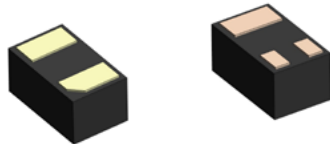


STN10XXXXLXX

TVS Diode ESD suppressor



Product features

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

Applications

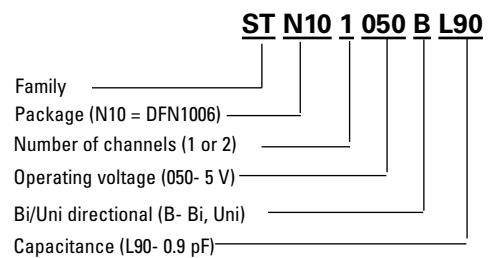
- USB ports
- Display port
- Wireless communications
- Digital visual interface (DVI)
- Cellular handsets & accessories
- Microcontroller input protection

Environmental compliance and general specifications

- IEC61000-4-2 (ESD)
 - ±15 kV (air)
 - ±8 kV (contact)
- IEC61000-4-5 (Lightning) 1 A (8/20 μs)



Ordering part number

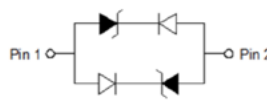


Pin out/functional diagram

STN101050BL90



DFN1006-2L

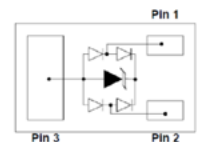


Pin Configuration

STN102050UL80



DFN1006-3L



Absolute maximum ratings

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

| Parameter | Symbol | Value | | Unit |
|--|-----------|-------------------|-------------------|------|
| | | STN101050BL90 | STN102050UL80 | |
| Peak pulse power dissipation on 8/20 μs waveform | P_{pp} | 30 | 60 | W |
| ESD per IEC 61000-4-2 (Air) | V_{ESD} | +/-15 | +/-15 | kV |
| ESD per IEC 61000-4-2 (Contact) | | +/-8 | +/-8 | |
| Lead soldering temperature | T_L | +260 (10 seconds) | +260 (10 seconds) | °C |
| Operating junction temperature range | T_J | -55 to +125 | -55 to +125 | °C |
| Storage temperature range | T_{STG} | -55 to +150 | -55 to +150 | °C |

Electrical characteristics

(+25 °C)

STN101050BL90

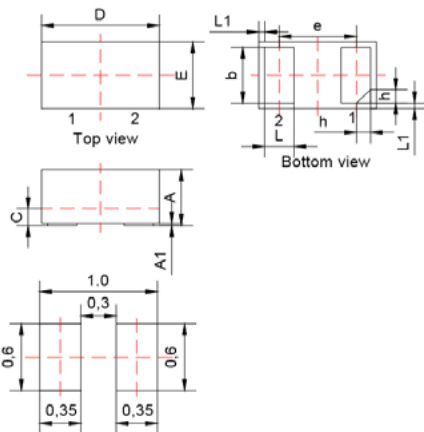
| Parameter | Test condition | Minimum | Typical | Maximum | Symbol (Units) |
|---------------------------|------------------------------------|---------|---------|---------|----------------|
| Reverse working voltage | - | - | - | 5.0 | V_{RWM} (V) |
| Reverse breakdown voltage | $I_T = 1$ mA | 6.0 | - | - | V_{BR} (V) |
| Reverse leakage current | $V_{RWM} = 5$ V | - | - | 1.0 | I_R (μA) |
| Peak pulse current | $t_p = 8/20$ μs | - | - | 1 | I_{pp} (A) |
| Clamping voltage | $I_{pp} = 1$ A, $t_p = 8/20$ μs | - | 8.5 | 12.5 | V_C (V) |
| Junction capacitance | $V_{RWM} = 0$ V, $f = 1$ MHz | - | 0.9 | 1.5 | C_J (pF) |

STN102050UL80

| 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 | - | - | V_{BR} (V) |
| Reverse leakage current | $V_{RWM} = 5$ V | - | - | 1.0 | I_R (μA) |
| Peak pulse current | $t_p = 8/20$ μs | - | - | 5 | I_{pp} (A) |
| Clamping voltage | $I_{pp} = 1$ A, $t_p = 8/20$ μs | - | 8.5 | 12 | V_C (V) |
| Junction capacitance | $V_{RWM} = 0$ V, $f = 1$ MHz Between I/O | - | - | 0.8 | C_J (pF) |

