

# STN061050B300

## TVS Diode ESD suppressor



### Product features

- Protects one bi-directional I/O line
- Low clamping voltage
- Low operating voltage: 5.0 V
- Low leakage current
- Ultra-low capacitance
- Meets moisture sensitivity level (MSL) 3
- Molding compound flammability rating: UL 94V-0
- Termination finish: Ni/Pd/Au

### Applications

- USB ports
- Display port
- Wireless communications
- Digital visual interface (DVI)
- Cellular handsets & accessories

### Environmental compliance and general specifications

- IEC61000-4-2 (ESD)
  - $\pm 30$  kV (air)
  - $\pm 30$  kV (contact)
- IEC61000-4-5 (Lightning) 3.5 A (8/20  $\mu$ s)



### Ordering part number

	ST	N06	1	050	B	300
Family						
Package (N06=DFN0603)						
Number of channels						
Operating voltage (050=5 V)						
Bi/Uni directional (B=Bi)						
Capacitance (300= 3 pF)						

### Pin out/functional diagram



DFN0603-2L



## Absolute maximum ratings

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

### STN061050B300

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 8/20 μs waveform	$P_{PP}$	41	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)

### STN061050B300

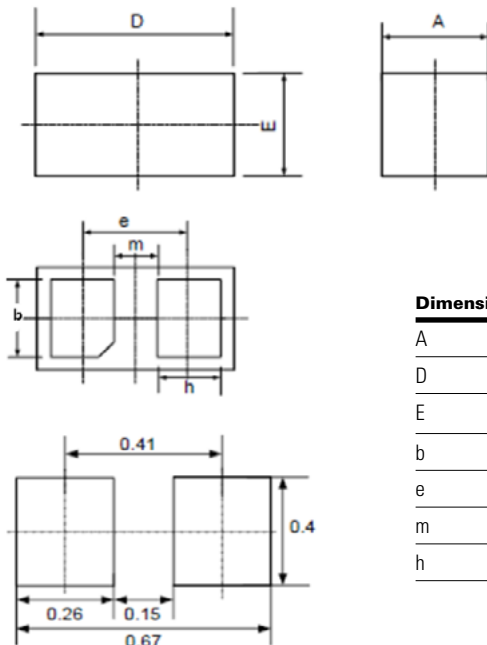
Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	5.0	$V_{RWM}$ (V)
Reverse breakdown voltage	$I_T = 1$ mA	5.3	-	-	$V_{BR}$ (V)
Reverse leakage current	$V_{RWM} = 3.3$ V	-	-	0.1	$I_R$ (μA)
Holding voltage	$t_p = 8/20$ μs	5.3	-	-	$V_H$ (V)
Clamping voltage	$I_{PP} = 16$ A, $t_p = 100$ ns	-	15	-	$V_C$ (V)*
	$V_{ESD} = 8$ kV	-	15	-	$V_C$ (V)**
	$I_{PP} = 1$ A, $t_p = 8/20$ μs	-	-	8.5	$V_C$ (V)***
	$I_{PP} = 7$ A, $t_p = 8/20$ μs	-	-	12	$V_C$ (V)***
Dynamic resistance	$t_p = 100$ ns	-	0.35	-	$R_{DYN}$ (Ω)*
Junction capacitance	$V_{RWM} = 0$ V, $f = 1$ MHz	-	3.0	4.0	$C_J$ (pF)
	$V_{RWM} = 2.5$ V, $f = 1$ MHz	-	2.4	3.0	$C_J$ (pF)

\* TLP parameter:  $Z_0 = 50$  Ω,  $t_P = 100$  ns,  $t_r = 2$  ns, averaging window from 60 ns to 80 ns.  $R_{DYN}$  is calculated from 4 A to 16 A.

\*\* Contact discharge mode, according to IEC61000-4-2.

\*\*\* Non-repetitive current pulse, according to IEC61000-4-5.

