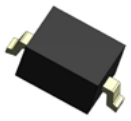
STS321XXXBXX1

TVS Diode ESD suppressor



Applications

- Cellular handsets and accessories
- Microprocessor based equipment
- Poratble electronics
- Notebooks, desktops, and servers
- Portable instrumentation
- Peripherals
- Pagers

Product features

- 400 Watts peak pulse power per line (t_P =8/20 µs)
- Protects one bi-directional I/O line
- Low clamping voltage
- Low leakage current
- Meets moisture sensitivity level (MSL) 3
- Molding compound flammability rating: UL 94V-0
- Termination finish: Tin

Environmental compliance and general specifications

- IEC61000-4-2 (ESD)
  - Up to ±30 kV (air)
  - Up to ±30 kV (contact)
- IEC61000-4-5 (Lightning) Up to 22 A (8/20 µs)

Pb HALOGEN HF FREE RoHS

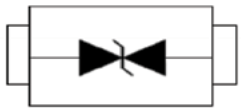
Ordering part number

ST S32 1 033 B 401

- Family
- Package (S32- SOD-323)
- Number of channels (1-1)
- Operating voltage (033- 3.3 V)
- Bi/Uni directional (B- Bi)
- Capacitance (401- 40 pF)

Pin out/functional diagram

SOD-323



Pin Configuration

EATON

Powering Business Worldwide

Absolute maximum ratings

(+25 °C, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 8/20 µs waveform	P_{pp}	400	W
ESD per IEC 61000-4-2 (Air)	V_{ESD}	+/-30	kV
ESD per IEC 61000-4-2 (Contact)		+/-30	
Lead soldering temperature	T_L	+260 (10 seconds)	°C
Operating junction temperature range	T_J	-55 to +125	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical characteristics

(+25 °C)

STS321033B401

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	3.3	V_{RWM} (V)
Reverse breakdown voltage	I_T = 1 mA	3.6	-	-	V_{BR} (V)
Reverse leakage current	V_{RWM} = 3.3 V	-	-	1	I_R (µA)
Clamping voltage	I_{PP} = 30 A, t_p = 8/20 µs	-	-	15	V_C (V)
Junction capacitance	V_{RWM} = 0 V, f = 1 MHz	-	40	60	C_J (pF)

STS321050B331

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	5	V_{RWM} (V)
Reverse breakdown voltage	I_T = 1 mA	5.5	-	-	V_{BR} (V)
Reverse leakage current	V_{RWM} = 5 V	-	-	1	I_R (µA)
Clamping voltage	I_{PP} = 1 A, t_p = 8/20 µs	-	-	9	V_C (V)
	I_{PP} = 22 A, t_p = 8/20 µs	-	-	18	V_C (V)
Junction capacitance	V_{RWM} = 0 V, f = 1 MHz	-	33	75	C_J (pF)

STS321120B301

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	12	V_{RWM} (V)
Reverse breakdown voltage	I_T = 1 mA	13.3	-	-	V_{BR} (V)
Reverse leakage current	V_{RWM} = 12 V	-	-	1	I_R (µA)
Clamping voltage	I_{PP} = 1 A, t_p = 8/20 µs	-	-	19	V_C (V)
	I_{PP} = 12 A, t_p = 8/20 µs	-	-	33	V_C (V)
Junction capacitance	V_{RWM} = 0 V, f = 1 MHz	-	30	45	C_J (pF)

STS321150B351

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	15	V_{RWM} (V)
Reverse breakdown voltage	I_T = 1 mA	16.7	-	-	V_{BR} (V)
Reverse leakage current	V_{RWM} = 15 V	-	-	1	I_R (µA)
Clamping voltage	I_{PP} = 1 A, t_p = 8/20 µs	-	-	23	V_C (V)
	I_{PP} = 10 A, t_p = 8/20 µs	-	-	33	V_C (V)
Junction capacitance	V_{RWM} = 0 V, f = 1 MHz	-	35	40	C_J (pF)

