SY205212SLC

Single Line TVS Diode for ESD Protection

General Description

SY205212SLC is a single line transient voltage suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for the USB VBUS line. The SY205212SLC is designed to protect against ESD and other over-current transient events. It complies with IEC 61000-4-2 (ESD) (±30kV air, ±30kV contact discharge), IEC 61000-4-5 (surge) 25A (8/20μs).

The SY205212SLC can protect one uni-directional line. The SY205212SLC is available in a DFN1.6×1.0-2 package with a working voltage of 20V.

Features

- Transient Protection for Single Line
  - IEC 61000-4-2 (ESD) ±30kV (Air) ±30kV (Contact)
  - IEC 61000-4-5 (Surge) 25A (8/20μs)
- For Operating Voltage of 20V and Below
- Protects One Control or Power Line
- Capacitance: 210pF (Typical)
- Low Leakage Current: 0.1μA @ V_{RWM} (Max)
- Low Clamping Voltage

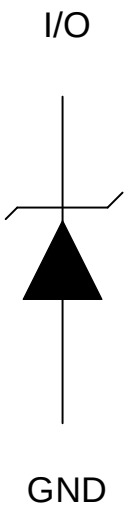
Applications

- USB VBUS Protection
- Power Supply Protection
- Desktops, Servers and Notebooks
- Mobile Phones
- Portable Instrumentation
- Digital Cameras

Mechanical Characteristics

- DFN1.6×1.0-2 Package
- Marking: Device code, Date Code
- Packaging: Tape and Reel

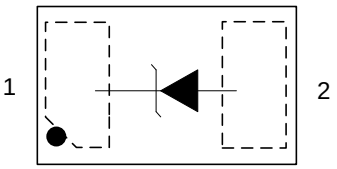
Circuit Diagram



Ordering Information

Part Number	Package Type	Top Mark
SY205212SLC	DFN1.6×1.0-2	PYWA

Pinout (Top View)



Marking Codes

Note 1: "P" is device code, fixed.

Note 2: "YWA" is date code.

Absolute Maximum Rating				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Maximum Peak Pulse Current (8/20μs)	I_{PP}		25	A
Maximum Peak Pulse Power (8/20μs)	P_{PK}		850	W
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	-30	30	kV
Operating Temperature	T_{OPT}	-40	+125	℃
Storage Temperature	T_{STG}	-55	+150	°C

Electrical Characteristics T_A = 25℃						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ**	**Max**	**Unit**
Nominal Reverse Working Voltage	V_{RWM}				20	V
Reverse Leakage Current @ V_{RWM}	I_R	V_{RWM} = 20V, T_A = 25°C Pin1 to Pin2		0.01	0.1	μA
Reverse Breakdown Voltage @ I_T	V_t	I_T = 1mA Pin1 to Pin2	22.2	24.5	27	V
Forward Voltage @I_F	V_F	I_T = 1mA Pin2 to Pin1	0.4		1.2	V
Clamping Voltage @ I_{PP}	V_C (1)	I_{PP} = 10A, t_p = 8/20μs Pin1 tp Pin2		28		V
Clamping Voltage @ I_{PP}	V_C (1)	I_{PP} = 25A, t_p = 8/20μs Pin1 to Pin2		32		V
Parasitic Capacitance	C_{ESD} (1)	V_R = 0V, f = 1MHz Pin1 to Pin2		210		pF

Note: The device is not guaranteed to function outside its operating conditions.

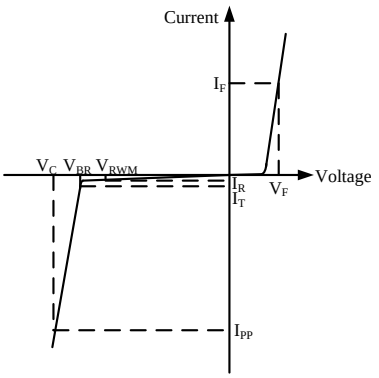
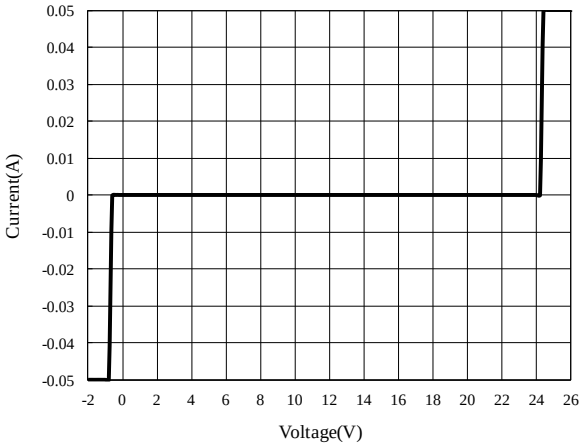


