

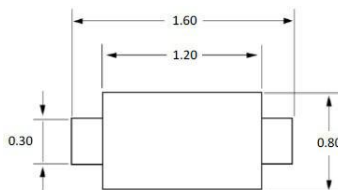
Description

The SENXX11D5 is an uni-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive data and power line. The SENXX11D5 complies with the IEC 61000-4-2 (ESD) with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a small lead-free SOD-523 package. The small size and high ESD surge protection make SENXX11D5 an ideal choice to protect cell phone, digital cameras, audio players and many other portable applications.

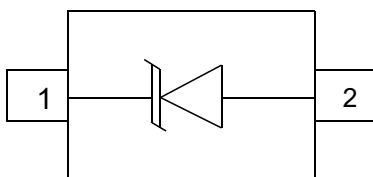
Features

- Protects one data or power line
- Working voltage: 3.3 ~36 V
- 2-pin SOD-523 package
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
- RoHS Compliant

Dimensions & Symbol (Unit: mm Max)



Package Dimensions



Pin and Circuit Schematic

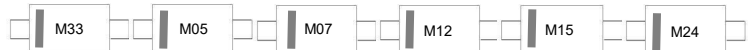
Mechanical Characteristics

- Package: SOD-523
- 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
- Digital Cameras
- Peripherals
- Audio Players
- Keypads, Side Keys, LCD Displays

Marking Information



SEN3311D3	SEN0511D3	SEN0711D3	SEN1211D3	SEN1511D3	SEN2411D3
M33	M05	M07	M12	M15	M24

Details marking code reference specification of approval list

Ordering Information

Part Number	Packaging	Reel Size
SEN3311D5	3000/Tape & Reel	7 inch
SEN0511D5	3000/Tape & Reel	7 inch
SEN0711D5	3000/Tape & Reel	7 inch
SEN1211D5	3000/Tape & Reel	7 inch
SEN2411D5	3000/Tape & Reel	7 inch
SEN3611D5	3000/Tape & Reel	7 inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, RH=45%-75%, unless otherwise noted)

SEN3311D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 μs)	P_{pp}	300	W
Peak Pulse Current (8/20 μs)	I_{pp}	27	A
ESD per IEC 61000-4-2 (Air)	VESD	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature Range	T_J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$

SEN0511D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 μs)	P_{pp}	300	W
Peak Pulse Current (8/20 μs)	I_{pp}	22	A
ESD per IEC 61000-4-2 (Air)	VESD	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature Range	T_J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$

SEN0711D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 μs)	P_{pp}	300	W
Peak Pulse Current (8/20 μs)	I_{pp}	18	A
ESD per IEC 61000-4-2 (Air)	VESD	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature Range	T_J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$

SEN1211D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P _{pp}	300	W
Peak Pulse Current (8/20μs)	I _{pp}	13	A
ESD per IEC 61000-4-2 (Air)	VESD	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	T _J	-55 to +125	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

SEN2411D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P _{pp}	300	W
Peak Pulse Current (8/20μs)	I _{pp}	5	A
ESD per IEC 61000-4-2 (Air)	VESD	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	T _J	-55 to +125	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

SEN3611D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P _{pp}	300	W
Peak Pulse Current (8/20μs)	I _{pp}	4	A
ESD per IEC 61000-4-2 (Air)	VESD	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	T _J	-55 to +125	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

Electrical Characteristics (T_A=25°C)

SEN3311D5

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			3.3	V	
Breakdown Voltage	V _{BR}	4.8			V	IT = 1mA
Reverse Leakage Current	I _R			5	uA	VRWM = 3.3V
Clamping Voltage	V _C		7		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	V _C			15	V	IPP = 27A (8 x 20uS pulse)
Junction Capacitance	C _J		150		pF	VR = 0V, f = 1MHz