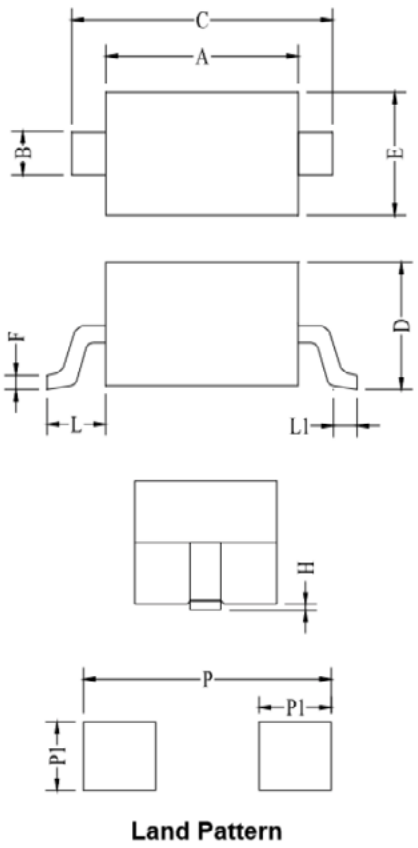
STS321240B301

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	24	V_{RWM} (V)
Reverse breakdown voltage	I_T = 1 mA	26.7	-	-	V_{BR} (V)
Reverse leakage current	V_{RWM} = 24 V	-	-	1	I_R (µA)
Clamping voltage	I_{PP} = 1 A, t_p = 8/20 µs	-	-	40	V_C (V)
	I_{PP} = 8 A, t_p = 8/20 µs	-	-	50	V_C (V)
Junction capacitance	V_{RWM} = 0 V, f = 1 MHz	-	30	35	C_J (pF)

STS321360B141

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	36	V_{RWM} (V)
Reverse breakdown voltage	I_T = 1 mA	40	42	47.6	V_{BR} (V)
Reverse leakage current	V_{RWM} = 36 V	-	-	0.2	I_R (µA)
Clamping voltage	I_{PP} = 1 A, t_p = 8/20 µs	-	45	60	V_C (V)
	I_{PP} = 6 A, t_p = 8/20 µs	-	60	70	V_C (V)
Junction capacitance	V_{RWM} = 0 V, f = 1 MHz	-	14	25	C_J (pF)

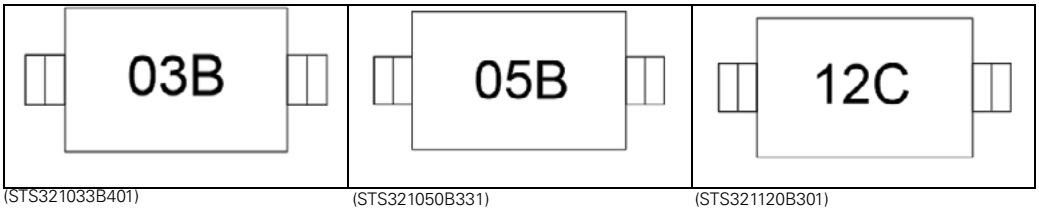
Mechanical parameters, pad layout- mm/inches



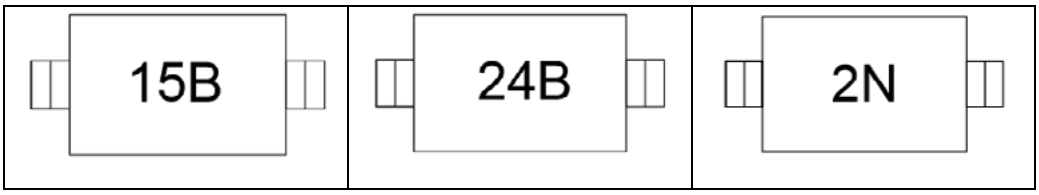
Land Pattern

	Millimeters		Inches	
Dimension	**Minimum**	**Maximum**	**Minimum**	**Maximum**
A	1.60	1.80	0.063	0.071
B	0.25	0.35	0.010	0.014
C	2.50	2.75	0.098	0.108
D	0.00	1.00	0.000	0.039
E	1.20	1.40	0.047	0.055
F	0.08	0.15	0.003	0.006
L	0.475 REF		0.019 REF	
L1	0.25	0.40	0.010	0.016
H	0.00	0.10	0.000	0.004
P	3.00		0.118	
P1	0.80		0.031	

