SVS03331P1RBQ

Low Capacitance ESD and EOS Protection

Description

SVS03331P1RBQ is specifically designed to provide secondary surge and ESD protection on antennas and high-speed data ports. SVS03331P1RBQ utilizes snap-back technology to minimize device clamping voltage.

SVS03331P1RBQ is in DFN 1.00 x 0.60 x 0.50mm 2-Lead package. Each device protects one high-speed line operating at 3.3V with a capacitance of 0.37pF typical. ESD characteristics are highlighted by high ESD withstand voltage per IEC 61000-4-2 (±30kV contact & ±30kV air) and extremely low dynamic resistance (0.22 Ohms typical). The device has leads which are Pb-Free and is qualified to AEC-Q101 for automotive applications.

Features

- High ESD withstand Voltage
  - IEC 61000-4-2 (ESD): ±30kV (Contact), ±30kV (Air)
  - ISO 10605 (ESD): ±25kV (Contact), ±25kV (Air)
- Small package
- Protects one line
- Low ESD clamping voltage
- Working voltage: 3.3V
- Low capacitsance: 0.37pF (typ)
- Low leakage current
- Low dynamic resistance
- Qualified to AEC-Q101
- Solid-state silicon-avalanche technology

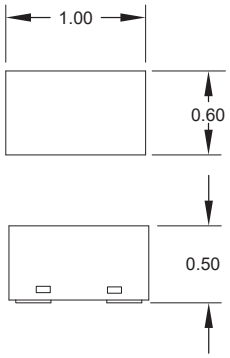
Applications

- Antenna
- USB3.0/ USB 3.1/ USB Type-C
- Automotive Applications
- Industrial Equipment

Mechanical Characteristics

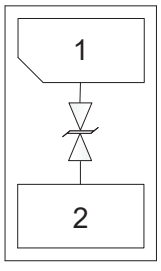
- Package: DFN 1.00 x 0.60 x 0.50mm 2-Lead
- Pb-free, Halogen Free, RoHS/WEEE compliant
- Lead Finish: Pb-Free
- Marking: Marking Code + Date Code
- Packaging: Tape and Reel

Package Dimension



Nominal Dimensions in mm

Functional Schematic



DFN 1.00 x 0.60 x 0.50mm 2-Lead (Bottom View)

Absolute Maximum Rating

RATING	SYMBOL	VALUE	UNITS
Peak Pulse Power (t_p = 8/20µs)	P_{PK}	80	W
Peak Pulse Current (t_p = 8/20µs)	I_{PP}	10	A
ESD per IEC 61000-4-2 (Contact)(1)	V_{ESD}	±30	kV
ESD per IEC 61000-4-2 (Air)(1)		±30	
ESD per ISO- 10605 (Contact)(2)	V_{ESD}	±25	kV
ESD per ISO- 10605 (Air)(2)		±25	
Operating Temperature	T_{OP}	-40 to +125	°C
Junction Temperature	T_J	-40 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics

T=25°C unless otherwise specified

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse Stand-Off Voltage	V_{RWM}					3.3	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA		6	7.6	11	V
Reverse Leakage Current	I_R	V_{RWM} = 3.3V			<5	50	nA
Clamping Voltage(3)	V_C	t_p = 1.2/50µs (Voltage), 8/20µs (Current) Combination Waveform, R_S = 2Ω, I_{PP} = 10A			5.3	8	V
ESD Clamping Voltage(4)	V_C	t_p = 0.2/100ns (TLP)	I_{TLP} = 4A		3.4		V
			I_{TLP} = 16A		6.0		
Dynamic Resistance(4),(5)	R_{DYN}	t_p = 0.2/100ns (TLP)			0.22		Ω
Junction Capacitance	C_J	V_R = 0V, f = 1MHz			0.37	0.43	pF

Notes:

(1): ESD Gun return path to Ground Reference Plane (GRP).

(2): ESD Gun return path to Horizontal Coupling Plane (HCP); Test conditions: a)150pF/330pF, 330Ω b) 150pF/330pF, 2kΩ.

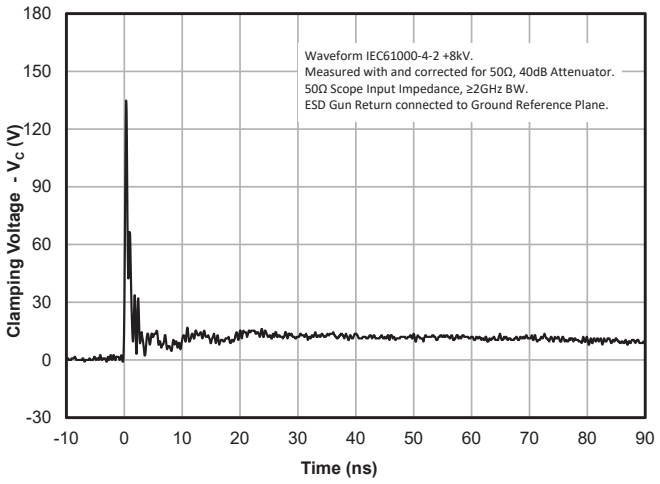
(3): Measured using a 1.2/50µs voltage, 8/20µs current combination waveform, R_S= 2Ω. Clamping is defined as the peak voltage across the device after the device snaps back to a conducting state.

