Bluetooth Low Energy Module (BT5.0)

Key Features

- Bluetooth 5.0 Single-Mode Compliant
- Powerful ARM Cortex-M3
  - Up to 48-MHz Clock Speed
  - 275KB of Nonvolatile Memory including 128KB of In-System Programmable Flash
  - Up to 28KB of System SRAM, of Which 20KB is Ultra-Low Leakage SRAM
  - 8KB of SRAM for Cache or System RAM use
  - 2-Pin cJTAG and JTAG Debugging
  - Supports Over-The-Air Upgrade (OTA)
  - Ultra-Low Power Sensor Controller
  - 10 GPIOs
  - All Digital Peripheral Pins Can Be Routed to Any GPIO
  - Four General-Purpose Timer Modules (Eight 16-Bit or Four 32-Bit Timers, PWM Each)
  - 12-Bit ADC, 200-ksamples/s, 8-Channel Analog MUX
  - Continuous Time Comparator
  - Ultra-Low-Power Analog Comparator
  - Programmable Current Source
  - UART
  - 2× SSI (SPI, MICROWIRE, TI)
  - I2C
  - I2S
  - Real-Time Clock (RTC)
  - AES-128 Security Module
  - True Random Number Generator (TRNG)
  - Support for Eight Capacitive-Sensing Buttons
  - Integrated Temperature Sensor
- RF Performance
  - TX Power: up to 2dBm
  - RX Sensitivity: up to -96dBm
- Communication Range: 60 meters (LOS)
- Antenna: Integrated PCB antenna
- Size: 16.55mm x 10.8mm x 1.5mm (Without Shielding)
  16.55mm x 10.88 mm x 2.3mm (With Shielding)
- Ultra Low Power Consumption:
  - Shutdown: 100nA (Wake up on External Events)

- Standby: 1.1uA (RTC Running and RAM/CPU Retention)
- RX Current: 5.9mA
- TX Current @ 0dBm: 6.1mA

■ BQB, FCC, CE, RoHS compliant

Descriptions

BDE-BLEM203P is a Bluetooth 5.0 single-mode compliant Bluetooth low energy module targeted at low power sensors and PC/Phone accessories. It supports BLE 5.0 futures, including 2Mbits and PHY coded.

BDE-BLEM203P 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.

