

STS521XXXUXXX

TVS Diode ESD suppressor



Product features

- Compact package size 0.063" x 0.032" (1.6 mm x 0.8 mm)
- Protects one uni-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

Applications

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

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 15 A (8/20 μ s)



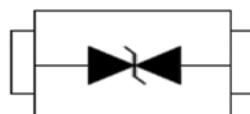
Ordering part number

	<u>ST</u>	<u>S52</u>	<u>1</u>	<u>033</u>	<u>U</u>	<u>112</u>
Family	_____	_____	_____	_____	_____	_____
Package (S52 = SOD-523)	_____	_____	_____	_____	_____	_____
Number of channels (1=1)	_____	_____	_____	_____	_____	_____
Operating voltage (033 = 3.3 V)	_____	_____	_____	_____	_____	_____
Bi/Uni directional (U=Uni)	_____	_____	_____	_____	_____	_____
Capacitance (112 = 110 pF)	_____	_____	_____	_____	_____	_____

Pin out/functional diagram



SOD-523



Pin Configuration

Absolute maximum ratings

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

Parameter	Symbol	Value						Unit
		STS521033 U112	STS521050 U751	STS521070 U701	STS521120 U351	STS521240 U161	STS521360 U201	
Peak pulse power dissipation on 8/20 μs waveform	P_{PP}	250	150	120	120	200	120	W
ESD per IEC 61000-4-2 (Air)	V_{ESD}	+/-20	+/-30	+/-30	+/-15	+/-30	+/-25	kV
ESD per IEC 61000-4-2 (Contact)		+/-15	+/-30	+/-30	+/-8	+/-30	+/-25	
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)

STS521033U112

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	3.3	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	4.0	-	-	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 3.3$ V	-	1	5	I_R (μA)
Clamping voltage	$I_{PP} = 15$ A, $t_p = 8/20$ μs	-	15	-	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	110	-	C_J (pF)

STS521050U751

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	5.0	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	6.0	-	8.0	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 5.0$ V	-	0.01	0.1	I_R (μA)
Forward voltage	$I_F = 15$ mA	-	0.8	1.1	V_F (V)
Peak pulse current	$t_p = 8/20$ μs	-	-	10	I_{PP} (A)
Clamping voltage	$I_{PP} = 1$ A, $t_p = 8/20$ μs	-	8.5	10	V_C (V)
	$I_{PP} = 10$ A, $t_p = 8/20$ μs	-	12	15	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	75	100	C_J (pF)

STS521070U701

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	7.0	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	7.5	8.5	9.5	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 7$ V	-	-	0.1	I_R (μA)
Clamping voltage	$I_{pp} = 1$ A, $t_p = 8/20$ μs	-	-	13	V_c (V)
	$I_{pp} = 9$ A, $t_p = 8/20$ μs	-	-	16	V_c (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	70	85	C_j (pF)

STS521120U351

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	12.0	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	-	16	18	V_c (V)
	$I_{pp} = 6$ A, $t_p = 8/20$ μs	-	21	25	V_c (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	35	40	C_j (pF)

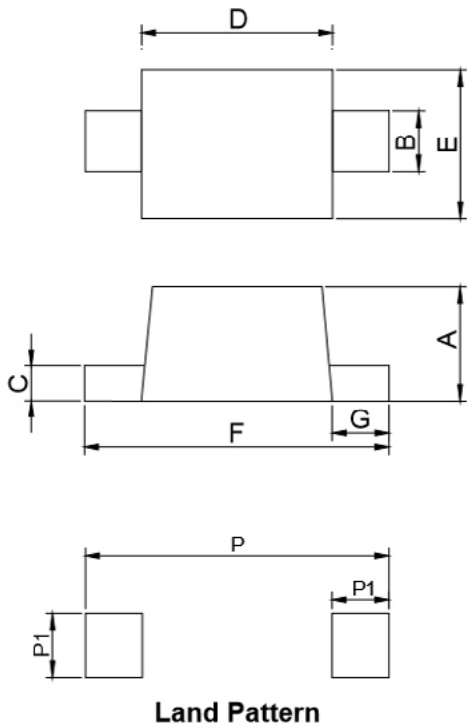
STS521240U161

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	-	-	0.1	I_R (μA)
Clamping voltage	$I_{pp} = 1$ A, $t_p = 8/20$ μs	-	35	40	V_c (V)
	$I_{pp} = 4$ A, $t_p = 8/20$ μs	-	42	48	V_c (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	16	25	C_j (pF)

