

### Features

- Transient protection for high-speed data lines  
IEC 61000-4-2 (ESD)  $\pm 20\text{kV}$  (Air)  
 $\pm 20\text{kV}$  (Contact)  
IEC 61000-4-5 (Surge) 4A (8/20 $\mu\text{s}$ )
- For 5V and below operating voltage
- Small package: DFN1.2\*1.0-6
- Protects two data lines
- Low Cap: 0.3pF Typ. (I/O-I/O)  
0.6pF Typ. (I/O-GND)
- Low leakage current: 0.1 $\mu\text{A}$  @  $V_{\text{RWM}}$  (Typ.)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  contact discharge

### Description

SYT03S05SHC 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 0.3pF(I/O-I/O) only, SYT03S05SHC is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), ( $\pm 20\text{kV}$  air,  $\pm 20\text{kV}$  contact discharge), IEC 61000-4-5 (Surge) (4A, 8/20 $\mu\text{s}$ ), etc.

SYT03S05SHC uses small DFN1.2\*1.0-6 package. Each SYT03S05SHC device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make SYT03S05SHC ideal for high-speed data ports and high-frequency lines (e.g., USB2.0 & DVI) applications. The low clamping voltage of the SYT03S05SHC guarantees a minimum stress on the protected IC.

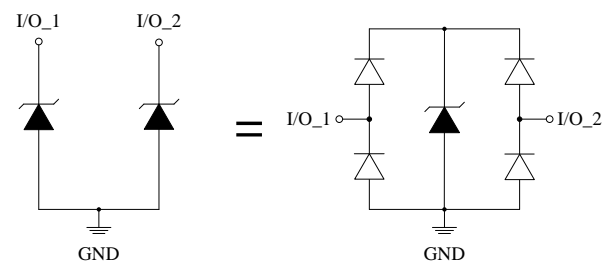
### Applications

- Serial ATA
- PCI Express
- Desktops, Servers and Notebooks
- MDDI Ports
- USB2.0 Power and Data Line Protection
- Display Ports
- Digital Visual Interfaces (DVI)

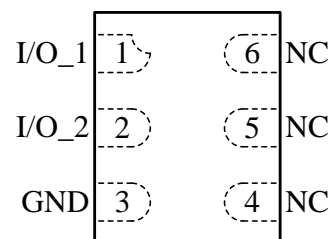
### Mechanical Characteristics

- DFN1.2\*1.0-6 package
- Marking: Device code, Date code
- Packaging: Tape and Reel

### Circuit Diagram



### Pin Configuration



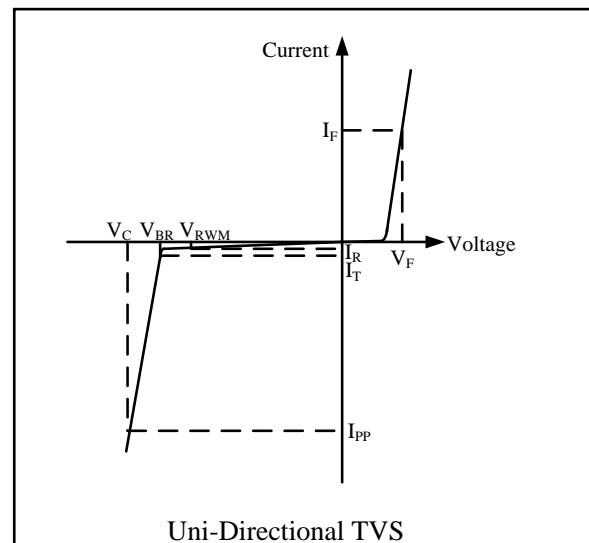
DFN1.2\*1.0-6  
(Top View)

### Absolute Maximum Rating

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

### Electrical Characteristics (T = 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 @ $I_F$



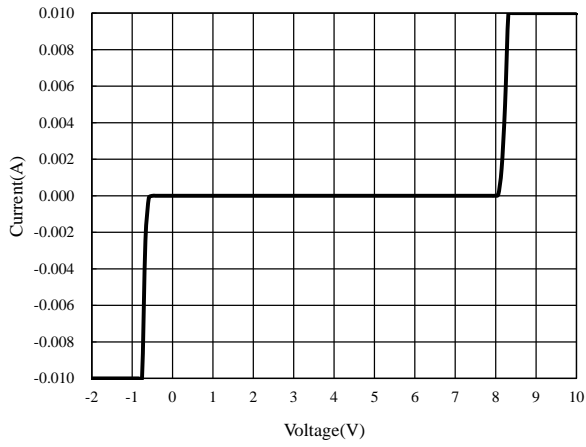
Symbol	Test Condition	Minimum	Typical	Maximum	Units
$V_{RWM}$				5.0	V
$I_R$	$V_{RWM} = 5V$ , from I/O to GND		0.1	1	$\mu$ A
$V_{BR}$	$I_T = 1mA$ , from I/O to GND	6		11	V
$V_F$	$I_F = 1mA$ , from GND to I/O	0.4		1.2	V
$V_C^1$	$I_{PP} = 4A$ , $t_p = 8/20\mu s$ , from I/O to GND		12		V
$V_C^1$	$I_{PP} = 16A$ , $t_p = 10/100ns$ , from I/O to GND		14		V
$R_{DYN}^{1,2}$	$t_p = 10/100ns$ , from I/O to GND		0.4		$\Omega$
$C_{ESD}^1$	$V_R = 0V$ , $f = 1MHz$ , Between I/O and GND		0.6	0.8	pF
$C_{ESD}^1$	$V_R = 0V$ , $f = 1MHz$ , Between I/O and I/O		0.3	0.4	pF

