

Description

IDT's OB1203 Sensor Module integrates a multi-channel light sensor (LS/CS), a proximity sensor (PS), and a photoplethysmography sensor (PPG).

The light sensor can be configured as an ambient light sensor (LS) to measure ambient light similar to the human eye experience or as an RGB color sensor (CS). The module has a fully integrated biosensor for reflective photoplethysmography. With the appropriate algorithm, it can determine the human heart rate, oxygen saturation (SpO₂), respiration rate, and heart rate variability (a measure of stress). The OB1203 integrates light sources and drivers in a single optically optimized package.

A major LS application for the device is in smart phones or other mobile devices to enable brightness control of display panels. The OB1203 can also determine proximity of nearby objects in order to support the activation of touch screen displays or system functions. The sensor combines optical sensing features (CS, LS, PS) and bio-sensing functionality (PPG) without needing a visible optical opening. The unique implementation of the OB1203 enables SpO₂ measurements behind ink that is IR transmissive, but visibly dark, allowing for aesthetic industrial designs.

Biosensor Features

- SpO₂ measurement behind visibly dark, IR-transmissive ink
- Industry's smallest optical biosensor module
- Fully integrated and trimmed module, including two LEDs, 250mA maximum drive current, and photodetectors
- Output resolution of PPG: 16 to 18 bits
- Data stored in 18-bit-wide, 32-sample FIFO memory
- Integrated averaging function for higher signal-to-noise ratio (SNR) and data rate reduction
- Programmable measurement rate: up to 3200 samples per second
- High SNR

Ambient Light Sensor Features

- High lux accuracy over different light sources.
- Absolute sensitivity: 0.06 lx to >150,000 lx
- Output resolution LS: 13 to 20 bits
- Three LS gain modes: x1 to x6
- Highly linear output, 50Hz/60Hz light and fluorescent light flicker immunity

Color Sensor Features

- Four parallel channels (red, green, blue, clear)
- Accurate correlated color temperature (CCT)
- Accurate CIE 1931 XYZ (RGB) color measurement
- Very stable spectral response over angle of light incidence
- Output resolution for CS: 13 to 20 bits

Proximity Sensor Features

- Integrated and trimmed LED source, driver, and photodetector
- Programmable, pulsed LED up to 250mA output current
- High resolution (12 to 16 bits)
- Object movement detection (in/out)
- Ambient light suppression > 100 klx sunlight
- Crosstalk cancelation (analog and digital)

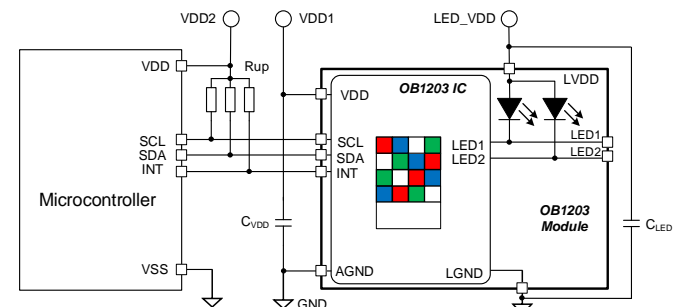
Physical Characteristics

- Highly reliable and industry-proven OSIP package with integrated cover glass for hypoallergenic products
- Wide operation temperature range: -40°C to +85°C
- Wide supply voltage range: 1.7V to 3.6V
- Typical active current at minimum duty cycle:
 - LS/CS: 110µA
 - PS: 90µA + LED current (typical: ~300µA average)
- Low standby current: 2µA typical
- I2C interface capable of Standard Mode (100kHz) or Fast Mode (400kHz) communication; 1.8V to 3.3V logic compatible
- Programmable level-based interrupt functions with upper and lower thresholds for extending battery life
- Industry's smallest package: 4.2 × 2 × 1.2 mm³ 14-pin module

