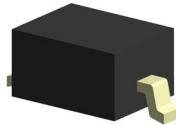


STS321XXXXXXAH

Automotive high surge TVS diode ESD suppressor



Product features

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

Applications

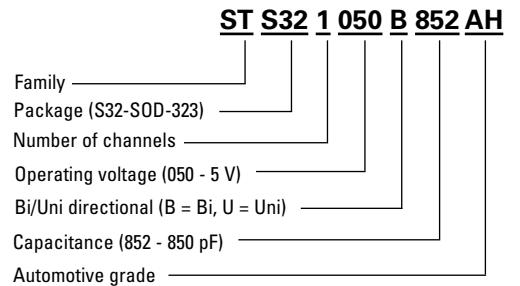
- Automotive chassis and safety systems
- Advanced driver assistance systems (ADAS)
- Communication and infotainment systems
- CAN-bus, LIN and Ethernet communication modules
- Network systems and body electronics
- Power train controls
- Automotive lighting

Environmental compliance and general specifications

- IEC61000-4-2 (ESD) ± 30 kV (air), ± 30 kV (contact)
- IEC61000-4-4 (EFT) 40 A (5/50 ns)
- IEC61000-4-5 (Lightning) up to 140 A (8/20 μ s)



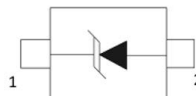
Ordering part number



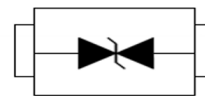
SOD-323



**Pin configuration
Uni-directional**



**Pin configuration
Bi-directional**



Product specifications

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

STS321045B502AH

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μ s waveform	-	2000	-	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	-	-	-	4.5	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	4.7	-	6.5	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 4.5$ V	-	-	± 1	I_R (μ A)
Clamping voltage	$I_{PP} = 100$ A, $t_p = 8/20$ μ s	-	12	14	V_C (V)
		$I_{PP} = 140$ A, $t_p = 8/20$ μ s	-	16	18
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	500	600	C_J (pF)

STS321050U852AH

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μ s waveform	-	2000	-	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	-	-	-	5	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	6	7	8	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 5$ V	-	-	1.0	I_R (μ A)
Clamping voltage	$I_{PP} = 50$ A, $t_p = 8/20$ μ s	-	11	13	V_C (V)
		$I_{PP} = 110$ A, $t_p = 8/20$ μ s	-	14	17
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	850	1050	C_J (pF)

STS321070U722AH

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μ s waveform	-	2000	-	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	-	-	-	7	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	7.5	8	9	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 7$ V	-	-	1	I_R (μ A)
Clamping voltage	$I_{PP} = 50$ A, $t_p = 8/20$ μ s	-	12	15	V_C (V)
	$I_{PP} = 100$ A, $t_p = 8/20$ μ s	-	15	18	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	720	900	C_J (pF)

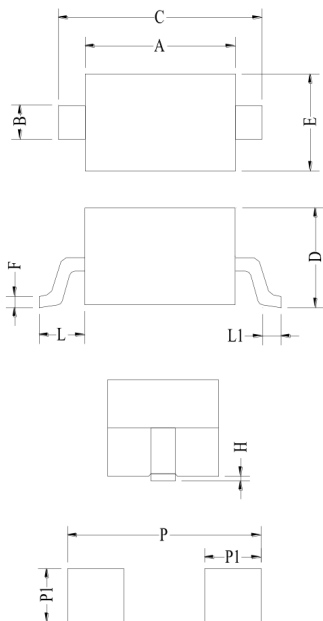
STS321120U372AH

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μ s waveform	-	2000	-	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	14.4	17	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 12$ V	-	-	1.0	I_R (μ A)
Clamping voltage	$I_{PP} = 20$ A, $t_p = 8/20$ μ s	-	16	19	V_C (V)
	$I_{PP} = 40$ A, $t_p = 8/20$ μ s	-	20	24	V_C (V)
	$I_{PP} = 70$ A, $t_p = 8/20$ μ s	-	22	28	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	370	450	C_J (pF)

STS321150U332AH

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Peak pulse power dissipation	8/20 μ s waveform	-	2000	-	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	17.2	20	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 12$ V	-	-	1.0	I_R (μ A)
Clamping voltage	$I_{PP} = 25$ A, $t_p = 8/20$ μ s	-	22	25	V_C (V)
	$I_{PP} = 50$ A, $t_p = 8/20$ μ s	-	26	28	V_C (V)
	$I_{PP} = 55$ A, $t_p = 8/20$ μ s	-	27	30	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	330	400	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	0.010	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	0.01	0.013	0.016
H	-	0.06	0.14	-	0.002	0.006
P	-	3.00	-	-	0.118	-
P1	-	0.80	-	-	0.031	-

