

# LL038BT3810

## List

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# LL038BT3810

## Ultra-Low Capacitance TVS For ESD Protection Diode

### Features

- Fast turn-on and low clamping voltage.
- ESD protect for eight high-speed data lines.
- Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  contact discharge.
- Provide transient protection:
  - IEC 61000-4-2 (ESD)  $\pm 20\text{kV}$  (Air),  $\pm 12\text{kV}$  (Contact).
  - IEC 61000-4-4 (EFT) 40A (5/50ns).
  - Cable discharge event (CDE).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. LL038BT3810-H.

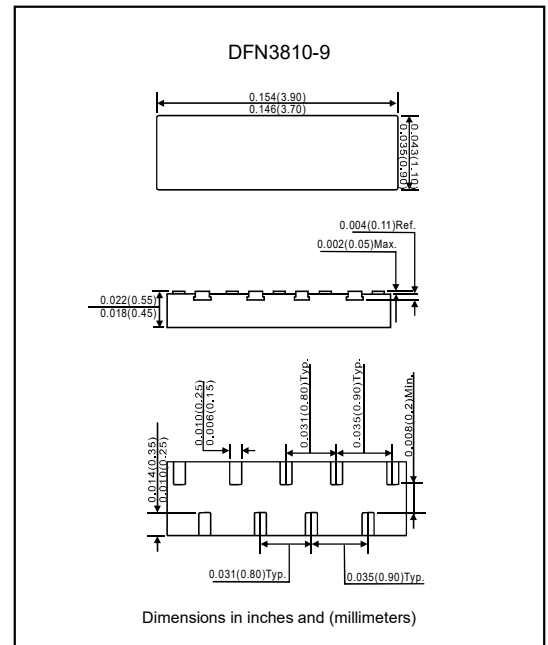
### Applications

- SATA, eSATA interfaces, display ports.
- USB 3.1 power and data line protection.
- V-by-one.
- LVDS interfaces.
- High definition multi-media interface (HDMI) 1.3, 1.4 and 2.0 version.

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, DFN3810-9.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.