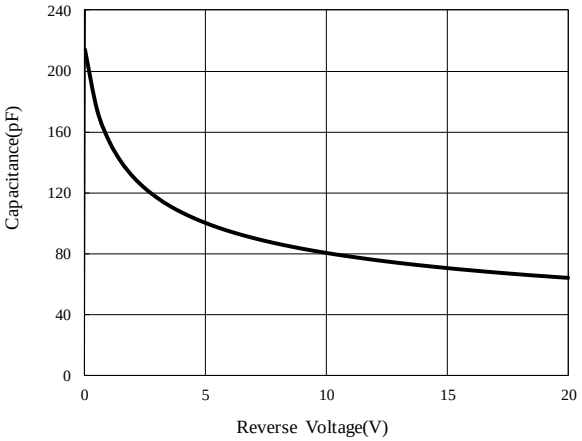
Figure 1. Uni-Directional TVS

Typical Characteristics

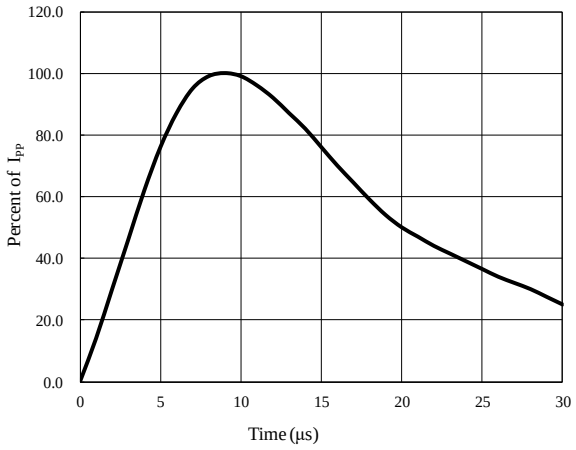
Voltage Sweeping



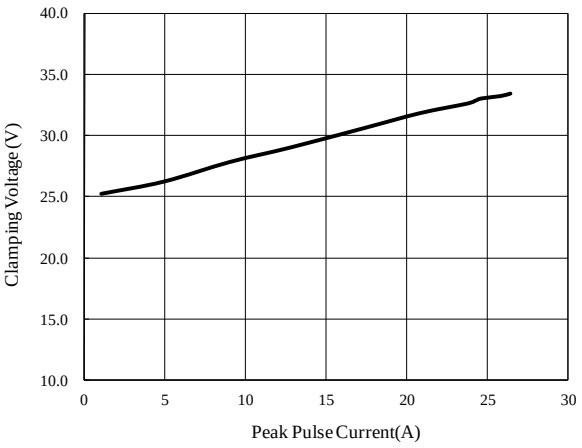
Capacitance vs. Voltage



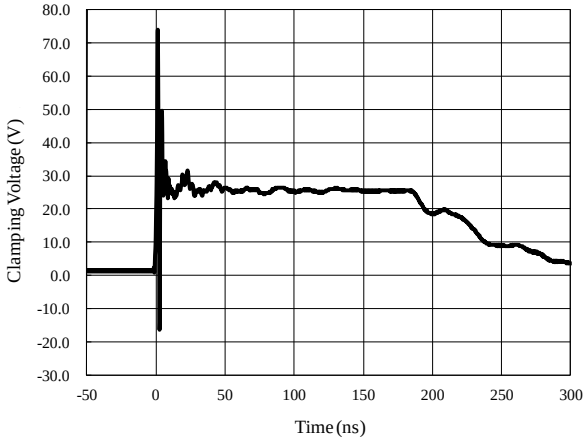
Pulse Waveform



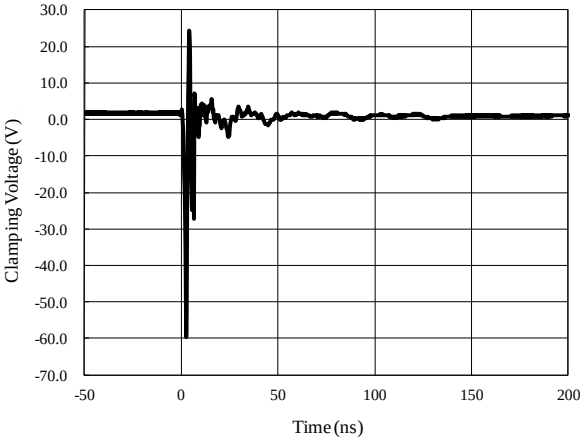
Clamping Voltage vs. Peak Pulse Current(8/20μs)



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)



Application Information

The SY205212SLC is designed to protect one line against system EOS by clamping down the voltage at a low level. Figure 2 shows the typical use of SY205212SLC for the USB type-C. The SY205212SLC Pin1 should connect with power or control lines, and Pin2 should connect to the ground plane on the board.