#### NOTES

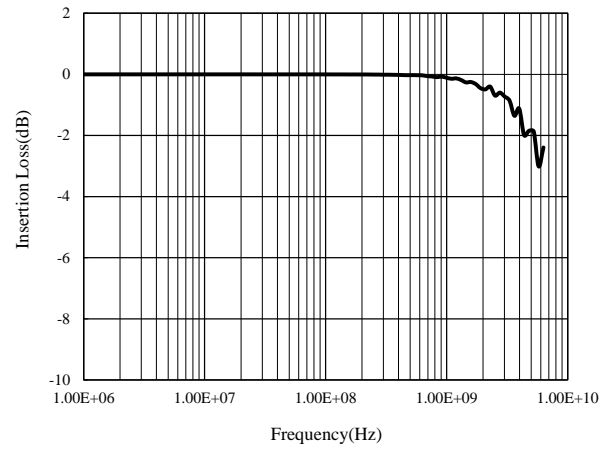
<sup>1</sup>Guaranteed by design and not subject to production test.

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

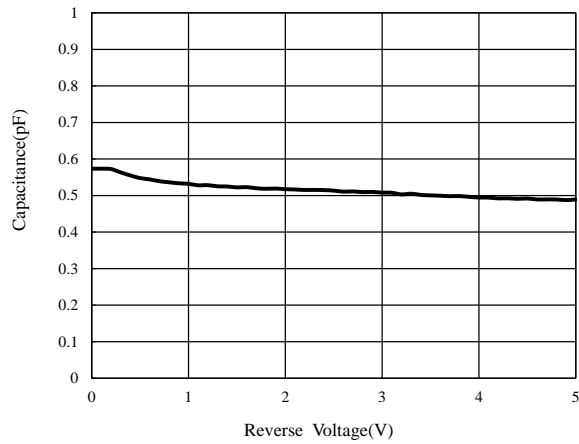
**Voltage Sweeping of I/O to GND**



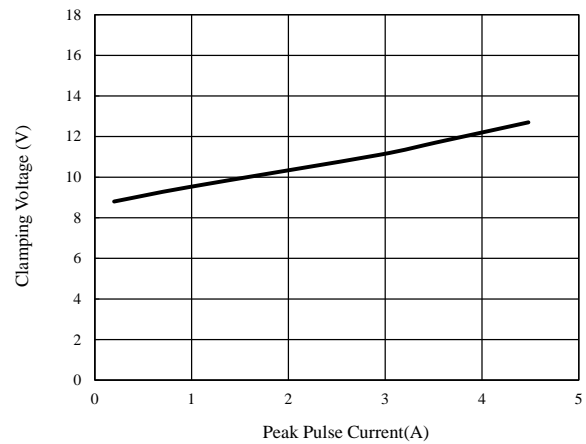
**Insertion Loss S21 of I/O to GND**



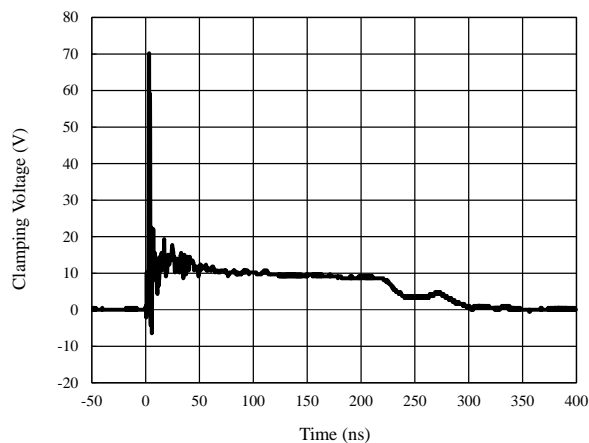
**Capacitance vs. Voltage  
- I/O to GND**



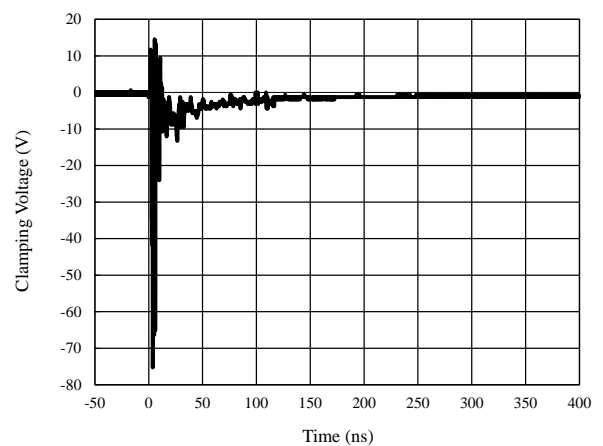
**Clamping Voltage vs. Peak Pulse Current  
(8/20μs)**



