

STN161XXXUXXX

TVS Diode ESD suppressor



Product features

- Protects one I/O or power line
- Low clamping voltage
- Low leakage current
- Meets moisture sensitivity level (MSL) 3
- Molding compound flammability rating: UL 94V-0
- Termination finish: Tin

Applications

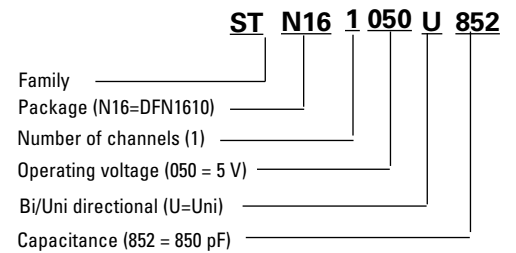
- Cellular phones
- Wearables
- Portable electronics
- Laptop/notebook computers
- Digital cameras

Environmental compliance and general specifications

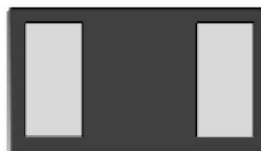
- IEC61000-4-2 (ESD)
 - Up to ±30 kV (air)
 - Up to ±30 kV (contact)
- IEC61000-4-5 (Lightning) Up to 110 A (8/20 μs)



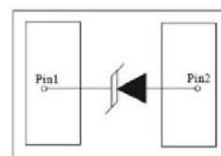
Ordering part number



Pin out/functional diagram



DFN1610-2L



PIN Configuration

Absolute maximum ratings

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

Parameter	Symbol	Value	Unit
STN161XXXUXXX			
Peak pulse power dissipation on 8/20 μ s waveform	P_{pp}	2000	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)

STN161050U852

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	5.0	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	6	7	8	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 5$ V	-	-	1	I_R (μ A)
Peak pulse current	$t_p = 8/20$ μ s	-	-	110	I_{pp} (A)
Clamping voltage	$I_{pp} = 50$ A, $t_p = 8/20$ μ s	-	11	14	V_C (V)
	$I_{pp} = 80$ A, $t_p = 8/20$ μ s	-	13	15	V_C (V)
	$I_{pp} = 110$ A, $t_p = 8/20$ μ s	-	14	17	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	850	1050	C_J (pF)

STN161070U722

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	9	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 7$ V	-	-	1	I_R (μ A)
Forward voltage	$I_F = 10$ mA	0.6	-	1	V_F
Peak pulse current	$t_p = 8/20$ μ s	-	-	100	I_{pp} (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)

STN161090U602

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	9.0	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	9.5	10.5	12.5	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 9$ V	-	-	1	I_R (μ A)
Forward voltage	$I_T = 10$ mA	0.6	-	1.0	V_F
Peak pulse current	$t_p = 8/20$ μ s	-	-	90	I_{pp} (A)
Clamping voltage	$I_{pp} = 40$ A, $t_p = 8/20$ μ s	-	14	17	V_C (V)
	$I_{pp} = 50$ A, $t_p = 8/20$ μ s	-	15	19	V_C (V)
	$I_{pp} = 90$ A, $t_p = 8/20$ μ s	-	18	22	V_C (V)
	$I_{pp} = 90$ A, $t_p = 8/20$ μ s	-	18	22	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	600	750	C_J (pF)

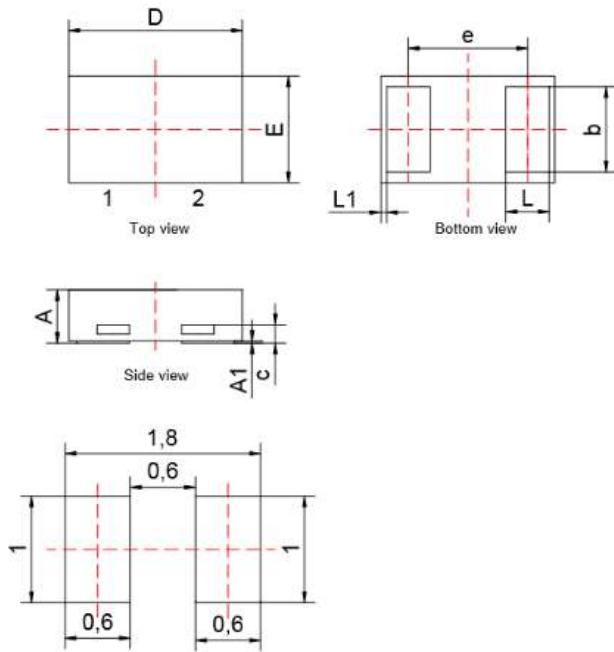
STN161120U372

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	12	V_{RWM} (V)
Reverse breakdown voltage	$I_T = 1$ mA	13.3	14.4	17	V_{BR} (V)
Reverse leakage current	$V_{RWM} = 12$ V	-	-	1	I_R (μ A)
Peak pulse current	$t_p = 8/20$ μ s	-	-	70	I_{pp} (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)
	$I_{pp} = 70$ 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)