STS521360U201

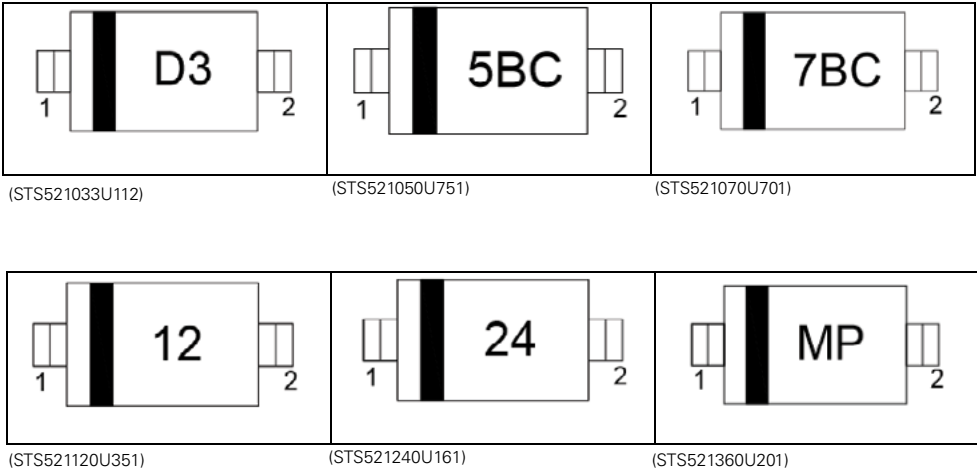
Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	36	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	40	-	-	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 36$ V	-	-	5	I_R (μA)
Clamping voltage	$I_{pp} = 1$ A, $t_p = 8/20$ μs	-	-	55	V_c (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	-	20	C_j (pF)

Mechanical parameters, pad layout- mm/inches



Dimension	Millimeters		Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.50	0.70	0.020	0.028
B	0.25	0.35	0.010	0.014
C	0.07	0.20	0.0028	0.0079
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
F	1.50	1.70	0.059	0.067
G	0.15	0.25	0.006	0.010
P1	0.40		0.016	
P	1.80		0.072	

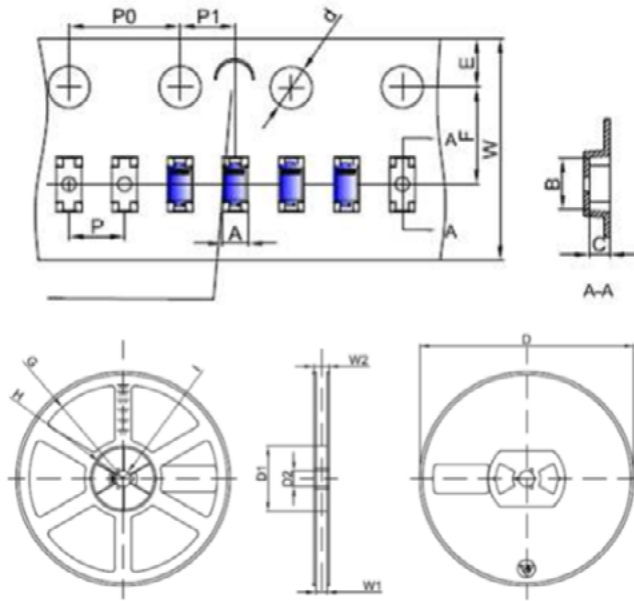
Part marking



Packaging information mm/inches

Drawing not to scale.

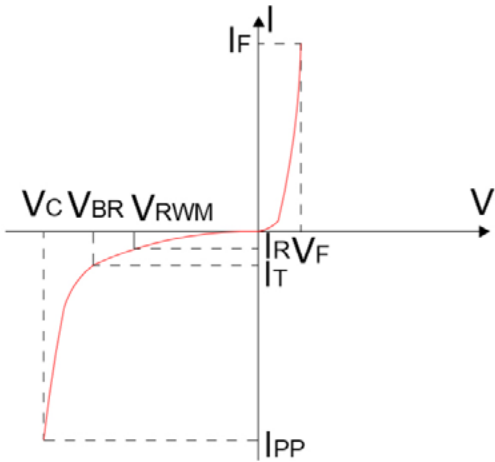
Supplied in tape and reel packaging, 5,000 parts per 7" diameter reel (EIA-481 compliant)