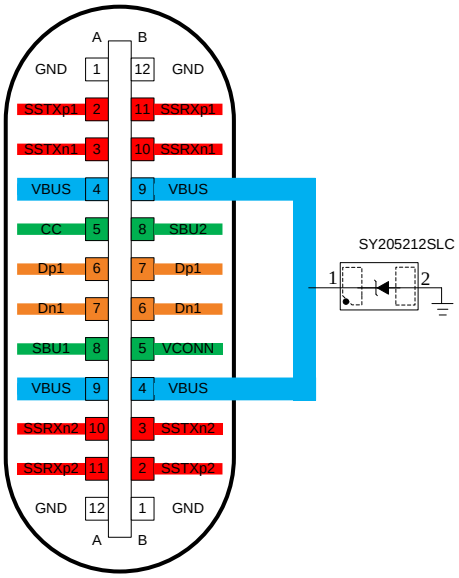


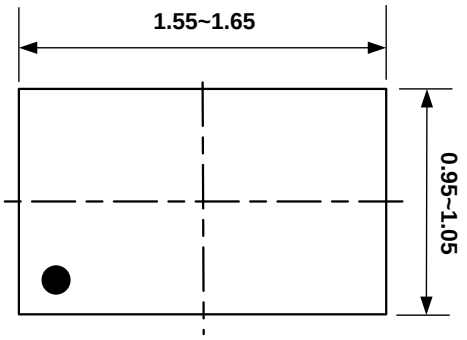
Figure 2. SY205212SLC Typical Application for USB Type-C

PCB Layout Guidelines

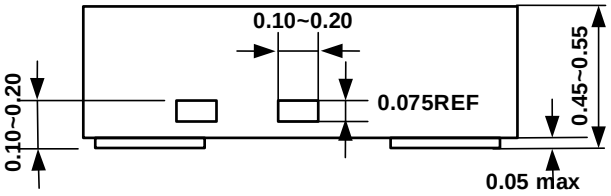
For optimum ESD protection and circuit performance, following PCB layout guidelines are recommended:

- Place the SY205212SLC as close to the connectors or terminal ports as possible.
- The distance between the SY205212SLC ground pin and the GND reference path should be as short as possible.
- Use a large via to connect the SY205212SLC Pin2 to the ground.
- Avoid running signals near board edges.
- The SY205212SLC should be placed near the protected line.

