



TECHNICAL DATASHEET

Hardware Documentation & Development Specifications

ICP-10111 Barometric Pressure Sensor

High-Precision Environmental Sensor Module

Part Number: ICP-10111-001
Revision: Rev. 1.0
Document Date: 2025-07-21

DOCUMENT INFORMATION

| | |
|------------------|---------------------------|
| Document Type | Technical Datasheet |
| Classification | Development Documentation |
| Project Phase | Prototype & Development |
| Technical Author | DevLab Engineering Team |
| Review Status | Draft - Under Development |
| Distribution | Internal Development Team |

DEVELOPMENT NOTICE

This document describes a prototype hardware module under development.
Specifications are preliminary and subject to change during development process.
Not intended for production use without further validation and testing.

UNIT Electronics

Hardware Development & Prototyping
Development Project - Contact: info@unitelectronics.com
© 2025 Development documentation - All specifications are preliminary

PROJECT INFORMATION & DEVELOPMENT STATUS

REVISION HISTORY

| Rev. | Date | Author | Description of Changes |
|------|------------|-------------------------|-----------------------------------|
| 1.0 | 2025-07-21 | DevLab Engineering Team | Initial development documentation |

DEVELOPMENT STATUS

- Project Phase:** Prototype Development
- Hardware Status:** Functional prototype completed
- Testing Status:** Basic functionality verified
- Documentation:** Preliminary specifications
- Certification:** Not yet initiated

FUTURE COMPLIANCE TARGETS

- Design Guidelines:** Following IPC-2221 recommendations
- Environmental Goals:** RoHS compliance preparation
- Safety Considerations:** Basic safety guidelines applied
- EMC Preparation:** Layout considerations for future testing
- Quality Process:** Development best practices

DEVELOPMENT NOTICES

Project Status:

This hardware module is currently in the prototype development phase. All specifications and characteristics described in this document are preliminary and based on initial testing and design calculations.

Disclaimer:

The information in this document represents the current state of development and is provided for development team reference only. Specifications may change as the project progresses through design validation and testing phases.

Usage Notice:

This prototype is intended for development, testing, and evaluation purposes only. It is not suitable for production applications without further development, validation, and appropriate certifications.

*This document follows general technical documentation practices
and represents current development status as of the revision date*

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Hardware License Information

Open Source Hardware License

License Type: Open Source Hardware

License: MIT License

Copyright: Copyright (c) 2025 UNIT Electronics

Description: This hardware design is released under the MIT License

Permissions:

- Commercial Use: Permitted
- Modification: Permitted
- Distribution: Permitted

Requirements:

- Attribution: Attribution required for derivative works

Limitations:

- Warranty: No warranty provided

Design Standards & IPC Guidelines

IPC Standards Reference

This hardware design follows industry-standard IPC guidelines and best practices:

PCB Design Standards:

- IPC-2221 - Generic Standard on Printed Board Design
- IPC-2152 - Standard for Determining Current Carrying Capacity in Printed Board Design

Assembly Standards:

- IPC-A-610 - Acceptability of Electronic Assemblies
- IPC-J-STD-001 - Requirements for Soldered Electrical and Electronic Assemblies

Component Standards:

- IPC-7351 - Generic Requirements for Surface Mount Design and Land Pattern Standard

Testing Standards:

- IPC-TM-650 - Test Methods Manual

Compliance Status (Development Phase)

Environmental Compliance:

- RoHS: Design prepared for RoHS compliance
- REACH: Material selection following REACH guidelines
- Lead-Free: Lead-free assembly process compatible

Note: Development stage - testing in progress

1 SCOPE AND PURPOSE

1.1 Document Scope

This technical datasheet provides comprehensive specifications, electrical characteristics, mechanical dimensions, and application guidelines for the ICP-10111 Barometric Pressure Sensor module. This document is intended for design engineers, system integrators, and technical personnel involved in the development and integration of environmental sensing solutions.

1.2 Product Overview

The ICP-10111 Barometric Pressure Sensor module is a compact embedded sensor with integrated environmental monitoring capabilities, designed for IoT applications and precise atmospheric measurements. The module combines high-accuracy pressure sensing with auxiliary environmental monitoring capabilities in a compact, easy-to-integrate form factor.

