

Features

- Transient protection for high-speed data lines
IEC61000-4-2 (ESD) ±15kV (Air)
±15kV (Contact)
- IEC61000-4-5 (Lightning) 6.0A (8/20µs)
- ESD Protect for 8 high-speed I/O Channels
- Protects four I/O lines
- Low capacitance: 0.55pF(Typical)(I/O-GND)
- Low leakage current: 0.01µA@VRWM (Maximum)
- Low clamping voltage

Applications

- Portable applications
- Communication systems
- Computers and peripherals
- High speed data lines:
 - USB 2.0/3.0/3.1(Gen 1)
 - HDMI 1.4/2.0
 - eSATA
 - DisplayPort

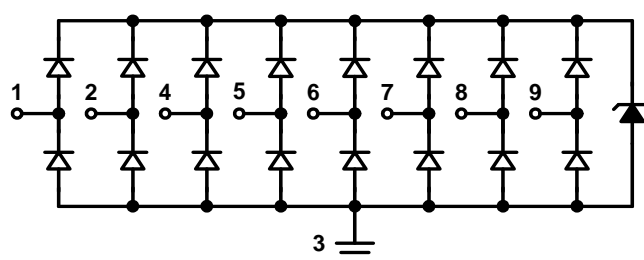
Mechanical Characteristics

- Package: DFN3810-9L
- Marking: Part number
- Packaging: Tape and Reel
- ROHS compliant

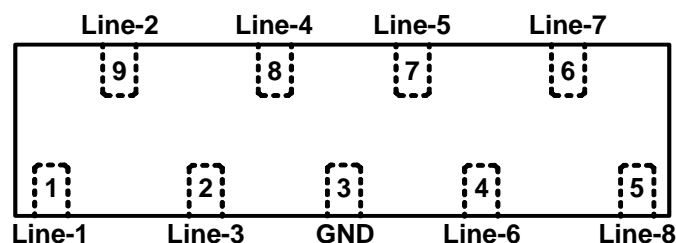
Description

TT0318TWX is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.55pF only, is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC61000-4-2 (ESD), Level 4 (±15kV air, ±8kV contact discharge), IEC61000-4-5 (Lightning) (6A, 8/20us), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

Circuit Diagram



Pin Configuration



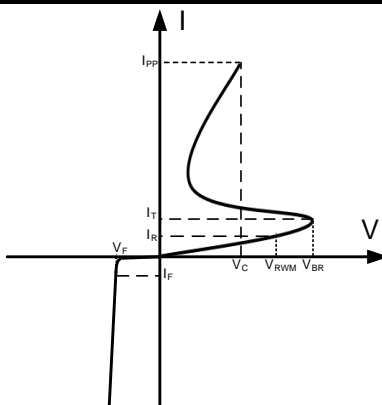
DFN3810-9L

(Top View)

Absolute Maximum Rating

| Symbol | Parameter | Value | Units |
|-----------|--|----------------------|-------|
| I_{PP} | Peak Pulse Current (8/20 μ s) | 6 | A |
| V_{ESD} | ESD per IEC61000-4-2 (Air) ESD per IEC61000-4-2 (Contact) | ± 15 ± 15 | kV |
| T_{OPT} | Operating Temperature | -55/+125 | °C |
| T_{STG} | Storage Temperature | -55/+150 | °C |

Electrical Characteristics (T = 25°C)

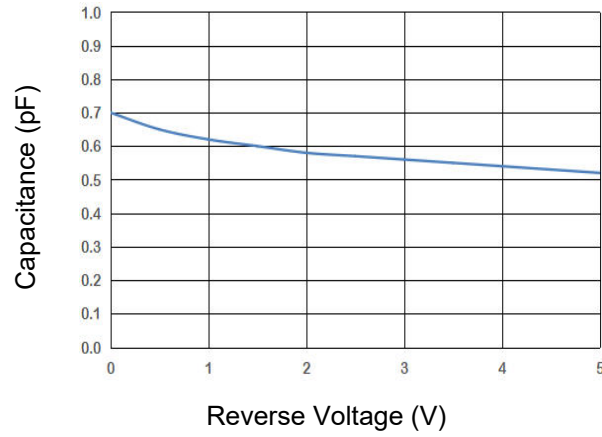
| Symbol | Parameter | Diagram |
|-----------|-------------------------------------|---|
| V_{RWM} | Nominal Reverse Working Voltage |  |
| I_R | Reverse Leakage Current @ V_{RWM} | |
| V_{BR} | Reverse Breakdown Voltage @ I_T | |
| I_T | Test Current for Reverse Breakdown | |
| V_C | Clamping Voltage @ I_{PP} | |
| I_{PP} | Maximum Peak Pulse Current | |
| C_{ESD} | Parasitic Capacitance | |
| I_F | Forward Current | |
| V_F | Forward Voltage @ I_F | |

