

## BME688



# BME688 Environmental Sensor 4-in-1

v1.0

2025-07-15

Rev. A

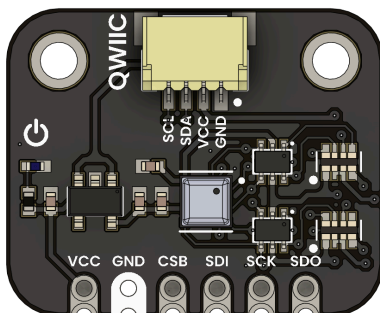
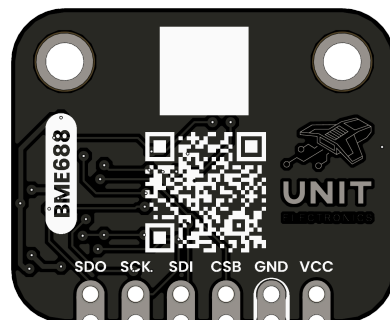
*The sensor module for professional environmental monitoring*

## PRODUCT OVERVIEW

The BME688 Environmental Sensor 4-in-1 is an advanced, high-precision sensor module designed for professional environmental monitoring applications. Built around Bosch's industry-leading BME688 sensor, this module delivers exceptional accuracy and reliability for temperature, humidity, pressure, and gas detection in a single, compact form factor.

This professional-grade sensor module is engineered for demanding applications requiring precise environmental data collection. With its dual communication interfaces and ultra-low power consumption, it's ideal for battery-powered IoT devices, industrial monitoring systems, and research applications where accuracy and reliability are paramount.

## PRODUCT VIEWS

**TOP VIEW***Component placement and connectors***BOTTOM VIEW***Underside components and connections*

# KEY TECHNICAL SPECIFICATIONS

## POWER SUPPLY

Power supply:1.71V to 3.6V Sensor Supply Voltage

Low power consumption:sleep < 0.1  $\mu$ A, typical operation < 3  $\mu$ A

## CONNECTIVITY

Interfaces:I<sup>2</sup>C (Qwiic) and SPI

Connector:Qwiic + Pin Headers

## PIN CONFIGURATION

GROUP	AVAILABLE PINS	SUGGESTED USE
SPI	CSB, SDI (MOSI), SDO (MISO), SCK	High-speed SPI to read sensor data

## COMMUNICATION INTERFACES

INTERFACE	SIGNALS / PINS	TYPICAL USE
UART	–	Unavailable
I <sup>2</sup> C	SDA, SCL (CSB held high)	Default interface (Qwiic connector)
SPI	CSB = GND, SDI (MOSI), SCK, SDO (MISO)	High-speed alternative

## TECHNICAL FEATURES

### Temperature measurement

–40 to +85 °C, ±0.5 °C accuracy

### Barometric pressure

300 to 1100 hPa, ±1 hPa accuracy

### Dual interface

I<sup>2</sup>C (Qwiic) and SPI

### Humidity measurement

0 to 100 % RH, ±3 % accuracy

### VOC detection

Indoor Air Quality (IAQ) index

### Compact form factor

Qwiic connector + standard through-hole pins

## TYPICAL APPLICATIONS

### Environmental Monitoring

Ideal for tracking air quality, humidity, temperature, and pressure in smart homes and industrial applications.

### IoT Devices

Can be integrated into IoT systems for real-time environmental data collection and analysis.

### Weather Stations

Useful in DIY weather stations for accurate weather forecasting and monitoring.

### Smart Agriculture

Helps in monitoring soil and air conditions to optimize crop growth and yield.

