EM MICROELECTRONIC

A COMPANY OF THE SWATCH GROUP

FACT SHEET | EM9301

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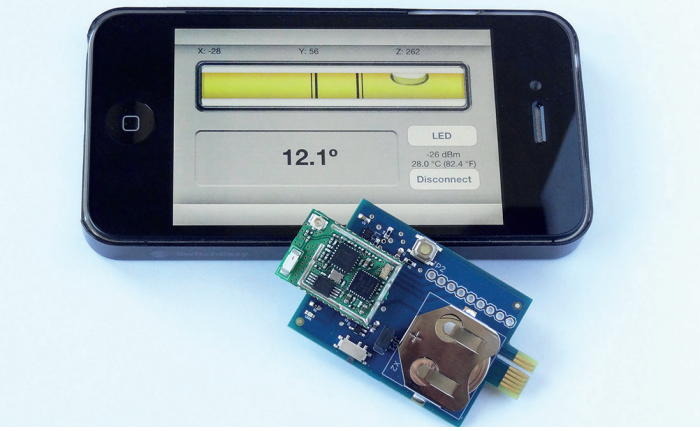
www.emmicroelectronic.com



Single-Cell Battery Bluetooth Low Energy Controller

General Description

The EM9301 is a low-voltage, low-power, fully-integrated, single-chip *Bluetooth*[1] Low Energy (BLE) controller.

It features a low-power physical layer, a link layer with an embedded security engine, a Host/Controller Interface (HCI), and a powerful power management which allows operation using efficiently all kinds of batteries down to 1.9V.

EM9301 can be for all applications where a supply voltage from a typical 3V battery or from any other source is available in the system with a small bill of material..

This BLE controller offers performances tailored for extremely low-power applications. Furthermore, the minimum amount of external components required makes the EM9301 suitable for applications where the form factor is a fundamental parameter.

The EM9301 controller is designed to act as BLE master or slave according to the *Bluetooth* specification V4.1 (Declaration ID D025195). It can be controlled by any external microcontroller featuring BLE profiles and applications through the standard *Bluetooth* HCI interface. UART and SPI interfaces are available as HCI transport layers. Moreover, during the intervals with no active BLE RF connection, the EM9301 features a proprietary low-power mode which can further reduce the power consumption.

With its high level of flexibility the EM9301 is the best choice for a *Bluetooth SMART*[1] product.

Features

- Master and slave BLE controller compliant to *Bluetooth* specification V4.1
- Functional down to 1.9V
- Low average and peak current consumptions allowing the use of low-cost button-cell batteries
- Widely-spread, low-cost 26MHz quartz reference
- 1Mbps on-air data rate
- 200Ω differential impedance of antenna port, no antenna matching elements needed through appropriate PCB antenna design
- Programmable RF output level from -18dBm to +4dBm to optimize current consumption for a wide range of applications
- Supply Voltage Level Detector (SVLD) function enables monitoring the battery charge condition
- QFN24 5mm x 5mm package or die form available

Typical Current Consumptions

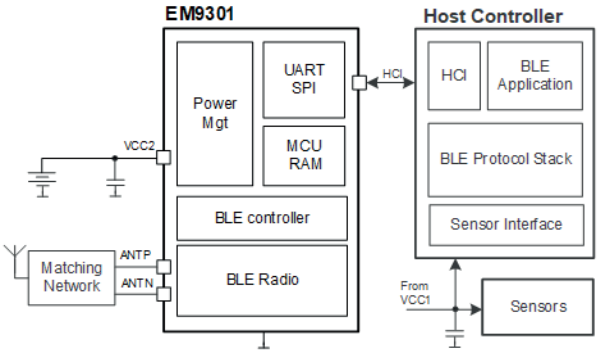
- 12mA Tx current at 0dBm output power
- 13mA Rx current
- 9µA BLE Idle State
- <0.5µA OFF Mode

Applications

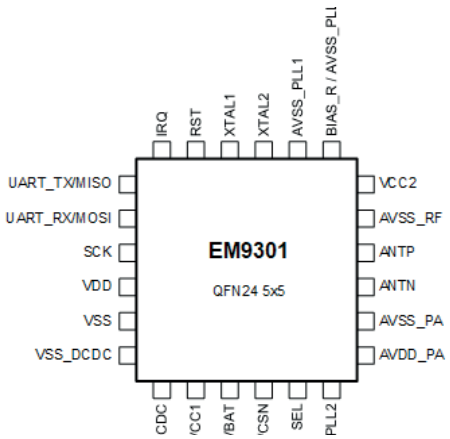
- Remote sensing
- Wireless mouse and keyboard
- Wireless sensors for watches
- Wireless sport equipment
- Alarm and security systems
- Wireless health care systems
- Beacon applications

[1] *Bluetooth* and *Bluetooth SMART* are trademarks owned by the Bluetooth Special Interest Group (SIG).

Typical Application Schematic



Pin Assignment



*Not all connections are shown.

Versions

Version	Description / Features	Applications / Comments
002	• BLE controller • Xtreme power mode • Deep-Sleep operating state	Wireless applications relying on 3V-type batteries (e.g. watches) or in which an external LDO is available (e.g. USB dongle)
022	• BLE controller • Operating supply voltage down to 1.9V • Xtreme power mode • Deep-Sleep operating state • External timing capability • Power consumption optimized	Ultra low power wireless applications relying on 3V-type batteries (e.g. watches) or in which an external LDO is available (e.g. USB dongle)

Ordering Information

Ordering Code	Description	Packaging	Container
EM9301V02LF24B+	BLE controller version 002	QFN24	Tape
EM9301V22LF24B+	BLE controller version 022	QFN24	Tape
EM9301V02WW7	BLE controller version 002	Wafer	Wafer container
EM9301V22WW7	BLE controller version 022	Wafer	Wafer container