BDE-BLEM901

Bluetooth Low Energy Module

Key Features

- Bluetooth 4.0 single-mode compliant
- Support master and slave modes, up to 8 simultaneous links in master mode
- True single-chip BLE SoC solution
- RF performance
  - TX power: -20dBm to 4dBm
  - RX sensitivity: up to -95dBm
- Communication range: 100m (LOS)
- 32-bit ARM Cortex-M0 MCU
  - 64KB system memory
  - 512KB in-module flash
  - Single 2.4V to 3.6V power supply
  - 18 GPIOs for user
  - 2-channel programmable PWM
  - Two SPI/UART interface
- Ultra low power consumption:
  - 2uA @ deep sleep mode,
  - 3uA @ sleep mode (32KHz RC OSC on)
  - RX current: 13.6mA
  - TX current @ 0dBm: 13.3mA
- Antenna: PCB antenna
- Size: 25.00mm x11.78mm x 2.3mm (Without Shielding)
- BQB certification
- FCC, CE 2200, RoHS compliant

Descriptions

BDE-BLEM901 is a Bluetooth 4.0 single-mode compliant Bluetooth low energy module targeted at low power sensors and PC/Phone accessories.

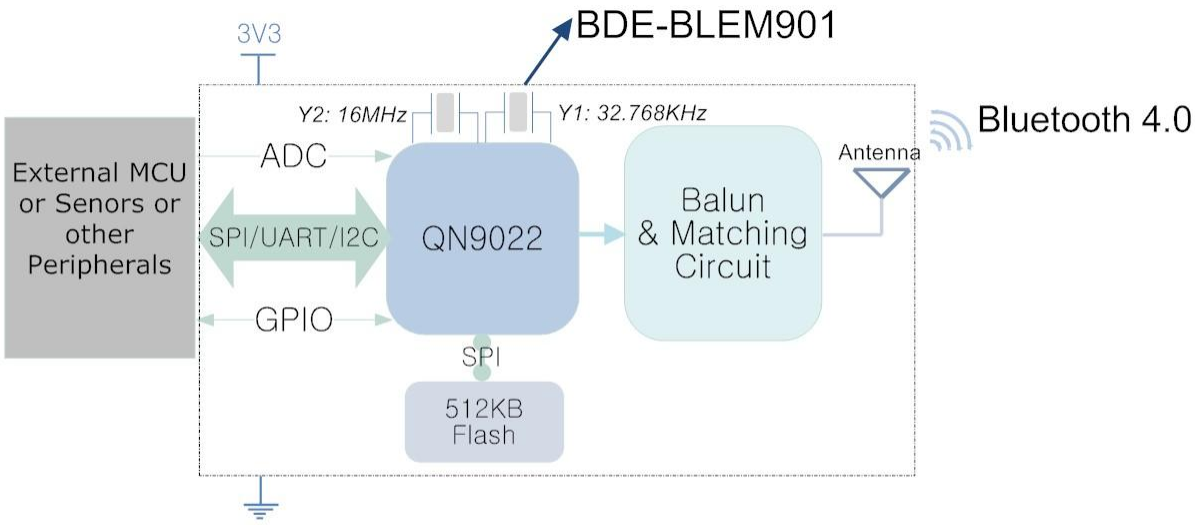
BDE-BLEM901 highly integrates Bluetooth Low Energy radio, stack, profile and applications in a SoC, without the need of using an external MCU. The module also offers flexible hardware interfaces for the sensor application.

It enables ultra low power connectivity and data transfer for the applications that are sensitive to power consumption, size and cost.

Applications

- Medical devices
- Sports and fitness equipment
- Home electronics
- Mobile and PC accessories
- Industry automation

Block Diagram



The Block Diagram of BDE-BLEM901

Fig. 1: Block diagram of BDE-BLEM901

Electrical Characteristics

- Absolute maximum rating

Rating	Min	Typ	Max	Unit
Storage Temperature	-40	-	125	℃
VDD	-0.3	-	5	V

- Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	25	85	℃
VDD	2.4	3.3	3.6	V

Overall Dimensions

Fig. 2 shows the overall dimensions of BDE-BLEM901. The module measures 25mm long by 11.78mm wide by 2.3mm high without board level shield.