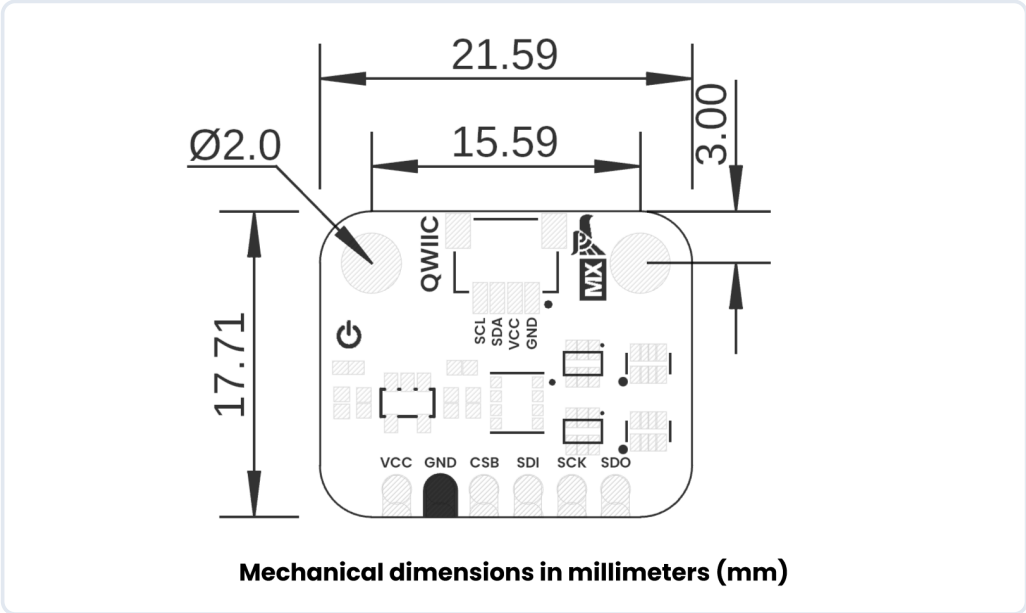
### Wearable Devices

Can be used in health and fitness wearables to monitor

VISUAL DOCUMENTATION

PRIMARY TECHNICAL DOCUMENTATION

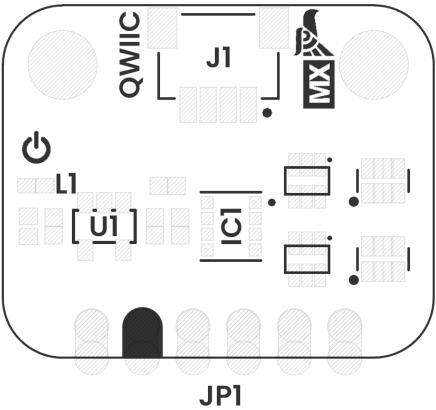
MECHANICAL DIMENSIONS



Physical dimensions and mounting specifications (measurements in millimeters)

SUPPLEMENTARY TECHNICAL DOCUMENTATION

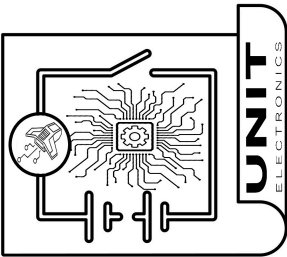
SYSTEM TOPOLOGY



Top View of Board Topology

Connection topology and system integration

CIRCUIT SCHEMATIC



Detailed circuit schematic diagram

[View Complete Schematic PDF](#)

## USAGE

This module works with multiple platforms and toolchains:

- Arduino IDE (Adafruit BME680/BME688 library)
- PlatformIO (Arduino or Espressif frameworks)