(4): Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I_{TLP} and V_{TLP} averaging window: t_1 = 70ns to t_2 = 90ns.

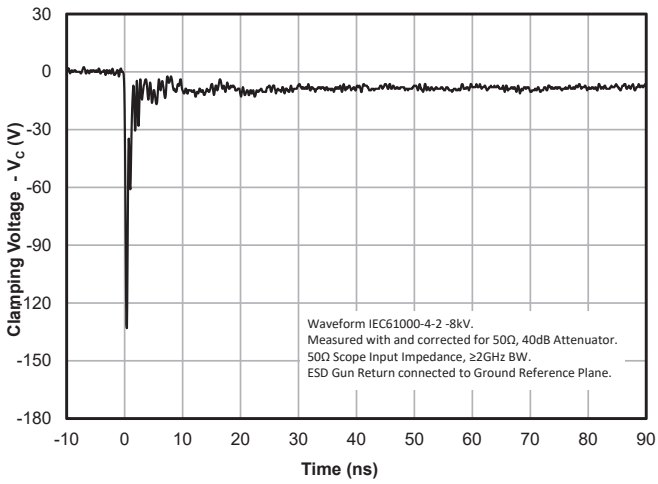
(5): Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A.

Typical Characteristics

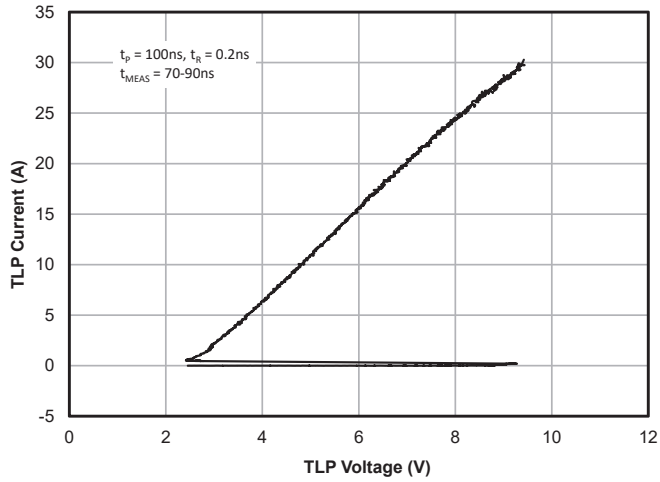
ESD Clamping (+8kV Contact per IEC 61000-4-2)



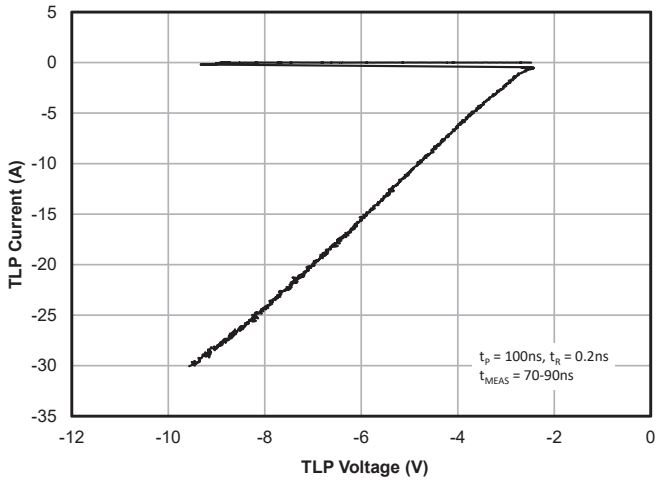
ESD Clamping (-8kV Contact per IEC 61000-4-2)



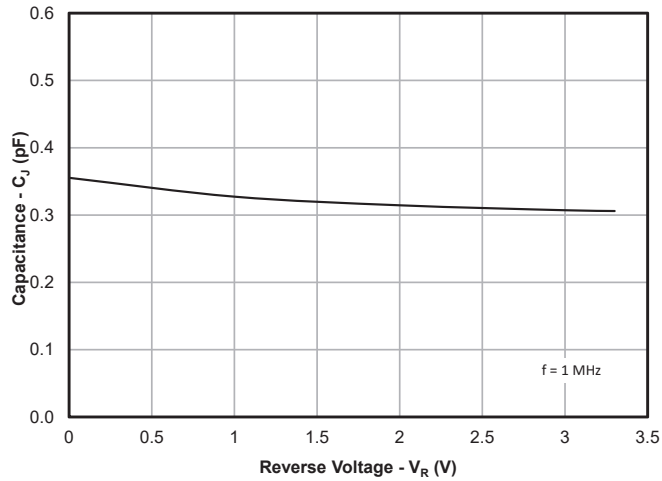
TLP Characteristics (Positive Pulse)



