

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) 2A (8/20 μs)
- For 5V and below operating voltage
- Package optimized for high-speed lines
- Ultra-small package (1.0mm \times 0.6mm \times 0.55mm)
- Protects one data, control or power line
- Low capacitance: 0.35pF (Typical)
- Low leakage current: 10nA @ V_{RWM} (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge

Description

SYT01S05DWC is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.35pF only, SYT01S05DWC 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) (2A, 8/20 μs), etc.

SYT01S05DWC uses ultra-small DFN1.0*0.6-2L package. Each SYT01S05DWC device can protect one high-speed data line. It offers system designers flexibility to protect single data line where space is a premium concern. The combined features of low capacitance, ultra-small size and high ESD robustness make SYT01S05DWC ideal for high-speed data port and high-frequency line (e.g., USB 2.0 & antenna line) applications, such as cellular phones and HD visual devices.

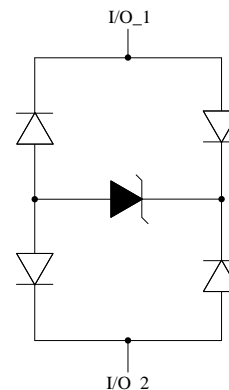
Applications

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

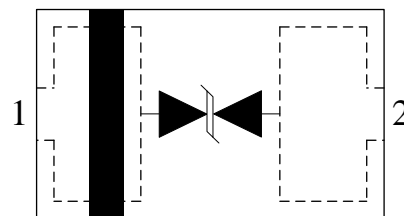
Mechanical Characteristics

- DFN1.0*0.6-2L package
- Flammability Rating: UL 94V-0
- Marking: Part number (S)
- Packaging: Tape and Reel

Circuit Diagram



Pin Configuration



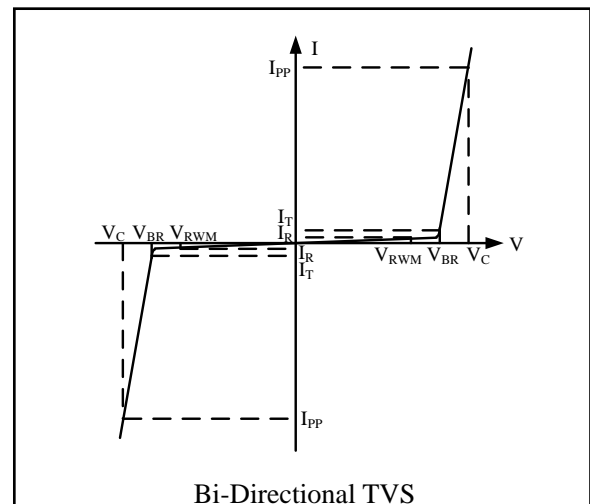
DFN1.0x0.6-2L
(Top View)

Absolute Maximum Rating

| Symbol | Parameter | Value | Units |
|-----------|--|----------------------|--------------|
| I_{PP} | Peak Pulse Current (8/20 μ s) | 2 | A |
| P_{PK} | Peak Pulse Power (8/20 μ s) | 30 | Watts |
| V_{ESD} | ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact) | ± 20 ± 20 | kV |
| 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} | Peak Pulse Current |
| C_{ESD} | Parasitic Capacitance |
| V_R | Reverse Voltage |
| f | Small Signal Frequency |



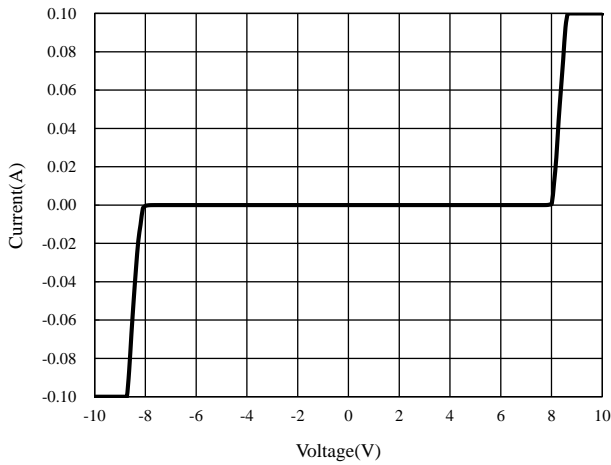
| Symbol | Test Condition | Minimum | Typical | Maximum | Units |
|-----------------|--|---------|---------|---------|----------|
| V_{RWM} | | | | 5.0 | V |
| I_R | $V_{RWM} = 5V, T = 25^{\circ}C$ Between I/O and I/O | | 0.01 | 1.0 | μ A |
| V_{BR} | $I_T = 1mA$ Between I/O and I/O | 6.0 | 8.8 | 11 | V |
| V_C^1 | $I_{PP} = 2A, t_p = 8/20\mu s$ Between I/O and I/O | | | 15 | V |
| V_C^1 | $I_{PP} = 16A, t_p = 10/100ns$ Between I/O and GND | | 17 | | V |
| $R_{DYN}^{1,2}$ | $t_p = 10/100ns$ Between I/O and GND | | 0.6 | | Ω |
| C_{ESD}^1 | $V_R = 0V, f = 1MHz$ Between I/O and I/O | | 0.35 | 0.50 | pF |

