

Description

The Si1102 is a high-performance (0–40 cm) active proximity detector. Because it operates on an absolute reflectance threshold principle, it avoids the ambiguity of motion-based proximity systems. To achieve maximum performance, high optical isolation (less than 10^{-6} coupling) is required between two millimeter-sized light ports, one for the transmit LED and the other for the Si1102. For reduced-range applications (~10 cm), existing holes with high optical loss in a product case may be reused as optical ports, such as display windows, illumination light piping, camera windows, infrared receiver windows, or headphone/microphone holes. The detector even works without a dedicated window if a semi-opaque plastic case is used.

The Si1102 consists of a patented, high-EMI immunity, differential photodiode and a signal processing IC with LED driver and high-gain optical receiver. Proximity detection is based on measuring the reflected light from a strobed, optically isolated LED.

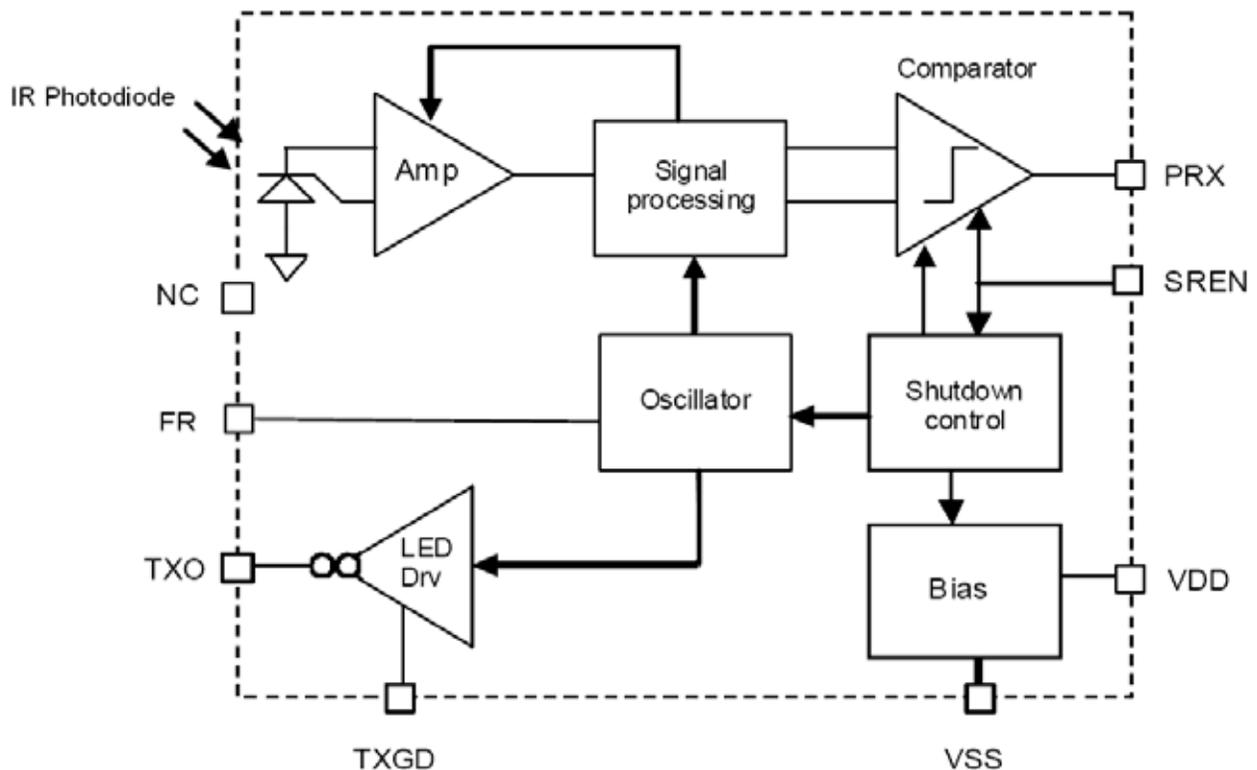
The standard package for the Si1102 is an 8-pin ODFN.

