

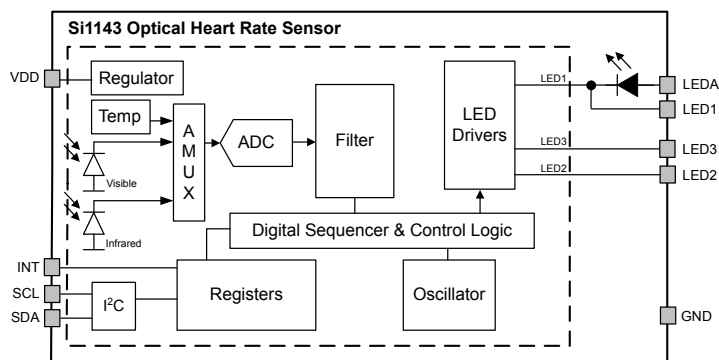
Si1143-AAGX Data Short

Optical Heart Rate Sensor Module with I²C Interface

The Si1143-AAGX is a low-power, reflectance-based, heart rate sensor module with integrated 525 nm green LED, two additional LED driver outputs, I²C digital interface, and programmable-event interrupt output. This optical heart rate sensor module includes an analog-to-digital converter, integrated high-sensitivity photodiodes, host communications processor, and three integrated LED drivers with fifteen selectable drive levels. The Si1143-AAGX offers excellent performance under a wide dynamic range and a variety of light sources from 525 nm to 940 nm. The Si1143-AAGX devices are provided in a 10-lead 4.9x2.85x1.2 mm QFN package and are capable of operation from 1.71 to 3.6 V over the -40 to +85 °C temperature range.

Applications:

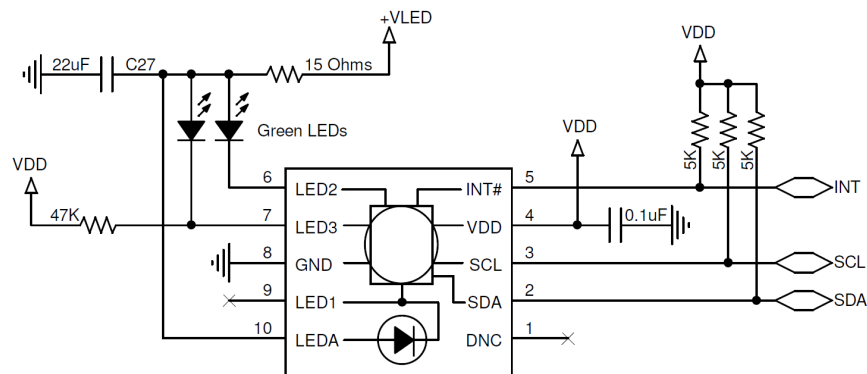
- Fitness Bands
- Smart Watches
- Other Wearables
- Healthcare



Si1143-AAGX Sensor Module Block Diagram

KEY FEATURES

- Fully integrated heart rate module IC
 - Green LED with lens
 - High-sensitivity photodiode
 - Low-noise analog-to-digital converter and filtering
 - LED drivers
 - Optical blocking
 - Host communications and interrupts
- Accurate sensing of weak blood flow signals on the wrist
- Three independent regulated LED drivers
 - Scalable from cost-sensitive single LED systems to high performance three LED systems
 - Programmable from 6 mA to 360 mA each
- Integrated green LED ideal for wrist based heart rate applications
 - Add up to 2 external LEDs
 - Broad spectral sensitivity supports green through 940 nm LEDs
- No additional optical blocking required
- Low power consumption
 - 1.71 to 3.6 V supply voltage
 - 25.6 μ s LED "on" time keeps total power consumption duty cycle low without compromising performance or noise immunity
 - < 500 nA standby current
 - Internal and external wake support
 - Built-in voltage supply monitor and power-on reset controller
- I²C serial communications
 - Up to 3.4 Mbps data rate
 - Slave mode hardware address decoding (0x5A)
- 10-lead 4.9x2.85x1.2 mm LGA Module
- Temperature Range
 - -40 to +85 °C



Si1143-AAGX Module Application Schematic with up to 3 LEDs and Separate LED Power Supply

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
V _{DD} Supply Voltage	V _{DD}		1.71	—	3.6	V
V _{DD} OFF Supply Voltage	V _{DD_OFF}	OFF mode	−0.3		1.0	V
V _{DD} Supply Ripple Voltage ¹		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 CVIH		V _{DD} × 0.7	—	V _{DD}	V
SCL, SDA Input Low Logic Voltage	I ² CVIL		0	—	V _{DD} × 0.3	V
LED Emission Wavelength	λ		—	525	—	nm
LED Supply Voltage	V _{LED}		4.1	—	5.0	V
LED Supply Ripple Voltage ¹		0–30 kHz 30 kHz – 100 MHz	— —	— —	250 100	mVpp mVpp
Start-Up Time		V _{DD} above 1.71 V	25	—	—	ms
LED3 Voltage		Start-up	V _{DD} × 0.77	—	—	V

1. Supply voltage ripple sensitivity depends on the voltage at the LEDx pins when turned on.

Part Number	Package	LED Drivers
Si1143-AAGX-GMR	4.9 x 2.85 x 1.2 mm LGA Module	3 LED drivers, 1 green LED integrated



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