## Mechanical parameters, pad layout- mm



Land Pattern

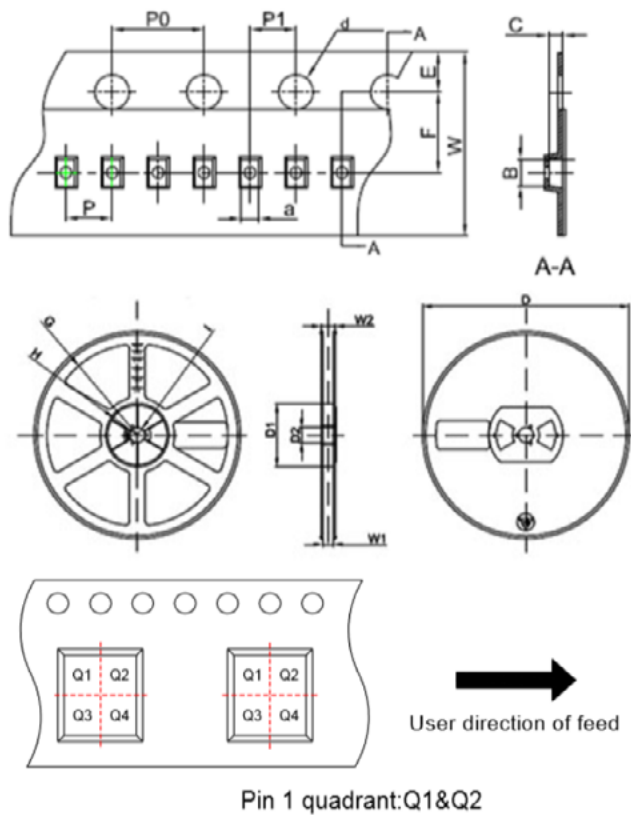
Dimension	Minimum	Maximum
A	0.28	0.32
D	0.55	0.65
E	0.25	0.35
b	0.20	0.30
e	0.350	
m	0.165	
h	0.14	0.24

## Part marking



Packaging information- mm/inches

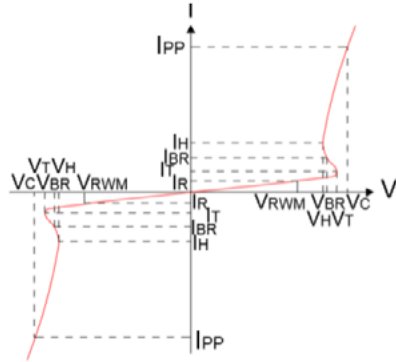
Drawing not to scale.  
Supplied in tape and reel packaging, 10,000 parts per 7" diameter reel (EIA-481 compliant)



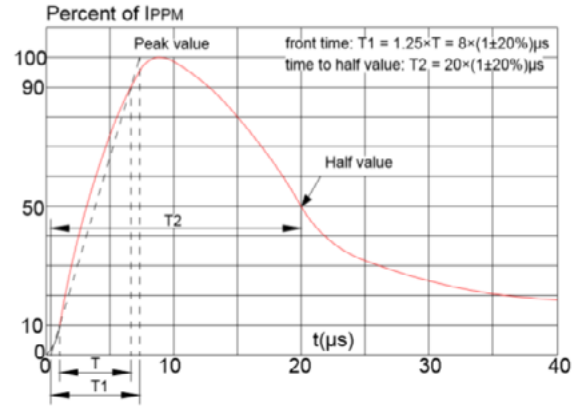
Symbol	Millimeters	Inches
	Typ.	Typ.
a	0.41	0.016
B	0.70	0.028
C	0.38	0.015
d	Φ1.50	Φ0.059
E	1.75	0.069
F	3.50	0.138
P0	4.00	0.157
P	2.00	0.079
P1	2.00	0.079
W	8.00	0.315
D	Φ178	Φ7.008
D1	54.40	2.142
D2	13.00	0.512
G	R78.00	R3.071
H	R25.60	R1.008
I	R6.50	R0.256
W1	9.50	0.374
W2	12.30	0.484