| Symbol | Test Condition | Minimum | Typical | Maximum | Units |
|-----------|---|---------|---------|---------|----------|
| V_{RWM} | | | | 3.3 | V |
| I_R | $V_{RWM} = 3.3V, T = 25^\circ C$ Between I/O and GND | | 10 | 100 | nA |
| V_{BR} | $I_T = 1mA$ Between I/O and GND | 5.0 | 6.2 | | V |
| V_C | $I_{PP} = 6A, t_p = 8/20\mu s$ Between I/O and GND | | 3.7 | | V |
| V_C | $I_{PP} = 8.0A, t_p = 100ns^{(1)}$ | | 4.55 | | V |
| | $I_{PP} = 16.0A, t_p = 100ns^{(1)}$ | | 7.10 | | V |
| R_{dyn} | $I_{PP} = 12.0A, t_p = 100ns^{(1)}$ | | 0.32 | | Ω |
| C_{ESD} | $V_R = 1.65V, f = 1MHz$ Between I/O and GND | | 0.55 | 0.65 | pF |

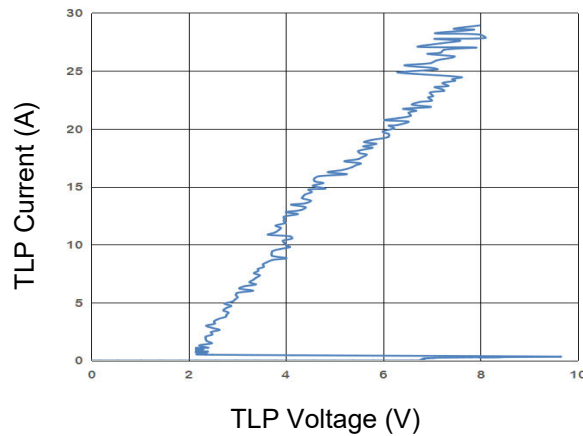
Notes:(1)Measurements performed using a 100ns Transmission Line Pulse(TLP) system,Between I/O and GND.

Typical Performance Characteristics

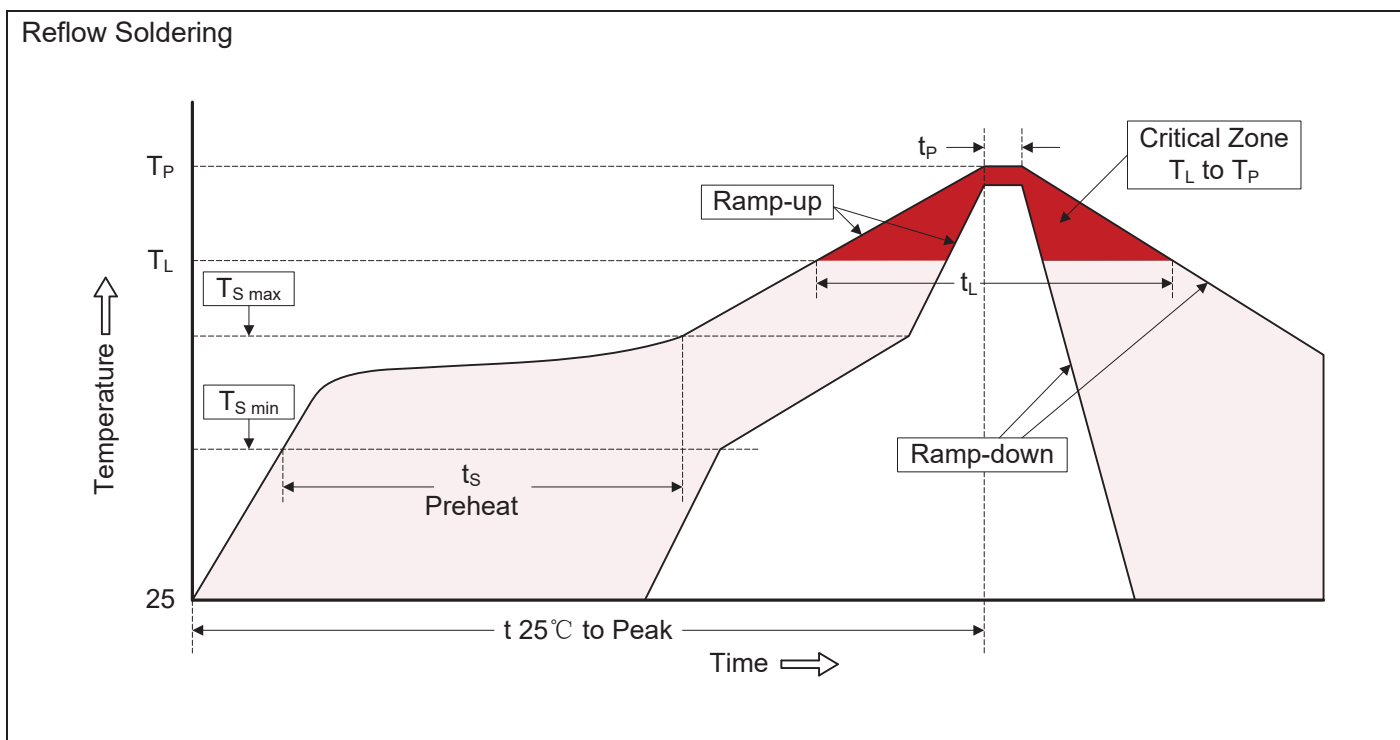
Capacitance vs Reverse Voltage I/O to GND