Marking

STS321045B502AH



STS321050U852AH



STS321070U722AH



STS321120U372AH



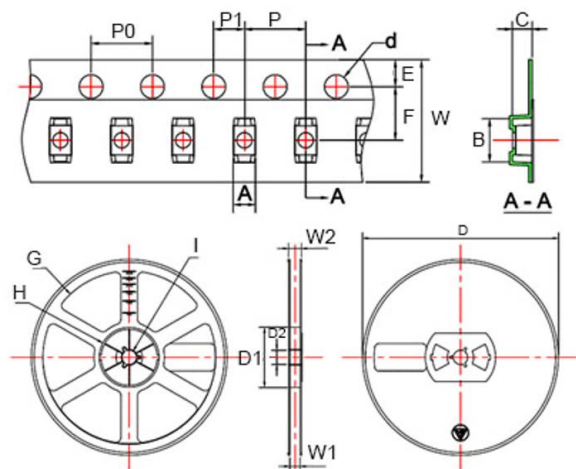
STS321150U332AH



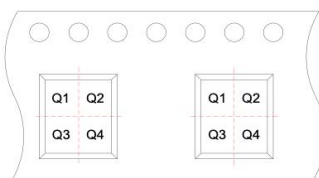
Packaging information mm/inches

Drawing not to scale.

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



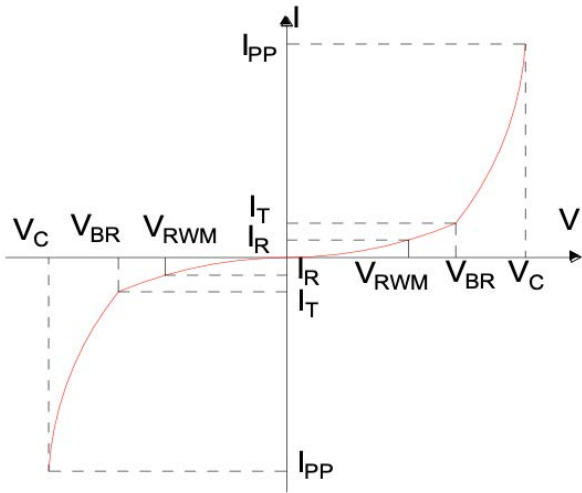
Dimension	Millimeter (typical)	Inches (typical)
A	1.46	0.057
B	2.9	0.114
C	1.25	0.049
d	1.50	0.059
E	1.75	0.069
F	3.5	0.138
P0	4	0.157
P	4	0.157
P1	2	0.079
W	8	0.315
D	178.0	7.008
D1	54.4	2.142
D2	13	0.512
G	R78.0	R3.071
H	R25.60	R1.008
I	R6.50	R0.256
W1	9.5	0.374
W2	12.3	0.484



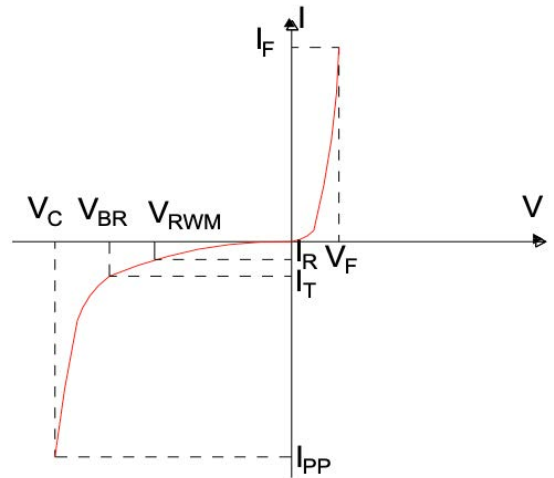
➔ User direction of feed

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

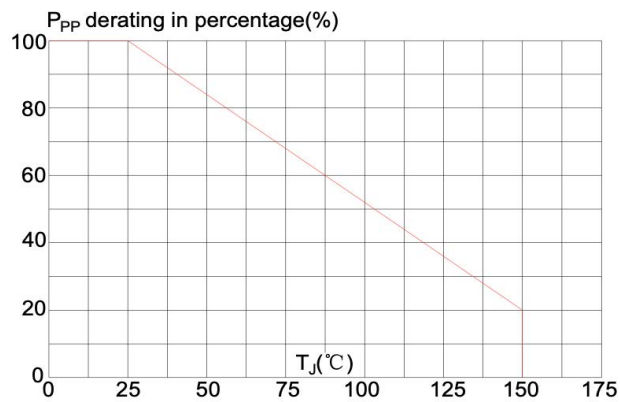
V- I curve characteristics (Bi-directional)



