SYT03S05SHC

Ultra-Low Capacitance TVS Protection

Features

- Transient protection for high-speed data lines
  IEC 61000-4-2 (ESD) ±20kV (Air)
  ±20kV (Contact)
  IEC 61000-4-5 (Surge) 4A (8/20μs)
- 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: 0.1μA @ V_{RWM} (Typ.)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ±8kV 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), (±20kV air, ±20kV contact discharge), IEC 61000-4-5 (Surge) (4A, 8/20μs), 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.

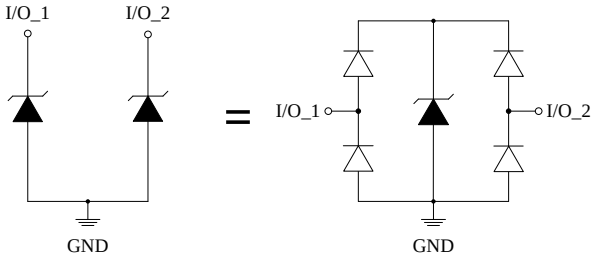
Applications

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

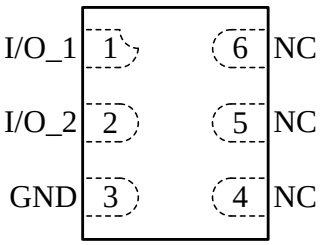
Mechanical Characteristics

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

Circuit Diagram



Pin Configuration



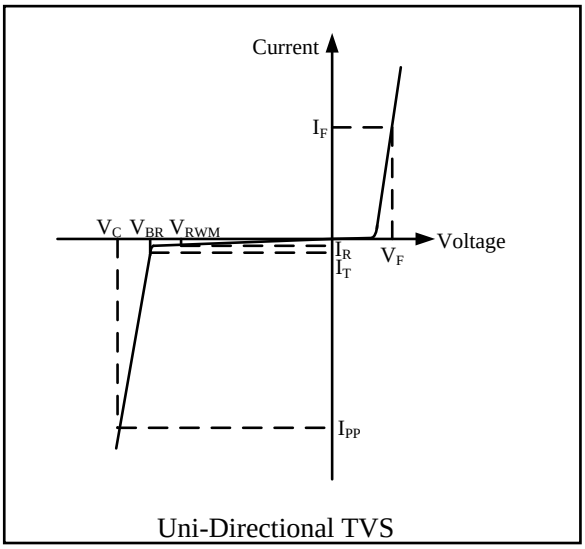
DFN1.2*1.0-6
(Top View)

Absolute Maximum Rating

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

Electrical Characteristics (T = 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



Uni-Directional TVS

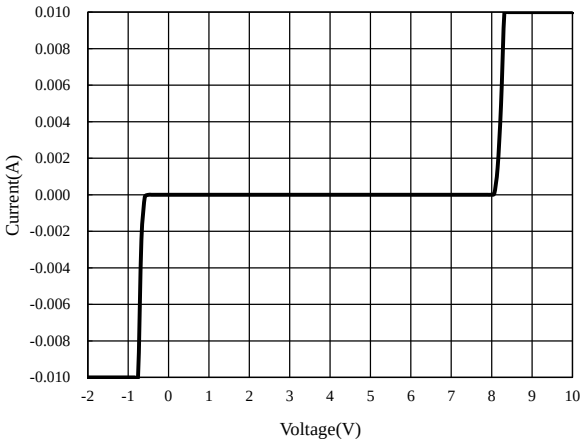
Symbol	Test Condition	Minimum	Typical	Maximum	Units
V_{RWM}				5.0	V
I_R	V_{RWM} = 5V, from I/O to GND		0.1	1	μA
V_{BR}	I_T = 1mA, from I/O to GND	6		11	V
V_F	I_F = 1mA, from GND to I/O	0.4		1.2	V
V_C[1]	I_{PP} = 4A, t_p = 8/20μs, from I/O to GND		12		V
V_C[1]	I_{PP} = 16A, t_p = 10/100ns, from I/O to GND		14		V
R_{DYN}[1,2]	t_p = 10/100ns, from I/O to GND		0.4		Ω
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

