BME688

BME688 Environmental Sensor 4-in-1

v1.0

2025-07-16
Rev. A

The sensor module for professional environmental monitoring

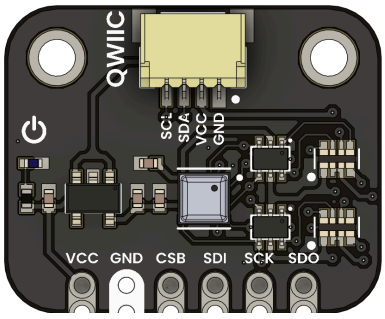
PRODUCT OVERVIEW

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.

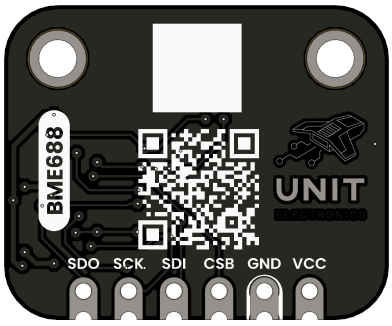
PRODUCT VIEWS

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 µA, typical operation < 3 µA**

CONNECTIVITY

Interfaces:	**I²C (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
I²C	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

Humidity measurement
0 to 100 % RH, ±3 % accuracy

Barometric pressure
300 to 1100 hPa, ±1 hPa accuracy

VOC detection
Indoor Air Quality (IAQ) index

Dual interface
I²C (Qwiic) and SPI

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.

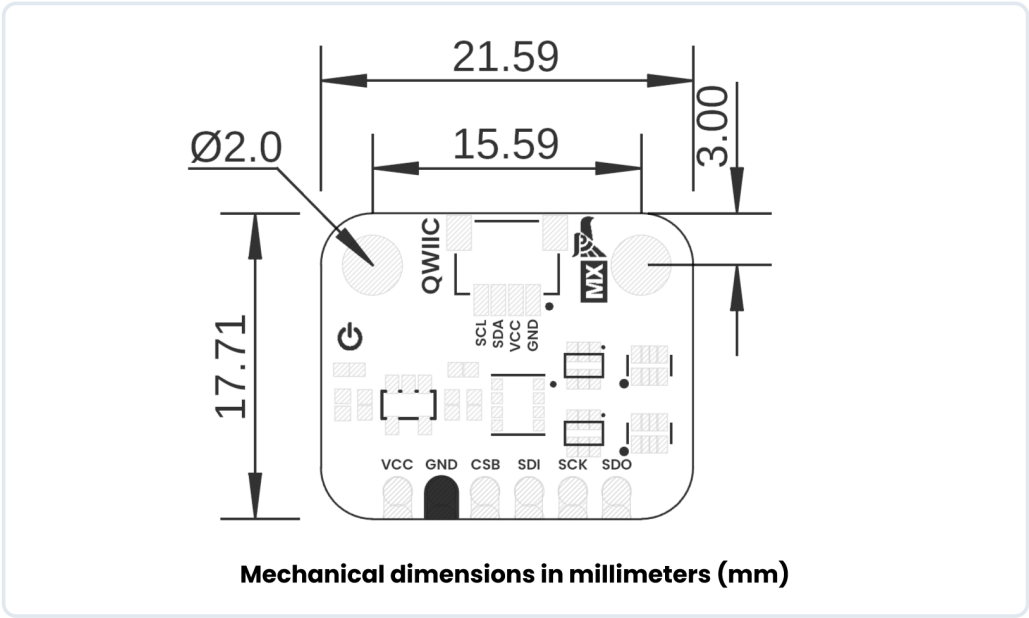
Smart Agriculture
Helps in monitoring soil and air conditions to optimize crop growth and yield.

Wearable Devices
Can be used in health and fitness wearables to monitor

VISUAL DOCUMENTATION

PRIMARY TECHNICAL DOCUMENTATION

MECHANICAL DIMENSIONS

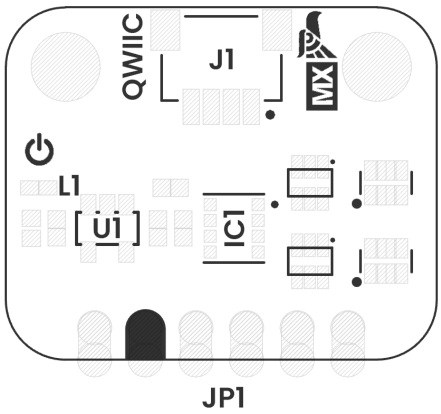


Mechanical dimensions in millimeters (mm)

