SENXX02S2

3.3V~36V 2Line Bi-directional TVS Diode Array

Description

TheSENXX02S2 is a bi-directional TVS diode array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting sensitive semiconductor components from damage. The SENXX02S2 com-plies with the IEC 61000-4-2 (ESD) with ±30kV air and ±30kV contact discharge. It is assembled into a lead-free SOT-23 package. It is designed to protect components which are connected to data and transmission lines from voltage surges.

Features

- 300W peak pulse power (8/20us)
- Protects one bi-directional or two uni-directional line(s)
- Ultra low leakage: nA level
- Stand−off Voltage: 3.3 V ~ 36 V
- Ultra low clamping voltage
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge: ±30kV
    - Contact discharge: ±30kV
  - IEC61000-4-4 (EFT) 40A (5/50ns)
- RoHS Compliant

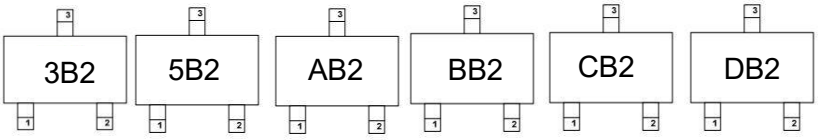
Mechanical Characteristics

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

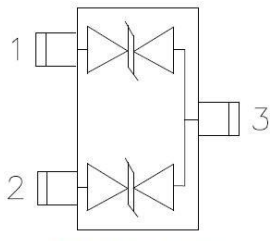
- Cellular Handsets and Accessories
- Personal Digital Assistants
- Notebooks and Handhelds
- Portable Instrumentation
- Set Top Box
- Industrial Controls
- Server and Desktop PC

Marking Information



Details marking code reference specification of approval list

Dimensions & Symbol（Unit: mm Max）



Circuit and Pin Schematic

Ordering information

Part Number	Packaging	Reel Size
SEN3302S2	3000/Tape & Reel	7 inch
SEN0502S2	3000/Tape & Reel	7 inch
SEN1202S2	3000/Tape & Reel	7 inch
SEN1502S2	3000/Tape & Reel	7 inch
SEN2402S2	3000/Tape & Reel	7 inch
SEN3602S2	3000/Tape & Reel	7 inch

Absolute Maximum Ratings (T_A=25ºC, RH=45%-75%, unless otherwise noted)

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SEN3302S2			
Parameter	**Symbol**	**Value**	**Unit**
Peak Pulse Power (8/20μs)	Ppp	300	W
Peak Pulse Current (8/20μs)	Ipp	25	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C
SEN0502S2			
Parameter	**Symbol**	**Value**	**Unit**
Peak Pulse Power (8/20μs)	Ppp	300	W
Peak Pulse Current (8/20μs)	Ipp	18	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C
SEN1202S2			
Parameter	**Symbol**	**Value**	**Unit**
Peak Pulse Power (8/20μs)	Ppp	300	W
Peak Pulse Current (8/20μs)	Ipp	10	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

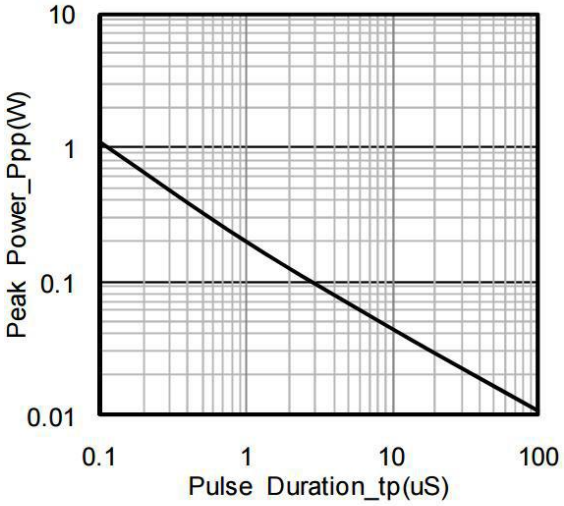
SEN1502S2			
Parameter	**Symbol**	**Value**	**Unit**
Peak Pulse Power (8/20μs)	Ppp	300	W
Peak Pulse Current (8/20μs)	Ipp	8	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C
SEN2402S2			
Parameter	**Symbol**	**Value**	**Unit**
Peak Pulse Power (8/20μs)	Ppp	300	W
Peak Pulse Current (8/20μs)	Ipp	4	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C
SEN3602S2			
Parameter	**Symbol**	**Value**	**Unit**
Peak Pulse Power (8/20μs)	Ppp	300	W
Peak Pulse Current (8/20μs)	Ipp	3	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	VESD	±30 ±30	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

