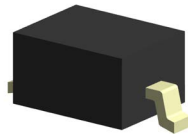


# STS321XXB100AH

## Automotive TVS diode ESD suppressor



### Product features

- AEC-Q101
- Protects one bi-directional I/O line
- Low capacitance
- Meets moisture sensitivity level (MSL) 1
- Molding compound flammability rating: UL 94V-0

### Applications

- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- CAN-bus, LIN and Ethernet communication modules
- Network systems and body electronics
- Power train controls
- Automotive lighting

### Environmental compliance and general specifications

- IEC61000-4-2 (ESD)  $\pm 30$  kV (air),  $\pm 30$  kV (contact)
- IEC61000-4-4 (EFT) 40 A (5/50 ns)
- IEC61000-4-5 (Lightning) up to 20 A (8/20  $\mu$ s)



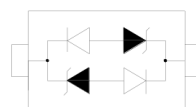
### Ordering part number

	<b>ST S32 1 050 B 100 AH</b>
Family	_____
Package (S32-SOD-323)	_____
Number of channels	_____
Operating voltage (050- 5 V)	_____
Bi/Uni directional (B - Bi)	_____
Capacitance (100- 1 pF)	_____
Automotive grade	_____

### SOD-323



### Pin configuration



**Product specifications**

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

**STS321033B100AH**

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μs waveform	-	350	-	$P_{PP}$ (W)
ESD per IEC 61000-4-2 (Air)	-	-	+/-30	-	$V_{ESD}$ (kV)
ESD per IEC 61000-4-2 (Contact)	-	-	+/-30	-	$V_{ESD}$ (kV)
Lead soldering temperature	-	-	+260 (10 seconds)	-	$T_L$ (°C)
Operating junction temperature range	-	-55	-	+150	$T_J$ (°C)
Storage temperature range	-	-55	-	+150	$T_{STG}$ (°C)
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	-	-	0.1	$I_R$ (μA)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ μs	-	-	6.5	$V_C$ (V)
	$I_{PP} = 10$ A, $t_p = 8/20$ μs	-	-	12	$V_C$ (V)
	$I_{PP} = 20$ A, $t_p = 8/20$ μs	-	-	17.5	$V_C$ (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	1.0	1.5	$C_J$ (pF)

**STS321050B100AH**

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μs waveform	-	400	-	$P_{PP}$ (W)
ESD per IEC 61000-4-2 (Air)	-	-	+/-30	-	$V_{ESD}$ (kV)
ESD per IEC 61000-4-2 (Contact)	-	-	+/-30	-	$V_{ESD}$ (kV)
Lead soldering temperature	-	-	+260 (10 seconds)	-	$T_L$ (°C)
Operating junction temperature range	-	-55	-	+150	$T_J$ (°C)
Storage temperature range	-	-55	-	+150	$T_{STG}$ (°C)
Reverse working voltage	-	-	-	5.0	$V_{RWM}$ (V)
Reverse breakdown voltage	$I_T = 1$ mA	6.0	-	-	$V_{BR}$ (V)
Reverse leakage current	$V_{RWM} = 5$ V	-	-	1.0	$I_R$ (μA)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ μs	-	-	9.8	$V_C$ (V)
	$I_{PP} = 17$ A, $t_p = 8/20$ μs	-	-	25	$V_C$ (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	1.0	1.5	$C_J$ (pF)

**STS321080B100AH**

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 $\mu$ s waveform	-	350	-	$P_{PP}$ (W)
ESD per IEC 61000-4-2 (Air)	-	-	+/-30	-	$V_{ESD}$ (kV)
ESD per IEC 61000-4-2 (Contact)	-	-	+/-30	-	$V_{ESD}$ (kV)
Lead soldering temperature	-	-	+260 (10 seconds)	-	$T_L$ ( $^{\circ}$ C)
Operating junction temperature range	-	-55	-	+150	$T_J$ ( $^{\circ}$ C)
Storage temperature range	-	-55	-	+150	$T_{STG}$ ( $^{\circ}$ C)
Reverse working voltage	-	-	-	8.0	$V_{RWM}$ (V)
Reverse breakdown voltage	$I_T = 1$ mA	8.5	-	-	$V_{BR}$ (V)
Reverse leakage current	$V_{RWM} = 8$ V	-	-	1	$I_R$ ( $\mu$ A)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ $\mu$ s	-	-	13.5	$V_C$ (V)
	$I_{PP} = 18$ A, $t_p = 8/20$ $\mu$ s	-	-	23	$V_C$ (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	1.0	1.5	$C_J$ (pF)