STN161150U332

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
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	I_R (μ A)
Peak pulse current	$t_p = 8/20$ μ s	-	-	55	I_{pp} (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)
	$I_{pp} = 55$ A, $t_p = 8/20$ μ s	-	27	30	V_C (V)
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	330	450	C_J (pF)

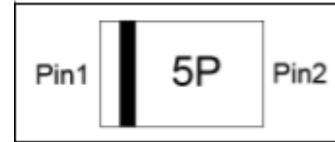
Mechanical parameters, pad layout- mm



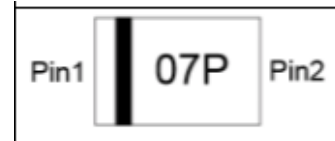
Recommended Soldering Footprint

Dimension	Minimum	Typical	Maximum
A	0.45	0.50	0.55
A1	0	0.02	0.05
b	0.85	0.90	0.95
c	0.08	0.12	0.18
D	1.55	1.60	1.65
e		1.1 BSC	
E	0.95	1.00	1.05
L	0.35	0.40	0.45
L1		0.06 BSC	

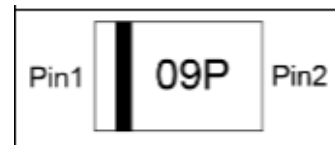
Part marking



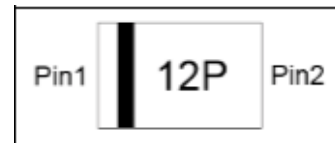
(STN161050U852)



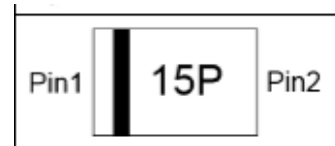
(STN161070U722)



(STN161090U602)



(STN161120U372)

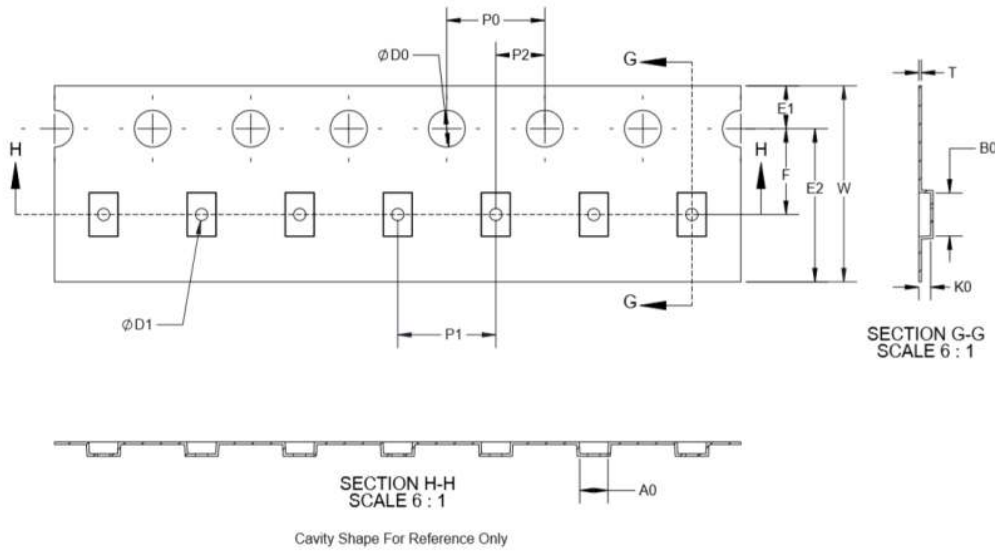


(STN161150U332)

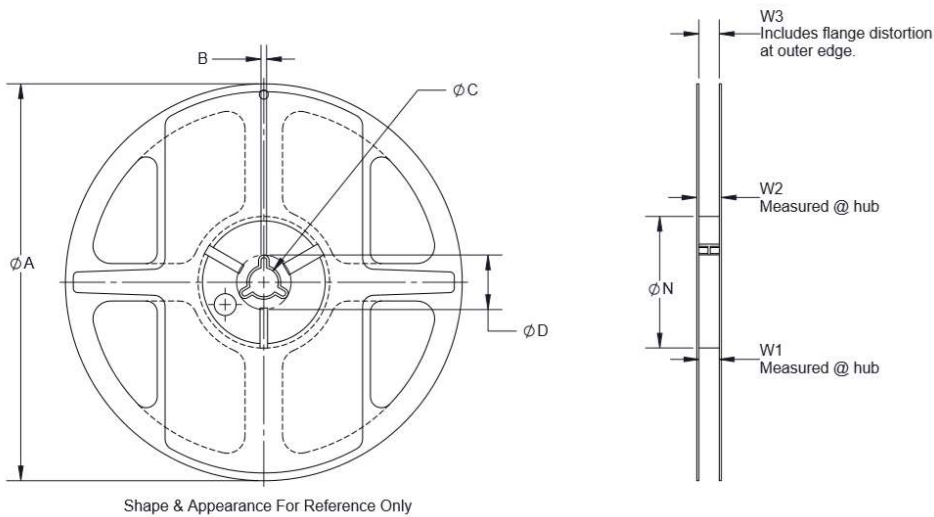
Packaging information mm/inches

Drawing not to scale.