Electrical Characteristics (T_A=25℃)

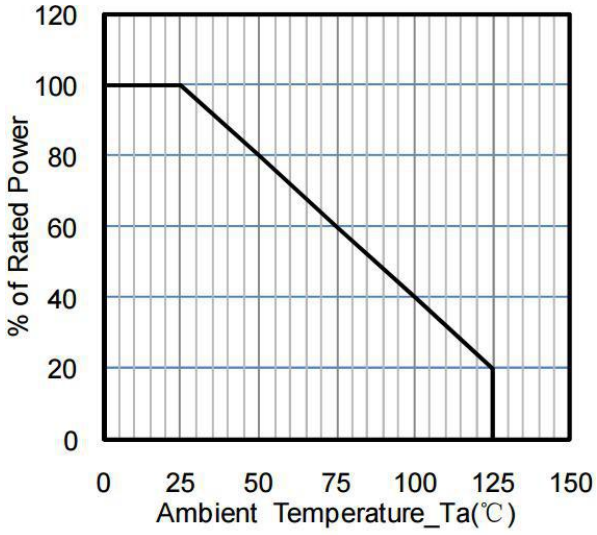
SEN3302S2						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	VRWM			3.3	V	
Breakdown Voltage	VBR	3.8			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM = 3.3V
Clamping Voltage	VC		6		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	VC			12	V	IPP = 25A (8 x 20uS pulse)
Junction Capacitance	CJ		100		pF	VR = 0V, f = 1MHz
SEN0502S2						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	6.0			V	IT = 1mA
Reverse Leakage Current	IR			1		VRWM = 5V
Clamping Voltage	VC		9.8		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	VC			16.7	V	IPP = 18A (8 x 20uS pulse)
Junction Capacitance	CJ		100		pF	VR = 0V, f = 1MHz
SEN1202S2						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	VRWM			12	V	
Breakdown Voltage	VBR	13.3			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM = 12V
Clamping Voltage	VC		19		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	VC			30	V	IPP =10A (8 x 20uS pulse)
Junction Capacitance	CJ		60		pF	VR = 0V, f = 1MHz

SEN1502S2						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM =15V
Clamping Voltage	VC		24		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	VC			38.5	V	IPP = 8A (8 x 20uS pulse)
Junction Capacitance	CJ		55		pF	VR = 0V, f = 1MHz
SEN2402S2						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	26.7			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM =24V
Clamping Voltage	VC		35		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	VC			65	V	IPP = 4A (8 x 20uS pulse)
Junction Capacitance	CJ		36		pF	VR = 0V, f = 1MHz
SEN3602S2						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	VRWM			36	V	
Breakdown Voltage	VBR	40			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM =36V
Clamping Voltage	VC		60		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	VC			75	V	IPP = 3A (8 x 20uS pulse)
Junction Capacitance	CJ		30		pF	VR = 0V, f = 1MHz

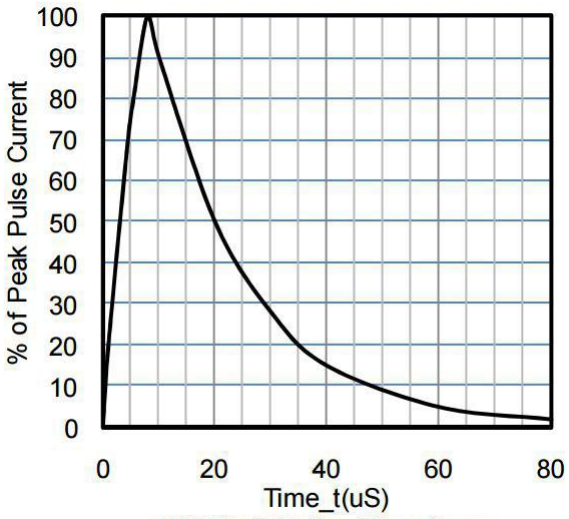
Typical Performance Characteristics (T_A=25°C unless otherwise Specified)