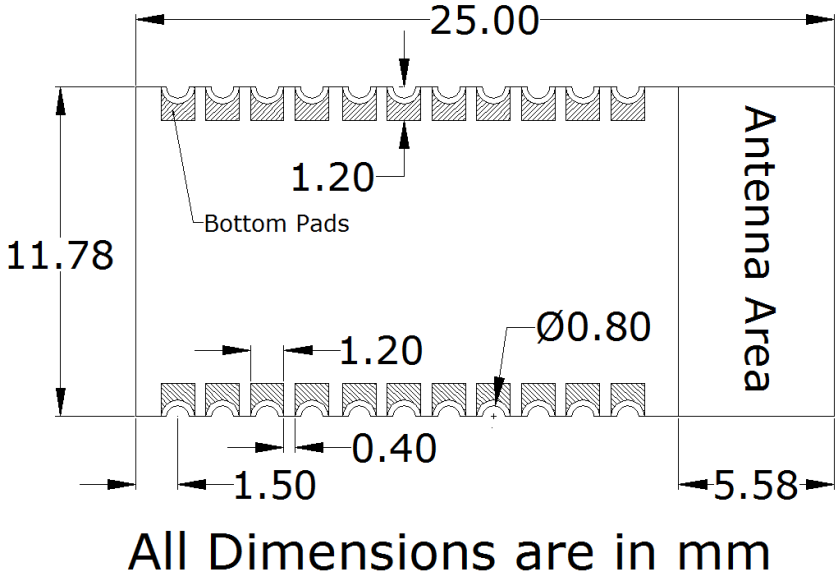


Fig. 2: Overall Dimensions of BDE-BLEM901

Pin Definitions

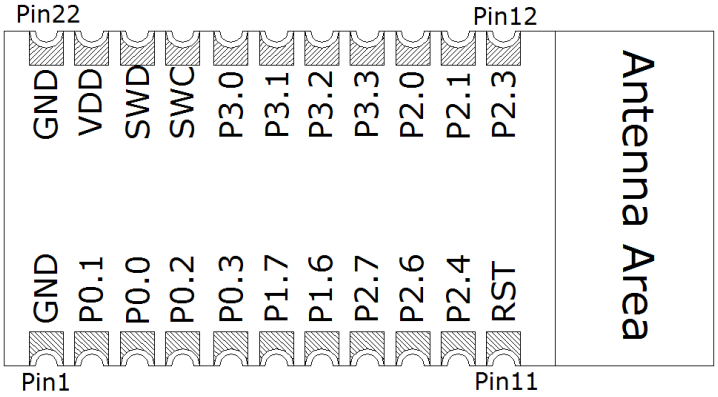


Fig. 3: The pinout of BDE-BLEM901 (TOP)

Table 2: Pin definitions of BDE-BLEM901

Pin Number	Pin Name	Definitions
1	GND	Power ground
2	P0.1	GPIO nCS0_0: SPI0 slave select for master/slave mode CTS0: UART0 CTS
3	P0.0	GPIO TXD0: UART0 TX data output with pull-up DAT0: In 4-wire mode, SPI0 output data. In 3-wire mode, data I/O RTCI: RTC input capture
4	P0.2	GPIO SDA: I2C data transmit SPICLK0: SPI0 clock RTS0: UART0 RTS
5	P0.3	GPIO CLKOUT0: Clock output 0 T0_ECLK: Timer 0 external clock input or PWM output
6	P1.7	GPIO RXD0: UART0 Rx data input DIN0: SPI0 input data in 4-wire mode, invalid in 3-wire mode T0_0: Timer 0 PWM output
7	P1.6	GPIO nCS0_1: SPI0 slave select output for master mode PWM0: PWM0 output T0_3: Timer 0 input capture /clock or PWM output
8	P2.7	GPIO ACMP1_O: Analog comparator result output PWM0: PWM0 output T1_ECLK: Timer 1 external clock input or PWM output
9	P2.6	GPIO PWM1: PWM1 output T2_0: Timer 2 input capture /clock or PWM output
10	P2.4	GPIO SCL: I2C master clock output with pull-up PWM1: PWM1 output T3_ECLK: Timer 3 external clock input or PWM output
11	RST	Reset pin, active low
12	P2.3	GPIO SDA: I2C data transmit ACMP0_O: Analog comparator result output T3_0: Timer 3 input capture /clock or PWM output

13	P2.1	GPIO DAT1: In 4-wire mode, SPI0 output data. In 3-wire mode, data I/O TXD1: UART1 Tx data output with pull-up T3_1: Timer 3 input capture /clock or PWM output
14	P2.0	GPIO DIN1: SPI1 input data in 4-wire mode, invalid in 3-wire mode RXD1: UART1 Rx data input T3_2: Timer 3 input capture /clock or PWM output
15	P3.3	GPIO DAT0: In 4-wire mode, SPI0 output data. In 3-wire mode, data I/O CLKOUT0: Clock output 0
16	P3.2	GPIO DIN0: SPI0 input data in 4-wire mode, invalid in 3-wire mode ACMP0_O: Analog comparator result output
17	P3.1	GPIO T0_2: Timer 0 input capture /clock or PWM output AIN1: ADC input channel 1 ACMP0-: Analog comparator negative input
18	P3.0	GPIO T2_1: Timer 1 input capture /clock or PWM output AIN0: ADC input channel 0 ACMP0+: Analog comparator positive input
19	SWC/P0.7	SWCLK: default to SWCLK (input with pullup) GPIO AIN3: ADC input channel 3 ACMP1-: Analog comparator 1 negative input
20	SWD/P0.6	SWDIO: default to SWDIO (input with pullup) GPIO AIN2: ADC input channel 2 ACMP1+: Analog comparator 1 positive input
21	VDD	Power supply
22	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

