

Si1153 Data Short

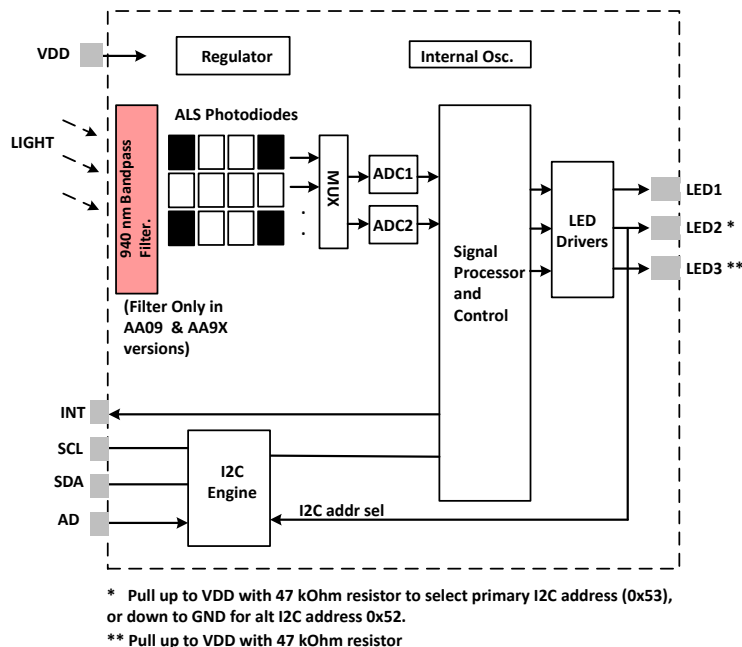
Proximity/Ambient Light Sensor IC with I²C Interface

The Si1153-AA00/AA09/AA9x is an ambient light sensor, proximity, and gesture detector with I²C digital interface and programmable-event interrupt output.

This touchless sensor IC includes dual 23-bit analog-to-digital converters, an integrated high-sensitivity array of visible and infrared photodiodes, a digital signal processor, and three integrated LED drivers with programmable drive levels. The Si1153 offers excellent performance under a wide dynamic range and a variety of light sources, including direct sunlight. The Si1153 can also work under dark glass covers. The photodiode response and associated digital conversion circuitry provide excellent immunity to artificial light flicker noise and natural light flutter noise. With two or more LEDs, the Si1153 is capable of supporting multiple-axis proximity motion detection. The Si1153 is provided in a 10-lead 2x2 mm DFN package or in a 10-lead 2.9x4.9 mm LGA module with integrated LED, and is capable of operation from 1.62 to 3.6 V over the -40 to +85 °C temperature range.

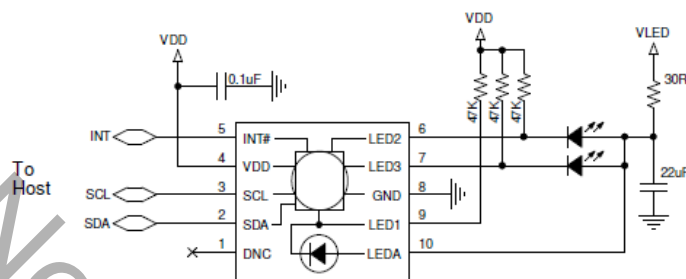
Applications:

- Wearables
- Handsets
- Display backlighting control
- Consumer electronics



KEY FEATURES

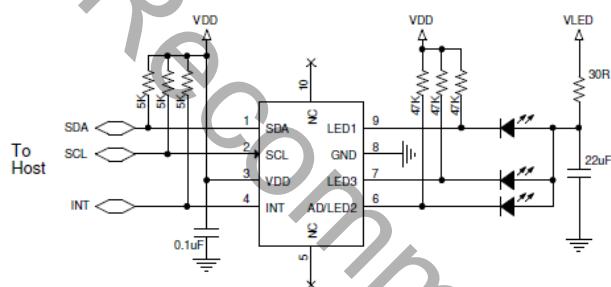
- Proximity detector
 - From under 1 cm to 50 cm without additional lensing.
 - From under 1 cm to 200 cm with additional lensing (e.g. 5 mm hemispherical lens as in our EVB).
 - Up to three independent LED drivers.
 - 30 current settings from 5.6 mA to 360 mA for each LED driver.
 - Operates in direct sunlight with optional on-die 940 nm passband filter.
 - On die 940 bandpass filter that rejects unwanted visible light and IR from daylight and other sources (Si1153-AA09/AA9X).
- Ambient light sensor
 - <100 mlx resolution possible, allowing operation under dark glass.
 - Up to 128 klx dynamic range possible across two ADC range settings.
- Industry's lowest power consumption
 - 1.62 to 3.6 V supply voltage.
 - 9 µA average current (LED pulsed 25.6 µs every 800 ms at 180 µA plus 3 mA Si1153 supply).
 - <500 nA standby current.
 - 25.6 µs LED "on" time keeps total power consumption duty cycle low without compromising performance or noise community.
- Internal and external wake support.
- Built-in voltage supply monitor and power-on reset controller.
- Trimmable internal oscillator with typical 1% accuracy.
- I²C serial communications
 - Up to 3.4 Mbps data rate.
 - Slave mode hardware address decoding.
- Two package options:
 - 10-lead 2 x 2 x 0.65 mm DFN
 - 10-lead 2.9 x 4.9 x 1.2 mm LGA module with integrated 940 nm LED
- Temperature Range: -40 to +85°C



Si1153 LGA Module Basic Application

DNC	1	10	LED4
SDA	2	9	LED1
SCL	3	8	GND
VDD	4	7	LED3
INT	5	6	AD/LED2

Pin Description 2.85x4.9 mm LGA Module



Si1153 DFN Basic Application

SDA	1	9	LED1
SCL	2	8	GND
VDD	3	7	LED3
INT	4	6	AD/LED2
DNC	10	5	DNC

Pin Description 2x2 mm DFN

Table 1.1. Recommended Operating Conditions

Parameter	Symbol	Condition	Min	Typ	Max	Unit
V _{DD} Supply Voltage	V _{DD}		1.62	—	3.6	V
V _{DD} OFF Supply Voltage	V _{DD_OFF}	OFF mode	−0.3		1.0	V
V _{DD} Supply Ripple Voltage		V _{DD} = 3.3 V 1 kHz – 10 MHz	—	—	50	mVpp
Operating Temperature	T		−40	25	85	°C
SCL, SDA, Input High Logic Voltage	I ² C _{VIH}		V _{DD} × 0.7	—	V _{DD}	V
SCL, SDA Input Low Logic Voltage	I ² C _{VIL}		0	—	V _{DD} × 0.3	V
Start-Up Time		V _{DD} above 1.62 V	25	—	—	ms

Table 1.2. Ordering Guide

Family	DFN OPNs	Package	ALS	940 nm Filter	Proximity (# of LED Drivers)	# of LEDs Included
Si1153	Si1153-AA00-GMR	2 x 2 mm DFN	Y		3	0
Si1153	Si1153-AA09-GMR	2 x 2 mm DFN		Y	3	0
Si1153	Si1153-AA9x-GMR	2.85 x 4.9 mm LGA Module		Y	3	1

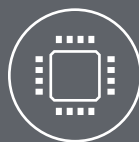


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