**STS321120B100AH**

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 $\mu$ s waveform	-	350	-	$P_{PP}$ (W)
ESD per IEC 61000-4-2 (Air)	-	-	+/-30	-	$V_{ESD}$ (kV)
ESD per IEC 61000-4-2 (Contact)	-	-	+/-30	-	$V_{ESD}$ (kV)
Lead soldering temperature	-	-	+260 (10 seconds)	-	$T_L$ ( $^{\circ}$ C)
Operating junction temperature range	-	-55	-	+150	$T_J$ ( $^{\circ}$ C)
Storage temperature range	-	-55	-	+150	$T_{STG}$ ( $^{\circ}$ C)
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	-	-	1.0	$I_R$ ( $\mu$ A)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ $\mu$ s	-	-	19	$V_C$ (V)
	$I_{PP} = 12$ A, $t_p = 8/20$ $\mu$ s	-	-	30	$V_C$ (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	1.0	1.5	$C_J$ (pF)

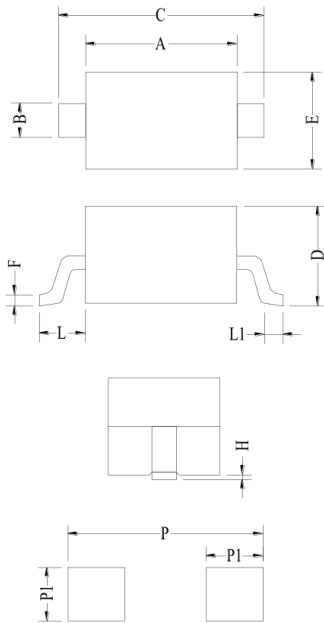
**STS321150B100AH**

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 $\mu$ s waveform	-	350	-	$P_{PP}$ (W)
ESD per IEC 61000-4-2 (Air)	-	-	+/-30	-	$V_{ESD}$ (kV)
ESD per IEC 61000-4-2 (Contact)	-	-	+/-30	-	$V_{ESD}$ (kV)
Lead soldering temperature	-	-	+260 (10 seconds)	-	$T_L$ ( $^{\circ}$ C)
Operating junction temperature range	-	-55	-	+150	$T_J$ ( $^{\circ}$ C)
Storage temperature range	-	-55	-	+150	$T_{STG}$ ( $^{\circ}$ C)
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	$I_R$ ( $\mu$ A)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ $\mu$ s	-	-	25	$V_C$ (V)
	$I_{PP} = 10$ A, $t_p = 8/20$ $\mu$ s	-	-	40	$V_C$ (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	1.0	1.5	$C_J$ (pF)

**STS321240B100AH**

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 $\mu$ s waveform	-	350	-	$P_{PP}$ (W)
ESD per IEC 61000-4-2 (Air)	-	-	+/-30	-	$V_{ESD}$ (kV)
ESD per IEC 61000-4-2 (Contact)	-	-	+/-30	-	$V_{ESD}$ (kV)
Lead soldering temperature	-	-	+260 (10 seconds)	-	$T_L$ ( $^{\circ}$ C)
Operating junction temperature range	-	-55	-	+150	$T_J$ ( $^{\circ}$ C)
Storage temperature range	-	-55	-	+150	$T_{STG}$ ( $^{\circ}$ C)
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	-	-	1.0	$I_R$ ( $\mu$ A)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ $\mu$ s	-	-	38	$V_C$ (V)
	$I_{PP} = 9$ A, $t_p = 8/20$ $\mu$ s	-	-	54	$V_C$ (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	1.0	1.5	$C_J$ (pF)

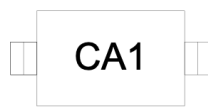
**Mechanical parameters, pad layout- mm/inches**



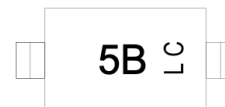
Dimension	Millimeters			Inches		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	1.6	1.7	1.8	0.063	0.067	0.071
B	0.25	0.32	0.4	0.01	0.013	0.016
C	2.3	2.6	2.8	0.091	0.102	0.11
D	0.8	0.95	1.1	0.031	0.037	0.043
E	1.2	1.3	1.4	0.047	0.051	0.055
F	0.08	0.13	0.18	0.003	0.005	0.007
L	-	0.475 ref	-	-	0.019 ref	-
L1	0.25	0.33	0.4	0.010	0.013	0.016
H	-	0.06	0.14	-	0.002	0.006
P	-	3.00	-	-	0.118	-
P1	-	0.80	-	-	0.031	-