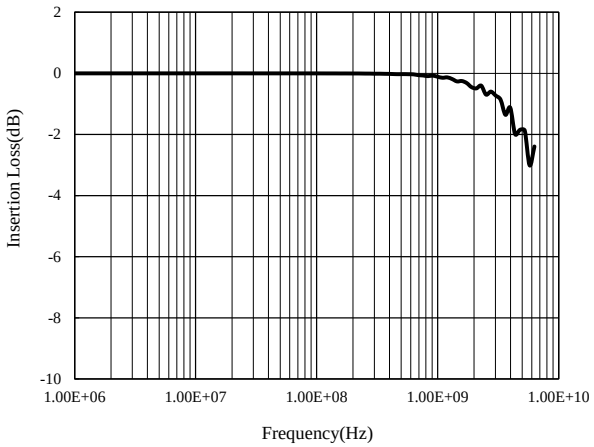
[1]Guaranteed by design and not subject to production test.

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

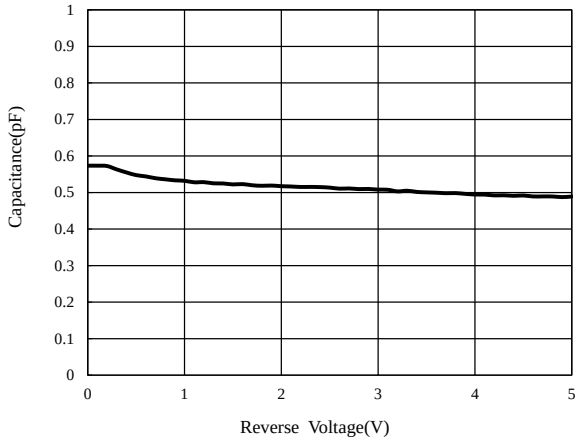
Voltage Sweeping of I/O to GND



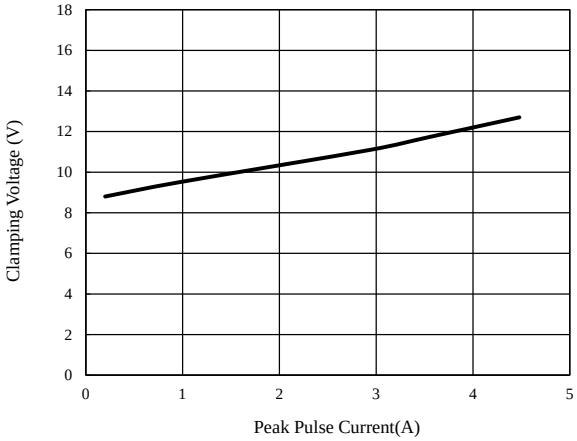
Insertion Loss S21 of I/O to GND



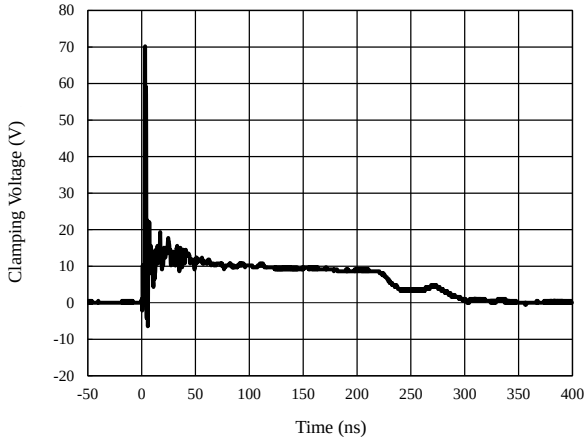
Capacitance vs. Voltage - I/O to GND



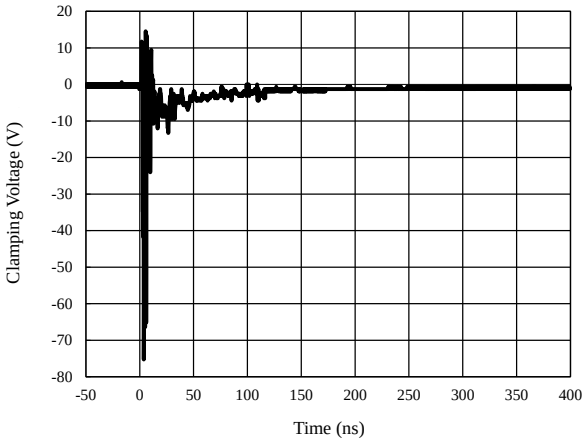
Clamping Voltage vs. Peak Pulse Current (8/20μs)