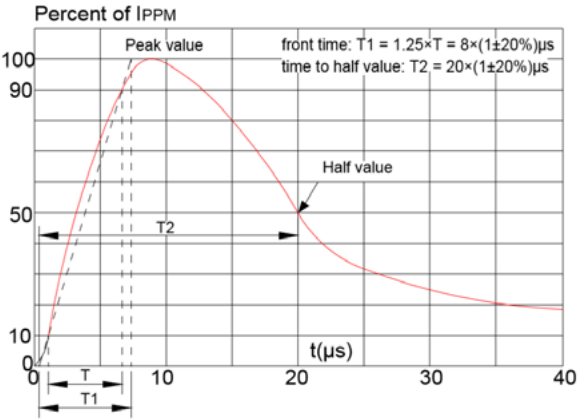
Symbol	Millimeter	Inches
	Typ.	Typ.
A	0.90	0.035
B	1.94	0.076
C	0.73	0.029
d	Φ1.50	Φ0.059
E	1.75	0.069
F	3.50	0.138
P0	4.00	0.157
P	2.00	0.079
P1	2.00	0.079
W	8.00	0.315
D	Φ178	Φ7.008
D1	54.40	2.142
D2	13.00	0.512
G	R78.00	R3.071
H	R25.60	R1.008
I	R6.50	R0.256
W1	9.50	0.374
W2	12.30	0.484

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

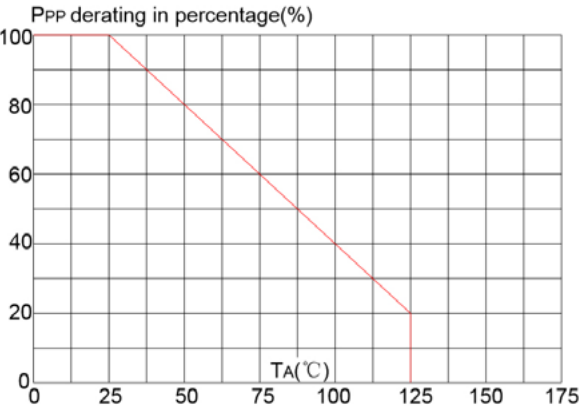
V- I curve characteristics (Uni-directional)



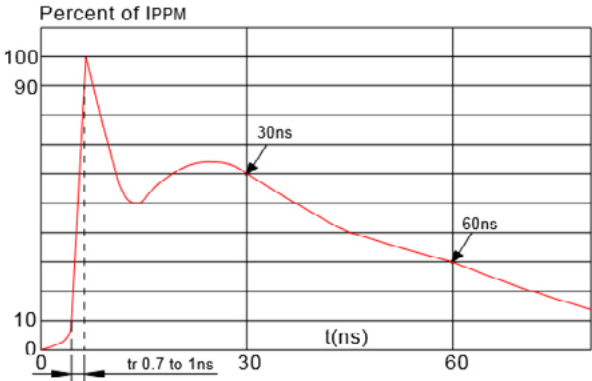
Pulse waveform (8/20 μ s)



Pulse derating curve



ESD waveform



Solder reflow profile

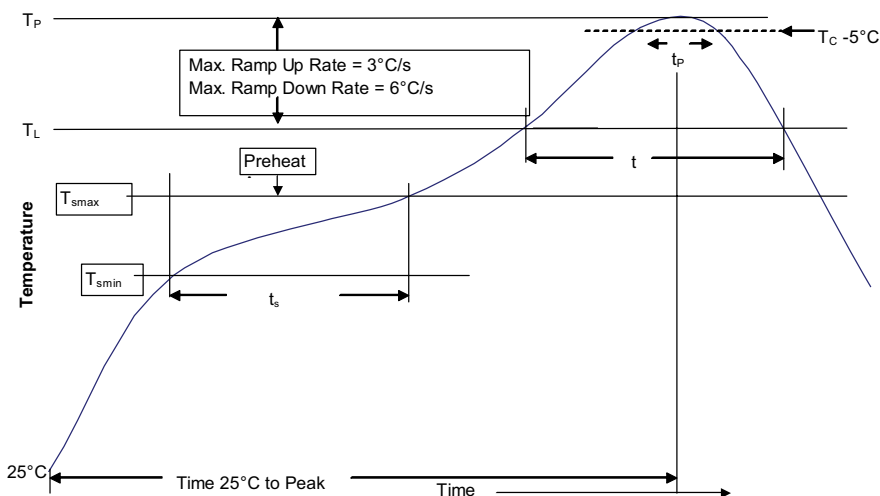


Table 1 - Standard SnPb solder (T_C)

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		
• 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)	183 °C	217 °C
Time (t_L) maintained above T_L	60-150 seconds	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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