

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.

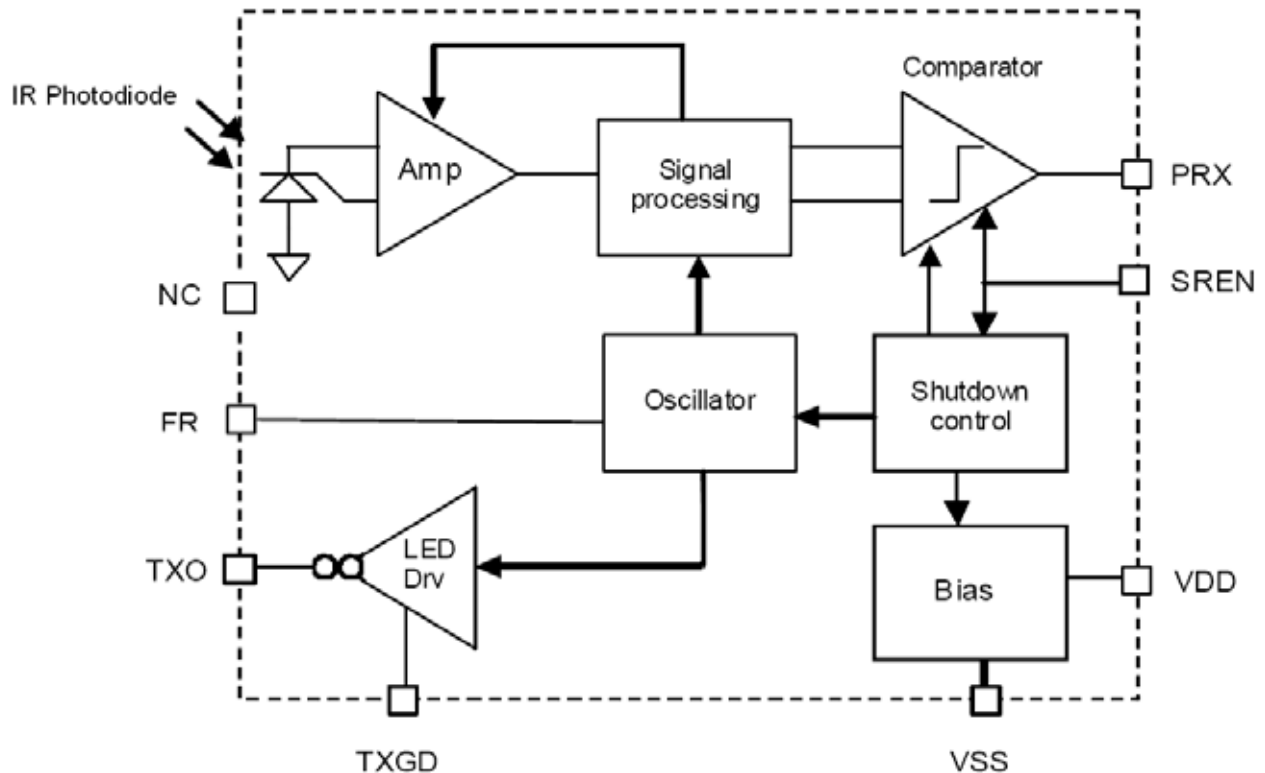
The standard package for the Si1102 is an 8-pin ODFN.

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

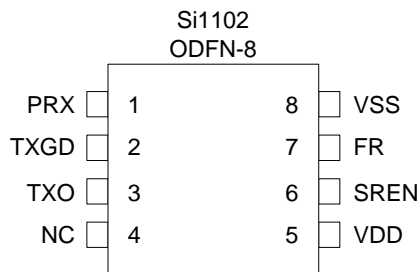


Selected Electrical Specifications

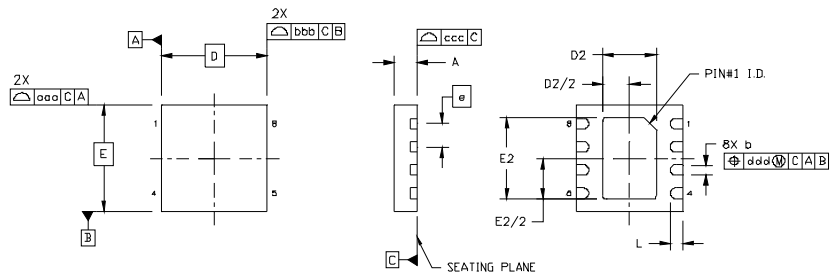
($T_A = -40$ to $+85$ °C unless otherwise specified)

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