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



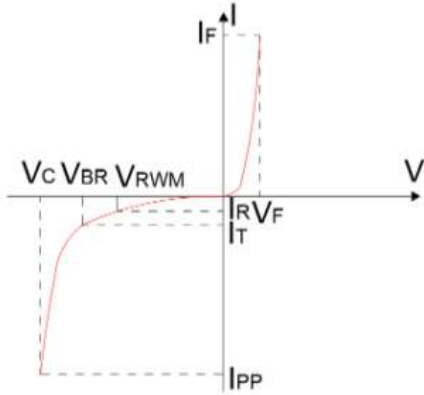
W	8 +0.2/-0.1
F	3.5±0.05
E1	1.75±0.10
E2	N/A
P0	4±0.10
P1	4±0.10
P2	2±0.05
ØD0	1.55±0.10
ØD1	0.6 +0.10/-0
A0	1.15±0.05
B0	1.75±0.05
K0	0.63±0.05
T	0.2±0.03



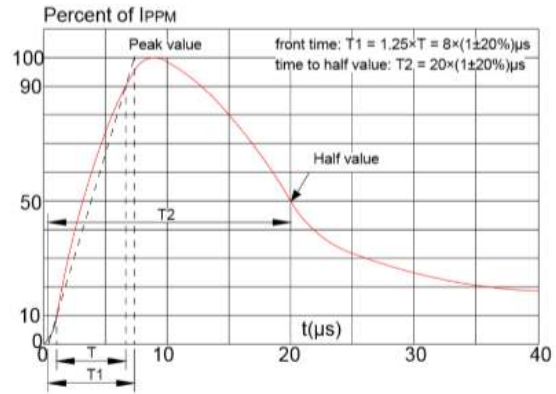
A	178
B	N/A
C	13
D	N/A
N	54.40
W1	9.50
W2	12.30
W3	N/A

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

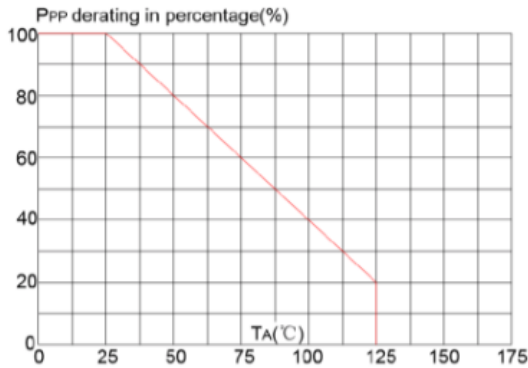
V- I curve characteristics (uni-directional)



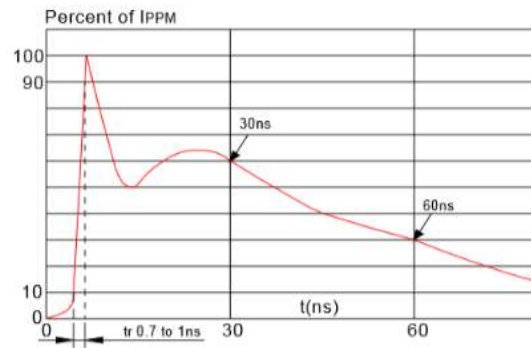
Pulse waveform (8/20 μs)



Pulse derating curve



ESD waveform



Solder reflow profile

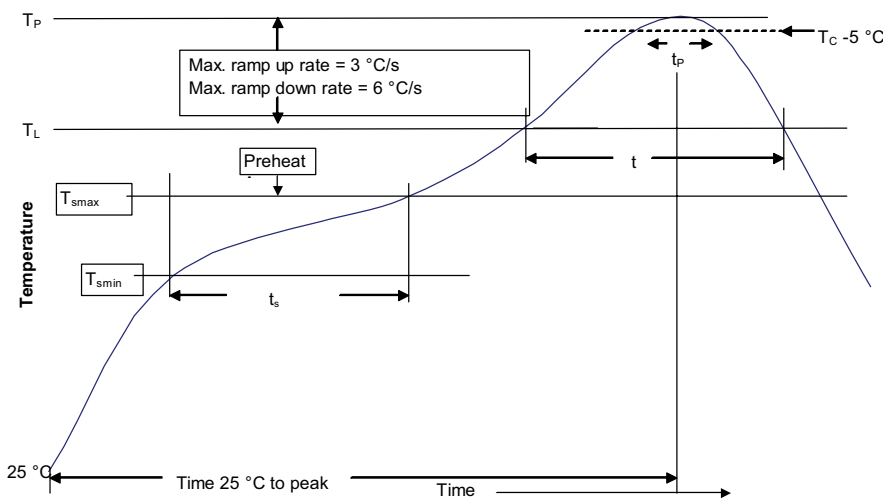


Table 1 - Standard SnPb solder (T_C)

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

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Printed in USA
Publication No. 11134
March 2021

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