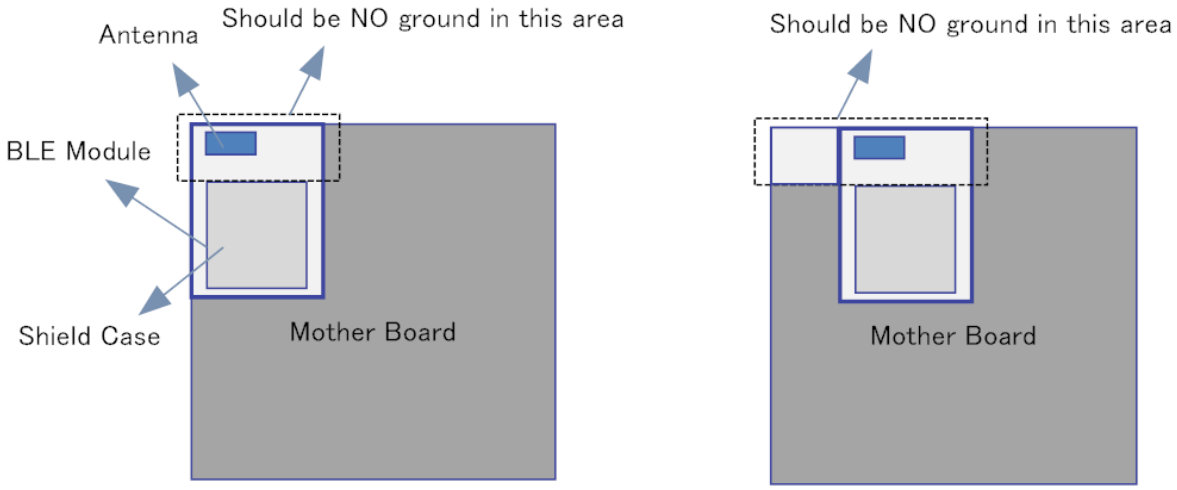


Fig. 4: Recommended location in X-Y plane

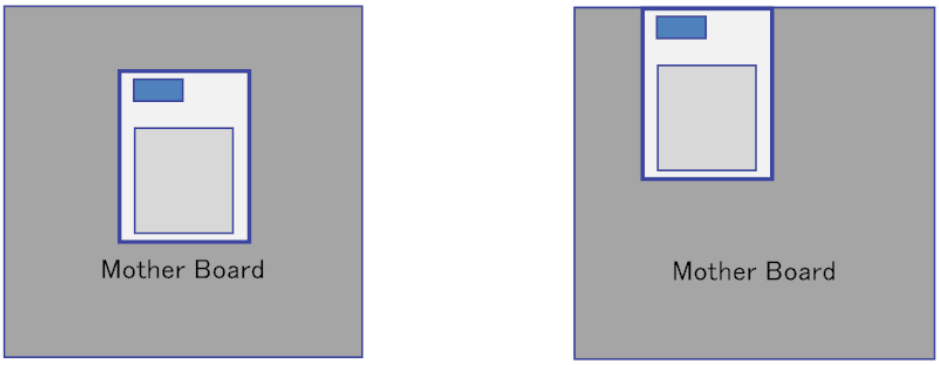


Fig. 5: Not recommended location in X-Y plane

- Location in Z plane

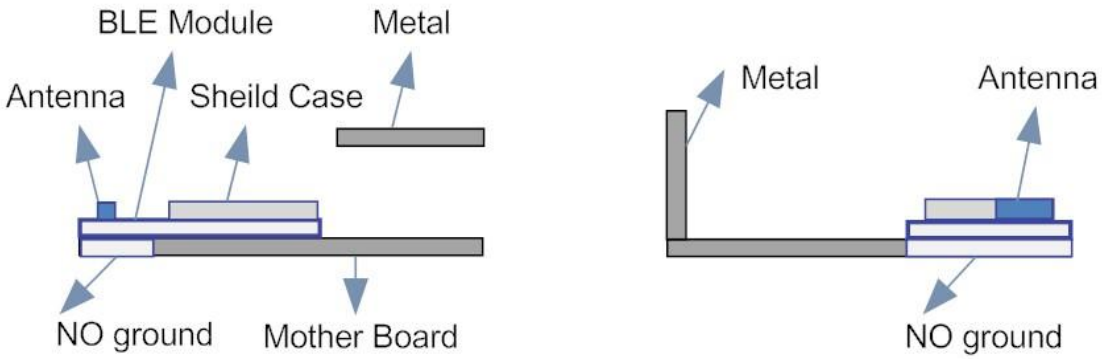


Fig. 6: Recommended location in Z plane

