

# STN204033BL60

## TVS Diode array ESD suppressor



### Product features

- Protects two line pairs
- Low operating voltage: 3.3 V
- Low capacitance: 1.0 pF maximum
- 350 W peak pulse power per line (tp=8/20 μs)
- Low operating and clamping voltage
- Low leakage current
- High ESD withstand in compact array footprint
- Meets moisture sensitivity level (MSL) 3
- Molding compound flammability rating: UL 94V-0
- Termination finish: Ni/Pd/Au

### Applications

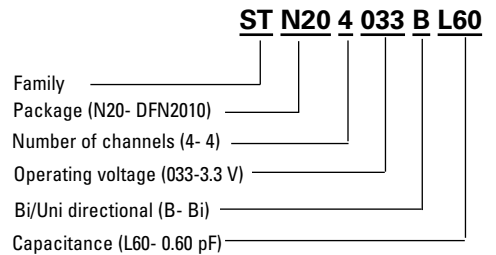
- 10/100/1000 ethernet
- Integrated magnetics /RJ-45 connectors
- LAN/WAN equipment
- Security cameras
- Industrial controls
- Notebooks & desktop computers

### Environmental compliance and general specifications

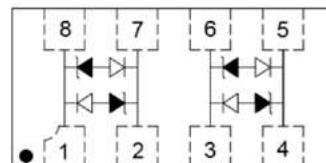
- IEC61000-4-2 (ESD)
  - ±30 kV (air)
  - ±30 kV (contact)
- IEC61000-4-5 (Lightning) 20 A (8/20 μs)



### Ordering part number



### Pin out/functional diagram



### Absolute maximum ratings

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

#### STN204033BL60

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 8/20 $\mu$ s waveform	P <sub>pp</sub>	350	W
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	+/-30	kV
ESD per IEC 61000-4-2 (Contact)		+/-30	
Lead soldering temperature	T <sub>L</sub>	+260 (10 seconds)	°C
Operating junction temperature range	T <sub>J</sub>	-55 to +125	°C
Storage temperature range	T <sub>STG</sub>	-55 to +150	°C

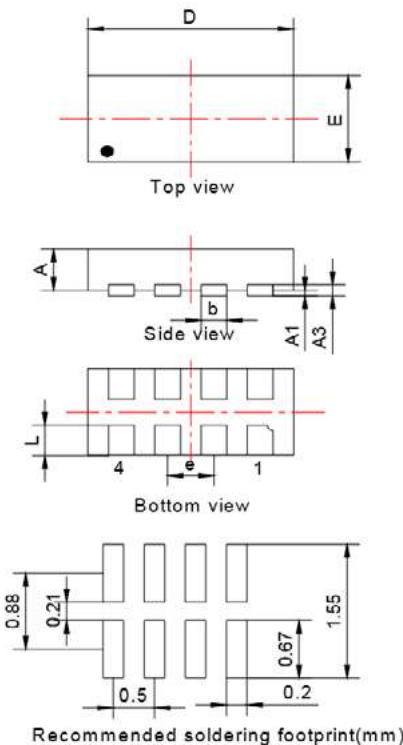
### Electrical characteristics

(+25 °C)

#### STN204033BL60

Parameter	Test condition	Minimum	Typical	Maximum	Symbol (Units)
Reverse working voltage	-	-	-	3.3	V <sub>RWM</sub> (V)
Reverse breakdown voltage	I <sub>T</sub> = 1 mA	3.5	4.2	-	V <sub>BR</sub> (V)
Reverse leakage current	V <sub>RWM</sub> = 3.3 V	-	0.01	0.1	I <sub>R</sub> ( $\mu$ A)
Clamping voltage	I <sub>PP</sub> = 1 A, t <sub>p</sub> = 8/20 $\mu$ s	-	6	7	V <sub>C</sub> (V)
	I <sub>PP</sub> = 12 A, t <sub>p</sub> = 8/20 $\mu$ s	-	11	15	V <sub>C</sub> (V)
	I <sub>PP</sub> = 20 A, t <sub>p</sub> = 8/20 $\mu$ s	-	15	18	V <sub>C</sub> (V)
Junction capacitance	V <sub>RWM</sub> = 0 V, f = 1 MHz Pins 1, 8 to 2, 7 and pins 3, 6 to 4, 5	-	0.6	1.0	C <sub>J</sub> (pF)