Mechanical parameters, pad layout- mm

STN101050BL90



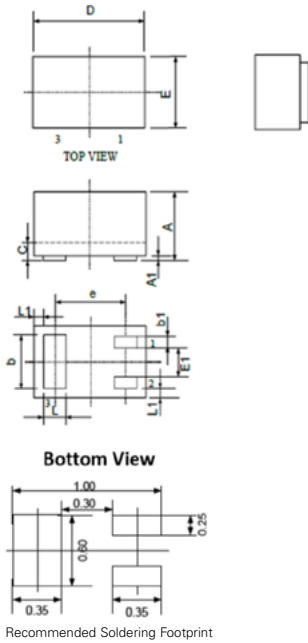
Recommended Soldering Footprint

| Dimension | Minimum | Typical | Maximum |
|-----------|---------|----------|---------|
| A | 0.45 | 0.50 | 0.55 |
| A1 | 0 | 0.02 | 0.05 |
| b | 0.45 | 0.50 | 0.55 |
| C | 0.12 | 0.15 | 0.18 |
| D | 0.95 | 1.00 | 1.05 |
| e | | 0.65 BSC | |
| E | 0.55 | 0.60 | 0.65 |
| L | 0.20 | 0.25 | 0.30 |
| L1 | | 0.05 REF | |
| h | 0.07 | 0.12 | 0.17 |

Part marking



Mechanical parameters, pad layout- mm
STN102050UL80



| Dimension | Minimum | Typical | Maximum |
|-----------|---------|----------|---------|
| A | 0.41 | 0.45 | 0.50 |
| A1 | 0 | 0.02 | 0.05 |
| b | 0.45 | 0.50 | 0.55 |
| b1 | 0.10 | 0.15 | 0.20 |
| C | 0.12 | 0.15 | 0.18 |
| D | 0.95 | 1.00 | 1.05 |
| e | | 0.65 SBC | |
| E | 0.55 | 0.60 | 0.65 |
| E1 | 0.15 | 0.20 | 0.25 |
| L | 0.20 | 0.25 | 0.30 |
| L1 | | 0.05 REF | |

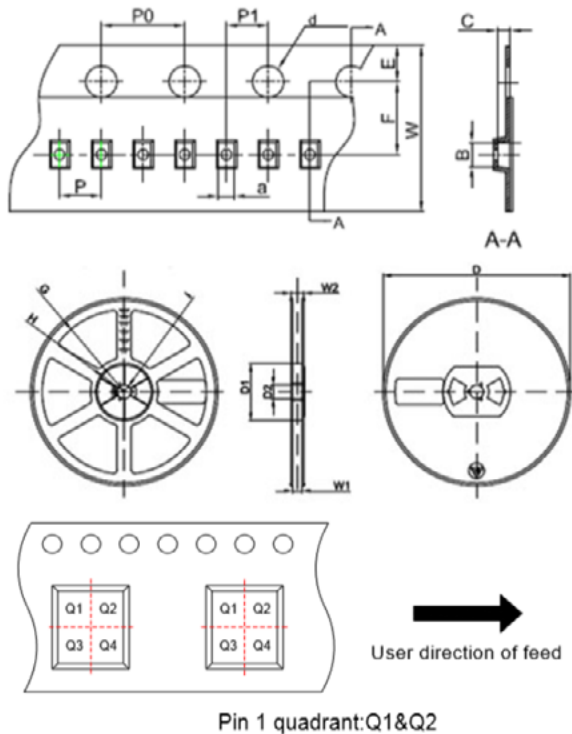
Part marking



Packaging information- mm/inches

Drawing not to scale.

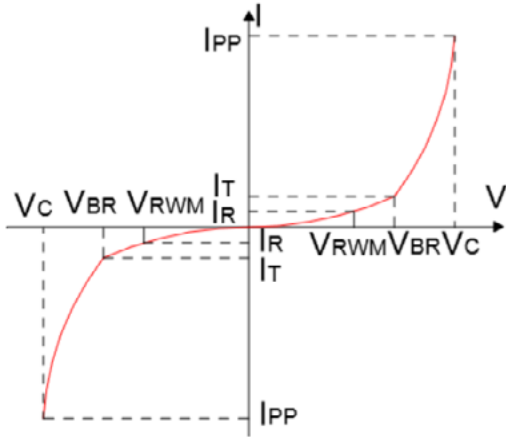
Supplied in tape and reel packaging, 10,000 parts per 7" diameter reel (EIA-481 compliant)