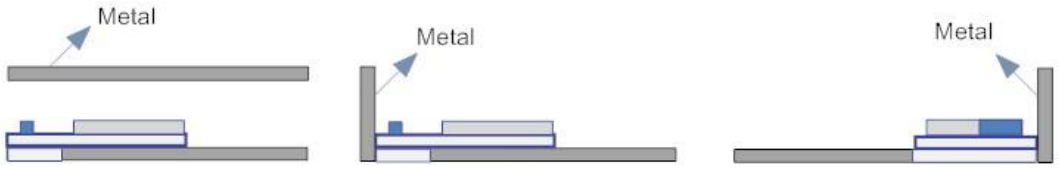


Fig. 7: Not recommended location in Z plane

Typical Solder Reflow Profile

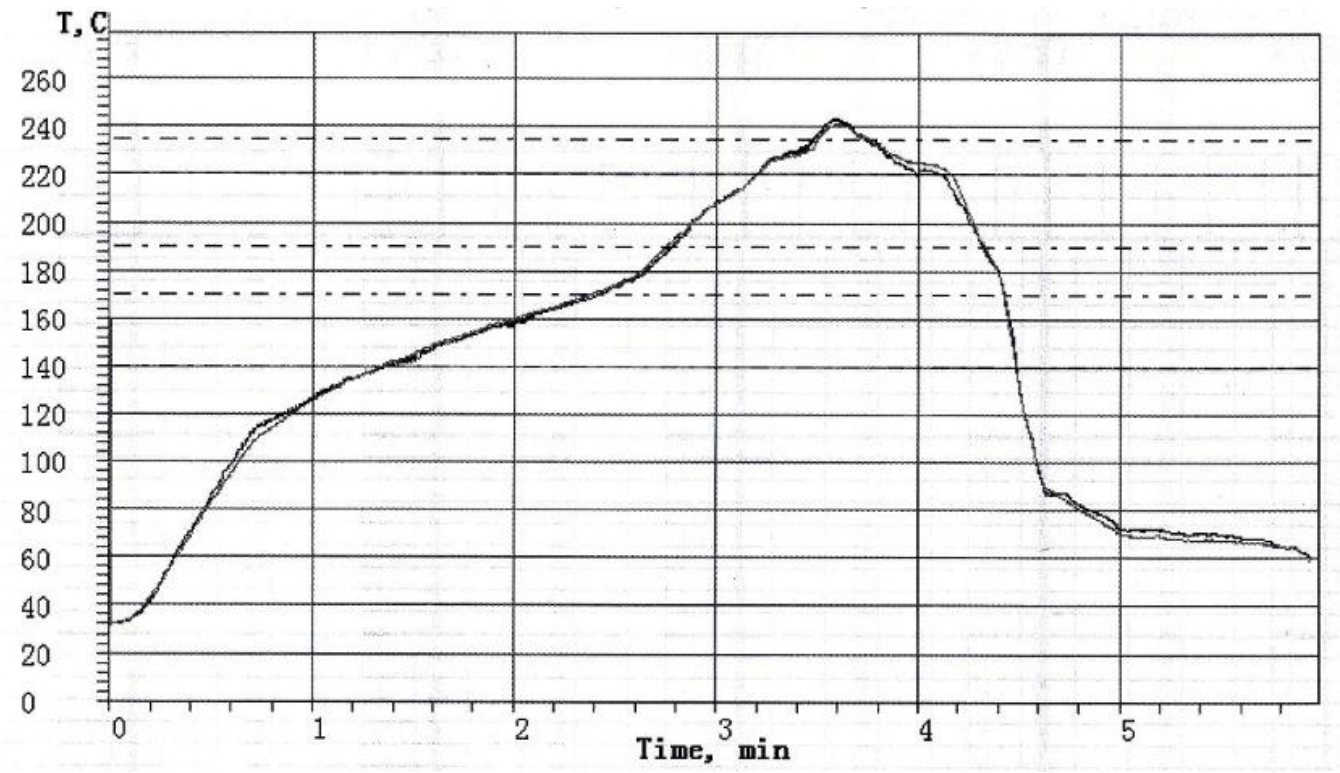


Fig. 8: Typical Solder Reflow Profile

Package Information

Fig. 9: Package information

Contacts

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