

AmbiMate SENSOR MODULE DEVELOPMENT KIT

MS4 Series

TE Connectivity's (TE) AmbiMate Sensor Module MS4 Development Kits allow a developer, with use of some downloadable code, to connect to either a Raspberry Pi or Arduino and start collecting data within 30 minutes. AmbiMate sensor module MS4 series provides an application specific set of sensors on a ready to attach PCB assembly for easy integration into a host product. Design resources are freed and time to market accelerated by integrating the MS4 series pre-engineered, four core sensor solution for Motion / Light / Temperature / Humidity into your next product.

Other MS4 series sensor modules include VOC (Volatile Organic Compound), eCO₂ (equivalent carbon dioxide) and sound detection. Add the capability to monitor air quality through the capture of VOC concentrations. Select an MS4 series with a microphone to augment motion detection or to listen for sound events.

All MS4 series sensor modules offer the flexibility of sharing a common seven position connection. This allows the designer to layout a single PCB footprint accommodating all the available sensor configurations at production.

Applications

- Indoor Lighting
- Building Automation
- Connected Home
- Air Quality
- Energy Management
- Work Space Comfort
- Zonal Environmental Controls

Four Core Sense Capability

- Motion (PIR)
- Light
- Temperature
- Humidity

Optional Sense Capability

- VOC
- eCO₂
- Sound (microphone)

Specifications

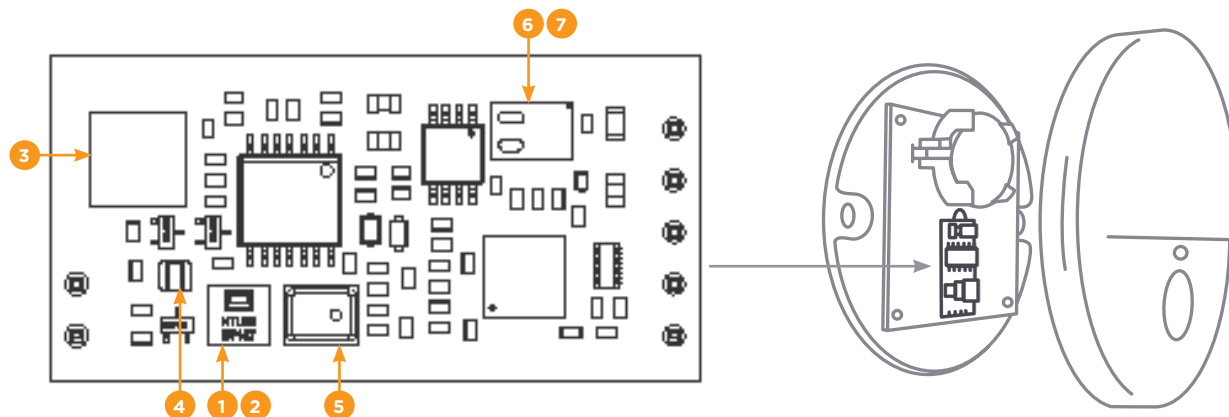
- Application Specification: [114-133092/114-133115](#)
- Design Objectives / Specification: [108-133092](#)



Benefits

- Design resources are freed and time to market is accelerated
- Simplicity of popular I²C communication protocol
- Event out pin for real time motion detection
- Space saving compact design
- Multiple attach methods to accommodate your application need
- One footprint allows multiple sensor configurations & flexibility in design
- All the parts required to interface with a Raspberry Pi and Arduino

Product Specifications



Item	Sensor	Sensor Performance
1	Temperature	5°C to +50°C ± 1°C Accuracy, 1 second acquisition rate
2	Relative Humidity	5% to 95% RH, 3% accuracy, 1 second acquisition rate
3	Motion	Interrupt driven
4	Ambient Light Level	1 second acquisition rate 0-1024 Lux
5	Microphone	Analog audio and interrupt driven option, response <0.5 seconds
6	VOC	0-1187ppb, 60 second acquisition rate
7	eCO ₂	400-8192ppm, 60 second acquisition rate, (an equivalent CO ₂ measurement based on total VOC concentrations)

Absolute Maximum Ratings	Symbol	Min	Max	Unit
Storage Temperature	Tstg	-40	85	°C
Power Supply Input Voltage	Vdd	3.1	3.5	VDC
Total System Current Draw	Id	x	10*	mA*

*w/ VOC/eCO₂ with value 33mA

Electrical Characteristics	Min	Max	Unit
Analog Audio Output Sensitivity	-25	-19	dBV
Analog Audio Output Freq Range	100	10k	Hz

Environmental Characteristics	Min	Max	Unit
Operating Temperature	-5	50	°C
Relative Humidity Operating, Non-Condensing Environment	5	95	%

Electrical

- 3.3 VDC input
- I²C Output (10k Baudrate)
- Interrupt driven event pin for motion detection
- Design optimized for maximum battery life

Design Considerations

- Mounting location: ceiling, wall, corner
- PIR requires use of Fresnel lens
- Enclosure must allow free air movement over sensors
- Use of light pipe recommended to avoid shadowing

For enhanced motion detection, please contact TE.

Note: Refer to Application Spec 114-133092 or contact TE for additional design considerations when integrating with a host product.

Pin Assignment

I²C Signals

Pin	Signal	I/O	Description
1	GND	I/O	Common Connection
2	Event Out	O	Motion
3	SCL	O	Clock Signal for I ² C bus
4	SDA	O	Data signal for I ² C bus
5	Vdd	I	3.3 VDC Input

Audio Signals

Pin	Signal	I/O	Description
1	Audio Output	O	Analog audio output signal
2	GND	O	Common connection

Product Selection Information

Kit Part Number	AmbiMate Part Number	AmbiMate Series	Four Core	VOC	eCO ₂	Sound	Vertical w/Header*
2331211-1	2314277-1	MS4	•				•
2331211-2	2314277-2	MS4	•			•	•
2331211-3	2314291-1	MS4	•	•	•		•

*.100" unshrouded high temp header for socket connection to .062" host PCB.

AmbiMate Development Kit



AmbiMate Loom ARD
Part Number: 1-2332094-1

AmbiMate Loom PI
Part Number: 2332094-1

AmbiMate MS4

Part Number: 2314277-1
Part Number: 2314277-2
Part Number: 2314291-1

Four Core Sense Capability

- Motion (PIR)
- Light
- Temperature
- Humidity

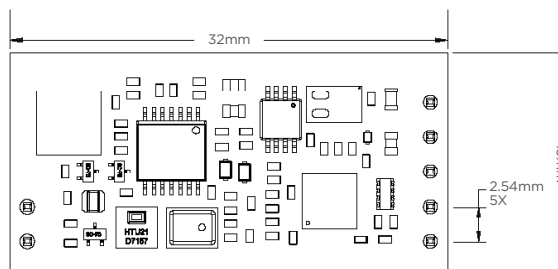
Optional Sense Capability

- VOC
- eCO₂
- Sound (microphone)

Free Python and Arduino code are available from te.com/AmbiMate

Dimensions

MS4 Series Header



te.com

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