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

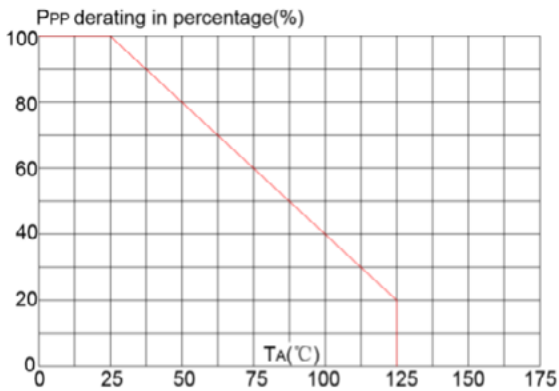
**V- I curve characteristics (Bi-directional)**



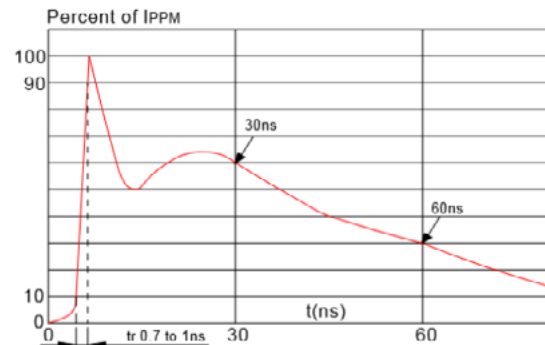
**Pulse waveform (8/20  $\mu$ s)**



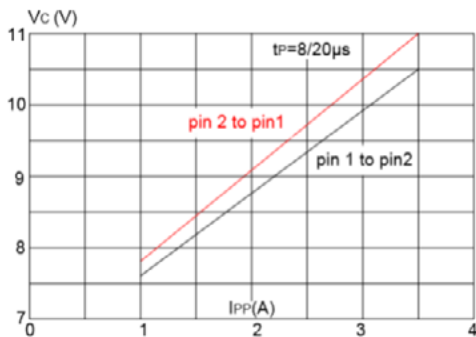
**Pulse derating curve**



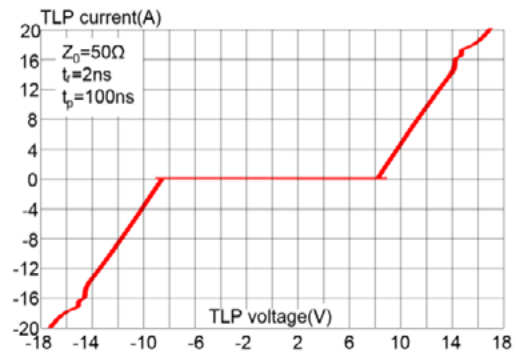
**ESD waveform**



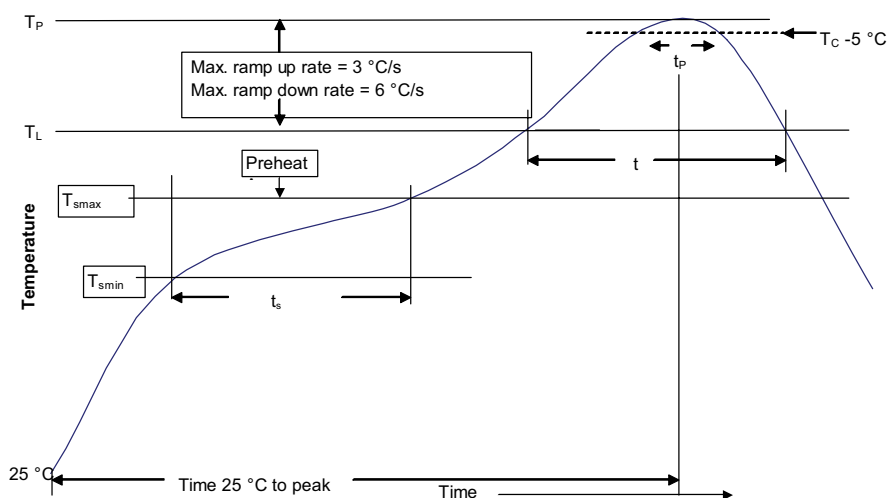
**Clamping voltage vs. peak pulse current**



**TLP Measurement**



## Solder reflow profile



**Table 1 - Standard SnPb solder ( $T_C$ )**

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 ( $T_C$ )**

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		
• 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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Publication No. 11137 BU-MC20119  
September 2020

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