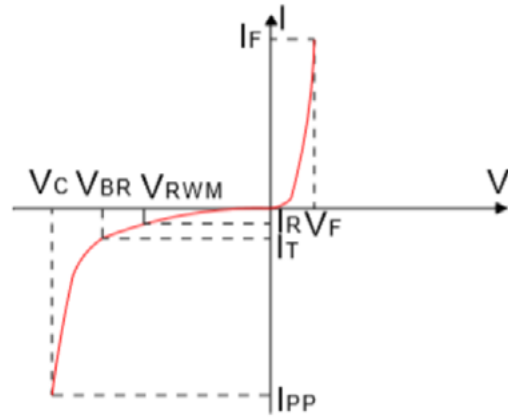
| Symbol | Millimeters | Inches |
|--------|-------------|--------|
| | Typ. | Typ. |
| a | 0.66 | 0.026 |
| B | 1.15 | 0.045 |
| C | 0.66 | 0.026 |
| d | Φ1.50 | Φ0.059 |
| E | 1.75 | 0.069 |
| F | 3.50 | 0.138 |
| P0 | 4.00 | 0.157 |
| P | 2.00 | 0.079 |
| P1 | 2.00 | 0.079 |
| W | 8.00 | 0.315 |
| 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)

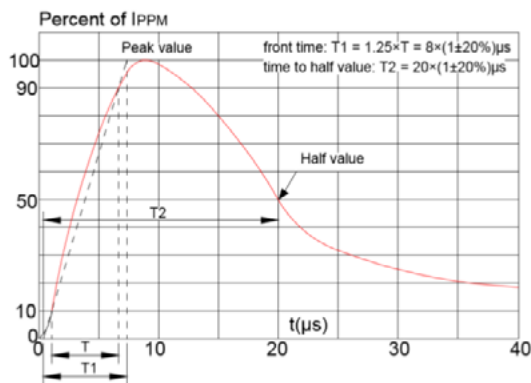
V- I curve characteristics (Bi-directional)
STN101050BL90



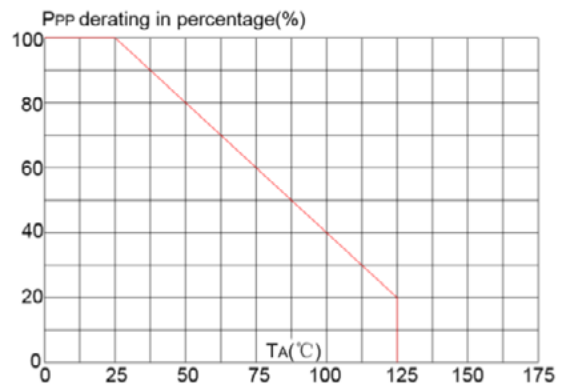
V- I curve characteristics (Uni-directional)
STN102050UL80



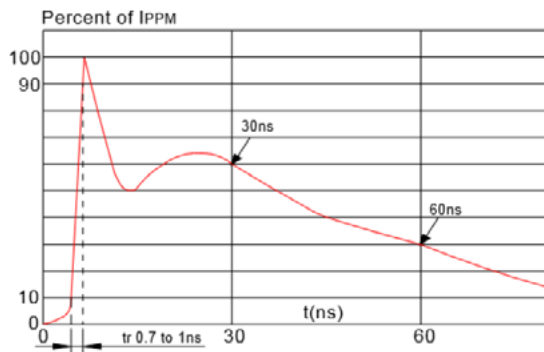
Pulse waveform (8/20 μs)



Pulse derating curve



ESD waveform



Solder reflow profile

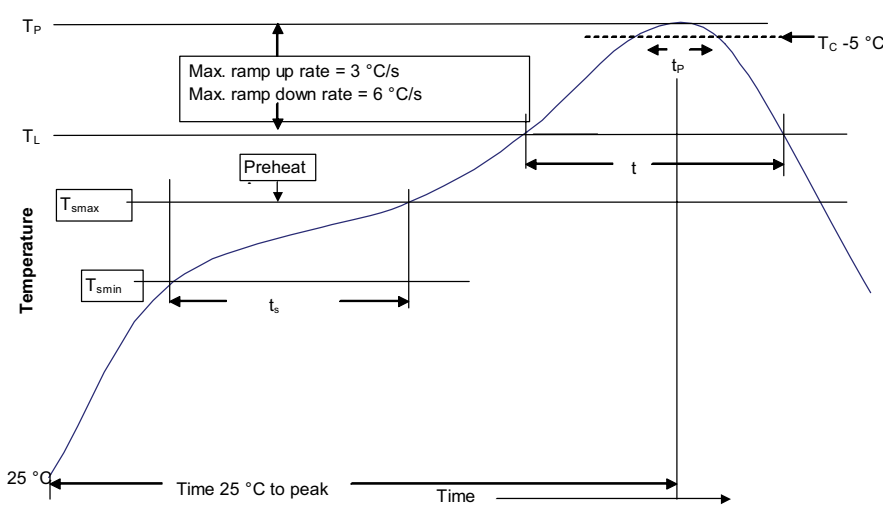


Table 1 - Standard SnPb solder (T_C)

| 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 | <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) | 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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