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

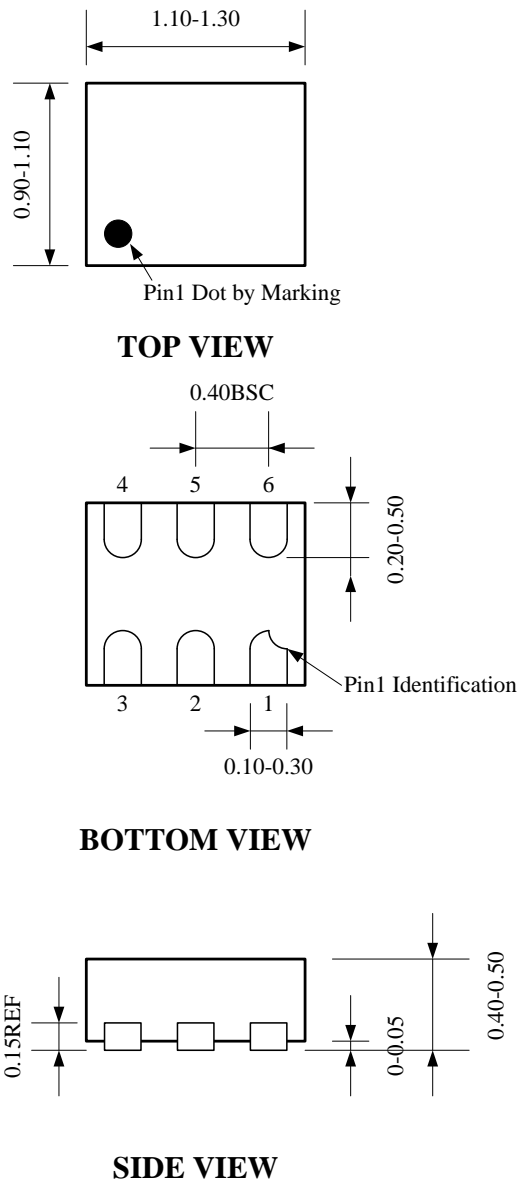


**ESD Clamping of I/O to GND  
(-8kV Contact per IEC 61000-4-2)**



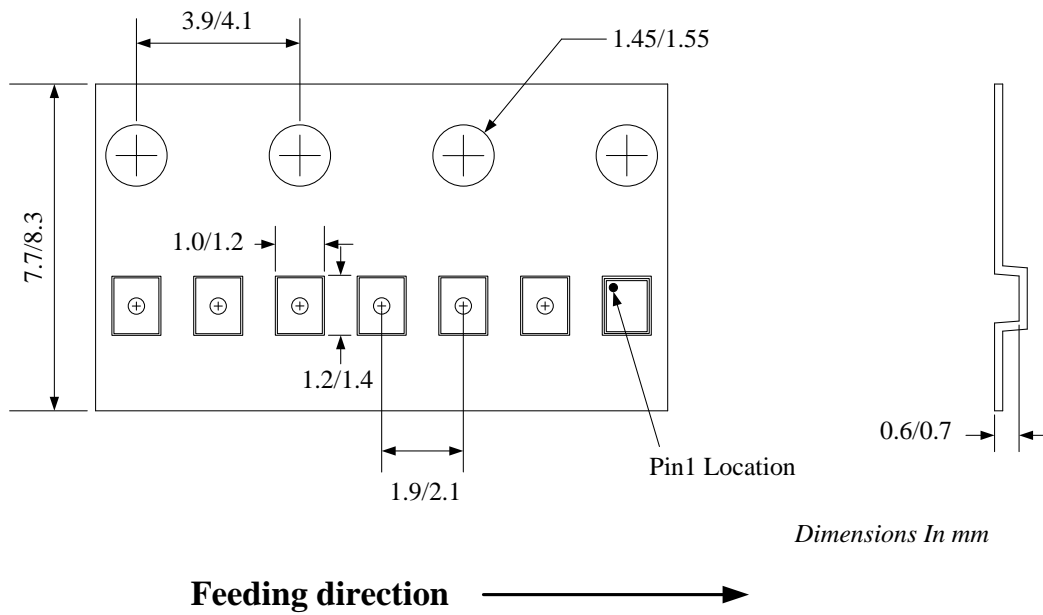
## Package Outline

- DFN1.2\*1.0-6 package



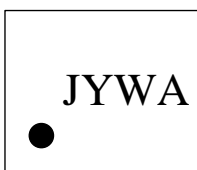
**Notes:** All dimension in mm and exclude mold flash & metal burr

## Tape and Reel Specification



Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Qty per reel (pcs)
DFN1.2*1.0-6	8	4	7"	3000

## Marking Codes



### Note:

- (1) "J" is the device marking, fixed.
- (2) "YWA" is date code.

## Ordering Information

Part Number	Package	Quantity Per Reel	Reel Size
SYT03S05SHC	DFN1.2*1.0-6	3,000	7 Inch