SEN0511D5

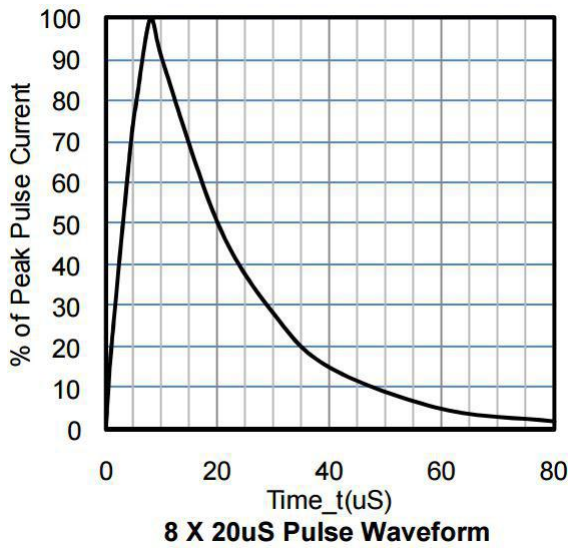
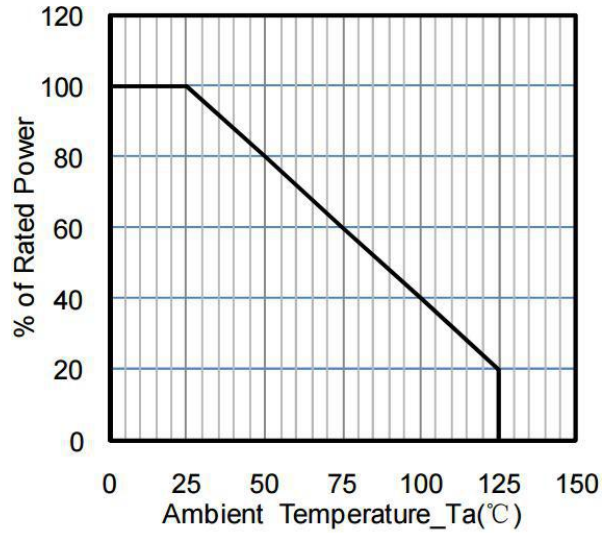
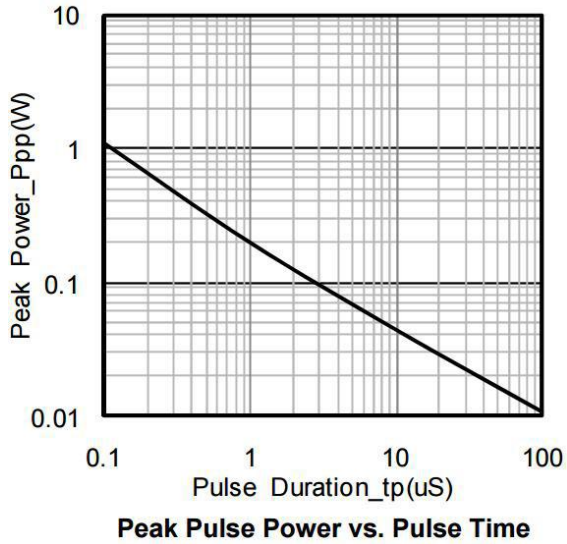
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			5	V	
Breakdown Voltage	V _{BR}	6			V	IT = 1mA
Reverse Leakage Current	I _R			1	uA	VRWM = 5V
Clamping Voltage	V _C		9.8		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	V _C			19	V	IPP = 22A (8 x 20uS pulse)
Junction Capacitance	C _J		160		pF	VR = 0V, f = 1MHz

SEN0711D5

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			7	V	
Breakdown Voltage	V _{BR}	7.5			V	IT = 1mA
Reverse Leakage Current	I _R			1	uA	VRWM = 7V
Clamping Voltage	V _C		12		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	V _C			20	V	IPP = 18A (8 x 20uS pulse)
Junction Capacitance	C _J		160		pF	VR = 0V, f = 1MHz