NOTES

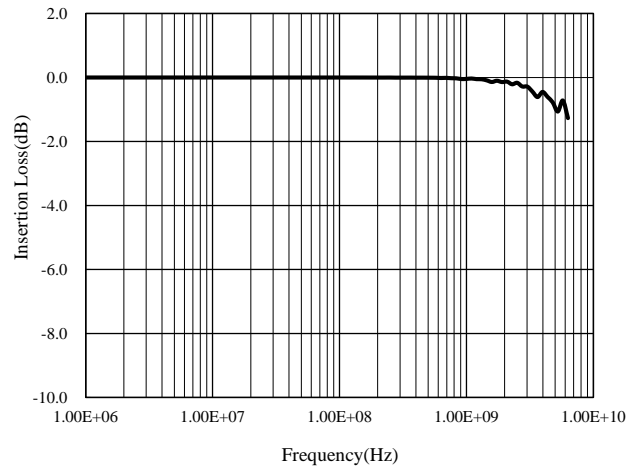
¹Guaranteed by design and not subject to production test.

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

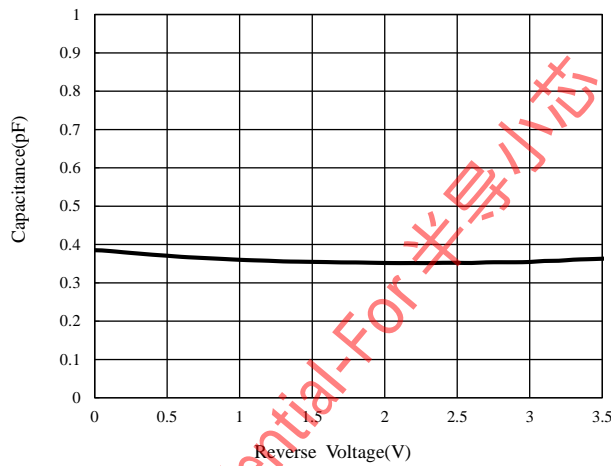
Voltage Sweeping of I/O to I/O



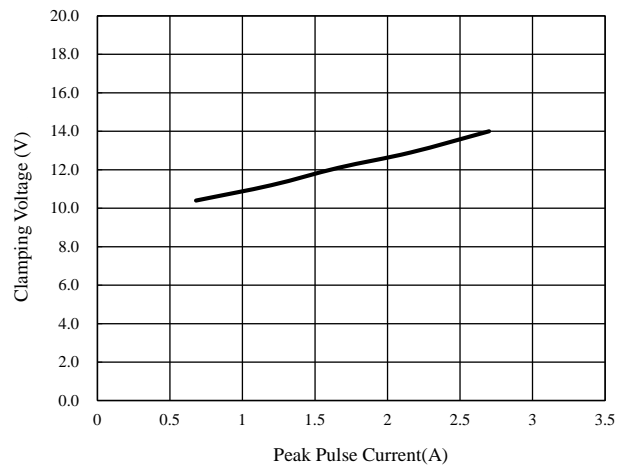
Insertion Loss S21 of I/O to I/O



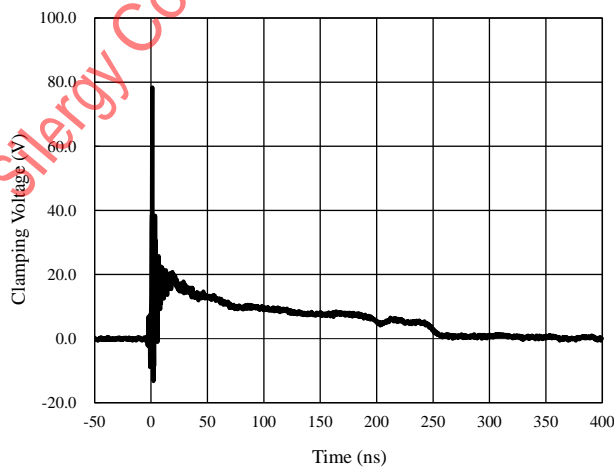
Capacitance vs. Voltage of I/O to I/O (f = 1MHz)



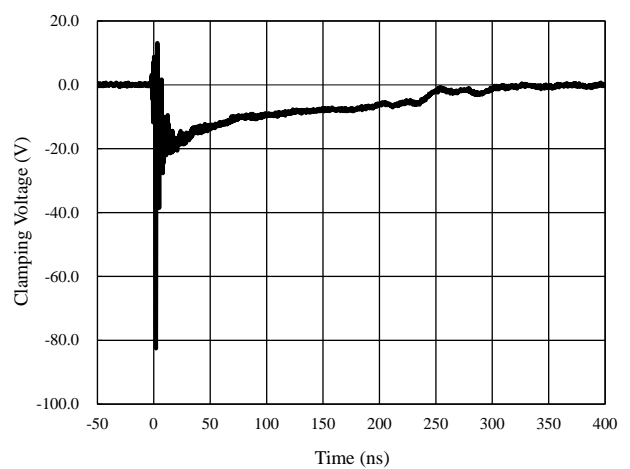
Clamping Voltage vs. Peak Pulse Current (8/20μs)



