# BLE Series

## Data Sheet

**USE8762E_BLE**

**-BT5.2 BLE Module**

Unisem Electronics

| VERSION | REVISION DATE | REVISOR | REVIEWER | REVISED CONTENTS |
|---|---|---|---|---|
| 2.0 | 16/10/2023 | NK | SP | |
| 2.1 | 16/10/2023 | NK | SP | |
| 2.2 | 22/02/2024 | NK | SP | |
| | | | | |

## Table of Contents



# Features:

**General**

- Ultra-low power consumption with intelligent PMU
- Supports Bluetooth 5.2 core specification and 2.4GHz proprietary feature multi-protocol independently
- Supports 2Mbps LE
- LE advertising Extensions
- LE Long Range
- Additional Adv channel
- Channel Selection #2
- High Duty Cycle Non-Connectable Adv
- Integrated MCU to execute Bluetooth protocol stack
- Supports multiple-level Low Energy states
- Supports LE L2CAP Connection Oriented Channel Support
- Supports LE low-duty directed advertising
- Supports LE data length extension feature
- Supports OTA (Over-the-Air) programming mechanism for firmware upgrade
- Supports GAP, ATT/GATT, SMP, L2CAP
- Generic Applications for GAP Central, Peripheral, Observer and Broadcaster Roles
- Supports True Random Number Generator (TRNG)
- Supports AES128 and AES256 feature

**MCU Platform**

- ARM Cortex-M0+ CPU (Maximum 40MHz)
- Serial flash controller with 8kB 4-way cache
- Total 104kB SRAM, 272kB ROM
- 64B EFuse for manufacturer use
- Embedded MCM flash (maximum 8Mbit)

**Bluetooth Transceiver**

- RX sensitivity: -97dBm BLE1M (minimum)
- TX power: +7.5dBm (maximum)
- Fast AGC control to improve receiving dynamic range
- Supports Bluetooth Low Energy PHY

**Peripheral Interfaces**

- Flexible general purpose IOs: 26 (maximum)
- Hardware key-scan and quad-decoder
- Embedded IR transceiver
- Real-time counters (RTC)
- Supports generic 4-wire SPI master/slave
- Supports an external 4-channel low-power comparator (the RTL8762ESF-CG only supports 2-channel inputs)
- Supports external 2-channel capacitive sensor inputs (the RTL8762ESF-CG cannot support this feature)
- 400ksps, 10-bit, 4-channel AUXADC (the RTL8762ESF-CG only supports 2-channel inputs)
- USE8762_BLE only supports 2-channel
- Timers x 8
- I2C x 2
- PWM x 8
- UART x 2
- I2S/PCM interface for external audio codec
- Supports one AMIC and one DMIC (PDM mono) (the RTL8762ESF-CG cannot support AMIC input function)
- Supports external 40MHz XTAL without capacitor (in limited condition)
- Supports an embedded internal 32kHz RCOSC to keep BLE link (in limited condition)

# General Description:

The USE8762C_BLE series is an ultra-low-power system-on-chip solution for Bluetooth 5.2 low energy and 2.4GHz proprietary multi-application that combine the excellent performance of a leading RF transceiver with a low-power ARM Cortex-M0+ power management unit, ADC, and smart I/O distribution controller.

In addition, the RTL8762E supports an analog MIC interface that integrates a sigma-delta ADC, programmable gain amplifier, and microphone bias circuit for voice command application. The RTL8762E also embeds an IR transceiver, hardware key-scan, and Quad-decoder on a single IC within a QFN package.

For more information visit the RealMCU website for RTL8762E Series of SoC.

# Pin Definition:

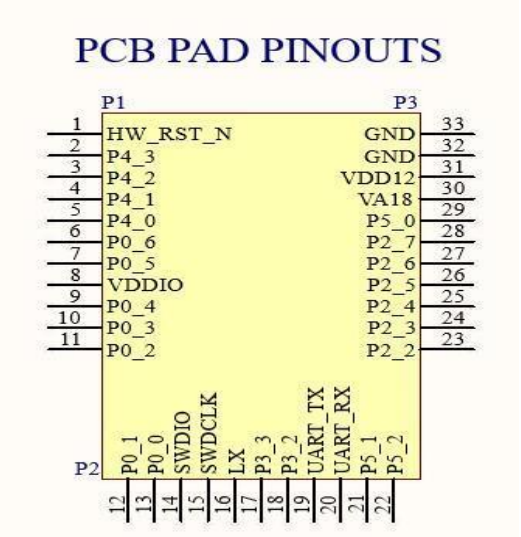


***Fig 1(a) : Module Pinouts***

Pin numbers are marked beside the soldering pad, On the top left side soldering pad marked as '1' and bottom left side marked as '11', On the button left side soldering pad marked '12' and button right side marked as '22', on the bottom right side soldering pad marked as '23' and top right side marked as '33'. for more information refer to Module Diagram.

## Pin Descriptions:

| Pin No | Pin Name | Type | Function Description |
|---|---|---|---|
| 1 | HW_RST_N | P | Hardware Reset |
| 2 | P4_3 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 3 | P4_2 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 4 | P4_1 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 5 | P4_0 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 6 | P0_6 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 7 | P0_5 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 8 | VDDI0 | P | Supply 1.8V~3.3V power for digital IO PADs. |
| 9 | P0_4 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 10 | P0_3 | I/O | LOG_UART TX.<br>Power on trap: Pull-up for normal operation Pull-down to bypass executing program code in flash<br>(PAD internal pull-up by default). |
| 11 | P0_2 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 12 | P0_1 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-and pull-down. |
| 13 | P0_0 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 14 | P1_0 (SWDIO) | I/O | Serial Wire Debug Input/ Output (default)<br>General purpose IO, 8mA driving capability.<br>With wakeup function. |