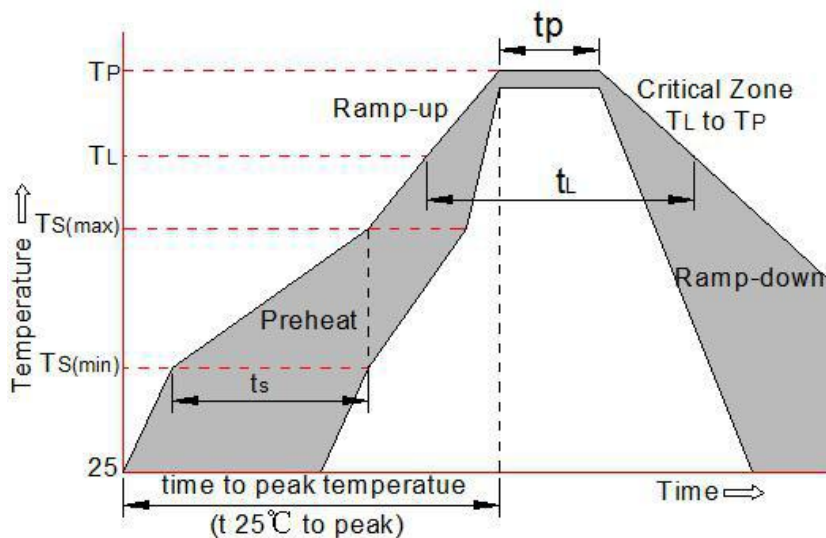
SEN1211D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			12	V	
Breakdown Voltage	V_{BR}	13.3			V	$I_T = 1mA$
Reverse Leakage Current	I_R			0.2	μA	$V_{RWM} = 12V$
Clamping Voltage	V_C		16		V	$I_{PP} = 1A$ (8 x 20 μs pulse)
Clamping Voltage	V_C			30	V	$I_{PP} = 13A$ (8 x 20 μs pulse)
Junction Capacitance	C_J		65		pF	$V_R = 0V, f = 1MHz$
SEN2411D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			24	V	
Breakdown Voltage	V_{BR}	27			V	$I_T = 1mA$
Reverse Leakage Current	I_R			1	μA	$V_{RWM} = 24V$
Clamping Voltage	V_C		40		V	$I_{PP} = 1A$ (8 x 20 μs pulse)
Clamping Voltage	V_C			60	V	$I_{PP} = 5A$ (8 x 20 μs pulse)
Junction Capacitance	C_J		40		pF	$V_R = 0V, f = 1MHz$
SEN3611D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			36	V	
Breakdown Voltage	V_{BR}	38			V	$I_T = 1mA$
Reverse Leakage Current	I_R			0.2	μA	$V_{RWM} = 36V$
Clamping Voltage	V_C		50		V	$I_{PP} = 1A$ (8 x 20 μs pulse)
Clamping Voltage	V_C			75	V	$I_{PP} = 4A$ (8 x 20 μs pulse)
Junction Capacitance	C_J		30		pF	$V_R = 0V, f = 1MHz$

Typical Performance Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise Specified)

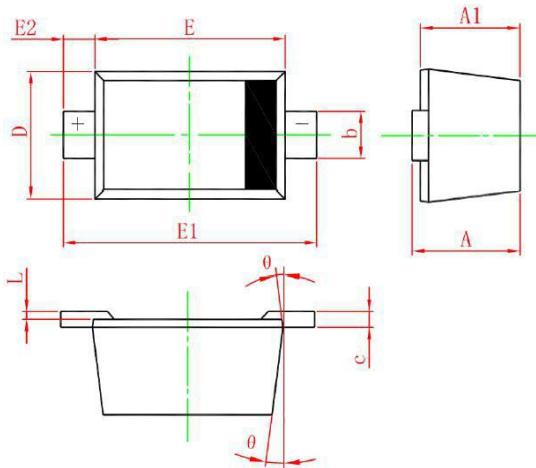


Soldering Parameters

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

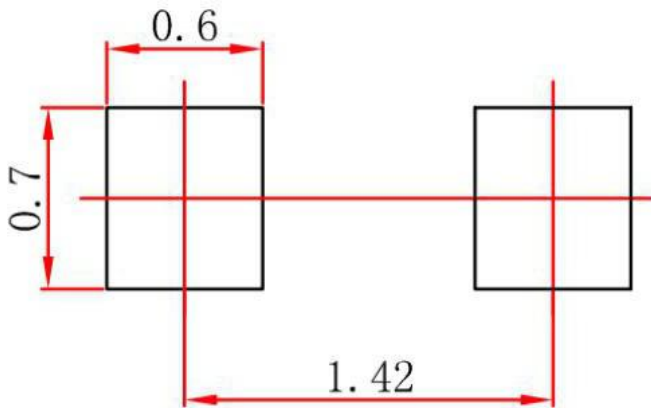


Package Mechanical Data



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.51	-	0.77	0.020	-	0.031
A1	0.50	-	0.70	0.020	-	0.028
b	0.25	-	0.35	0.010	-	0.014
c	0.08	-	0.15	0.003	-	0.006
D	0.75	-	0.85	0.030	-	0.033
E	1.10	-	1.30	0.043	-	0.051
E1	1.50	-	1.70	0.059	-	0.067
E2	0.20REF			0.008REF		
L	0.01	-	0.07	0.001	-	0.003
Φ	7° REF			7° REF		

Suggested Land Pattern



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