### Package outline



### Maximum ratings (At $T_A=25^\circ\text{C}$ unless otherwise noted)

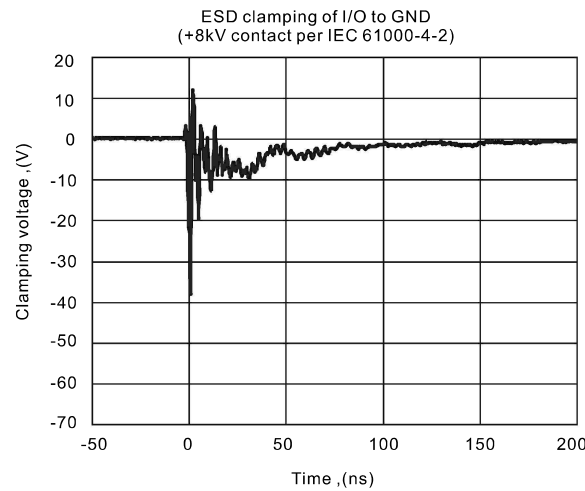
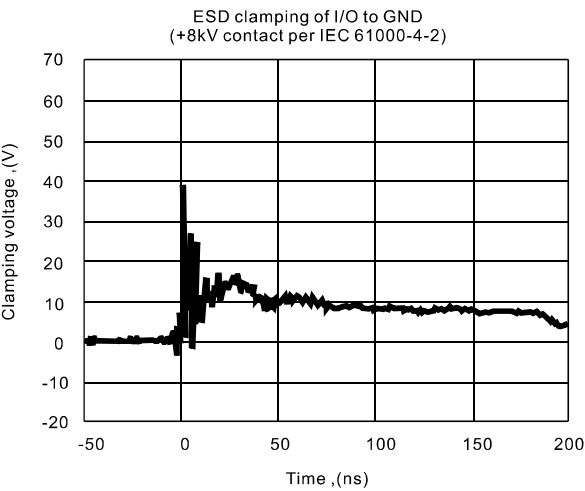
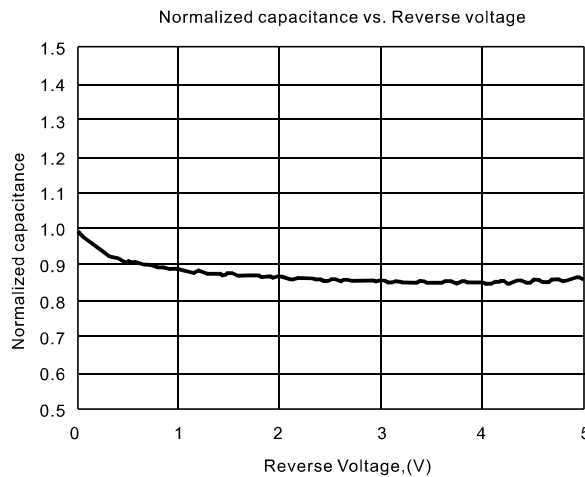
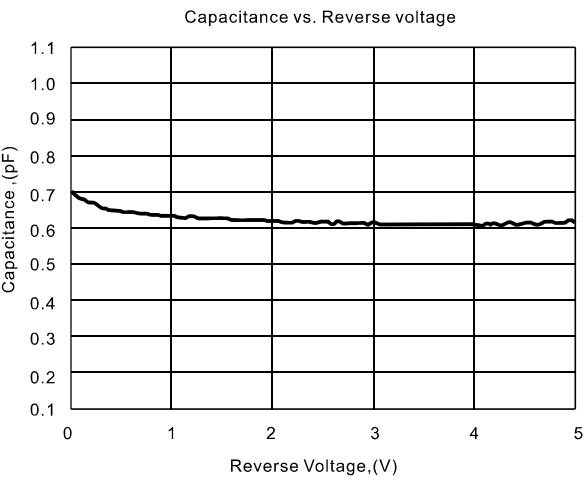
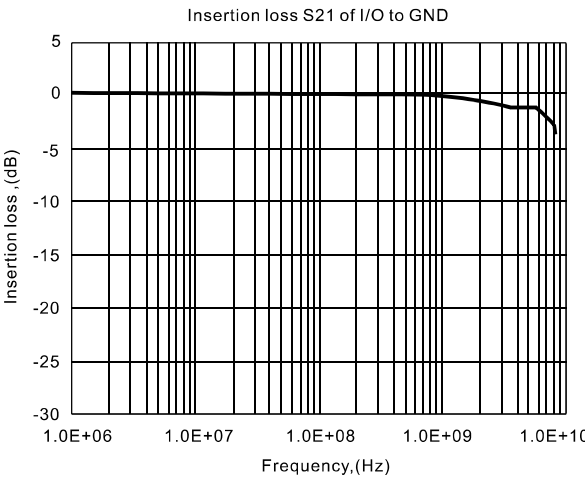
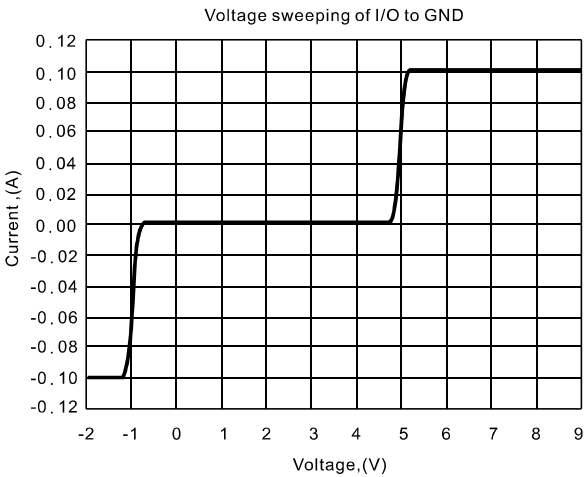
| Parameter                                             | Symbol           | Ratings      | Units            |
|-------------------------------------------------------|------------------|--------------|------------------|
| Electrostatic discharge voltage<br>(IEC61000-4-2 Air) | $V_{\text{ESD}}$ | $\pm 20$     | kV               |
| (IEC61000-4-2 Contact)                                |                  | $\pm 12$     |                  |
| Operating temperature                                 | $T_J$            | - 55 to +125 | $^\circ\text{C}$ |
| Storage temperature                                   | $T_{\text{STG}}$ | - 55 to +150 | $^\circ\text{C}$ |

### Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter                 | Conditions                                                       | Symbol           | Min. | Typ. | Max. | Unit          |
|---------------------------|------------------------------------------------------------------|------------------|------|------|------|---------------|
| Reverse stand-off voltage |                                                                  | $V_{\text{RWM}}$ |      |      | 3.3  | V             |
| Reverse leakage current   | $V_{\text{RWM}}=3.3\text{V}$                                     | $I_{\text{R}}$   |      | 0.1  | 1    | $\mu\text{A}$ |
| Trigger voltage           | $I_{\text{t1}}=1\mu\text{A}$                                     | $V_{\text{t1}}$  | 6    |      | 8    | V             |
| Holding voltage           | $I_{\text{h}}=40\text{mA}$                                       | $V_{\text{h}}$   | 2    |      | 4    | V             |
| Forward voltage           | $I_{\text{f}}=1\text{mA}$                                        | $V_{\text{F}}$   | 0.55 |      | 0.85 | V             |
| Clamping voltage          | $I_{\text{PP}}=5\text{A}$ , $t_{\text{p}}=8/20\mu\text{s}$       | $V_{\text{C}}$   |      |      | 4    | V             |
| Parasitic capacitance     | $V_{\text{R}}=0\text{V}$ , $f=1\text{MHz}$ (Between I/O and GND) | $C_{\text{ESD}}$ |      |      | 0.6  | pF            |

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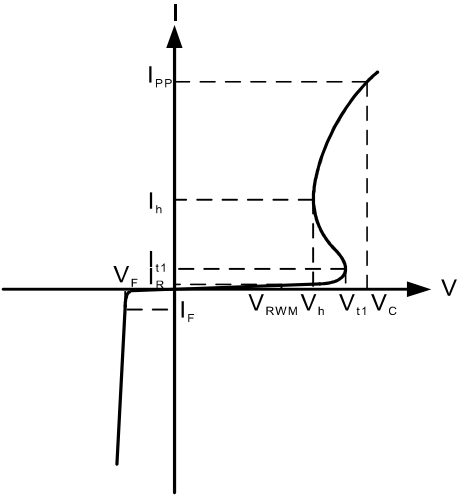
Rating and characteristic curves



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Rating and characteristic curves

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $V_{RWM}$ | Nominal reverse working voltage     |
| $I_R$     | Reverse leakage current @ $V_{RWM}$ |
| $V_{t1}$  | Trigger voltage                     |
| $I_{t1}$  | Trigger current @ $V_{t1}$          |
| $V_h$     | Holding voltage                     |
| $I_h$     | Holding voltage @ $V_h$             |
| $V_c$     | Clamping voltage @ $I_{pp}$         |
| $I_{pp}$  | Maximum peak pulse current          |
| $V_F$     | Forward voltage@ $I_F$              |
| $C_{ESD}$ | Parasitic capacitance               |



Uni-directional TVS

Pinning information

| Pin                                                                  | Simplified outline | Symbol |
|----------------------------------------------------------------------|--------------------|--------|
| Pin 1, 2, 4, 5, 6, 7, 8, 9 :<br>Input/Output Lines<br>Pin 3 : Ground |                    |        |

Marking

| Type number | Marking code                             |
|-------------|------------------------------------------|
| LL038BT3810 | <div><div>T318XX</div><div>•</div></div> |

Note: 1. "T318" is part number fixed.  
2. "XX" is the internal control code.  
3. "•" is Pin1 identification.