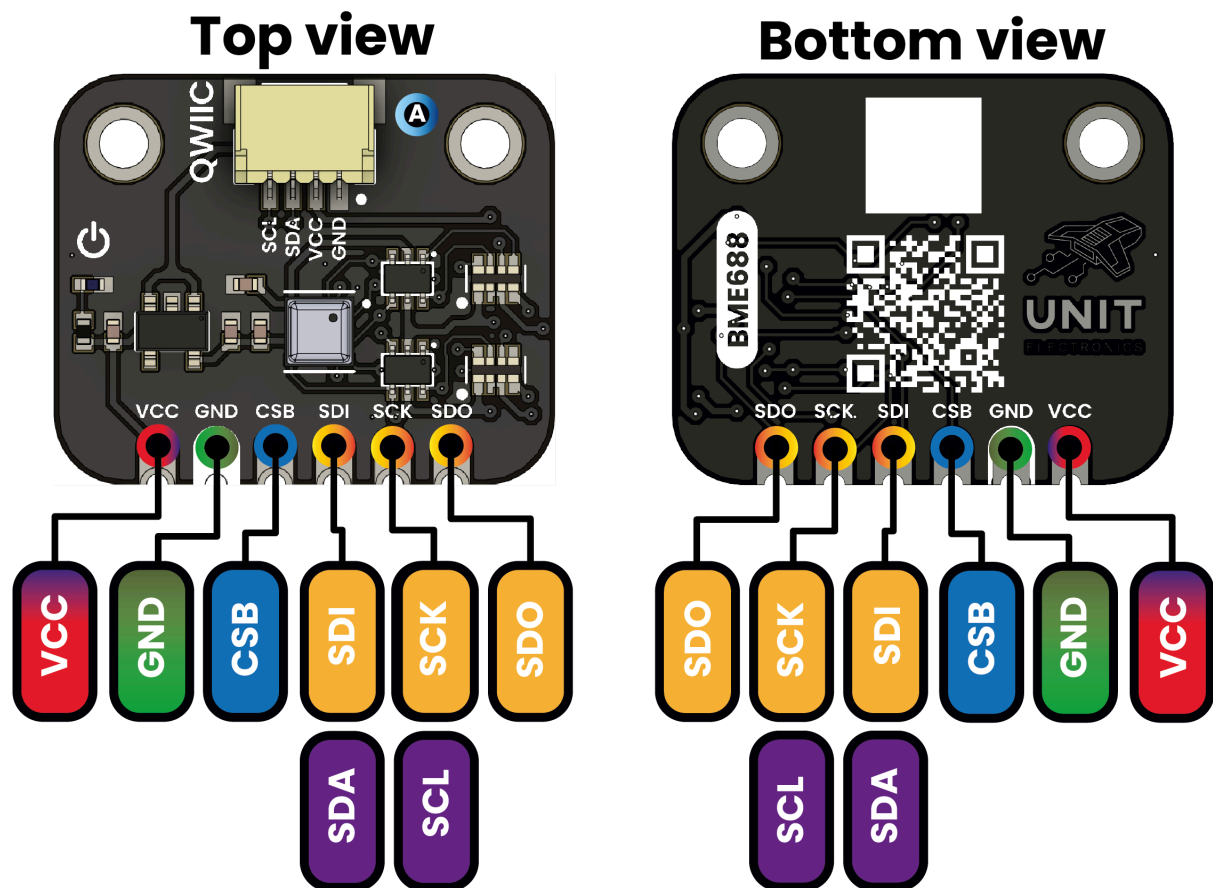
## DOWNLOADS

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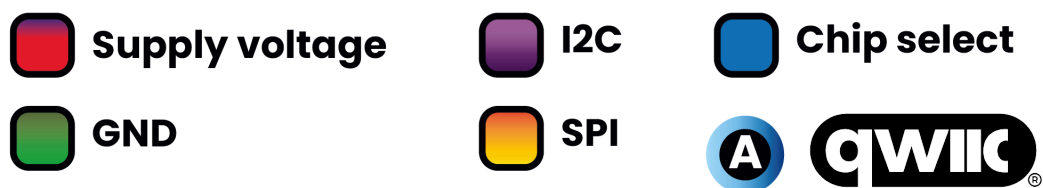
# PIN CONFIGURATION & LAYOUT

*Detailed pin assignment and connector layout*

## PINOUT



## Description:



Complete pin configuration diagram showing all connectors, pin assignments, and electrical connections for proper integration

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**BME688 v1.0**  
**Professional Technical Datasheet**

Date: 2025-07-15  
For commercial distribution