Block Diagram

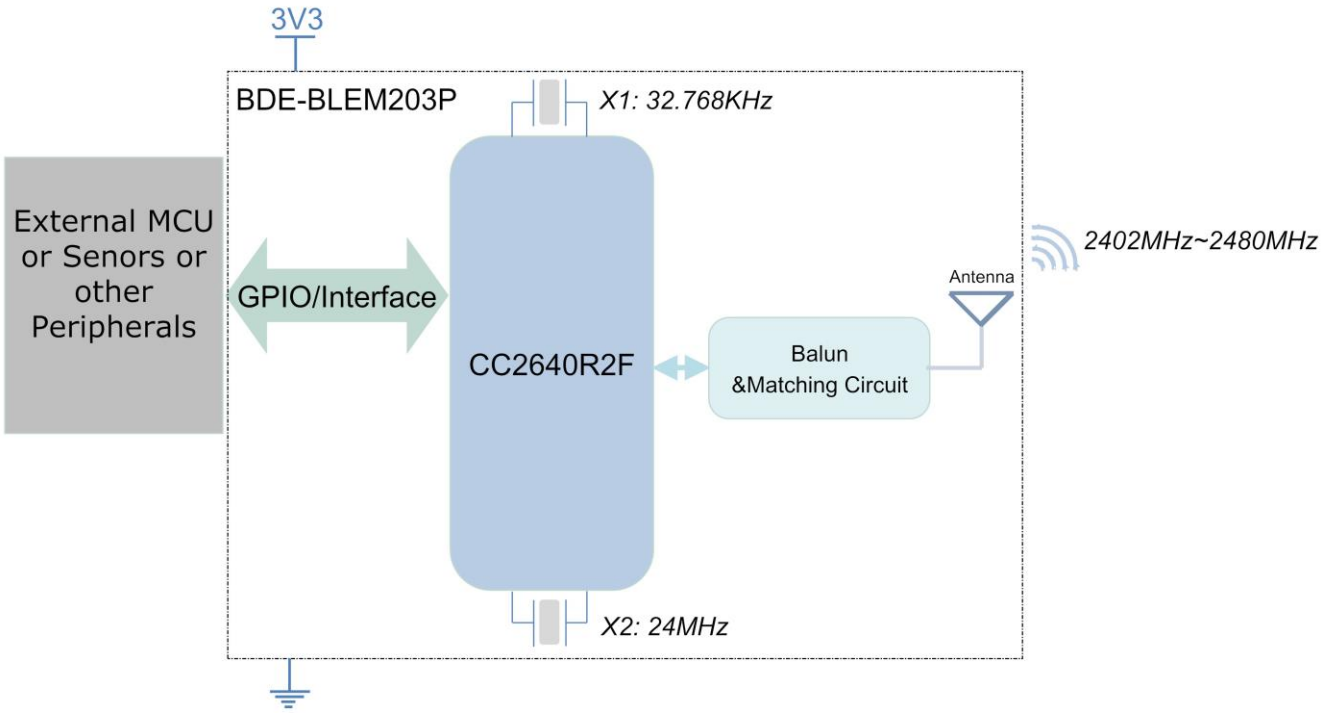

Fig. 1: The Block Diagram of BDE-BLEM203P

Applications

- Home and Building Automation
- Industrial
- Retail
- Health and Medical
- Sports and Fitness
- HID

Electrical Characteristics

- Absolute maximum rating

Rating	Min	Typ	Max	Unit	Notes
Storage Temperature	-40	-	125	℃	
VDD	-0.3	-	4.1	V	
Other Digital Terminals	-0.3	-	VDDS+0.3≤4.1	V	
Voltage on ADC input	-0.3	-	VDDS	V	Voltage scaling enabled
	-0.3	-	1.49	V	Voltage scaling disabled, internal reference
	-0.3	-	VDDS/2.9	V	Voltage scaling disabled, VDDS as reference
RF pin	-	-	2	dBm	

- Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	-	85	℃
VDDS	1.8	3.3	3.8	V

Pin Out

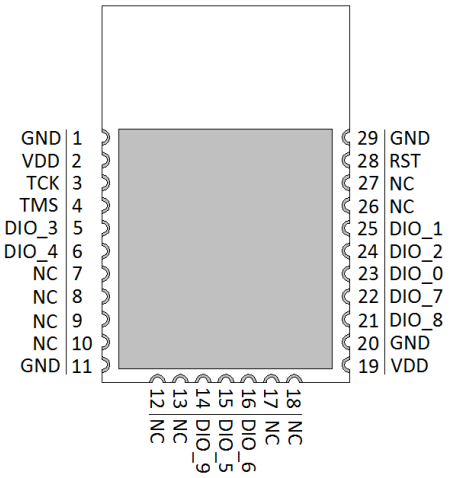

Fig. 2: The pinout of BDE-BLEM203P (TOP VIEW)

Table 1: Pin definitions of BDE- BLEM203P

Pin Number	Pin Name	Definitions
1	GND	Power Ground
2	VDD	Power Supply
3	TCK	JTAG_TCK
4	TMS	JTAG_TMS
5	DIO_3	GPIO, High-drive capability, JTAG_TDO
6	DIO_4	GPIO, High-drive capability, JTAG_TDI
7	NC	NC
8	NC	NC
9	NC	NC
10	NC	NC
11	GND	Power Ground
12	NC	NC
13	NC	NC
14	DIO_9	GPIO, Sensor Controller, Analog
15	DIO_5	GPIO, Sensor Controller, Analog
16	DIO_6	GPIO, Sensor Controller, Analog
17	NC	NC
18	NC	NC
19	VDD	Power Supply
20	GND	Power Ground
21	DIO_8	GPIO, Sensor Controller, Analog
22	DIO_7	GPIO, Sensor Controller, Analog
23	DIO_0	GPIO, Sensor Controller, high-drive capability
24	DIO_2	GPIO, Sensor Controller, high-drive capability

25	DIO_1	GPIO, Sensor Controller, high-drive capability
26	NC	NC
27	NC	NC
28	RST	
29	GND	Power Ground

Overall Dimensions

Fig. 1 shows the overall dimensions of BDE-BLEM203P. The module measures 16.55mm long by 10.88mm wide by 2.3mm high with the shield.

