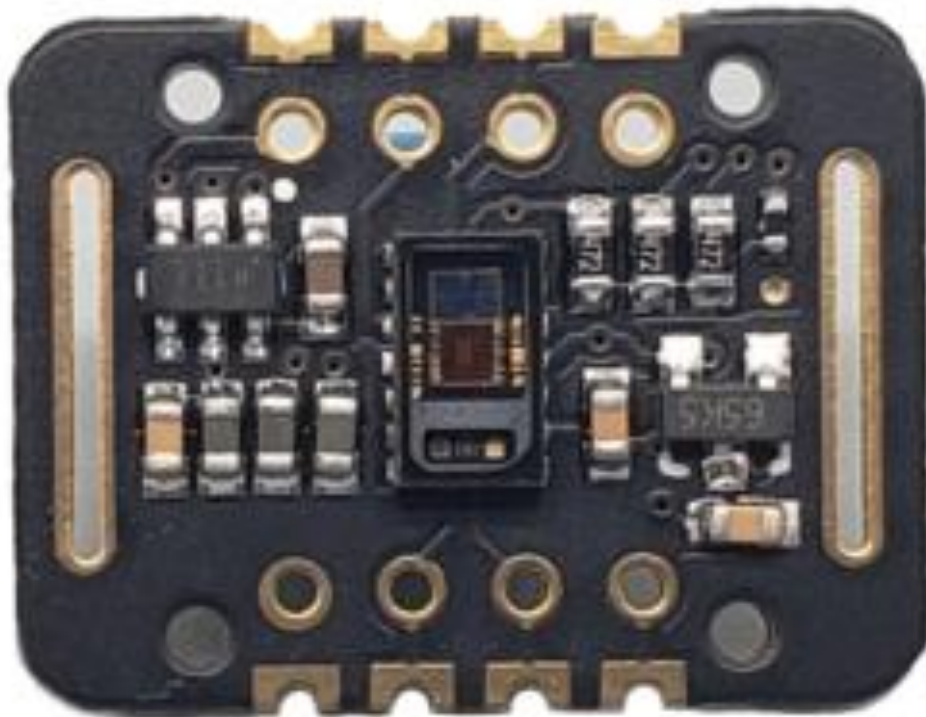


MAX30102 Heart Rate & SpO₂ Pulse Oximeter Sensor Module

The **MAX30102 Heart Rate and Pulse Oximeter Sensor Module** is a high-performance biometric sensor designed for accurate measurement of **heart rate and blood oxygen saturation (SpO₂)**. With its compact design and advanced integrated technology, it is widely used in **wearable health devices, fitness trackers, smartwatches, and medical monitoring systems**. For developers, students, and hobbyists, it offers an affordable and reliable way to bring health monitoring features into electronic projects using microcontrollers such as **Arduino, ESP32, STM32, and Raspberry Pi**.

This module is based on the **Maxim Integrated MAX30102 chip**, which combines **two LEDs (red and infrared), photodetectors, optical elements, and low-noise electronics** into a single package. This integration ensures **high accuracy, low power consumption, and ease of use** in health and biomedical projects.



Key Features of MAX30102 Heart Rate Sensor Module

- **Heart Rate Measurement:** Accurately measures beats per minute (BPM).
- **SpO₂ Monitoring:** Measures blood oxygen saturation using red and infrared LEDs.
- **High Sensitivity Photodetector:** Ensures precise readings even in low-light or noisy environments.
- **I2C Communication Interface:** Simple connection to microcontrollers like Arduino, ESP32, and Raspberry Pi.
- **Low Power Consumption:** Ideal for wearable and portable devices.
- **On-Chip Temperature Sensor:** Helps improve measurement accuracy and stability.
- **Integrated Ambient Light Rejection:** Reduces noise and interference from external light sources.
- **Compact Design:** Easy to integrate into health-monitoring devices.

Technical Specifications

- **Chipset:** Maxim Integrated MAX30102

- **LEDs:** Red (660nm) and Infrared (880nm)
- **Supply Voltage:** 1.8V (internal) and 3.3V (logic)
- **Interface:** I2C (standard 7-bit address)
- **Current Consumption:** Ultra-low power for battery-driven applications
- **On-Chip ADC:** 18-bit resolution for precise readings
- **Dimensions:** Compact and lightweight design, ideal for embedded projects

Why Choose the MAX30102 Pulse Oximeter Sensor?