Part marking



(STS321033B401) (STS321050B331) (STS321120B301)

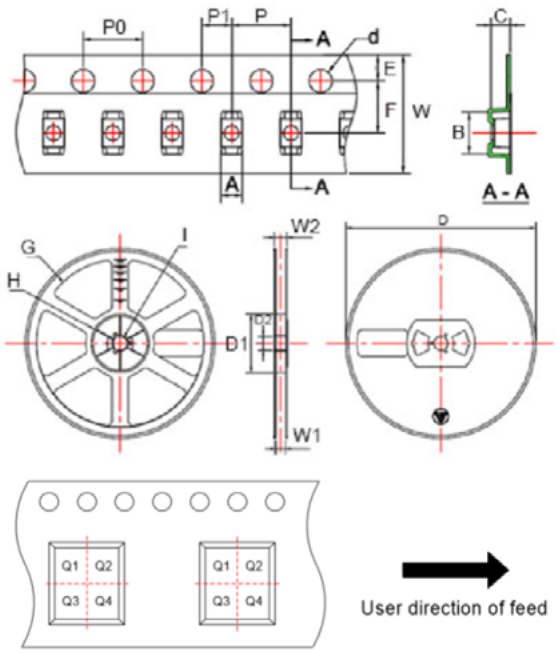


(STS321150B351) (STS321240B301) (STS321360B141)

Packaging information mm/inches

Drawing not to scale.

Supplied in tape and reel packaging, 3,000 parts per 7" diameter reel (EIA-481 compliant)

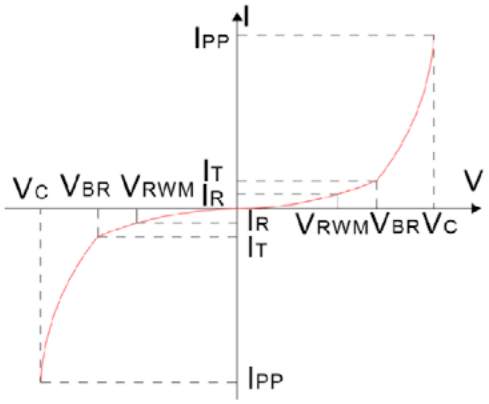


Pin 1 quadrant:Q1&Q2

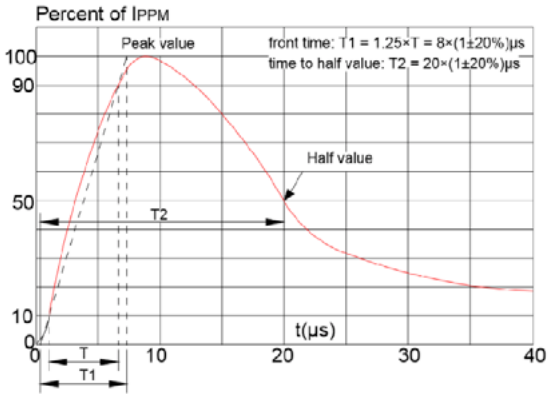
Symbol	Millimeters	Inches
A	1.46±0.05	0.057±0.002
B	2.90±0.05	0.114±0.002
C	1.25±0.05	0.049±0.002
d	ø1.50±0.1	ø0.059±0.004
E	1.75±0.1	0.069±0.004
F	3.50±0.1	0.138±0.004
P0	4.0±0.1	0.157±0.004
P	4.0±0.1	0.157±0.004
P1	2.0±0.1	0.079±0.004
W	8.00+0.3/-0.1	0.315+0.012/-0.004
D	ø178.0±2	ø7.008±0.079
D1	54.40±1	2.142±0.039
D2	13.0±1	0.512±0.039
G	R78.0±1	R3.071±0.039
H	R25.60±1	R1.008±0.039
I	R6.50±1	R0.256±0.039
W1	9.50±1	0.374±0.039
W2	12.30±1	0.484±0.039