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|---|---|---|---|
| | | | With internal strong/weak pull-up and pulldown. |
| 15 | P1_1 (SWDCLK) | I/O | Serial Wire Debug Clock (default)<br>General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 16 | LX | P | Switching regulator output. |
| 17 | P3_3 | I/O | General purpose IO,8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 18 | P3_2 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 19 | P3_0 (UART_TX) | I/O | HCI_UART_TX (default).<br>General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 20 | P3_1 (UART_RX) | I/O | HCI_UART_RX (default).<br>General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 21 | P5_1 | I/O | General purpose IO,8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 22 | P5_2 | I/O | General purpose IO,8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 23 | P2_2 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown.<br>AUXADC input 0, Capacitive sensor input 0. |
| 24 | P2_3 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown.<br>AUXADC input 1, Capacitive sensor input 1. |
| 25 | P2_4 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 26 | P2_5 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |
| 27 | P2_6 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown. |

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|---|---|---|---|
| | | | AUXADC input 2.<br>Analog MIC input_ N. |
| 28 | P2_7 | I/O | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown.<br>AUXADC input 3.<br>Analog MIC input_ P. |
| 29 | P5_0 / MICBIAS | I/O / P | General purpose IO, 8mA driving capability.<br>With wakeup function.<br>With internal strong/weak pull-up and pulldown.<br>Microphone bias.<br>Pin share as GPIO when microphone bias is not used. |
| 30 | VA18 | P | ADC reference voltage (decouple). |
| 31 | VDD12 | P | Supply 1.2V power |
| 32 | GND | P | Power supply |
| 33 | GND | P | Power supply |

## Applications:

- TV Remote Controller
- LE HID
- Beacon
- Home Automation
- Key Fob
- Toy

# Module Diagram:

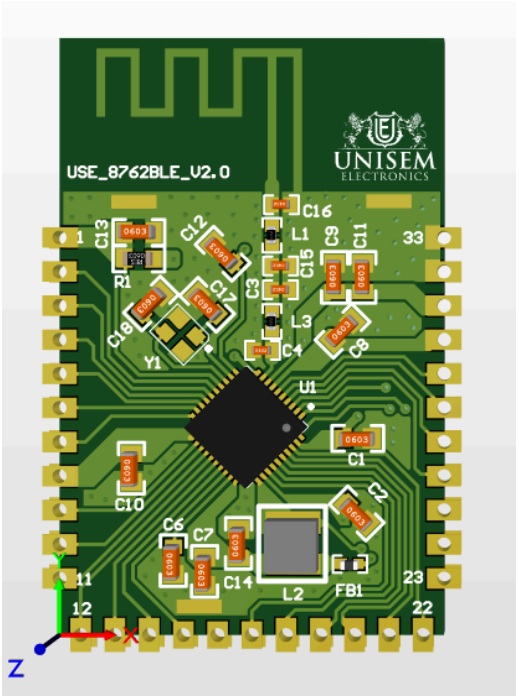


*Fig 1(b) : Module without shield*

# Module Dimension Drawing:

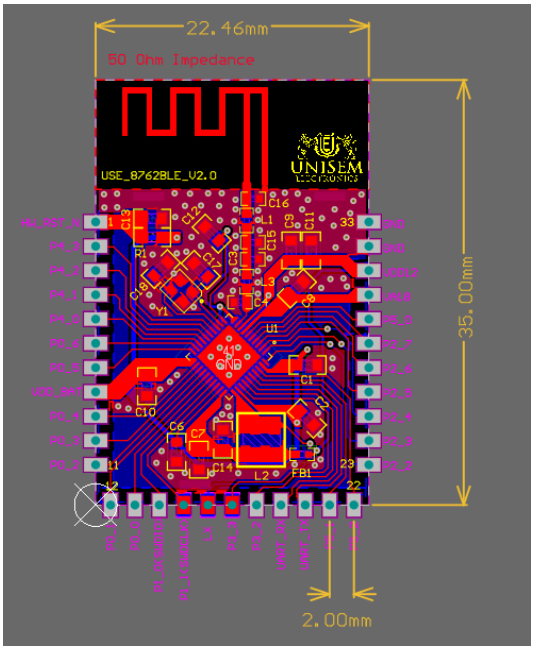


*Fig 1(c) : Module Pinouts & Dimension*

# Footprint Dimension:

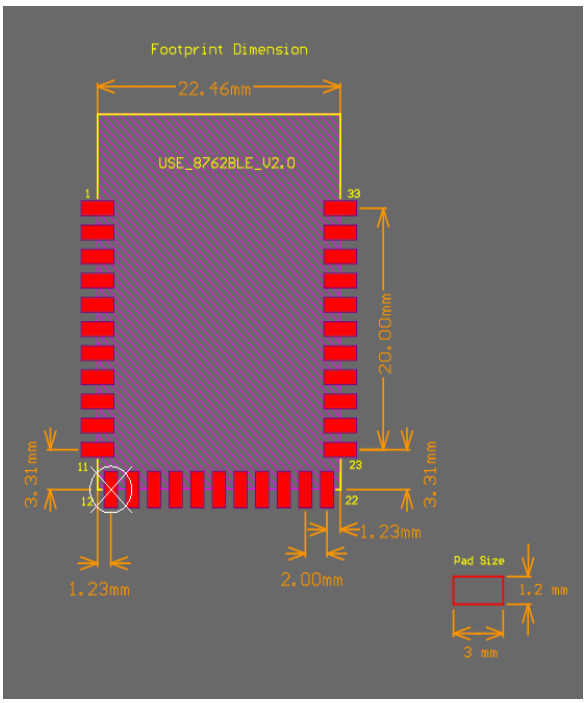


***Fig 1(d) : Module Footprint***