1.3 Key Features

- **ICP-10111 Pressure Sensor** - High precision barometric pressure measurement
- **BME688 Environmental Sensor** - Temperature, humidity, and gas sensing capabilities
- **Low Power Consumption** - Optimized for battery-powered applications
- **I2C/QWIIC Connectivity** - Standard digital interface with plug-and-play connector
- **Compact Form Factor** - PCB with castellated holes for flexible mounting options
- **Industrial Temperature Range** - -40to +85operation
- **RoHS Compliant** - Lead-free manufacturing process

2 TECHNICAL SPECIFICATIONS

2.1 Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit | Notes |
|---------------------------|--------|------|------|------|------------------------|
| Supply Voltage | VDD | -0.3 | 6.0 | V | Beyond operating range |
| Storage Temperature | TSTG | -55 | +125 | | Non-operating |
| Pressure Range (Absolute) | PABS | 0 | 1500 | hPa | Mechanical limit |

Table 2: Absolute Maximum Ratings

WARNING: Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

2.2 Recommended Operating Conditions

2.2.1 Sensor Specifications

| Parameter | Value | Unit | Notes |
|-------------------|------------------|-----------|-------------------|
| Pressure Range | 300-1250 | hPa | Absolute pressure |
| Pressure Accuracy | ±0.4 | hPa | At 25 |
| Temperature Range | -40 to +85 | | Operating range |
| Humidity Range | 0-100 | Interface | I2C |
| - | QWIIC compatible | | |

Table 3: Sensor Performance Specifications

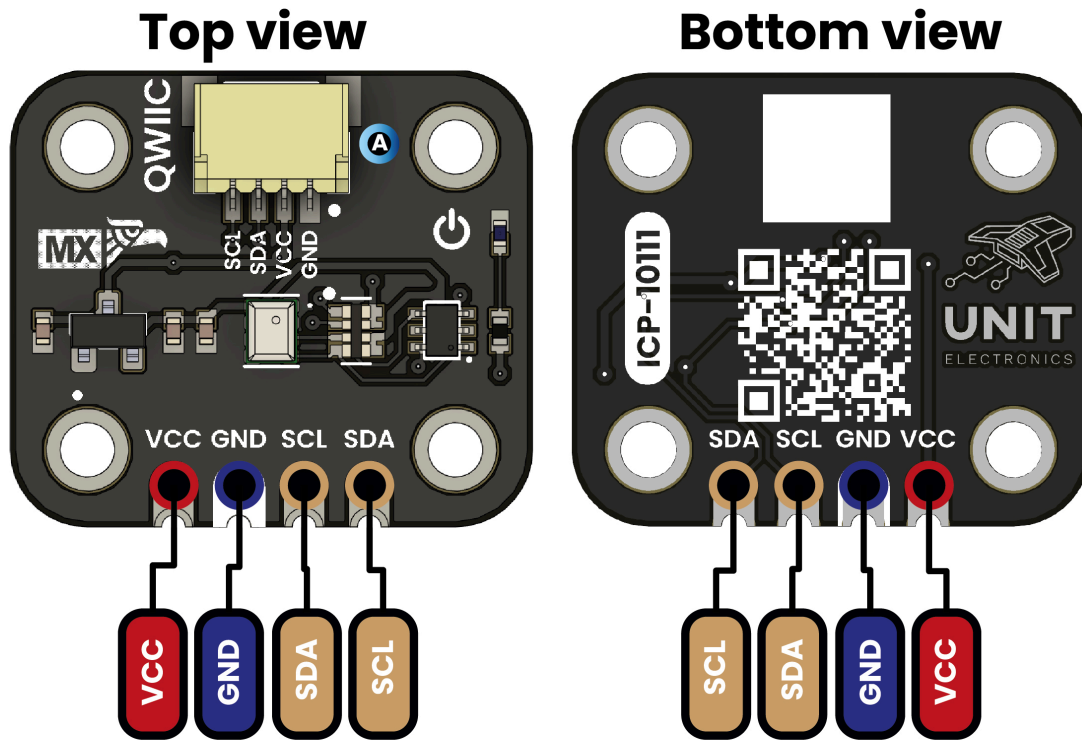
2.2.2 Power Specifications

| Parameter | Min | Typ | Max | Unit | Conditions |
|------------------|-----|-----|-----|------|------------------------|
| Supply Voltage | 3.0 | 3.3 | 5.0 | V | Normal Operation |
| Active Current | - | 1.2 | 2.0 | mA | Continuous measurement |
| Sleep Current | - | 0.1 | 0.5 | μA | Standby mode |
| Regulator Output | - | 1.8 | - | V | Internal LDO |

Table 4: Electrical Characteristics

2.3 Pinout

PINOUT



Description:



Figure 1: Pinout Diagram

| Pin Label | Function | Notes |
|-----------|--------------|----------------------------------|
| VCC | Power Supply | 3.3V or 5V |
| GND | Ground | Common ground for all components |
| SDA | I2C Data | |
| SCL | I2C Clock | |

