



## 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

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### **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  
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© 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

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## 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: Especificaciones técnicas

**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 2.2 Recommended Operating Conditions

### 2.2.1 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: Especificaciones técnicas

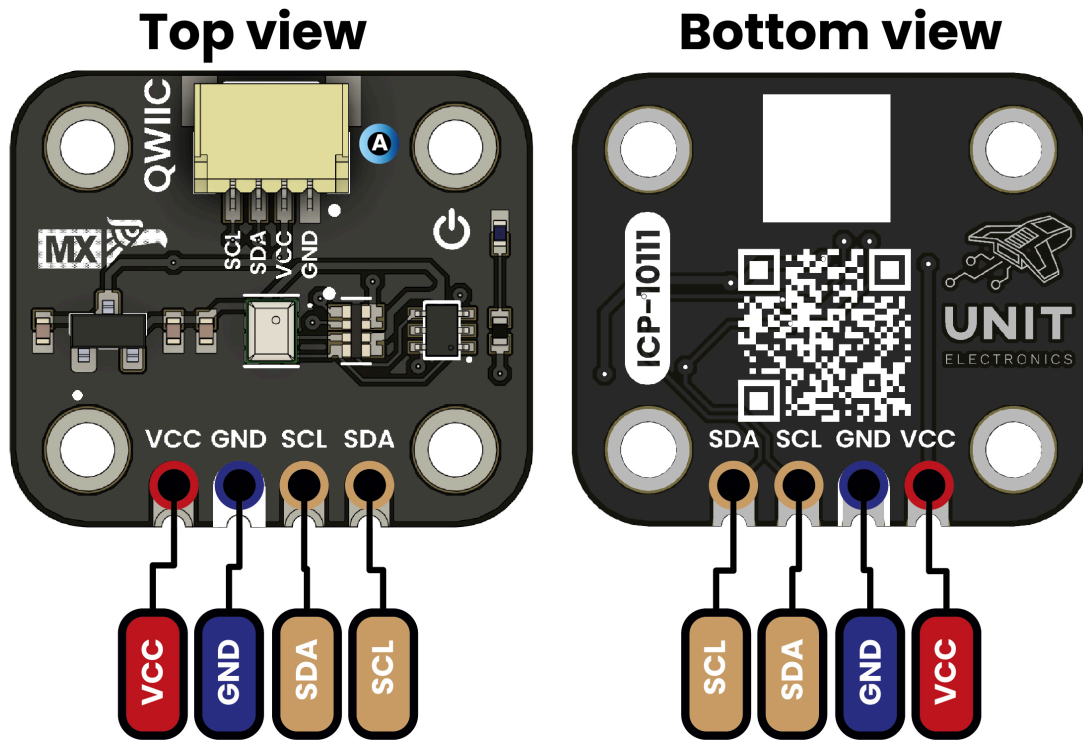
### 2.2.2 Power Specifications

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: Especificaciones técnicas

