BDE-BLEM101A

Key Features

- Bluetooth 4.0 single-mode compliant
- Support master and slave modes
- RF performance
  - TX power: -20dBm to +3dBm
  - RX sensitivity: -80dBm typical
- 1Mbps on-air data rate
- Communication range: 50m (LOS)
- 3.0V voltage supply
- Supply Voltage Level Detect (SVLD)
- Integrated with small chip antenna
- Can be interfaced with different external MCUs which can be integrated with BDE's BLE stack BDSLETM (QDID: B020484) through SPI/UART interface
- BQB certification
- FCC certification
- CE certification
- Ultra small form factor: 14.6mm x 10.9mm x 2.3mm

Descriptions

BDE-BLEM101A is a Bluetooth 4.0 single-mode compliant Bluetooth Low Energy RF module targeted at low power sensors and PC/Phone accessories.

BDE-BLEM101A can be interfaced with different low power MCUs which can be integrated with BDE's BLE stack *BDSLE™*, throughout Bluetooth standard HCI interface, enabling the flexible choice of the MCUs for the user. BDE have our BLE stack *BDSLE™* running on different platform such as 8051, Cortex-M0, Cortex-M0+, Cortex-M3. With BDE's support, customers can choose suitable platform or MCU and have their own development quickly.

BDE-BLEM101A is Bluetooth qualified module and listed as a controller subsystem, also the module complies with FCC and CE rules, which makes it a plug-in solution for the customer applications and can highly shorten the time to market for the product.

With its small size factor and the flexibility, the module is the best choice for the applications that are sensitive to power consumption, size and cost.

Applications

- Medical devices
- Sports and fitness equipments
- Smart home electronics
- Mobile and PC accessories
- Industry automation

Typical Application Schematic Diagram

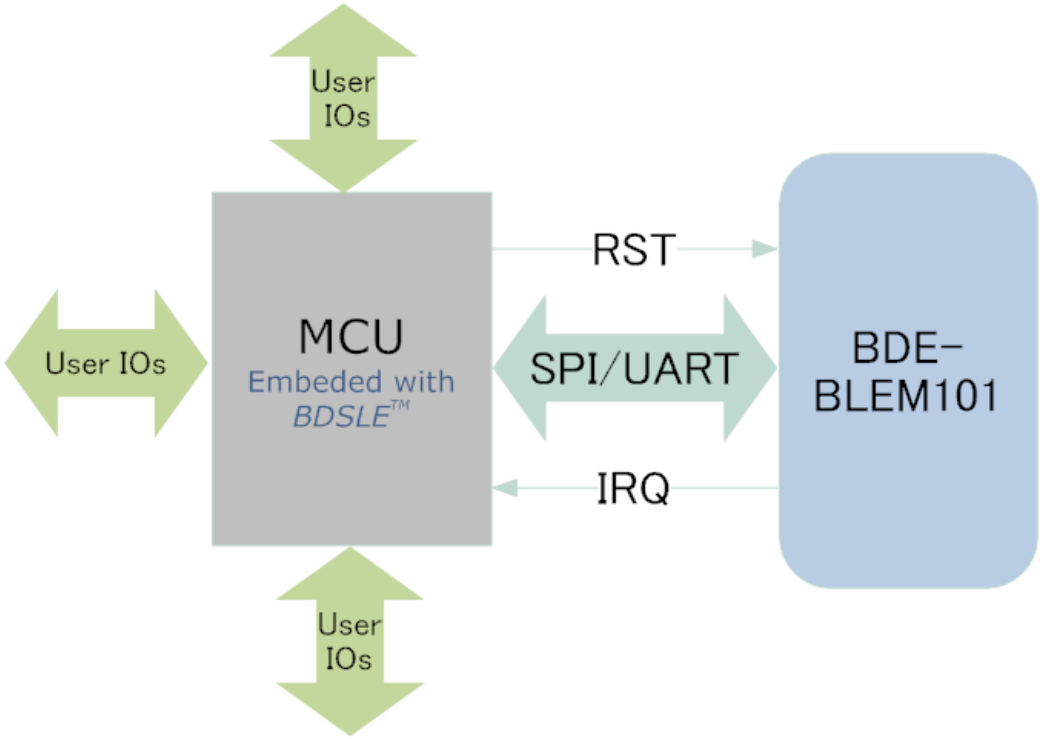

Fig. 1: Typical application schematic diagram of BDE-BLEM101A

Electrical Characteristics

- Absolute maximum rating

Rating	Min	Typ	Max	Unit
Storage Temperature	-55	-	150	℃
VDD	-0.2	-	3.8	V
GND	-0.2	-	0.2	V
Other Terminals	-0.2	-	VDD+0.2	V
V_{ESD}	-2000	-	+2000	V

- Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	-	85	℃
VDD	2.3	3.0	3.6	V

- Power consumptions (CR2032 3.0V coin cell battery power supply)