Table 5: Pin Configuration

2.4 Dimensions

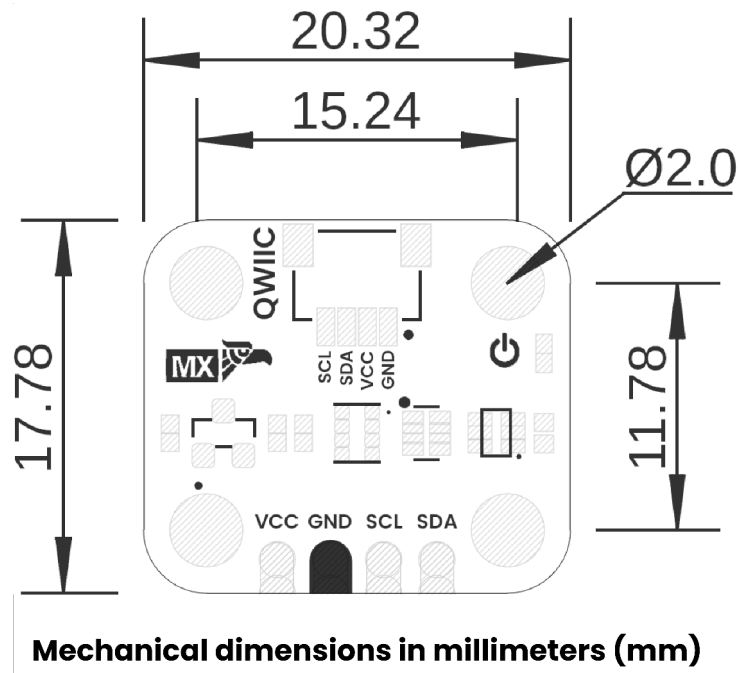
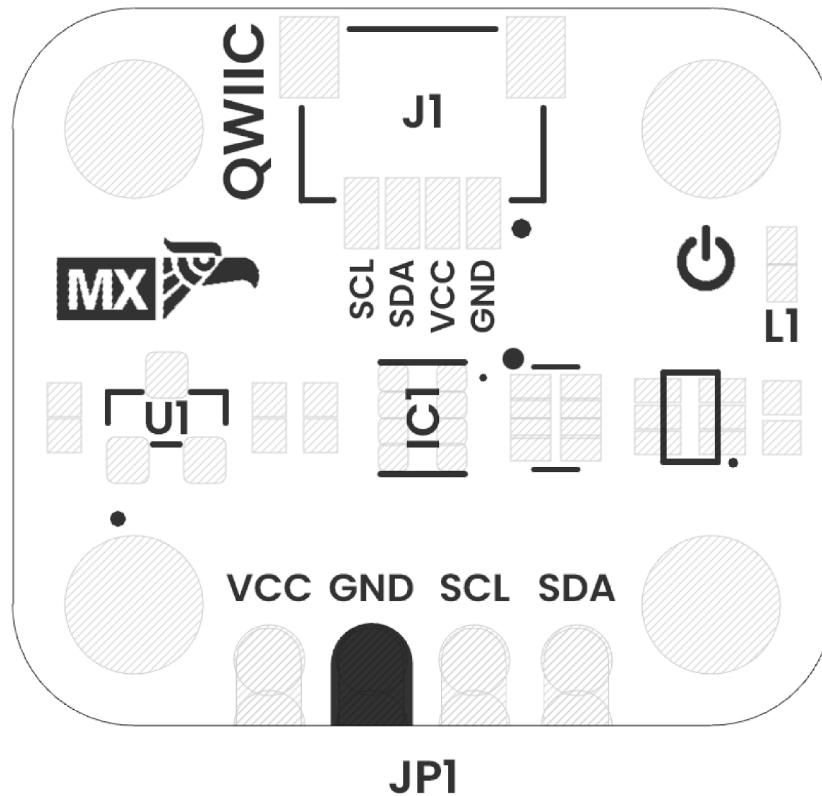


Figure 2: Dimensions

2.5 Topology



Top View of Board Topology

Figure 3: Topology

| Ref. | Description |
|------|--|
| IC1 | ICP-10111 Barometric Pressure Sensor |
| IC2 | BME688 Environmental Sensor |
| L1 | Power On LED |
| U1 | ME6206A18XG 1.8V Regulator |
| JP1 | 2.54 mm Castellated Holes |
| J1 | QWIIC Connector (JST 1 mm pitch) for I2C |

Table 6: Component Reference

2.6 Communication Interfaces

2.6.1 I2C Interface

- **Address:** 0x63 (ICP-10111), 0x77 (BME688)
- **Speed:** Standard (100 kHz), Fast (400 kHz)
- **Features:** QWIIC compatible connector
- **Pull-up Resistors:** 4.7k Ω integrated