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



Dimension	Millimeter		Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.46	0.51	0.018	0.020
A1	0.00	0.05	0.000	0.002
A3	0.127 typ.		0.005 typ.	
b	0.20	0.30	0.008	0.012
D	1.90	2.10	0.075	0.083
E	0.90	1.10	0.035	0.043
e	0.50 typ.		0.020 typ.	
L	0.30	0.40	0.012	0.016

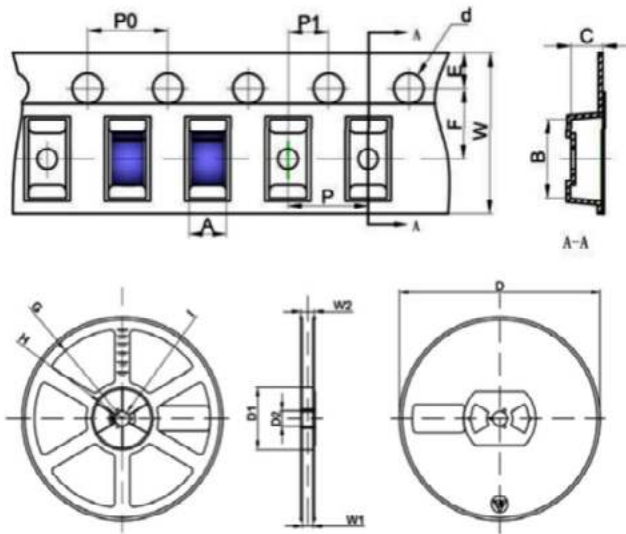
### Part marking



**Packaging information- mm/inches**

Drawing not to scale.

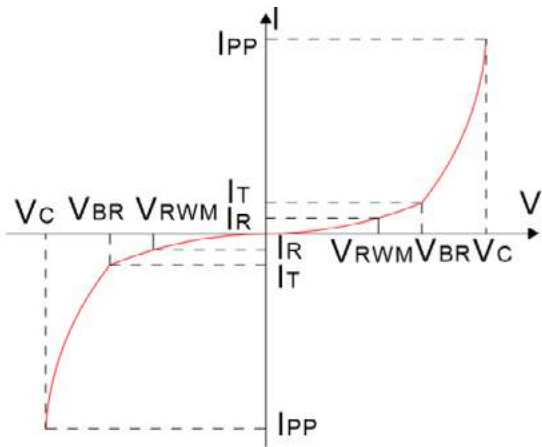
Supplied in tape and reel packaging, 3,000 parts per 7" EIA-481 diameter reel



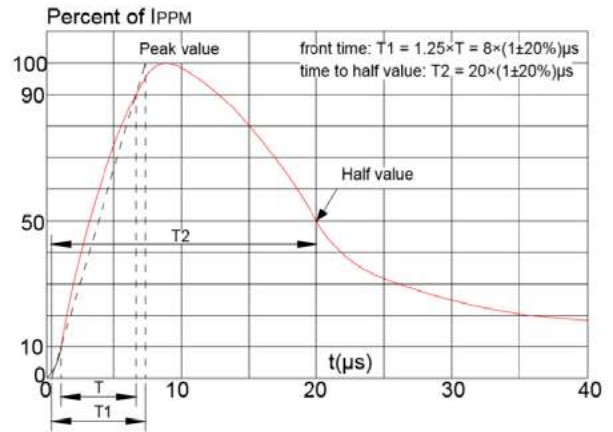
Symbol	Millimeters	Inches
A	1.12±0.05	0.044±0.002
B	2.12±0.05	0.083±0.002
C	0.46±0.05	0.018±0.002
d	$\Phi 1.50^{+0.10}_{-0.00}$	$\Phi 0.059^{+0.004}_{-0.000}$
D	$\Phi 178 \pm 2$	7.008±0.079
D1	54.40±1	2.142±0.039
D2	13.00±1	0.512±0.039
E	1.75±0.1	0.069±0.004
F	3.50±0.05	0.138±0.002
G	R78.00±1	3.071±0.039
H	R25.60±1	1.008±0.039
I	R6.50±1	0.256±0.039
P0	4.00±0.1	0.157±0.004
P	2.00±0.05	0.079±0.002
P1	2.00±0.05	0.079±0.002
W	$8.00^{+0.30}_{-0.00}$	$0.315^{+0.011}_{-0.004}$
W1	9.50±1	0.374±0.039
W2	12.30±1	0.484±0.039

