

## Description

The Si1142 is a low-power, reflectance-based infrared proximity and ambient light sensor with I<sup>2</sup>C digital interface and programmable-threshold interrupt output. This device includes an integrated high-sensitivity photodiode, digital converter, digital signal processor, and two integrated infrared LED drivers with selectable drive levels. The Si1142 offers excellent performance under a wide dynamic range of light sources including direct sunlight. The photodiode response and associated digital conversion circuitry provide excellent immunity to artificial light flicker noise. The two infrared LED driver device is capable of supporting advanced proximity motion detection. The Si1142 supports slave and autonomous modes of operation.

The device is provided in an 10-lead 2x2 mm QFN package and is capable of operation from 1.8 to 3.6 V over the -40 to +85 °C temperature range.

## Applications

- Handsets
- eReaders
- Notebooks/netbooks/tablet PCs
- Portable consumer electronics
- Audio products
- Security panels
- Tamper detection circuits
- Dispensers
- Valve controls
- Smoke detectors
- Touchless switches
- Occupancy sensors
- Consumer electronics
- Industrial automation
- Display backlighting control
- Photo-interrupter

## Features

### QuickSense™ Integrated Infrared Proximity Detector

- Two independent LED drivers
- Fifteen current settings from 6 mA to 416 mA for each LED driver
- 25.6 μs LED driver pulse width
- 500 mm proximity range with single pulse (<2.5 kLx)
- 150 mm proximity range with single pulse (>2.5 kLx)
- Operates at up to 128 klux (direct sunlight)
- Minimum reflectance sensitivity < 1 μW/cm<sup>2</sup>
- High EMI immunity without shielded packaging

### QuickSense™ Integrated Ambient Light Sensor

- 10 mlx resolution possible, allowing operation under dark glass
- 1 to 128 klx dynamic range possible across two ADC range settings
- 17-bit resolution
- Accurate lux measurements possible with IR correction algorithm
- 25.6 μs measurement cycle keeps total power consumption duty cycle low without compromising performance or noise immunity

### Industry's Lowest Power Consumption

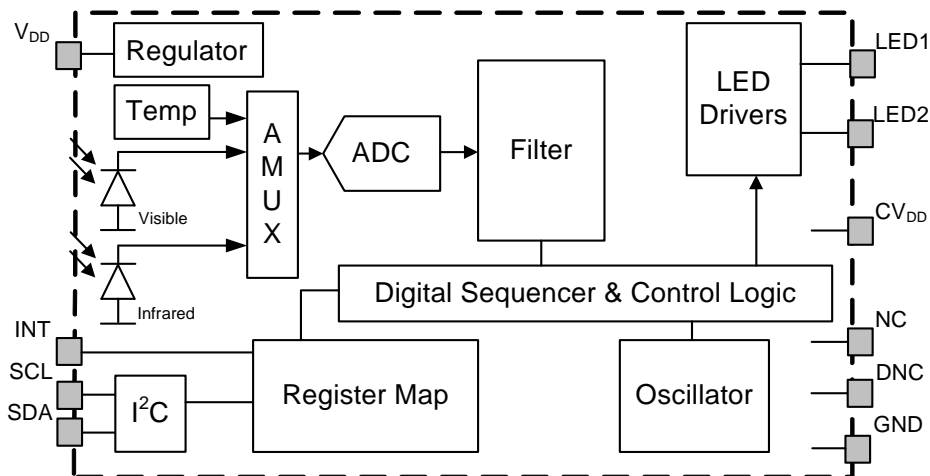
- 1.8 to 3.6 V supply voltage
- 9.7 μA average dc current draw  
Assuming single PS channel, ALS Visible + ALS IR every 800 ms,  
3 μA average current for sensors and internal circuitry, and 6.7 μA average current for external LED (assuming 209 mA for 25.6 μs every 800 ms)
- < 20 nA powered down current
- < 500 nA standby current
- Internal and external wake support
- Built-in voltage supply monitor and power-on reset controller

### Serial Communications

- SMBus (I<sup>2</sup>C compatible) up to 3.4 Mbps data rate
- Slave mode hardware address recognition

### Small-outline 10-Lead 2x2 mm QFN Package

Temperature Range: -40 to +85 °C

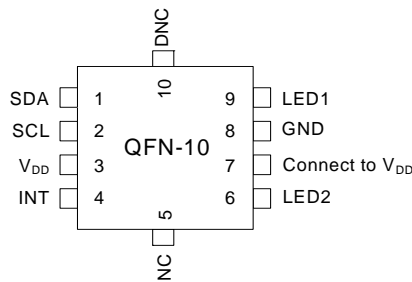


### Selected Electrical Specifications

(T<sub>A</sub> = -40 to +85 °C unless otherwise specified)

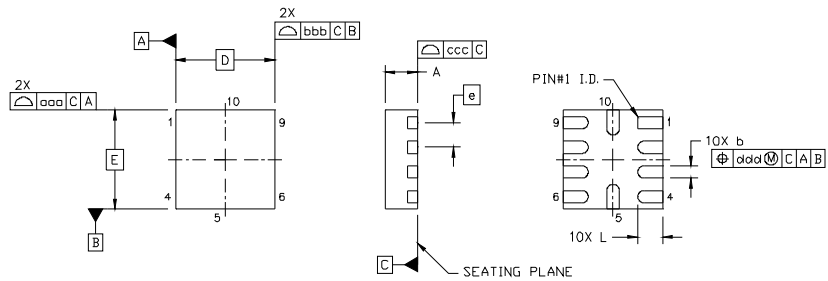
Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage	-40 to +85 °C, V <sub>DD</sub> to V <sub>SS</sub>	1.8	3.3	3.6	V
Operating Temperature		-40	25	85	°C
PS Operation under Direct Sunlight (Edc)	V <sub>DD</sub> = 3.3 V	—	—	128	klx
I <sub>DO</sub> Standby Mode	V <sub>DD</sub> = 3.3 V	—	—	500	nA
Min. Detectable Reflectance Input	V <sub>DD</sub> = 3.3 V	—	0.1	1	μW/cm <sup>2</sup>
ALS Dynamic Range		10m	—	128k	lx
ALS Linearity	100–1000 Lux	—	—	±5	%
	10–100 Lux	—	—	±10	%
	3–10 Lux	—	—	±30	%

### Pin Assignments (Preliminary)



Note: Connect any unused LED drivers to V<sub>DD</sub>.

### 10-Pin QFN Package



Symbol	Millimeters		
	Min	Typ	Max
A	0.55	0.65	0.75
b	0.20	0.25	0.30
D	2.00 BSC		
e	0.50 BSC		
E	2.00 BSC		
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	Range[<2.5 klx]	Range[>2.5 klx]	Supply Voltage
Si1142-A10-GM	QFN-10	2	500 mm	150 mm	1.8–3.6 V