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

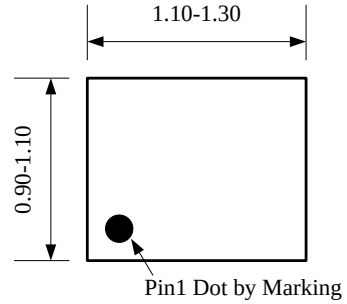


ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)

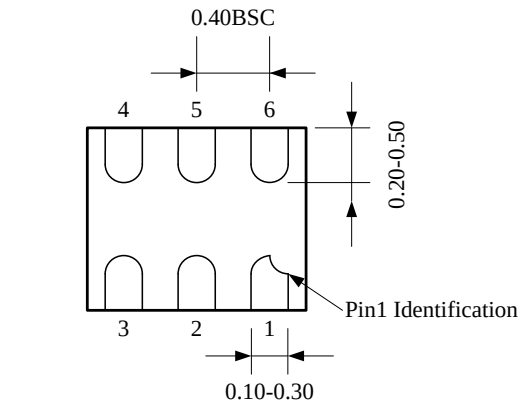


Package Outline

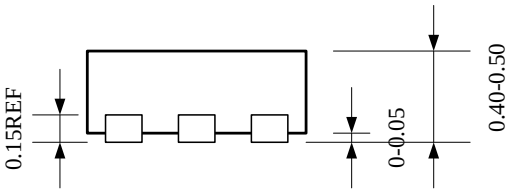
- DFN1.2*1.0-6 package



TOP VIEW



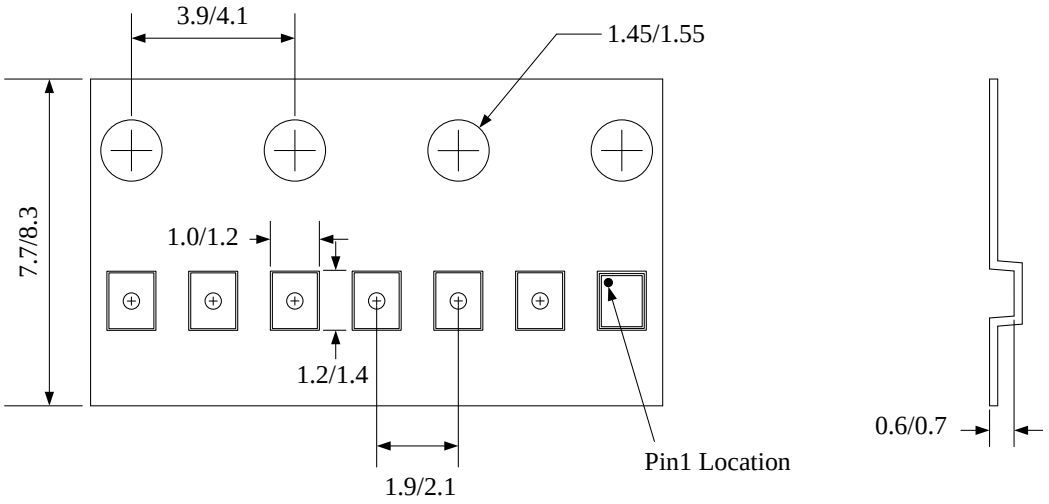
BOTTOM VIEW



SIDE VIEW

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

Tape and Reel Specification

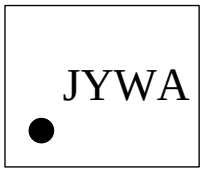


Dimensions In mm

Feeding direction ⟶

Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	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