Single-Cell Battery
Bluetooth low energy controller

Description

The EM9301 is the first generation of low voltage and low power, fully integrated single-chip Bluetooth low energy controller. It includes the physical layer, link-layer, with an embedded security engine, the Host Controller Interface (HCI), and a powerful power management including a DC-DC up converter. The EM9301 offers performances tailored for extremely low energy operation for power-sensitive applications. The purpose of the EM9301 is to offer a very high level of integration requiring a minimum of external components.

The on-chip 2.4GHz radio transceiver operates in the 2.400-2.485GHz ISM band and the internal step-up (boost) DC/DC converter allows the application to operate from a single-cell 1.5V battery. This converter is designed to support an extra load such as a low power controller or sensor interface circuit with a dedicated application profile. The EM9301 can also operate without the DC/DC converter, when supplied from a 3 V battery or any other source such as an external LDO regulator. No external coil is needed then.

The EM9301 is designed to act as a master or a slave according to the upcoming Bluetooth low energy specification V1.0. It has to be control by an external microcontroller or microprocessor through the standard UART or SPI interface by using HCI commands/events. Any 8, 16 or 32 bit MCU can be used to handle the upper layer Bluetooth low energy profiles as well as application specific tasks.

The EM9301 also features a proprietary interface allowing putting it on an extremely low power mode, when the Bluetooth Low Energy RF link is not required.

With its high level of flexibility the EM9301 is the best choice for a Bluetooth low energy companion chip.
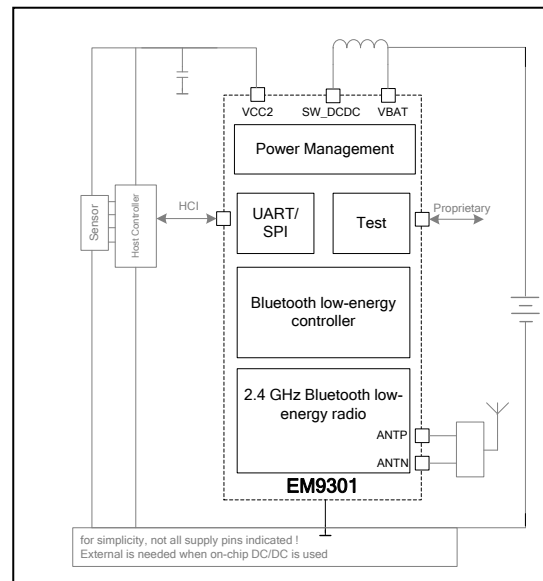
Features

➢ Single cell 1.5V battery operation
➢ Operation down to V_{BAT} = 0.8 V
➢ 3 V Lithium battery as alternative
➢ Compliant to Bluetooth low energy Specification V1.0
➢ On air data rate 1Mb/s
➢ Programmable RF output level:
  -20 dBm … + 4dBm in 8 steps
➢ No antenna matching elements needed through appropriate PCB antenna design
➢ 200 Ω differential impedance of antenna port
➢ Low-cost 26MHz Xtal
➢ Low-power +-500ppm RC oscillator time base

➢ BLD function: battery level detection in accordance with selected battery
➢ Current consumption (on V_{CC}, V_{CC} =2.1V)
14.5 mA	in peak current
10.0 µA	in stand-by mode
3.0 µA	in sleep-mode (DC/DC)[1]
0.8 µA	in power-down mode (no DC/DC)

  [1] External load reduced to < 500µA
➢ MLF24 4x4 package

Applications

➢ Remote sensing in general
➢ Wireless mouse and keyboard
➢ Wireless sensors in watches
➢ Wireless sports equipment
➢ Alarm and security systems

Typical Application Schematic

Pin Assignment

Copyright © 2009, EM Microelectronic-Marin SA
9301-FS.doc, Version 1.0, 11/09

Wireless and Sensing
www.emmicroelectronic.com
info@emmicroelectronic.com