Rating	Typ	Unit
TX current (@0dBm)	12	mA
RX current	13	mA

Power mode	Average current	Unit
Idle mode*1	200	uA
Sleep mode*2	20	uA
Deep-Sleep mode*3	9	uA
Power-Down mode*4	0.3	uA

*1 Idle mode is where the module enters per default after power up. In this mode, Xtal oscillator ON, RC oscillator ON, RF state OFF;

*2 Sleep mode is a low power mode of the module. n this mode, Xtal oscillator OFF, RC oscillator ON, RF state OFF;

*3 Deep-Sleep mode is the low power mode with the lowest power consumption. In this mode, Xtal oscillator OFF, RC oscillator OFF, RF state OFF;

*4 Power-Down mode is the mode that the power of the module is shut down by external MCU. This mode is only used in the condition that the power of the module is controllable by MOSFET or LDO etc. through the external MCU.

- Timming characteristics

Rating	Typ	Unit
Power up->Idle mode (Start up time)	15.5	ms
Sleep->Idle mode	2.6	ms
Deep-Sleep->Idle mode	2.7	ms

Overall Dimensions

The overall dimensions of BDE-BLEM101A is shown as Fig.2.

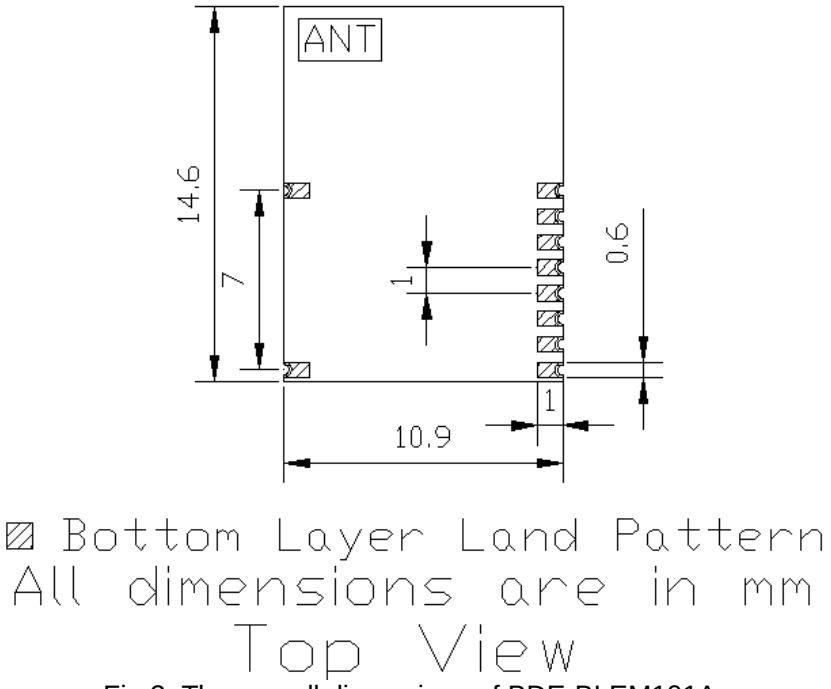

Fig.2: The overall dimensions of BDE-BLEM101A

Interface

BDE-BLEM101A can be mounted to the mother board through bottom layer land pattern as Fig.3 shows .

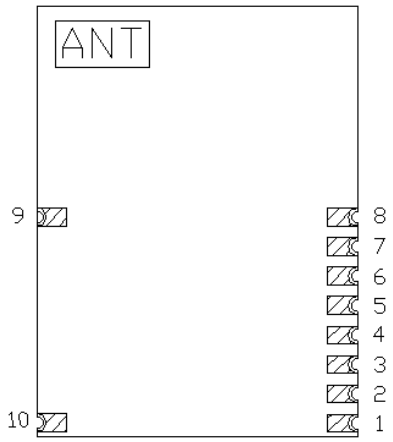

Fig.3: The interface of BDE-BLEM101A

Pin Definitions

Pin Number	Pin Name	Definitions
1	RST	Reset pin, active high
2	UART_TX/SPI_MISO	UART TX/SPI data output
3	UART_RX/SPI_MOSI	UART RX/SPI data input
4	UART_RTS/SPI_SCK	UART RTS/SPI clock input
5	UART/SPI_SEL	Interface selection (1=SPI, 0=UART)
6	UART_WU/SPI_CSN	UART wakeup from sleep/deep-sleep mode/SPI chip select
7	UART_CTS/IRQ	UART CTS/SPI interrupt request
8	VDD	Main power supply
9	VDD	Main power supply
10	GND	Power ground

Module Location

In order to get a fine performance when integrate the module to your product, it is advised to use the recommended module location to the respective PCB.