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

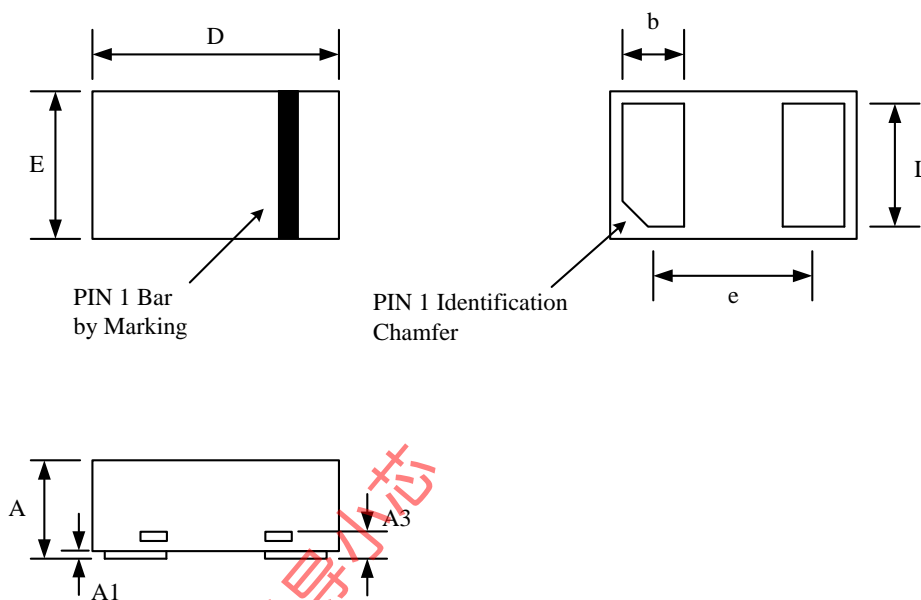


ESD Clamping of I/O to I/O (-8kV Contact per IEC 61000-4-2)



Package Outline

□ DFN1.0*0.6-2L Package

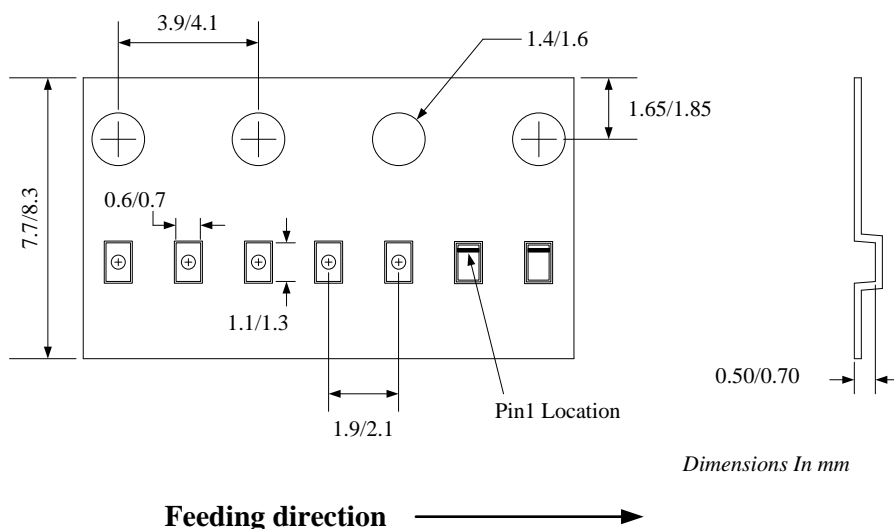


Package Dimensions

| Symbol | Dimensions In Millimeters | |
|--------|---------------------------|---------|
| | Minimum | Maximum |
| A | 0.400 | 0.550 |
| A1 | 0.000 | 0.050 |
| A3 | 0.125 REF | |
| D | 0.950 | 1.050 |
| E | 0.550 | 0.650 |
| b | 0.200 | 0.300 |
| e | 0.650 BSC | |
| L | 0.450 | 0.550 |

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) | Trailer * length(mm) | Leader * length (mm) | Qty per reel (pcs) |
|---------------|-----------------|------------------|------------------|----------------------|----------------------|--------------------|
| DFN1.0*0.6-2L | 8 | 2 | 7" | 400 | 400 | 10000 |

Marking Codes



Note:

(1) "S" is part number.

Ordering Information

| Part Number | Working Voltage | Quantity Per Reel | Reel Size |
|-------------|-----------------|-------------------|-----------|
| SYT01S05DWC | 5V | 10,000 | 7 Inch |

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