

## BME688



# BME688 Environmental Sensor 4-in-1

v1.0

2025-07-15

Rev. A

*The sensor module for professional environmental monitoring*

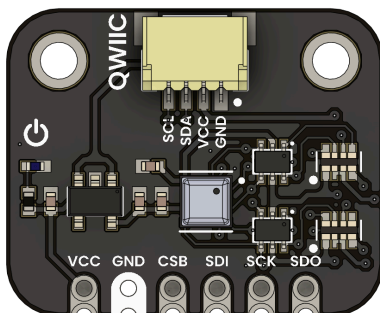
## PRODUCT OVERVIEW

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.

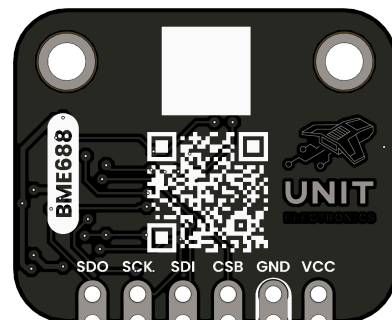
## PRODUCT VIEWS

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:  
Connector:

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

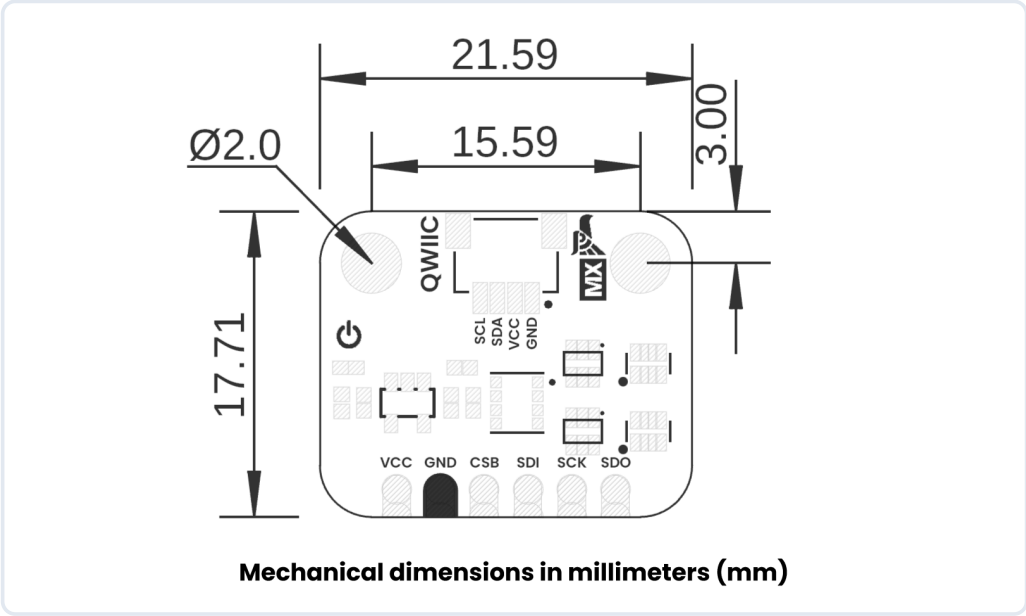
## TYPICAL APPLICATIONS

<div>Environmental Monitoring</div> <div>Ideal for tracking air quality, humidity, temperature, and pressure in smart homes and industrial applications.</div>	<div>IoT Devices</div> <div>Can be integrated into IoT systems for real-time environmental data collection and analysis.</div>	<div>Weather Stations</div> <div>Useful in DIY weather stations for accurate weather forecasting and monitoring.</div>
<div>Smart Agriculture</div> <div>Helps in monitoring soil and air conditions to optimize crop growth and yield.</div>	<div>Wearable Devices</div> <div>Can be used in health and fitness wearables to monitor</div>	

VISUAL DOCUMENTATION

PRIMARY TECHNICAL DOCUMENTATION

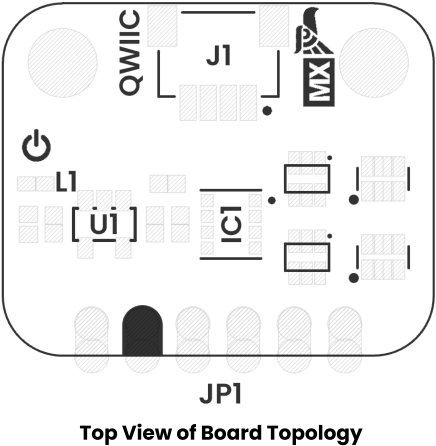
MECHANICAL DIMENSIONS



Physical dimensions and mounting specifications (measurements in millimeters)