2.6.2 Digital Interface Specifications

- **Logic Levels:** 3.3V CMOS compatible
- **Input High:** 2.0V minimum
- **Input Low:** 0.8V maximum
- **Output Drive:** 4mA typical

2.7 Physical Characteristics

2.7.1 Package Information

| Parameter | Value | Unit |
|--------------|--------------------|--------------|
| Package Type | Custom PCB | - |
| Dimensions | 25.4 x 15.24 x 3.2 | mm |
| Mounting | Castellated holes | 2.54mm pitch |
| Weight | 2.1 | g |

Table 7: Physical Dimensions

2.7.2 Environmental Specifications

| Parameter | Min | Max | Unit | Conditions |
|-----------------------|-----|-------------------|----------------|---------------|
| Operating Temperature | -40 | +85 | | Full accuracy |
| Storage Temperature | -55 | +125 | | - |
| Humidity | 0 | 100 | Pressure Range | 300 |
| 1250 | hPa | Absolute pressure | | |

Table 8: Environmental Operating Conditions

2.8 Software Support

2.8.1 Development Environment

- **Arduino IDE:** Full library support
- **ESP-IDF:** Native driver integration
- **PlatformIO:** Cross-platform support
- **CircuitPython:** Python library available

2.8.2 Key Libraries

- ICP-10111 pressure sensor driver
- BME688 environmental sensor library
- I2C communication protocols
- Data filtering and calibration

2.9 Applications

The ICP-10111 module is ideal for:

1. Weather Monitoring

- Atmospheric pressure measurement
- Altitude determination
- Weather prediction systems

1. IoT Environmental Sensing

- Smart building automation
- Agricultural monitoring
- Air quality assessment

1. Portable Devices

- Fitness trackers
- Outdoor navigation devices
- Drone altitude control

2.10 Safety and Compliance

2.10.1 Certifications

- **RoHS:** Compliant with EU directive
- **REACH:** Compliant with EU regulation
- **CE:** Electromagnetic compatibility

2.10.2 Safety Features

- **ESD Protection:** $\pm 2\text{kV}$ HBM on all pins
- **Reverse Polarity Protection:** Integrated
- **Thermal Protection:** Operating range monitoring

2.11 References

- [ICP-10111 Datasheet](#)
- [BME688 Datasheet](#)
- [ME6206 Regulator Datasheet](#)

2.12 Ordering Information

| Part Number | Description | Package | MOQ |
|---------------|-----------------|------------|-----|
| ICP10111-001 | Standard Module | Individual | 1 |
| ICP10111-DEV | Development Kit | Kit Box | 1 |
| ICP10111-BULK | Bulk Order | Tray | 100 |

Table 9: Available Part Numbers

2.13 Revision History

| Version | Date | Changes |
|---------|------------|-----------------|
| 1.0 | 2025-07-18 | Initial release |

Table 10: Document Revision History

2.14 Schematics

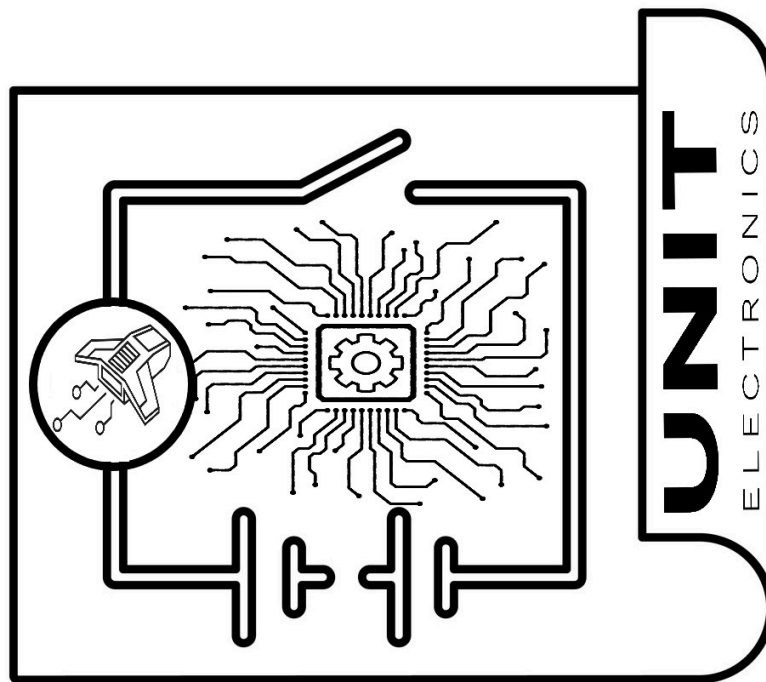


Figure 4: Circuit Schematic

For technical support and additional information, visit our website or contact our engineering team.