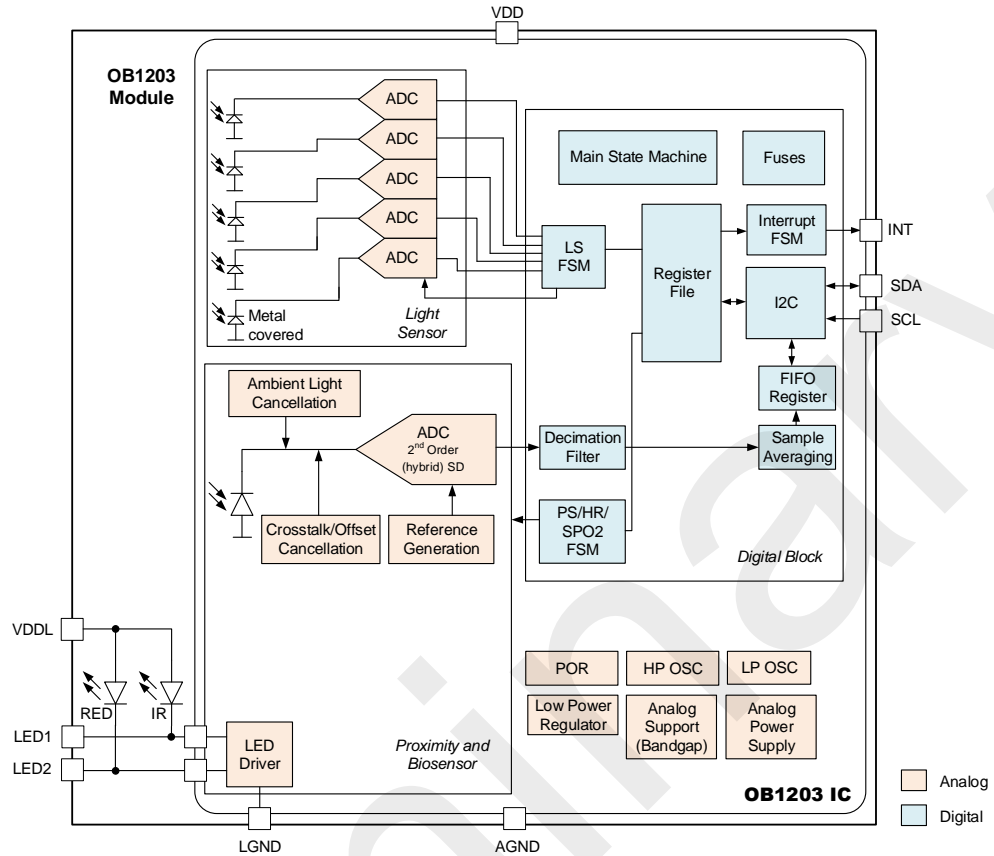
Typical Applications

- Mobile Devices: Wearables, Fitness and Accessories
- Industrial: Lighting, Proximity, Worker Safety, Driver Assist

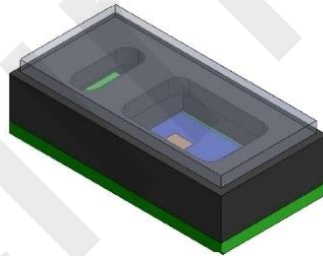
Application Circuit



Block Diagram



Ultra-compact Form Factor Optical Package: $4.2 \times 2 \times 1.2 \text{ mm}^3$



Corporate Headquarters

6024 Silver Creek Valley Road
San Jose, CA 95138
www.IDT.com

Sales

1-800-345-7015 or 408-284-8200
Fax: 408-284-2775
www.IDT.com/go/sales

Tech Support

www.IDT.com/go/support

DISCLAIMER Integrated Device Technology, Inc. (IDT) and its affiliated companies (herein referred to as "IDT") reserve the right to modify the products and/or specifications described herein at any time, without notice, at IDT's sole discretion. Performance specifications and operating parameters of the described products are determined in an independent state and are not guaranteed to perform the same way when installed in customer products. The information contained herein is provided without representation or warranty of any kind, whether express or implied, including, but not limited to, the suitability of IDT's products for any particular purpose, an implied warranty of merchantability, or non-infringement of the intellectual property rights of others. This document is presented only as a guide and does not convey any license under intellectual property rights of IDT or any third parties.

IDT's products are not intended for use in applications involving extreme environmental conditions or in life support systems or similar devices where the failure or malfunction of an IDT product can be reasonably expected to significantly affect the health or safety of users. Anyone using an IDT product in such a manner does so at their own risk, absent an express, written agreement by IDT.

Integrated Device Technology, IDT and the IDT logo are trademarks or registered trademarks of IDT and its subsidiaries in the United States and other countries. Other trademarks used herein are the property of IDT or their respective third party owners. For datasheet type definitions and a glossary of common terms, visit www.idt.com/go/glossary. All contents of this document are copyright of Integrated Device Technology, Inc. All rights reserved.