The **MAX30102 module** is highly regarded for its **accuracy, integration, and efficiency**. Unlike traditional sensors that require multiple external components, the MAX30102 provides a **ready-to-use, all-in-one solution**. This makes it:

1. **Developer-Friendly:** Simple I2C communication for quick integration with Arduino libraries.
2. **Highly Accurate:** Dual-LED design improves SpO₂ measurement reliability.
3. **Optimized for Wearables:** Low power consumption extends battery life in portable devices.
4. **Medical & Fitness Applications:** Reliable enough for both hobby projects and advanced biomedical research.

Applications of MAX30102 Module

The **MAX30102 Heart Rate and SpO₂ sensor** is versatile and can be applied in:

- **Wearable Devices:** Smartwatches, fitness trackers, and health bands.
- **Medical Devices:** Portable pulse oximeters and patient monitoring systems.
- **DIY Health Projects:** Arduino-based health monitors and IoT health devices.
- **Sports and Fitness:** Monitoring heart rate during workouts and training.
- **Research and Education:** Biomedical engineering, electronics labs, and IoT development.
- **IoT Health Monitoring Systems:** Integration with ESP32 or Raspberry Pi for cloud-based health data logging.

Can effectively eliminate external and internal light interference,
with the best reliable performance.

1.8V power supply

Independent 5.0V power supply for internal LED



LED peak wavelength: 660nm/880nm

LED power supply voltage: 3.3-5v

Communication Interface Voltage: 1.8 - 5V

Detection Signal Type: Optical Reflection Signal (PPG)

How to Use the MAX30102 with Arduino

Connecting the **MAX30102 sensor module** to Arduino is straightforward:

1. Connect the **SDA** and **SCL** pins to Arduino I2C pins (A4 and A5 on Arduino Uno).
2. Power the module with **3.3V** and connect GND.
3. Install available Arduino libraries such as **Adafruit MAX30102** or **SparkFun MAX3010x**.
4. Upload sample codes to start measuring **heart rate (BPM)** and **SpO₂ levels**.
5. Use serial monitor or OLED displays to visualize results in real-time.

With ESP32 or Raspberry Pi, you can enhance functionality by sending health data to a **cloud server or mobile app** for remote health tracking.

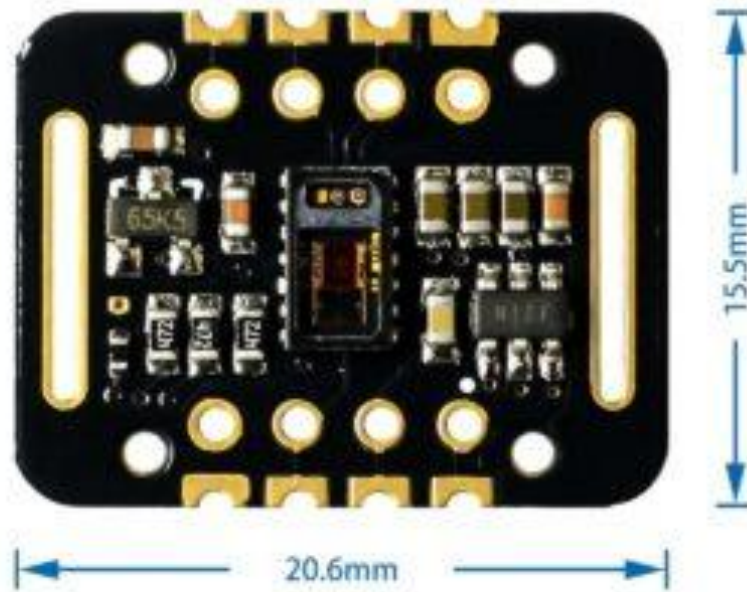


Package Includes

- 1 × MAX30102 Heart Rate & SpO₂ Pulse Oximeter Sensor Module

Conclusion

The **MAX30102 Heart Rate and Pulse Oximeter Sensor Module** is a compact, reliable, and energy-efficient solution for biometric sensing. Whether you are developing a **wearable health device, fitness tracker, or Arduino-based IoT health project**, this sensor provides precise and consistent performance. Its **integration of red and infrared LEDs with advanced signal processing** ensures accurate heart rate and oxygen level monitoring, making it ideal for both educational and professional applications.



By choosing the **MAX30102 sensor module**, you gain access to one of the most advanced and widely used biometric sensors on the market, perfect for **IoT health monitoring, biomedical projects, and wearable technology**.