Features

- High-performance proximity detector with a sensing range of up to 40 cm
- Threshold reflectance principle overcomes ambiguity associated with motion-based systems
- Adjustable detection threshold and strobe frequency
- Proximity (PRX) status latched between consecutive strobes
- High EMI immunity without shielded packaging
- Power supply: 2.0–5.5 V
- Operating temperature range: –40 to +85 °C
- Typical 10 μ A current consumption
- Current driven (400 mA) or saturated LED driver output
- Cancels dc ambient of at least 100 klux (direct sunlight).
- Small outline: 3 x 3 mm (ODFN)
- U.S. Patents 5,864,591 and 6,198,118 (others pending)

Applications

- Proximity sensing
- Photo-interrupter
- Occupancy sensing
- Touchless switch
- Object detection
- Handsets

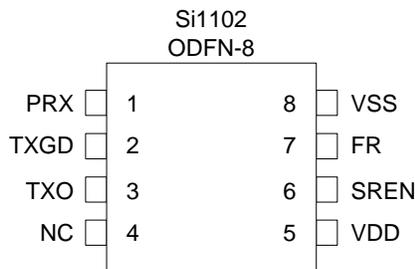


Selected Electrical Specifications

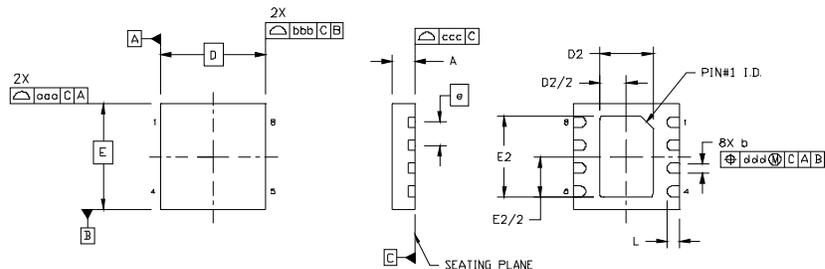
($T_A = -40$ to $+85$ °C unless otherwise specified)

| Parameter | Conditions | Min | Typ | Max | Units |
|---|--|-------|-----|-----|-------------------------|
| Supply Voltage | -40 to $+85$ °C, V_{DD} to V_{SS} | 2.0 | 3.3 | 5.5 | V |
| Operating Temperature | | -40 | — | 85 | °C |
| Peak to Peak power supply noise rejection | $V_{DD} = 3.3$ V, 1 kHz–10 MHz no spurious PRX or less than 20% reduction in range | | | 50 | mVPP on V_{DD} |
| DC Ambient light (Edc) | $V_{DD} = 3.3$ V | | | 100 | klux |
| I_{DD} Shutdown | $SREN = V_{DD}$, $FR = 0$, $V_{DD} = 3.3$ V | | 0.1 | 1.0 | μ A |
| I_{DD} average current | $SREN = 0$ V, $FR = 0$, $V_{DD} = 3.3$ V | | 120 | | μ A |
| I_{DD} average current | $SREN = 0$ V, $FR = \text{open}$, $V_{DD} = 3.3$ V | | 3 | | μ A |
| Min. Detectable Reflectance Input | $V_{DD} = 3.3$ V, 880 nm source | | 1 | | μ W/cm ² |

Pin Assignments



8-Pin ODFN Package



| Symbol | Millimeters | | |
|--------|-------------|------|------|
| | Min | Typ | Max |
| A | 0.55 | 0.65 | 0.75 |
| b | 0.25 | 0.30 | 0.35 |
| D | 3.00 BSC. | | |
| D2 | 1.40 | 1.50 | 1.60 |
| e | 0.65 BSC. | | |
| E | 3.00 BSC. | | |
| E2 | 2.20 | 2.30 | 2.40 |
| L | 0.30 | 0.35 | 0.40 |
| aaa | 0.10 | | |
| bbb | 0.10 | | |
| ccc | 0.08 | | |
| ddd | 0.10 | | |

Product Family

| Part Number | Pkg | LED Drivers | LED Drive Methods | Range | Rate Control | Sensitivity Control |
|-------------|--------|-------------|------------------------------------|-------|-------------------|---------------------|
| Si1102-A-GM | ODFN-8 | 1 | Current Driven (400 mA), Saturated | 40 cm | External resistor | External resistor |