Peak Pulse Power vs. Pulse Time



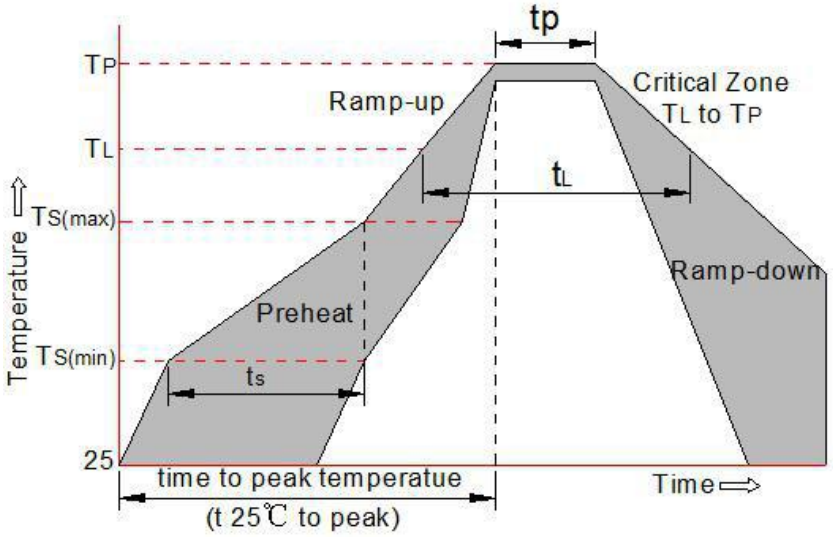
Power Derating Curve



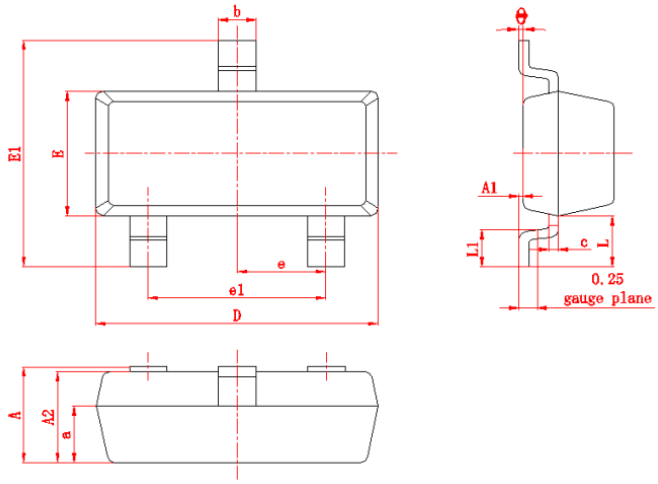
8 X 20uS Pulse Waveform

Soldering Parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L) (Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

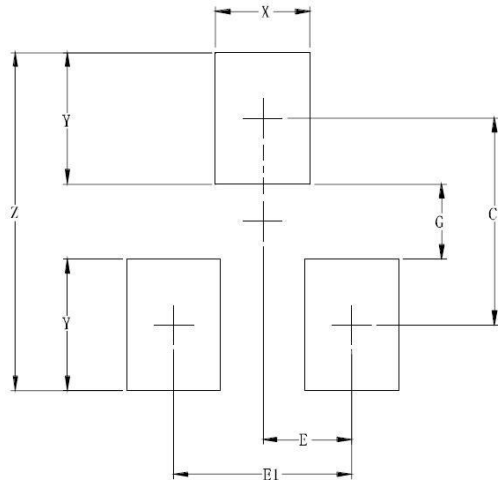


Package Mechanical Data



SYM	DIMENSIONS					
	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.035	-	.044	0.90	-	1.12
A1	.000	-	.004	0.01	-	0.10
A2	.035	.037	.040	0.90	0.95	1.05
b	0.012	-	.020	0.30	-	0.51
c	0.03	-	.007	0.08	-	0.18
D	.110	.114	.120	2.80	2.90	3.04
E1	.082	.093	.104	2.25	2.37	2.55
E	.047	.051	.055	1.20	1.30	1.40
e	.075			1.90		
e1	.037			0.95		
L1	.015	.020	.024	0.40	0.50	0.60
L	.022			0.55		
N	3			3		
θ	0°	-	8°	0°	-	8°

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	.087	2.20
E	.037	0.95
E1	.075	1.90
G	.031	0.80
X1	.039	1.00
Y	.055	1.40
Z	.141	3.60

Contact Information

JIANGXI Salltech Microelectronics Technology Co.,Ltd.

N0.699 Huangtang East Street,Ganjiang New District, Nanchang city,Jiangxi province

Tel: +86-791-83962891
Fax: +86-791-83962890