## 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: Especificaciones técnicas

## 2.4 Dimensions

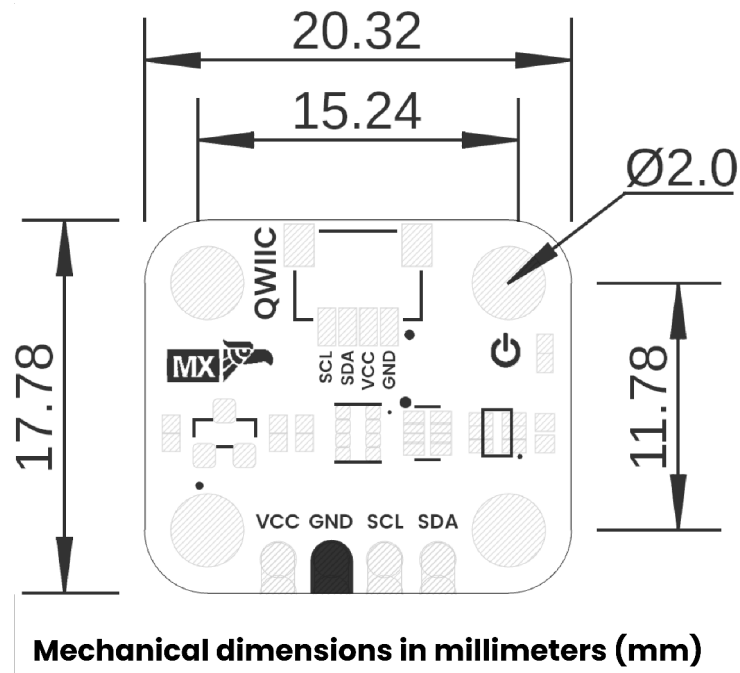
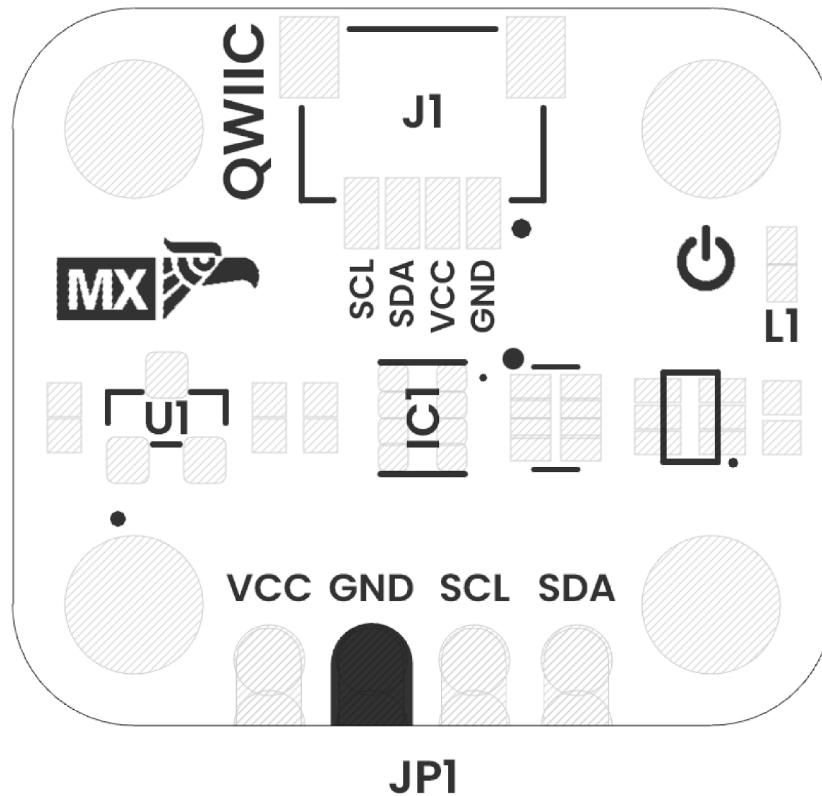


Figure 2: Dimensions

## 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: Especificaciones técnicas

## 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 $\Omega$  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: Especificaciones técnicas

### 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: Especificaciones técnicas

## 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: Especificaciones técnicas

## 2.13 Revision History

Version	Date	Changes
1.0	2025-07-18	Initial release

Table 10: Especificaciones técnicas

## 2.14 Schematics

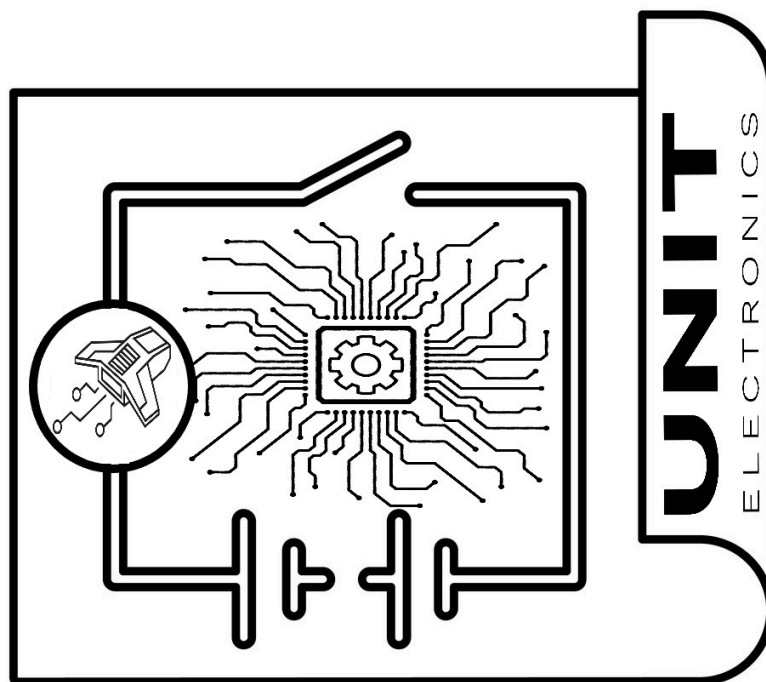


Figure 4: Circuit Schematic

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