

Low Power Ambient Light and Proximity Sensor with Intelligent Interrupt and Sleep Modes - Analog and Digital Out

ISL29030

The ISL29030 is an integrated ambient and infrared light-to-digital converter with a built-in IR LED driver and I²C Interface (SMBus Compatible). This device uses two independent ADCs for concurrently measuring ambient light and proximity in parallel. The flexible interrupt scheme is designed for minimal microcontroller utilization.

For ambient light sensor (ALS) data conversions, an ADC converts photodiode current (with a light sensitivity range of 2000 Lux) in 100ms per sample. The ADC rejects 50Hz/60Hz flicker noise caused by artificial light sources. The I_{ALS} pin provides an analog output current proportional to the measured light (420μA FSR).

For proximity sensor (Prox) data conversions, the built-in driver turns on an external infrared LED and the proximity sensor ADC converts the reflected IR intensity to digital. This ADC rejects ambient IR noise (such as sunlight) and has a 540μs conversion time.

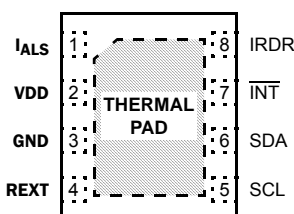
The ISL29030 provides low power operation of ALS and proximity sensing with a typical 138μA normal operation current (110μA for sensors and internal circuitry, ~28μA for external LED) with 220mA current pulses for a net 100μs, repeating every 800ms (or under).

The ISL29030 uses both a hardware pin and software bits to indicate an interrupt event has occurred. An ALS interrupt is defined as a measurement which is outside a set window. A proximity interrupt is defined as a measurement over a threshold limit. The user may also require that both ALS/prox interrupts occur at once, up to 16 times in a row before activating the interrupt pin.

The ISL29030 is designed to operate from 2.25V to 3.63V over the -40 °C to +85 °C ambient temperature range. It is packaged in a clear, lead-free 8 lead ODFN package.

Pin Configuration

ISL29030
8 LD ODFN (2.0x2.1x0.7mm)
TOP VIEW



*THERMAL PAD CAN BE CONNECTED TO GND OR ELECTRICALLY ISOLATED

Features

- Works Under All Light Sources Including Sunlight
- Dual ADCs Measure ALS/Prox Concurrently
- Intelligent Interrupt Scheme Simplifies μC Code

Ambient Light Sensing

- Simple Output Code Directly Proportional to lux
- 50Hz/60Hz Flicker Noise and IR Rejection
- Light Sensor Close to Human Eye Response
- Selectable 125/2000 Lux Range
- Analog 420μA Output Pin I_{ALS} Proportional to Lux

Proximity Sensing

- Proximity Sensor with Broad IR Spectrum
 - Can Use 850nm and 950nm External IR LEDs
- IR LED Driver with I²C Programmable Sink Currents
 - Net 100μs Pulse with 110mA or 220mA Amplitudes
 - Periodic Sleep Time up to 800ms Between Pulses
- Ambient IR Noise Cancellation (Including Sunlight)

Intelligent and Flexible Interrupts

- Independent ALS/Prox Interrupt Thresholds
- Adjustable Interrupt Persistency
 - 1/4/8/16 Consecutive Triggers Required Before Interrupt

Ultra Low Power

- 138μA DC Typical Supply Current for ALS/Prox Sensing
 - 110μA for Sensors and Internal Circuitry
 - 28μA Typical Current for External IR LED (Assuming 220mA for 100μs Every 800ms)
- <1.0μA Supply Current When Powered Down

Easy to Use

- Set Registers; Wait for Interrupt
- I²C (SMBus Compatible) Output
- Temperature Compensated
- Tiny ODFN8 2.0x2.1x0.7 (mm) Package

Additional Features

- 1.7V to 3.63V Supply for I²C Interface
- 2.25V to 3.63V Sensor Power Supply
- Pb-Free (RoHS compliant)

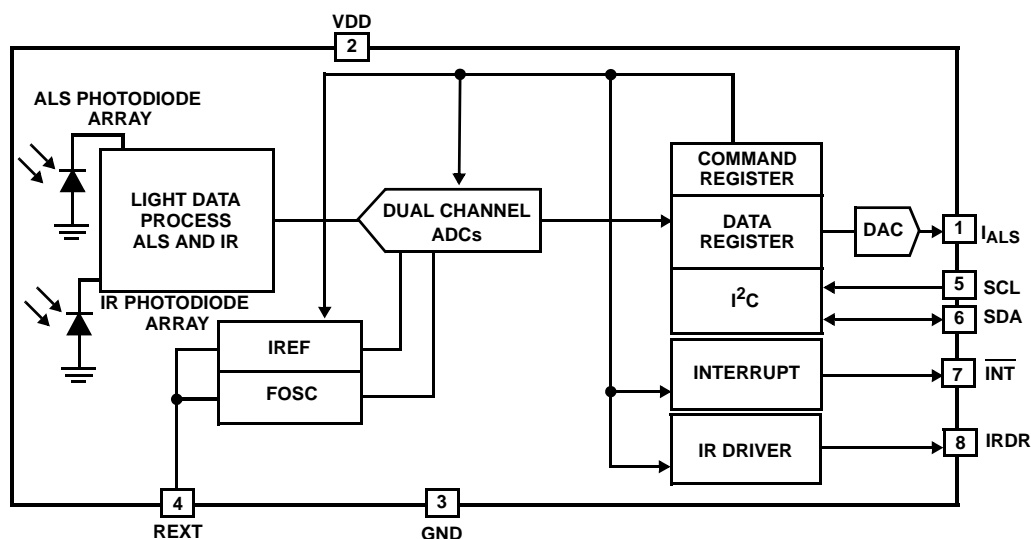
Applications

- Display and Keypad Dimming Adjustment and Proximity Sensing for:
 - Mobile Devices: Smart Phone, PDA, GPS
 - Computing Devices: Laptop PC, Netbook
 - Consumer Devices: LCD-TV, Digital Picture Frame, Digital Camera
- Industrial and Medical Light and Proximity Sensing

Pin Descriptions

PIN NUMBER	PIN NAME	DESCRIPTION	
-	T.PAD	Thermal Pad (connect to GND or float)	
1	I _{ALS}	Analog Current Output (Proportional to ALS/IR Data Count: 420μA FSR)	
2	VDD	Positive supply: 2.25V to 3.63V	
3	GND	Ground	
4	REXT	External resistor (499kΩ; 1%) connects this pin to ground	
5	SCL	I ² C clock line	The I ² C bus lines can be pulled from 1.7V to above V _{DD} , 3.63V max
6	SDA	I ² C data line	
7	INT	Interrupt pin; Logic output (open-drain) for interrupt	
8	IRDR	IR LED driver pin - current flows into ISL29030 from LED cathode	

Block Diagram



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