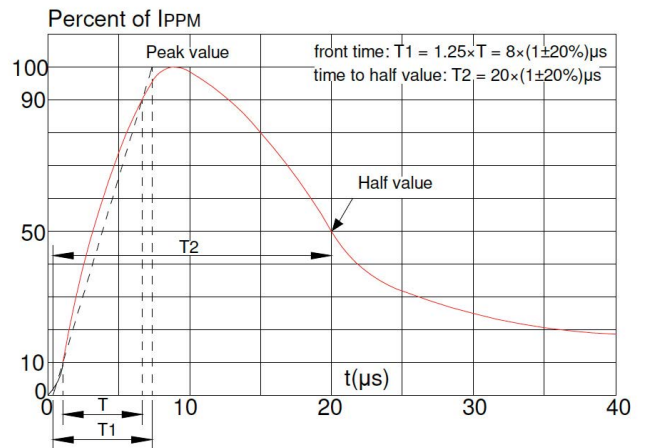
V- I curve characteristics (Uni-directional)



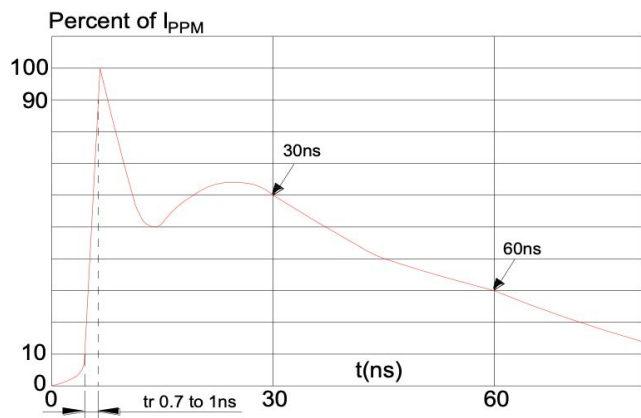
Pulse derating curve



Pulse waveform (8/20 μs)



ESD waveform (30 kV contact)



Solder reflow profile

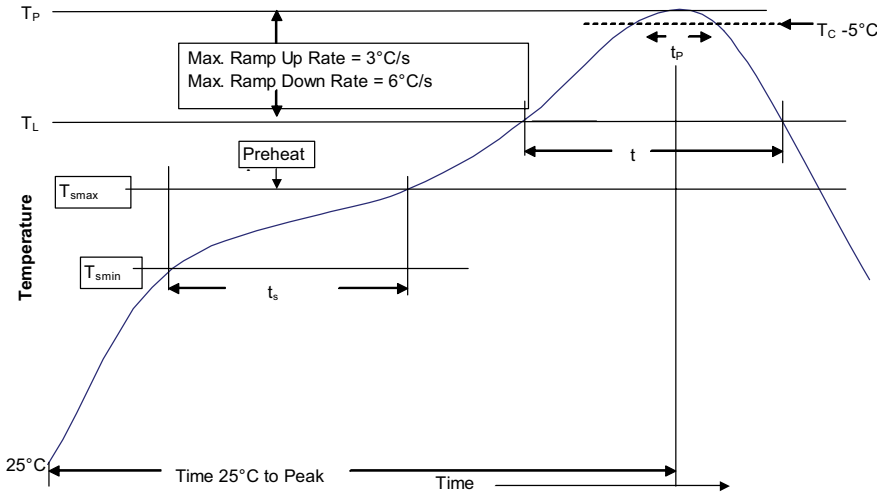


Table 1 - Standard SnPb solder (T_c)

Package thickness	Volume mm ³ <350	Volume mm ³ ≥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 mm ³ <350	Volume mm ³ 350 - 2000	Volume mm ³ >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"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) 	<ul style="list-style-type: none"> 100 °C 150 °C 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	<ul style="list-style-type: none"> 183 °C 60-150 seconds 	<ul style="list-style-type: none"> 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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

© 2023 Eaton
All Rights Reserved
Printed in USA
Publication No. ELX1280 BU-ELX22143
January 2023

Eaton is a registered trademark.
All other trademarks are property of their respective owners.

Follow us on social media to get the latest product and support information.