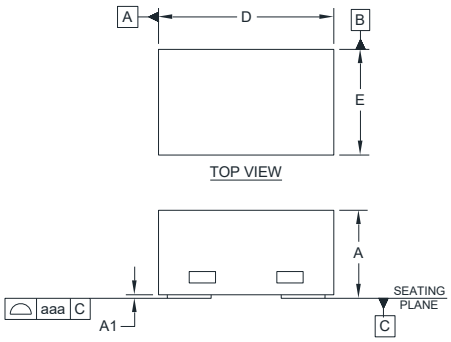
TLP Characteristics (Negative Pulse)

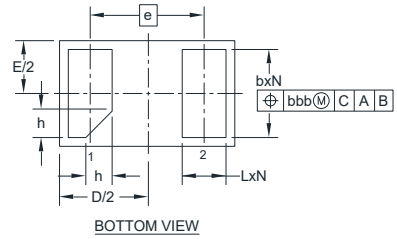


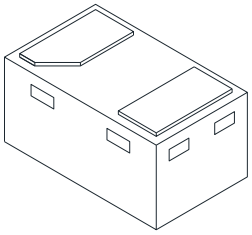
Capacitance vs. Reverse Voltage



Outline Drawing - DFN 1.00 x 0.60 x 0.50mm 2-Lead





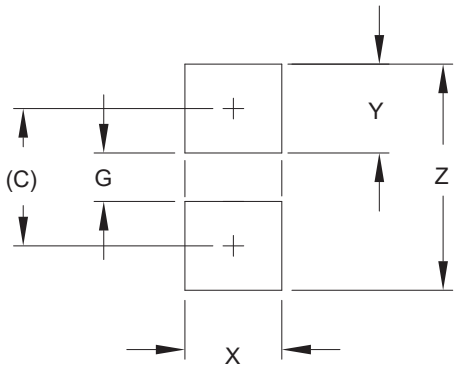


DIM	DIMENSIONS MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.54
A1	0.00	0.02	0.05
b	0.45	0.50	0.55
D	0.95	1.00	1.05
E	0.55	0.60	0.65
e	0.65 BSC		
L	0.20	0.25	0.30
h	0.10	0.15	0.20
N	2		
aaa	0.08		
bbb	0.10		

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

Landing Pattern - DFN 1.00 x 0.60 x 0.50mm 2-Lead

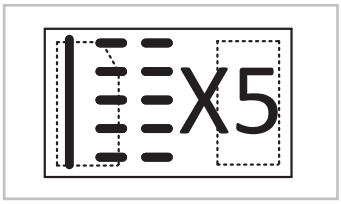


DIM	DIMENSIONS MILLIMETERS
C	(0.85)
G	0.30
X	0.60
Y	0.55
Z	1.40

NOTES:

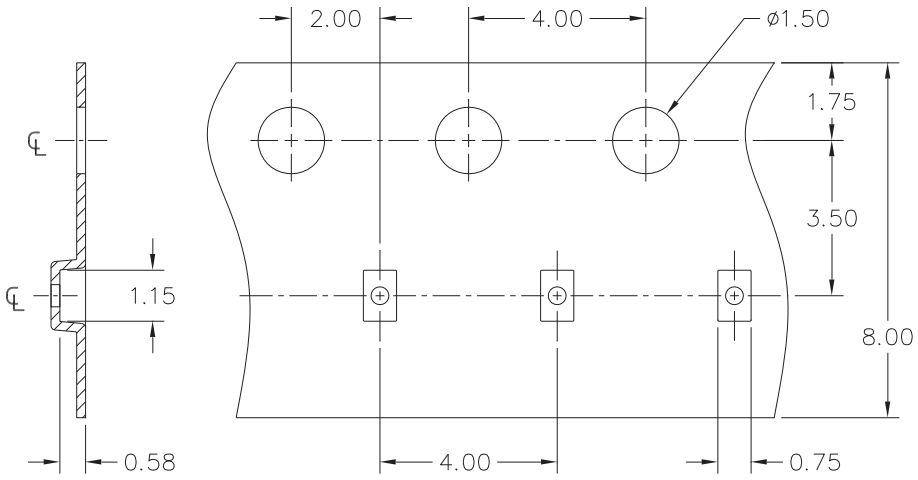
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Code

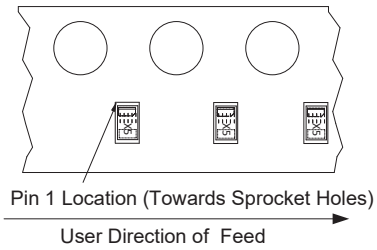


Notes:
(1) Marking will also include line matrix date code.
(2) Bar indicates Pin 1 location

Tape and Reel Specification



NOTES: 1.) All dimensions are nominal dimensions in mm



Order Information

PART NUMBER	QTY PER REEL	MATERIAL	REEL SIZE
SVS03331P1RBQ.C	3,000	Plastic	7"

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Datasheet Identification	Product Status	Definition
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Final	Full Production	This datasheet contains final specifications. Further product changes not expected however, Semtech reserves the right to change to the product or this document at any time without notice.

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