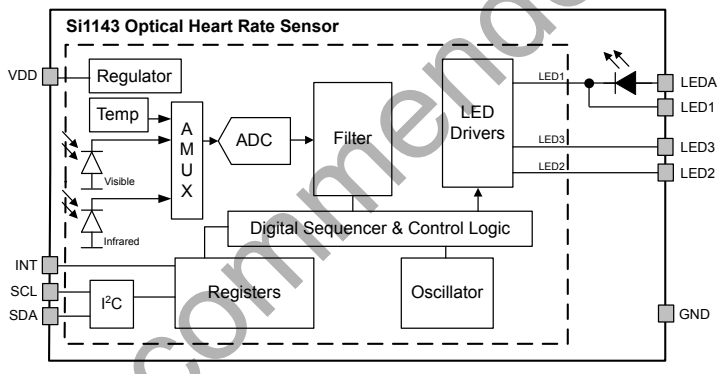
Si1143-AAGX Data Short

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

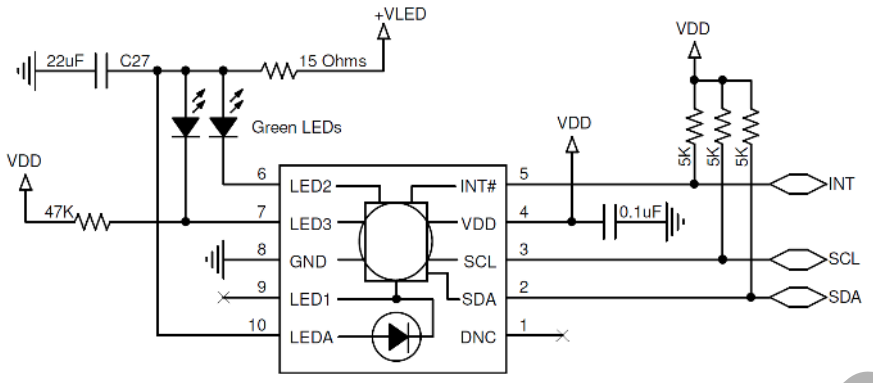


Si1143-AAGX Sensor Module Block Diagram

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 µs 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

1. Si1143-AAGX Information



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

Table 1.1. Recommended Operating Conditions

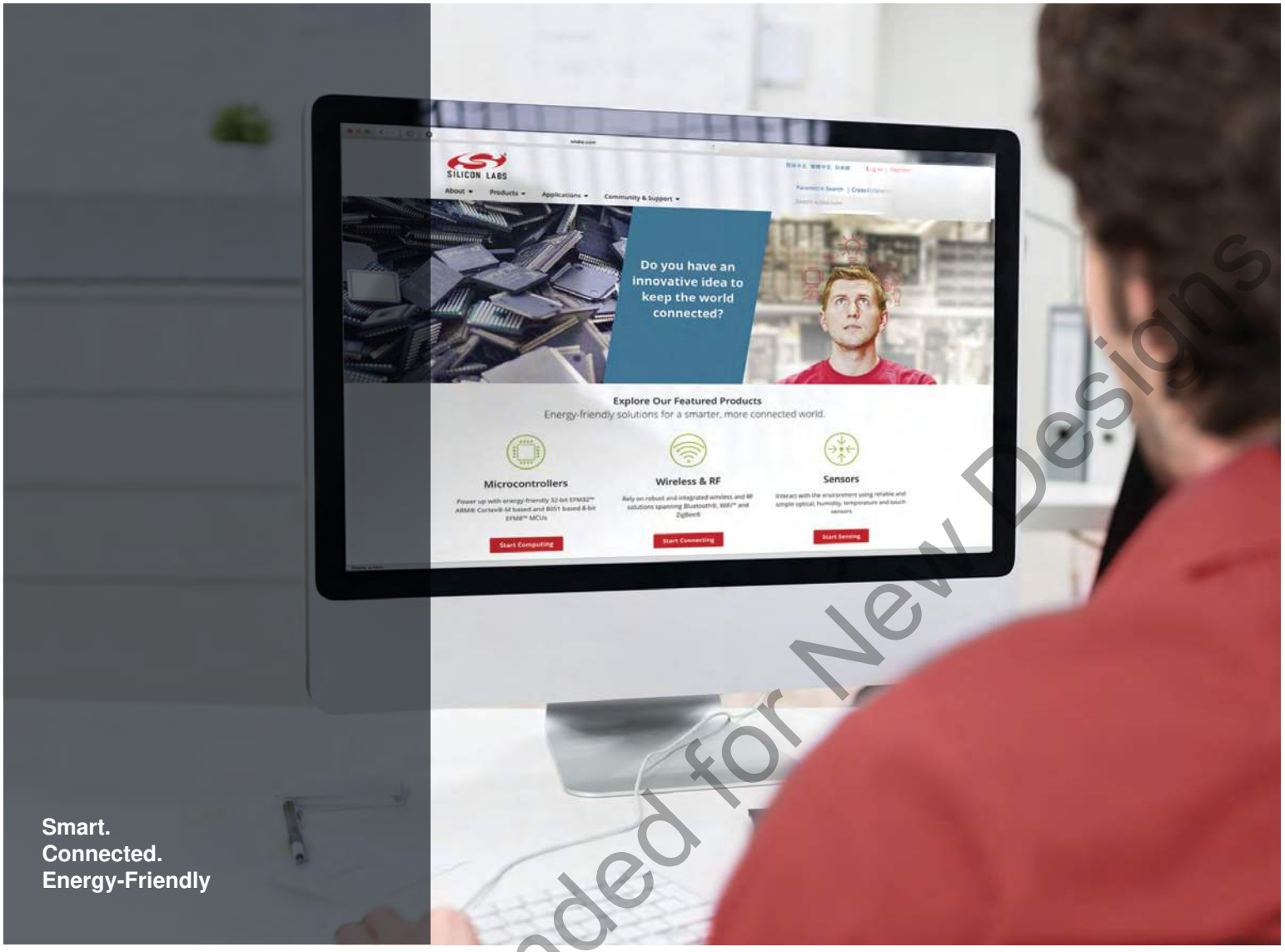
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
V_{DD} Supply Voltage	V_{DD}		1.71	—	3.6	V
V_{DD} OFF Supply Voltage	V_{DD_OFF}	OFF mode	–0.3		1.0	V
V_{DD} Supply Ripple Voltage[1]		V_{DD} = 3.3 V 1 kHz – 10 MHz	—	—	50	mVpp
Operating Temperature	T		–40	25	85	°C
SCL, SDA, Input High Logic Voltage	I^2CVIH		V_{DD} x 0.7	—	V_{DD}	V
SCL, SDA Input Low Logic Voltage	I^2CVIL		0	—	V_{DD} x 0.3	V
LED Emission Wavelength	l		—	525	—	nm
LED Supply Voltage	VLED		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} x 0.77	—	—	V

Note:

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

Table 1.2. Ordering Guide

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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