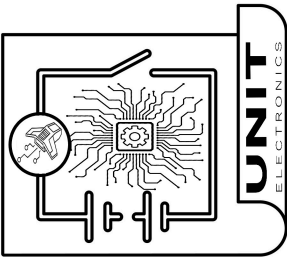
SUPPLEMENTARY TECHNICAL DOCUMENTATION

SYSTEM 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)

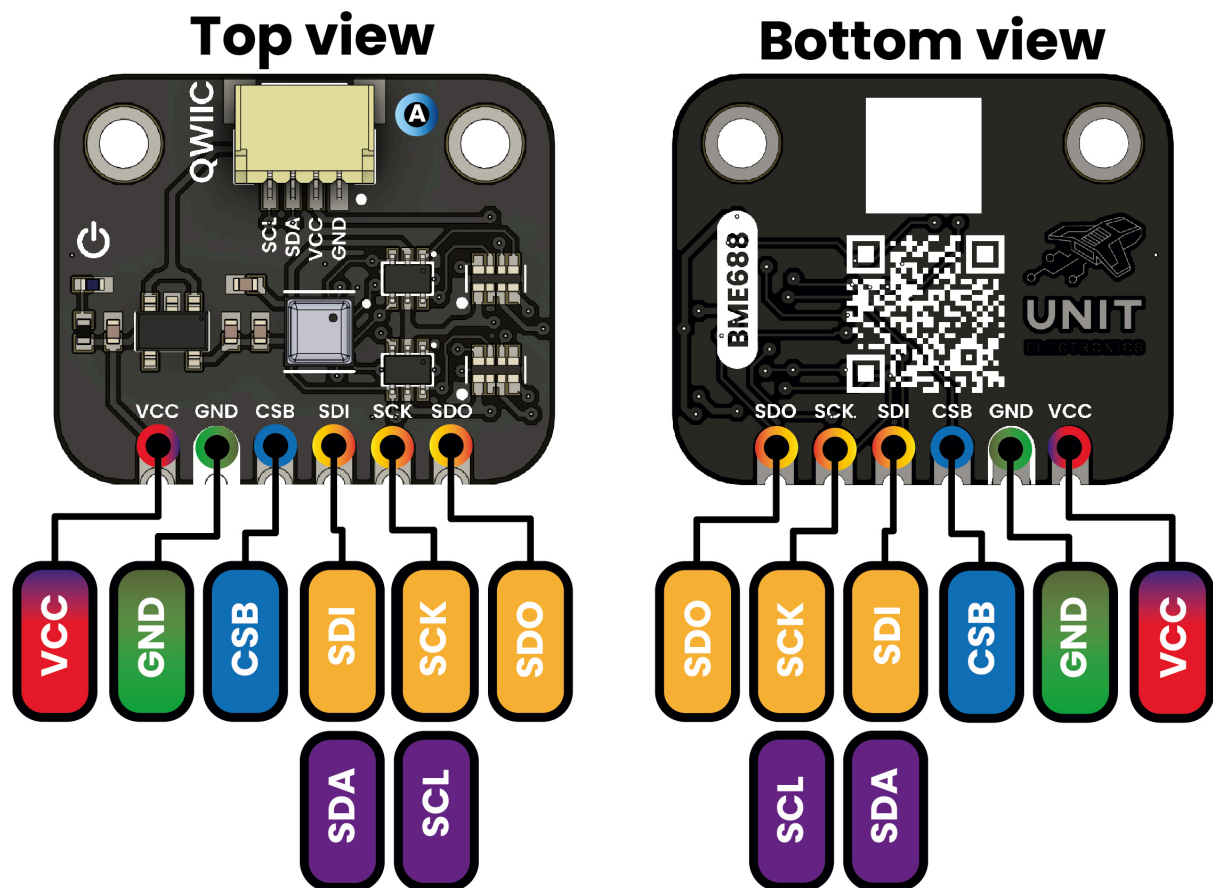
## DOWNLOADS

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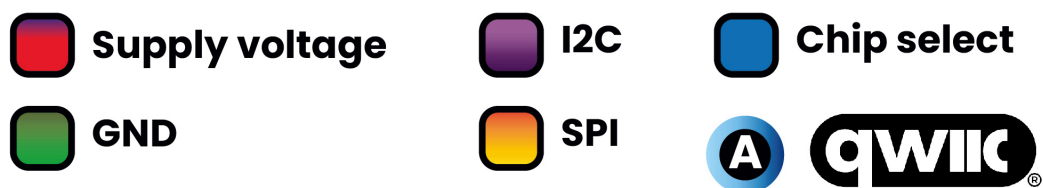
# PIN CONFIGURATION & LAYOUT

*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