TLP Measurement of I/O to GND

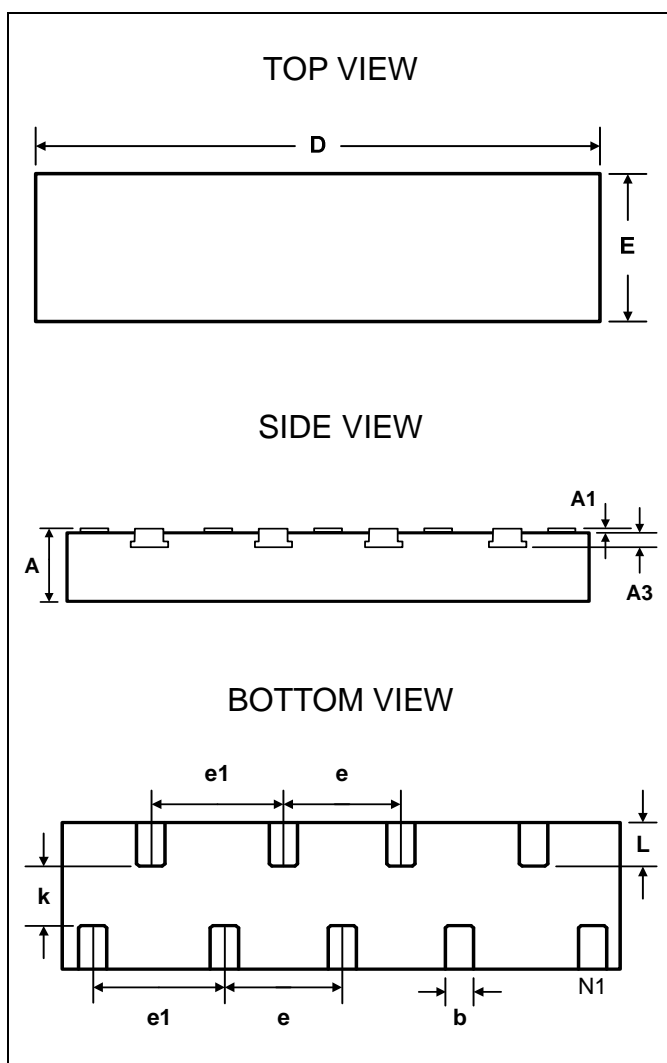


Recommended Soldering Conditions



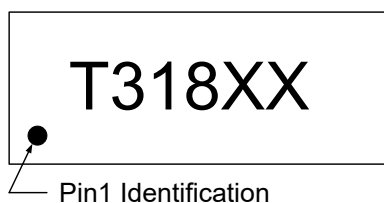
Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|---|----------------------------------|
| Average ramp-up rate (T_L to T_P) | 3°C/second max. |
| Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_s) | 150°C 200°C 60-180 seconds |
| $T_{S\ max}$ to T_L -Ramp-up Rate | 3°C/second max. |
| Time maintained above: -Temperature (T_L) -Time (t_L) | 217°C 60-150 seconds |
| Peak Temperature (T_P) | 260°C |
| Time within 5°C of actual Peak Temperature (t_P) | 20-40 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to Peak Temperature | 8 minutes max. |

Package Outline, DFN3810-9L

PACKAGE DIMENSIONS

| SYMBOL | Millimeters | | Inches | |
|-----------|-------------|-------|-----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.450 | 0.550 | 0.018 | 0.022 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A3 | 0.110REF. | | 0.004REF. | |
| D | 3.700 | 3.900 | 0.146 | 0.154 |
| E | 0.900 | 1.100 | 0.035 | 0.043 |
| k | 0.200MIN. | | 0.008MIN. | |
| b | 0.150 | 0.250 | 0.006 | 0.010 |
| e | 0.800TYP. | | 0.031TYP. | |
| e1 | 0.900TYP. | | 0.035TYP. | |
| L | 0.250 | 0.350 | 0.010 | 0.014 |

Marking Codes



Note:

- (1) "T318" is part number, fixed.
- (2) "XX" is the identification number.

Ordering Information

| Part Number | Working Voltage | Quantity Per Reel | Reel Size |
|-------------|-----------------|-------------------|-----------|
| TT0318TWX | 3.3V | 3,000 | 7 Inch |

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