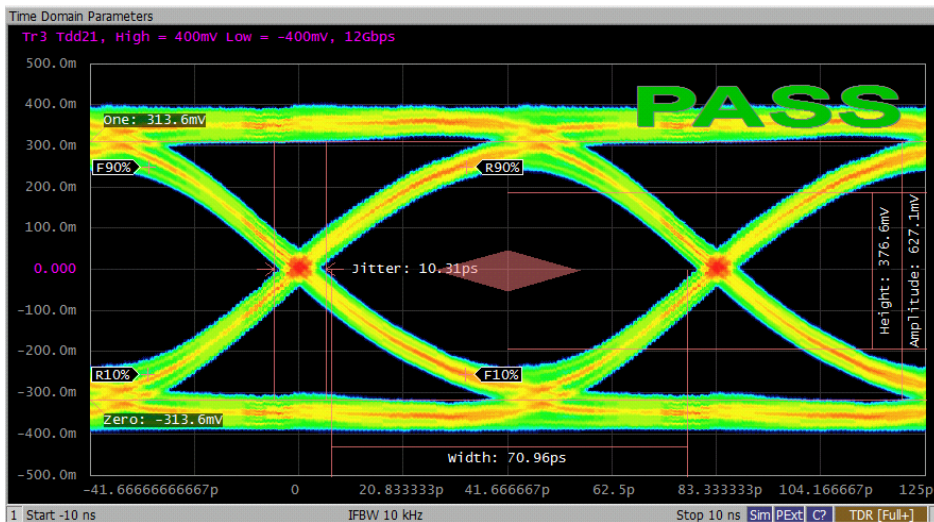


### Eye Diagram Measurement for HDMI2.1



Data rate 12Gb/s

HDMI2.1 Eye Diagram without SYT01A05DXC

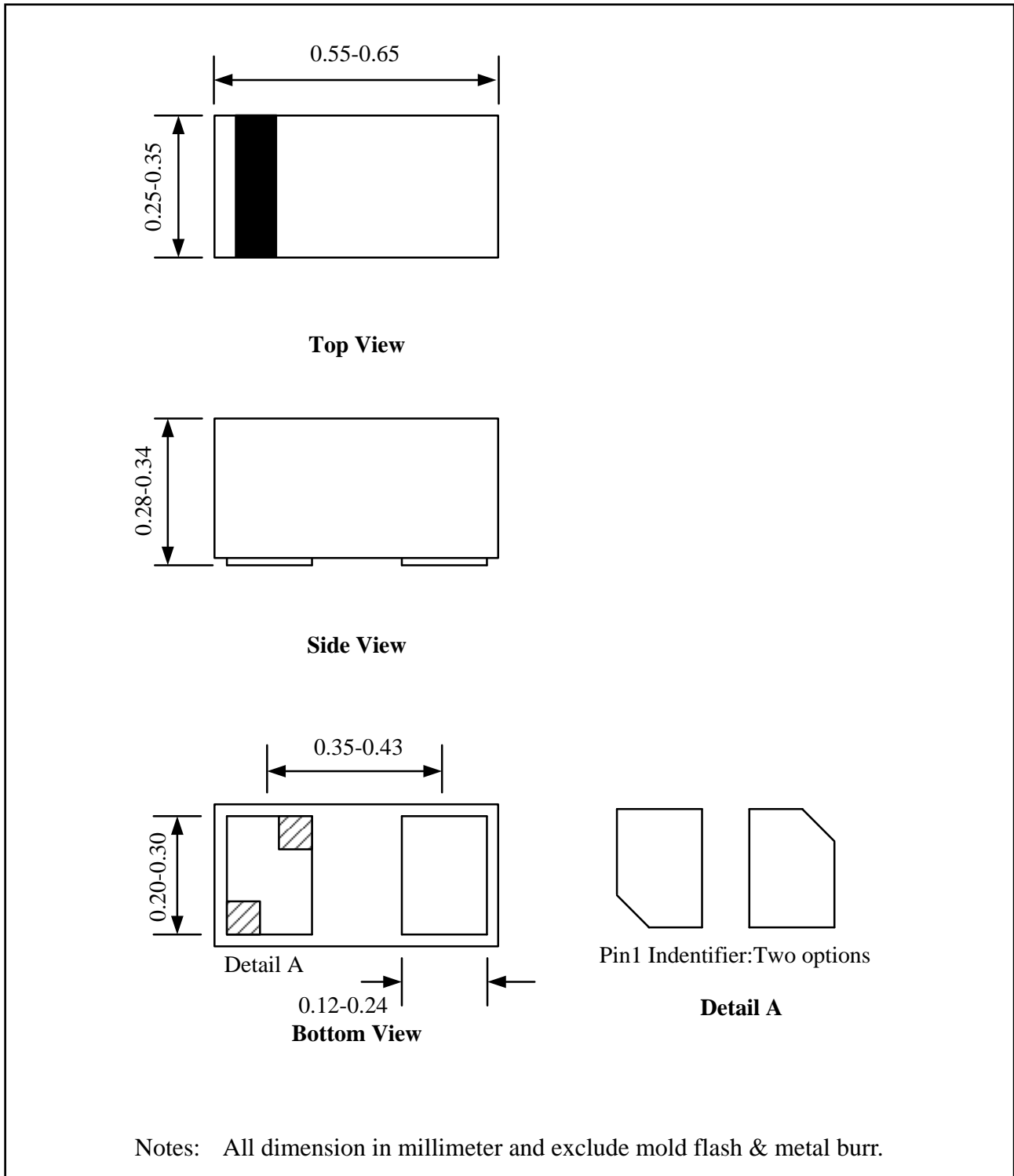


Data rate 12Gb/s

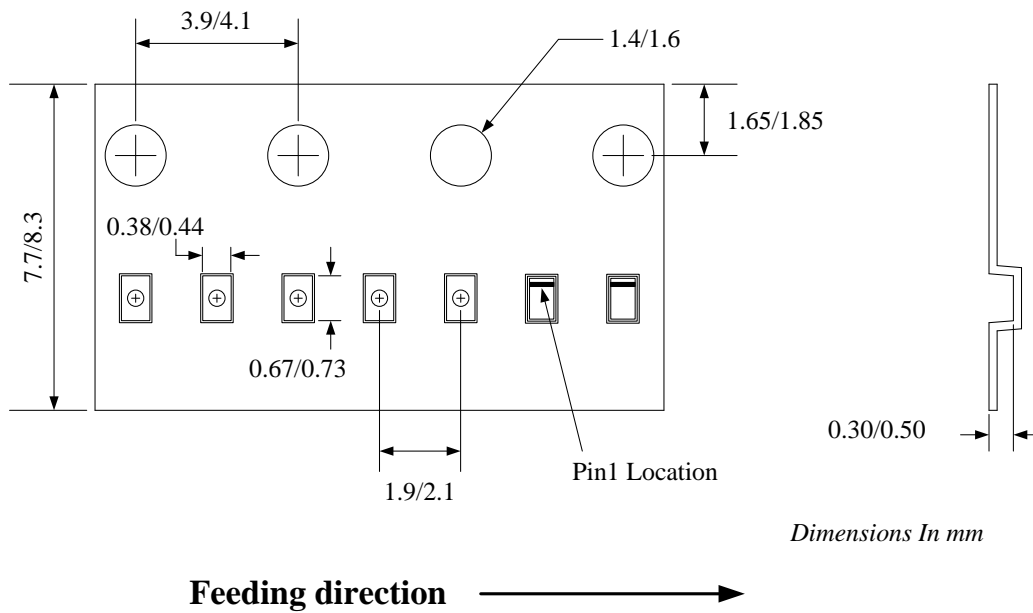
HDMI2.1 Eye Diagram with SYT01A05DXC

**Package Outline**

- DFN0.6\*0.3-2 package

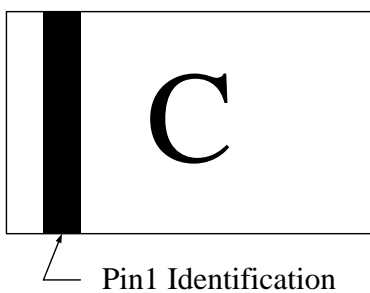


## Tape and Reel Specification



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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