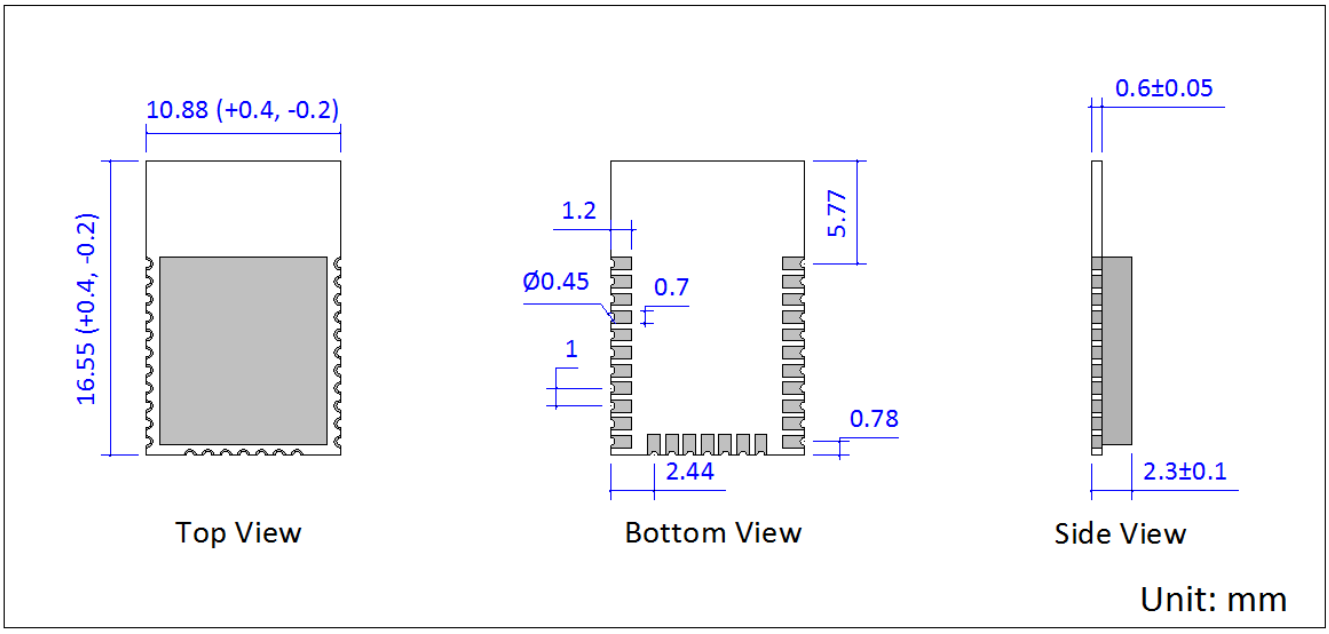

Fig. 3: Overall Dimensions of BDE-BLEM203P

Module Location for Reference

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

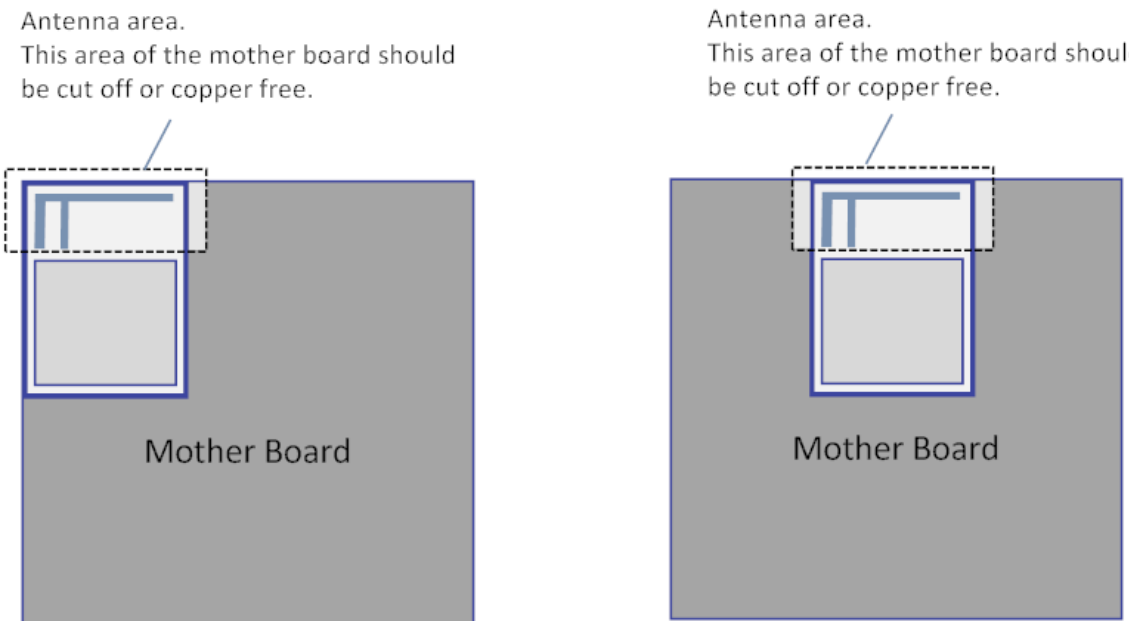

Fig. 4: Recommended location in X-Y plane

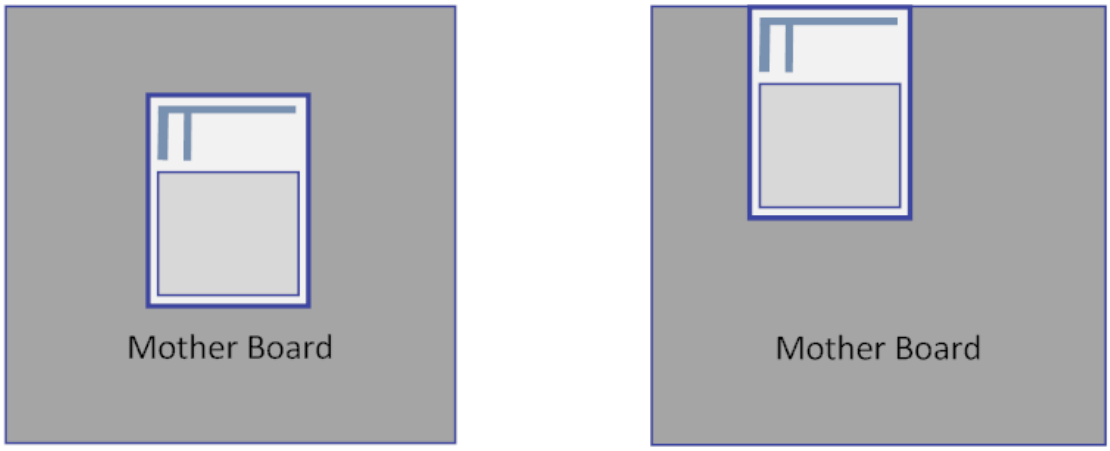

Fig. 5: Not recommended location in X-Y plane

■ Location in Z plane