- Location in X-Y plane

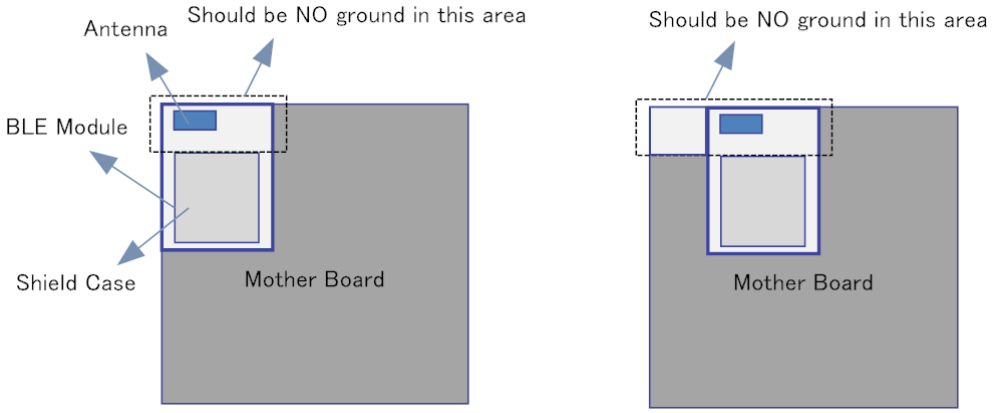

Fig. 4: Recommended location in X-Y plane

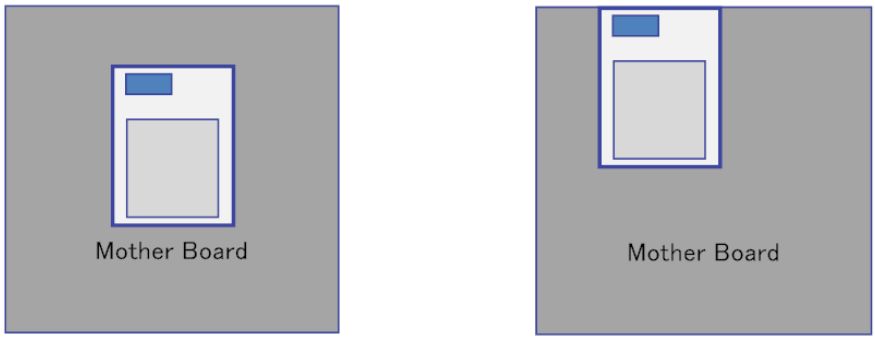

Fig. 5: Not recommended location in X-Y plane

- Location in Z plane

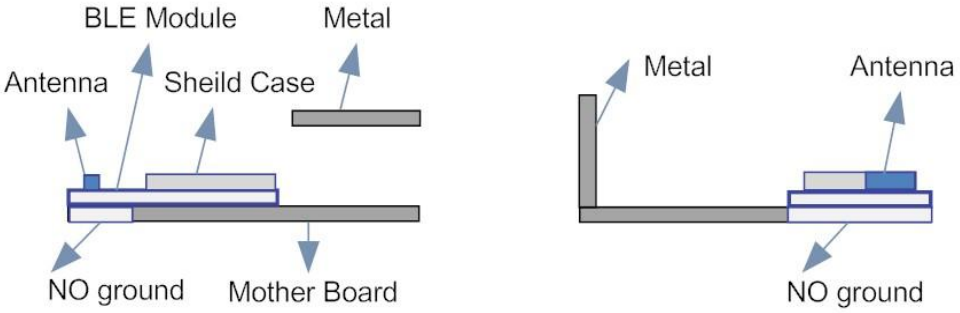

Fig. 6: Recommended location in Z plane

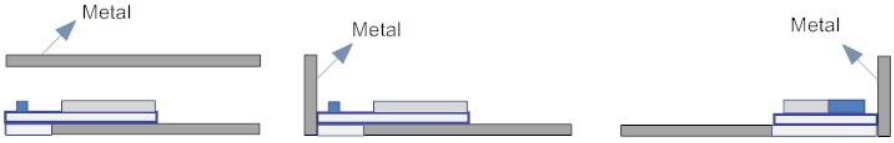

Fig. 7: Not recommended location in Z plane

Contacts

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Appendix A FCC Warning

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following tw o conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause u ndesired operation.

§ 15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates u ses and can radiate radio frequency energy and, if not installed and used in accordance with th e instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cau se harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is co nnected.
-Consult the dealer or an experienced radio/TV technician for help.

The BDE-BLEM101A module is designed to comply with the FCC statement. FCC ID is 2ABR UBDLEM101A. The host system using BDE-BLEM101A, should have label indicated FCC ID 2 ABRUBDLEM101A.

Any changes or modifications not expressly approved by the party responsible for compliance could void user's authority to operate the equipment.

The antenna of this device must not be installed and operated simultaneously with any other antenna or transmitter in final system.

Manual and Product Labeling information For final System
The end user manual shall include all required regulatory information/warning as show in this

manual. And when this module is installed in the host product, it will include "Contains FCC ID: 2ABRUBDLEM101A" on the label of the host product.