**Marking code**

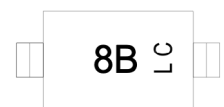
STS321033B100AH



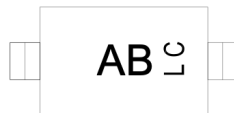
STS321050B100AH



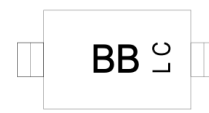
STS321080B100AH



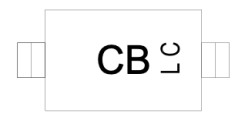
STS321120B100AH



STS321150B100AH



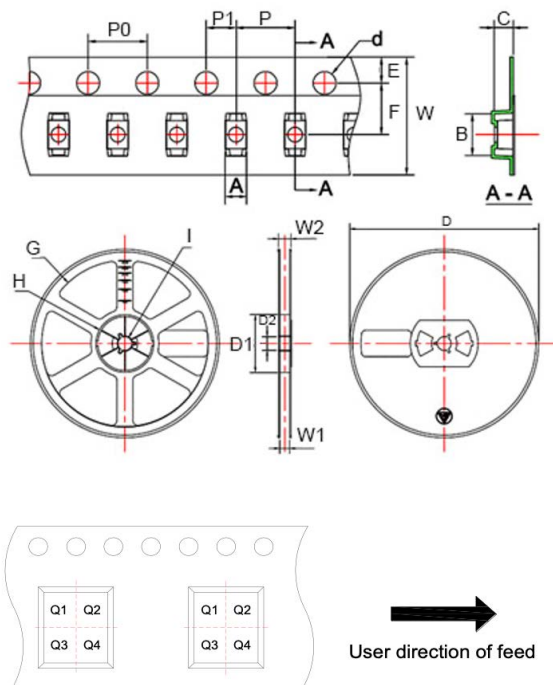
STS321240B100AH



**Packaging information mm/inches**

Drawing not to scale.

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

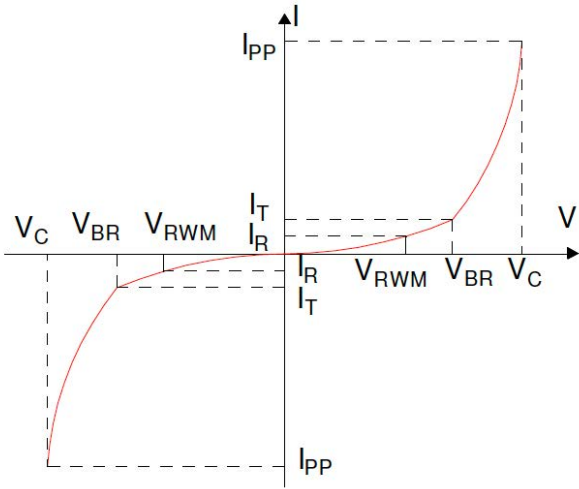


Dimension	Millimeter (typical)	Inches (typical)
A	1.46	0.057
B	2.9	0.114
C	1.25	0.049
d	1.50	0.059
E	1.75	0.069
F	3.5	0.138
P0	4	0.157
P	4	0.157
P1	2	0.079
W	8	0.315
D	178.0	7.008
D1	54.4	2.142
D2	13	0.512
G	R78.0	R3.071
H	R25.60	R1.008
I	R6.50	R0.256
W1	9.5	0.374
W2	12.3	0.484