Physical dimensions and mounting specifications (measurements in millimeters)

SUPPLEMENTARY TECHNICAL DOCUMENTATION

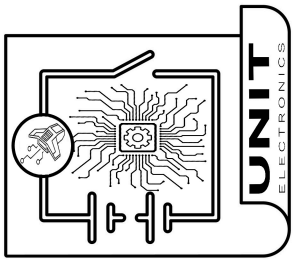
SYSTEM TOPOLOGY



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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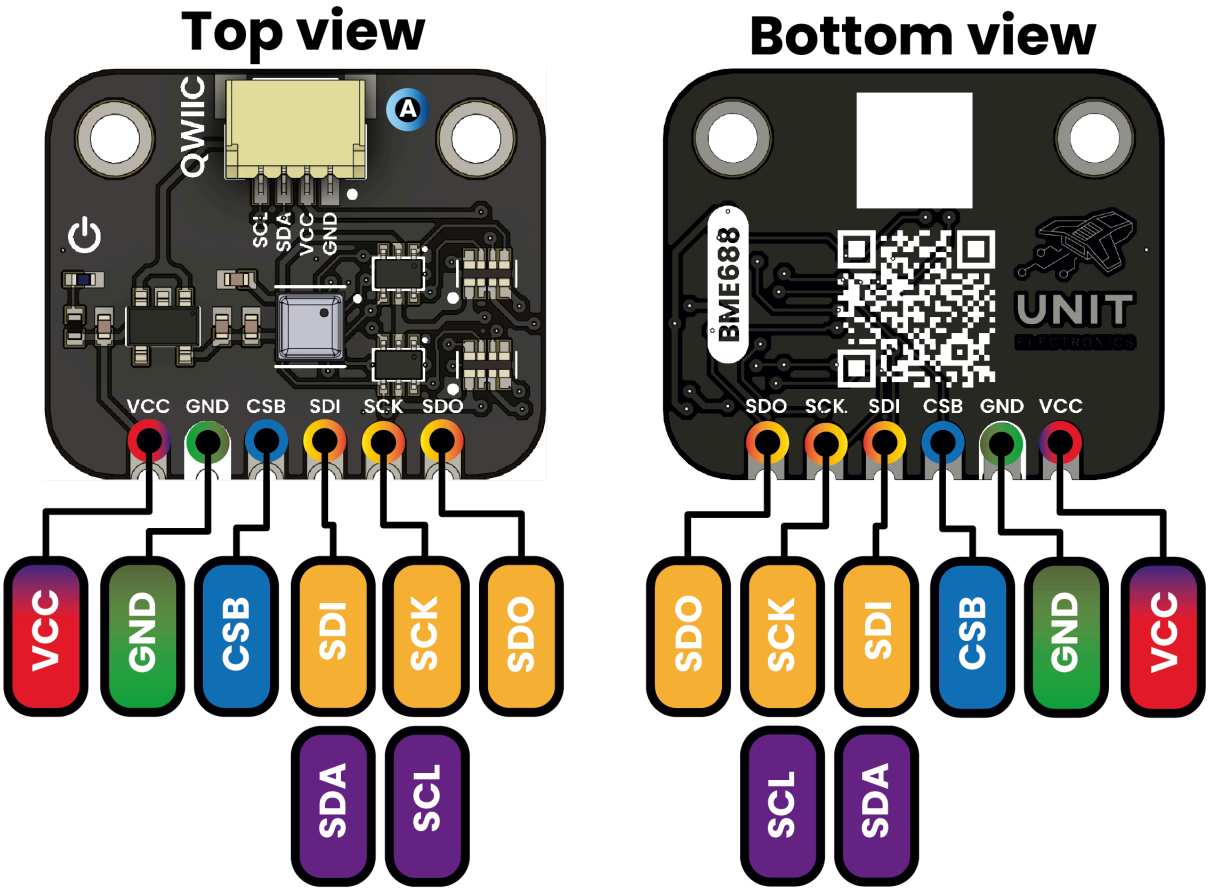
PIN CONFIGURATION & LAYOUT

Detailed pin assignment and connector layout

PINOUT



Description:

Supply voltage

GND

I2C

SPI

Chip select

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

BME688 v1.0
Professional Technical Datasheet
Date: 2025-07-16
For commercial distribution