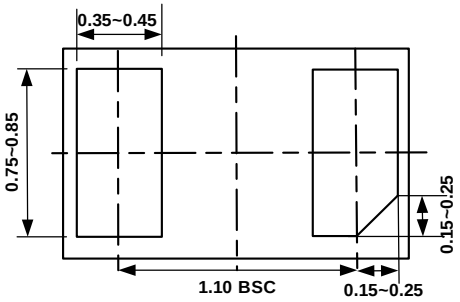
DFN1.6×1.0-2 Package Outline



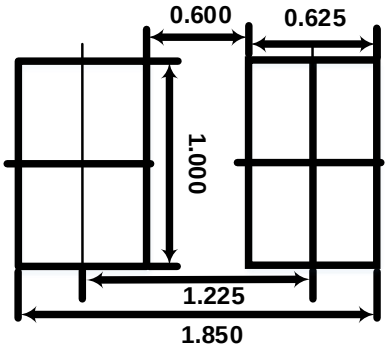
TOP VIEW



SIDE VIEW



BOTTOM VIEW

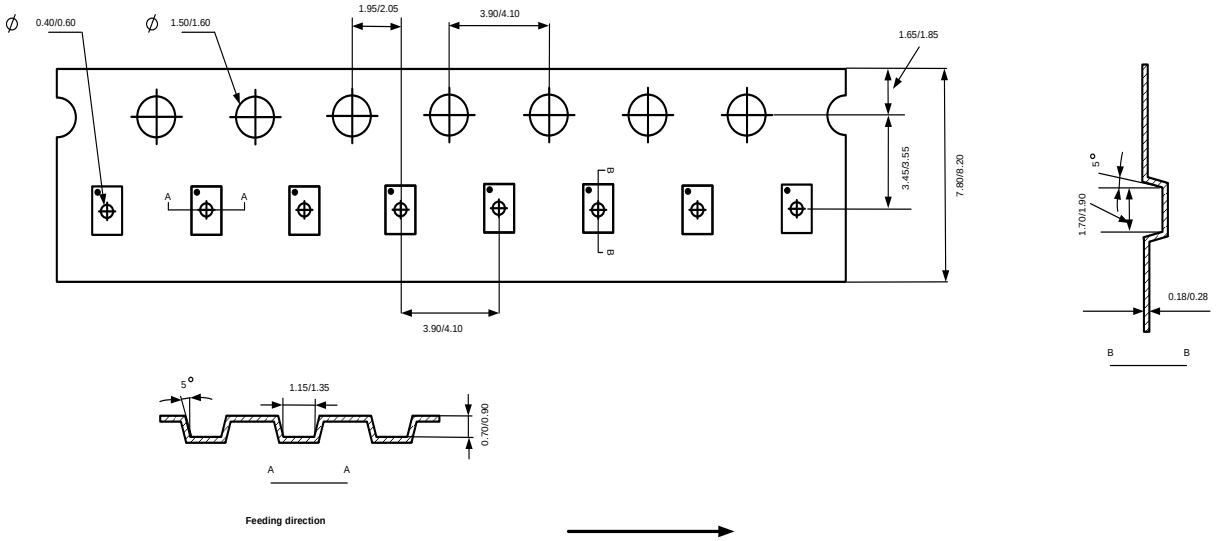


Recommended PCB Layout (Reference Only)

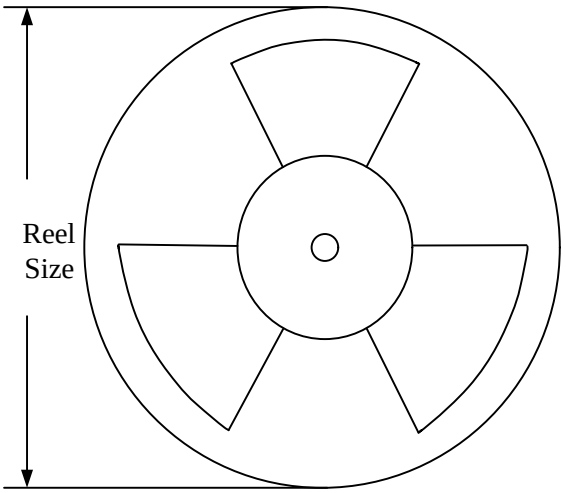
Note: *All dimensions are in millimeters and exclude mold flash and metal burr.*

Tape and Reel Specification

DFN1.6×1.0-2 Taping Orientation



Carrier Tape & Reel Specification for Packages



Package Types	Tape Width (mm)	Pocket Pitch(mm)	Reel Size (Inch)	Qty per Reel (pcs)
DFN1.6×1.0-2	8	4	7"	3000

Revision History

The revision history provided is for informational purpose only and is believed to be accurate, however, not warranted. Please make sure that you have the latest revision.

Revision Number	Revision Date	Description	Pages changed
0.9	10/26/2018	Initial Release	
1.0	10/26/2019	Production Release	

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