Ratings and V-I characteristic curves (+25 °C unless otherwise noted)

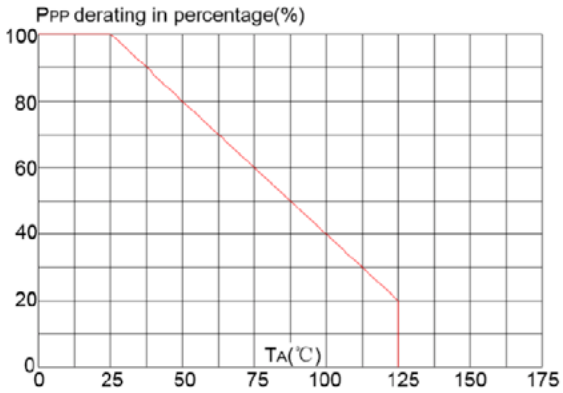
V- I curve characteristics (Bi-directional)



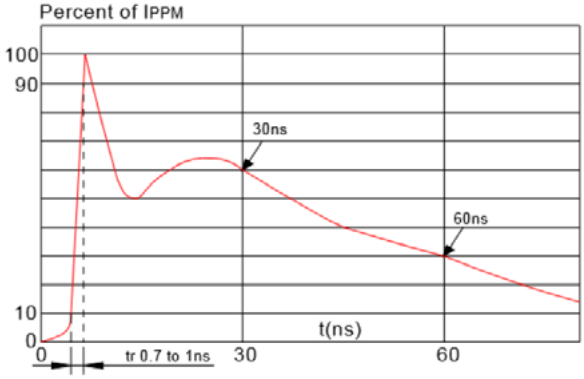
Pulse waveform (8/20 µs)



Pulse derating curve



ESD waveform



Solder reflow profile

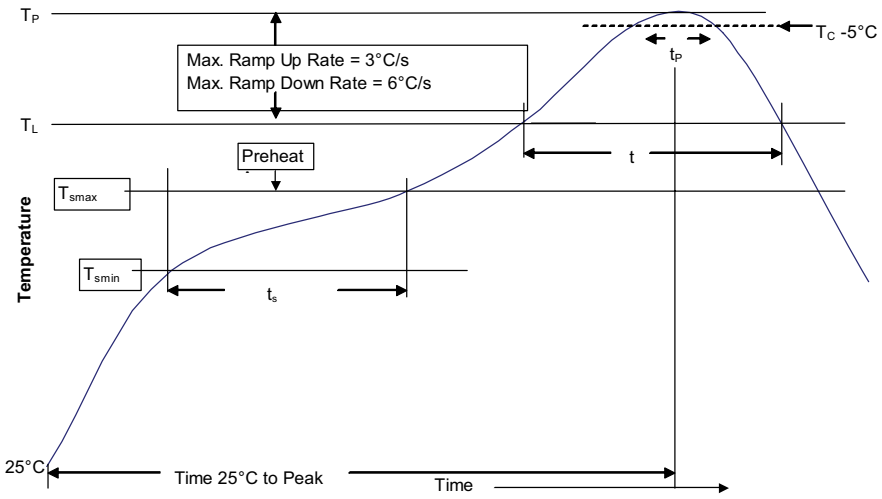


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Reference J-STD-020

Profile feature		Standard SnPb solder	Lead (Pb) free solder
Preheat and soak	• Temperature min. (T_{smin})	100 °C	150 °C
	• Temperature max. (T_{smax})	150 °C	200 °C
	• Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-120 seconds
Ramp up rate T_L to T_p		3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L		183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body temperature (T_p)*		Table 1	Table 2
Time (t_p)* within 5 °C of the specified classification temperature (T_C)		20 seconds*	30 seconds*
Ramp-down rate (T_p to T_L)		6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature		6 minutes max.	8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

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