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

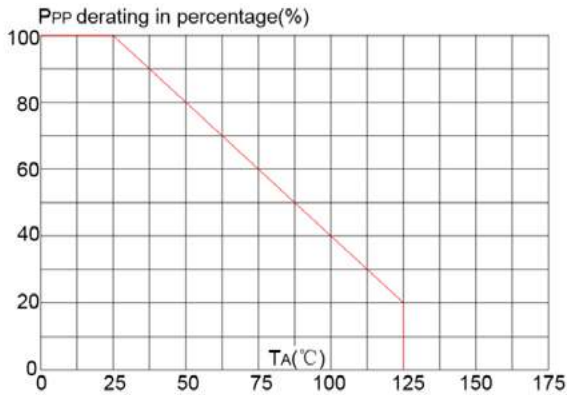
**V- I curve characteristics (Bi-directional)**



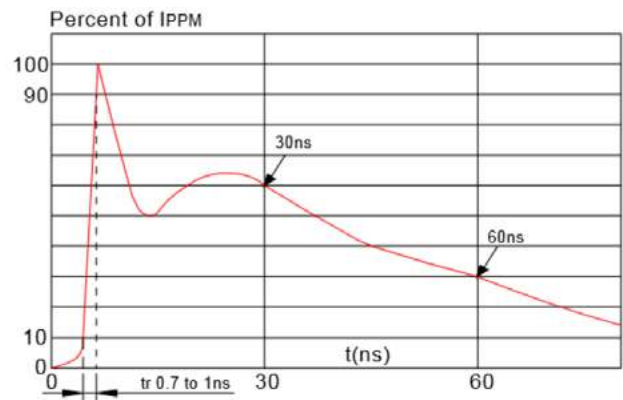
**Pulse waveform (8/20  $\mu$ s)**



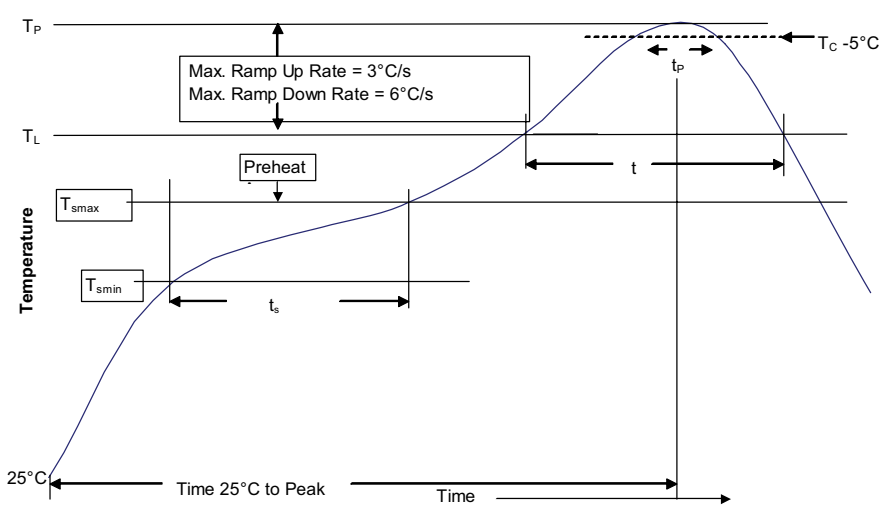
**Pulse derating curve**



**ESD waveform**



**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		
• Temperature min. (T <sub>smin</sub> )	100 °C	150 °C
• Temperature max. (T <sub>smax</sub> )	150 °C	200 °C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 seconds	60-120 seconds
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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