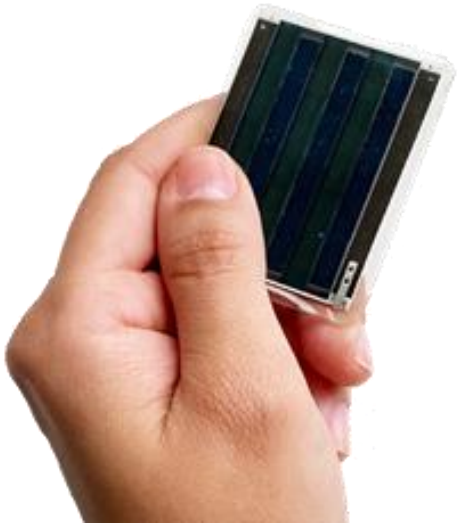
miro
Card

BATTERYLESS BLUETOOTH IOT SENSOR



Maintenance free, ultra-thin, battery less Bluetooth IoT sensor device for wireless remote sensing applications

miro Card is our first generation of battery less sensors. Using the latest solar harvesting technology, these devices operate without batteries even in low indoor lighting conditions, thus eliminating the need for battery maintenance. Their small credit card size enables them to be used as deploy-and-forget sensors for smart infrastructure. The PV cell-based harvesting is highly efficient and also works in low light conditions (>200 lux).

Onboard sensors include light, temperature, humidity, magnetic field, and acceleration. This device is currently available using Bluetooth Low Energy technology.

KEY BENEFITS

- Bluetooth Low Energy wireless standard
- No battery maintenance
- Fast wake up (~3 seconds)
- Small form factor
- High efficiency
- Works in low light conditions

APPLICATIONS

- Environmental sensing
- Smart buildings
- Wireless sensing
- Asset Tracking
- Electronic Point of Sale
- Industrial and home automation

Document Information

ABOUT

File name	miro Card datasheet
Document type	Datasheet
Date	11.02.2021
Revision	66

REVISION HISTORY

Date	Release	Changes

TABLE OF CONTENT

Functional Description

Battery less IoT Sensors are a new line of energy-harvesting sensors with virtually infinite lifetimes. These devices are powered entirely from the environment, using a high efficiency solar cell. Our advanced power management enables fast wake-up times of several seconds, depending on light availability. Once the device is in operation, it can read different sensors including light, temperature, humidity, and acceleration.

The **miro Card** operates in the 2.4GHz frequency band and can broadcast sensor data in Bluetooth Low Energy (BLE) beacon format, as well as proprietary 802.15.4-based protocols.

The companion App for Android devices can be used to visualize the sensor data from the **miro Card**. Depending on the specific configuration, this can mean either sensor data, or user data. In the following figure, two different **miro Card** types are visualized. The first is a temperature and humidity sensor. Depending on the **miro Card** configuration, not all sensor readings might be enabled. This directly correlates with the periodicity with which sensor values can be transmitted.

miro Card hosts four different sensors. Two are environmental sensors: a light sensor and a high-accuracy temperature/humidity sensor. In addition, a Hall sensor can detect the presence of a magnetic field. This can be used to determine the proximity of objects with magnets. An accelerometer can detect the orientation of the **miro Card**. These sensors can be used in conjunction with internal cryptographic keys to establish a secure communication protocol with smartphones and base stations.

Technical Specifications

MECHANICAL SPECIFICATIONS

Weight	5 g
Dimensions	60 x 45 x 2 mm
Enclosure	Plastic, ABS

OPERATING CONDITIONS

Temperature	-20 – 40 °C
Humidity	0 – 95% RH, non-condensing

DEVICE POWER SUPPLY

Power source	Organic solar cell
Input power required for cold start	3 µW, approx. 200 lx

RADIO / WIRELESS

Wireless technology	Bluetooth Low Energy BLE, 802.15.4 PHY
RF output power	5 dBm
Receiver sensitivity BLE	-97 dBm
Receiver sensitivity 802.15.4 PHY	-100 dBm

PACKET TRANSMISSION RATE

Condition	Luminosity	Startup Time	Avg. Input Power	Packet Rate
Natural + indoor light	2600 lx	2.9 s	977 µW	16.25 pkt/s
High indoor light	1000 lx	7.2 s	372 µW	6.17 pkt/s
Medium indoor light	500 lx	13.6 s	181 µW	2.92 pkt/s
Low indoor light	250 lx	33.5 s	85 µW	1.9 pkt/s

Sensor Specifications

TEMPERATURE

Range	-40 – 90 °C
Resolution	0.01 °C
Accuracy (typ.)	± 0.2 °C

HUMIDITY

Range	0 – 100 % RH
Resolution	0.5 % RH
Accuracy (typ.)	± 2 % RH, see Figure 1

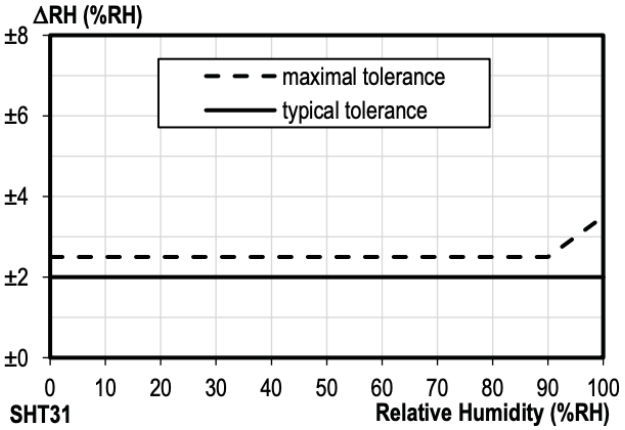


Figure 1

Additional Documentation

ADDITIONAL RESSOURCES

Product Information Page	Product Website
Technical Documentation	Technical Documentation Website

Keep in touch

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