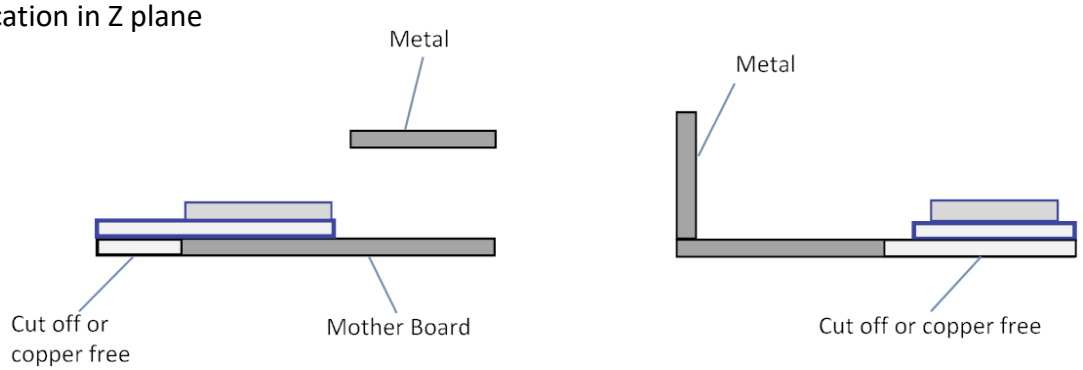

Fig. 6: Recommended location in Z plane

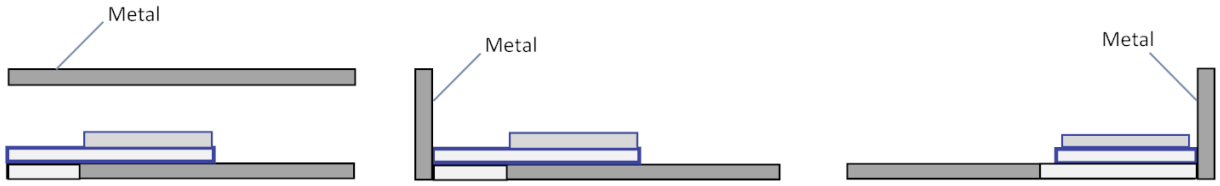

Fig. 7: Not recommended location in Z plane

Typical Solder Reflow Profile

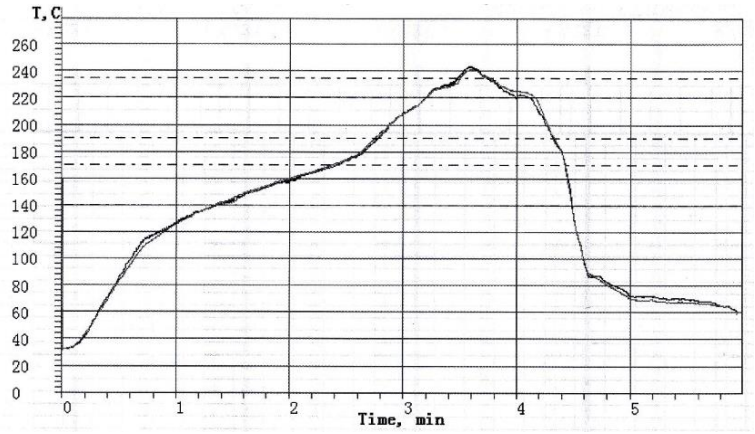

Fig. 8: Typical Solder Reflow Profile

Package Information

Fig. 9: Package

Contacts

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