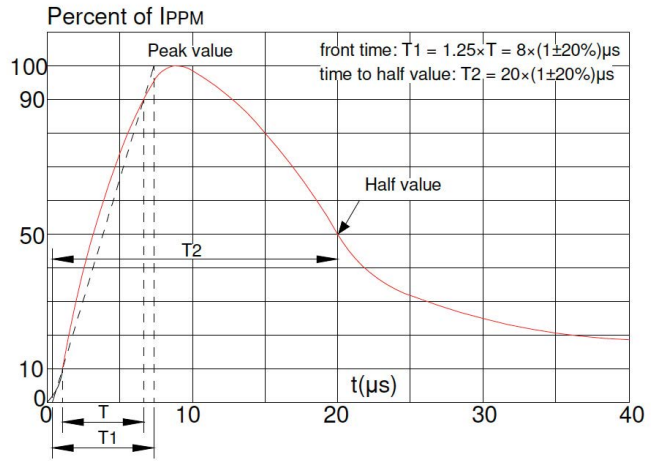
➔ User direction of feed

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

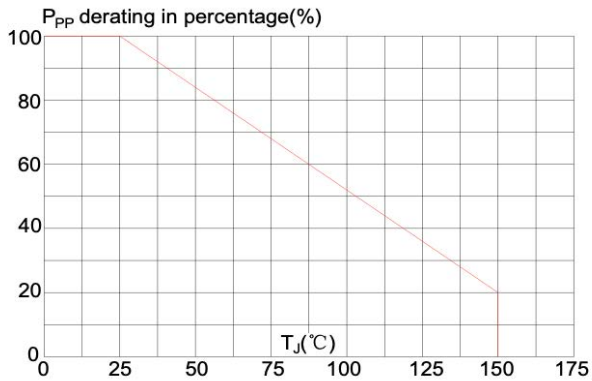
**V- I curve characteristics (Bi-directional)**



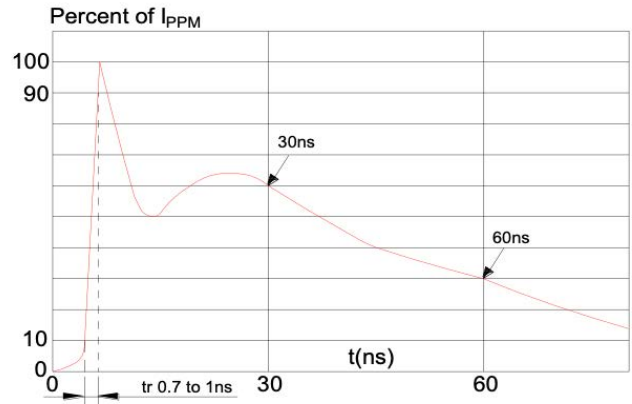
**Pulse waveform (8/20  $\mu$ s)**



**Pulse derating curve**



**ESD waveform (30 kV contact)**



Solder reflow profile

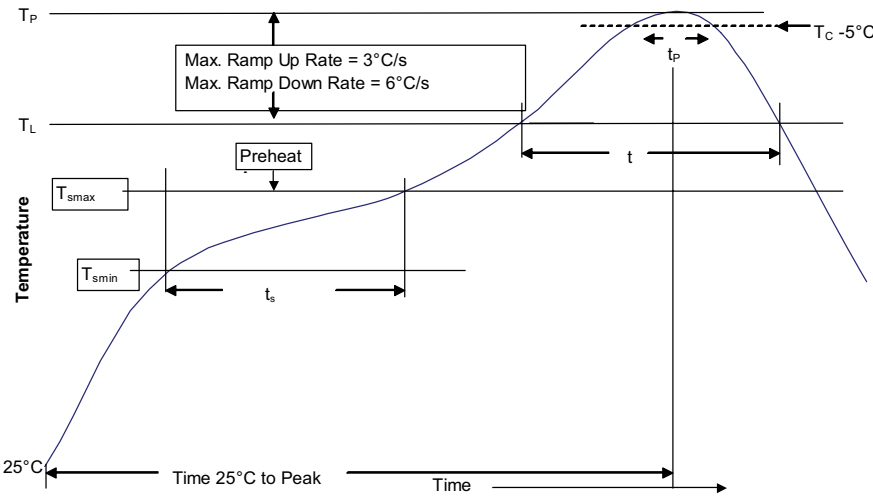


Table 1 - Standard SnPb solder (T<sub>C</sub>)

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T<sub>C</sub>)

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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	<ul style="list-style-type: none"> <li>Temperature min. (T<sub>smin</sub>)</li> <li>Temperature max. (T<sub>smax</sub>)</li> <li>Time (T<sub>smin</sub> to T<sub>smax</sub>) (t<sub>s</sub>)</li> </ul>	<ul style="list-style-type: none"> <li>100 °C</li> <li>150 °C</li> <li>60-120 seconds</li> </ul>
Ramp up rate T <sub>L</sub> to T <sub>p</sub>	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T <sub>L</sub> )	183 °C	217 °C
Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	60-150 seconds	60-150 seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )* within 5 °C of the specified classification temperature (T <sub>C</sub> )	20 seconds*	30 seconds*
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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