BDE-BLEM201

Bluetooth 5.0 Low Energy Module

Key Features

- Bluetooth 5.0 single-mode compliant
- Support master and slave modes, 3+ simultaneous connections in master mode
- Integrated Bluetooth Low Energy stack, no external MCU needed
- RF performance
  - TX power: -23dBm to 0dBm
  - RX sensitivity: up to -94dBm
- Communication range: 100m (LOS)
- Ultra low power 8051 microcontroller core
  - 8K RAM with retention
  - 256K in-system-programming flash
  - 23 GPIOs (21x4mA, 2x20mA)
  - 12-bit ADC with eight channels and configurable resolution
  - Data interfaces: I2C x 1, USART x 2
  - Integrate high-performance comparator
- Ultra low power consumption: 0.5uA@PowerMode3 (External Interrupts)
- Antenna: Chip antenna with -0.5 dBi Gain
- Size: 16.55mm x10.88mm x 1.5mm (Without Shielding)
  16.55mm x10.88mm x 2.2mm (With Shielding)
- BQB certification
- FCC, CE, RoHS compliant

Descriptions

BDE-BLEM201 is a Bluetooth 5.0 single-mode compliant Bluetooth low energy module targeted at low power sensors and PC/Phone accessories.

BDE-BLEM201 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 equipments
- Home electronics
- Mobile and PC accessories
- Industry automation

Block Diagram

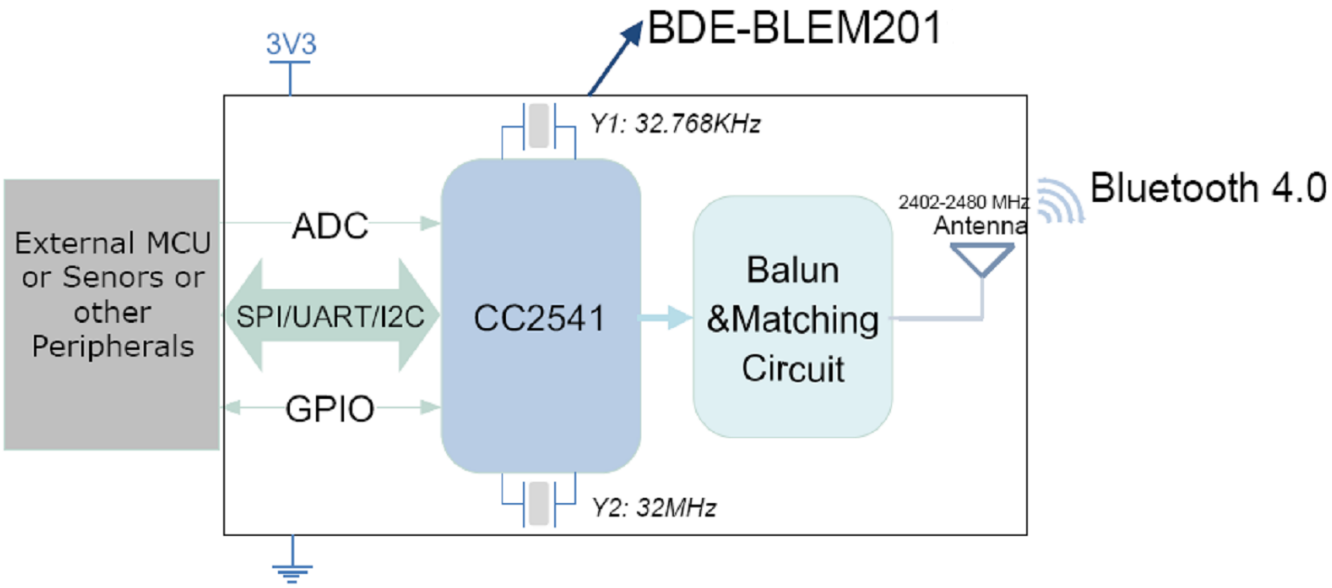

Fig. 1: Block diagram of BDE-BLEM201

Electrical Characteristics

■ Absolute maximum rating

Rating	Min	Typ	Max	Unit
Storage Temperature	-40	-	125	℃
VDD	-0.3	-	3.9	V
Other Terminals	-0.2	-	VDD+0.3≤3.9	V

■ Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	-	85	℃
VDD	2	3.3	3.6	V

Overall Dimensions

Fig. 2 shows the overall dimensions of BDE-BLEM201. The module measures 16.55mm long by 10.88mm wide by 1.5mm high without board level shield.

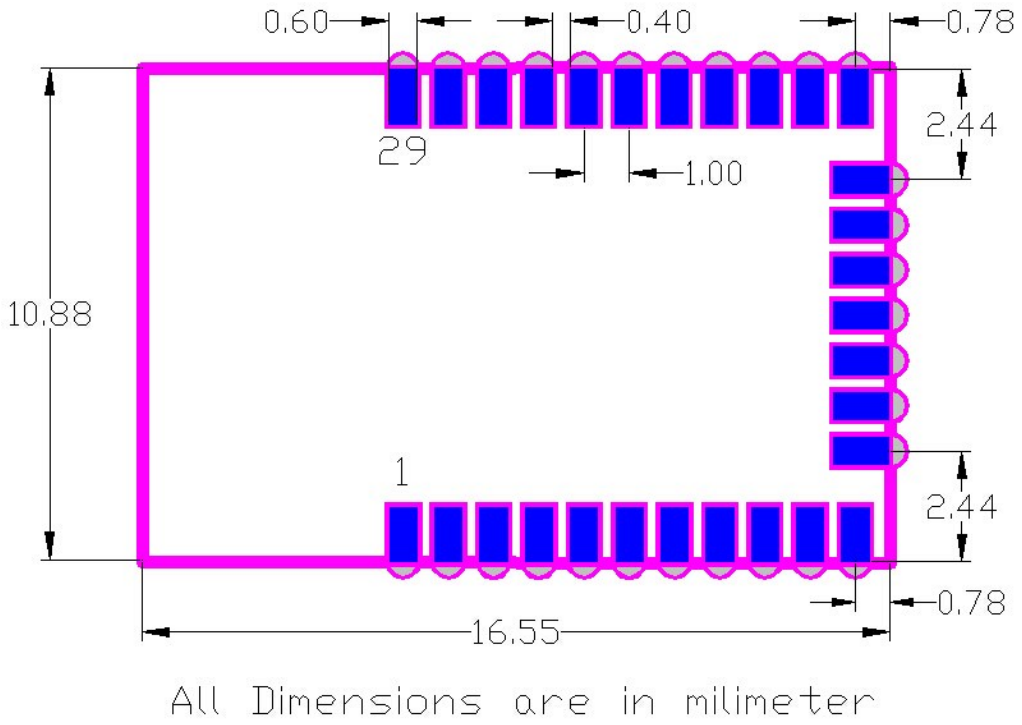

Fig. 2: Overall Dimensions of BDE-BLEM201

Pin Definitions

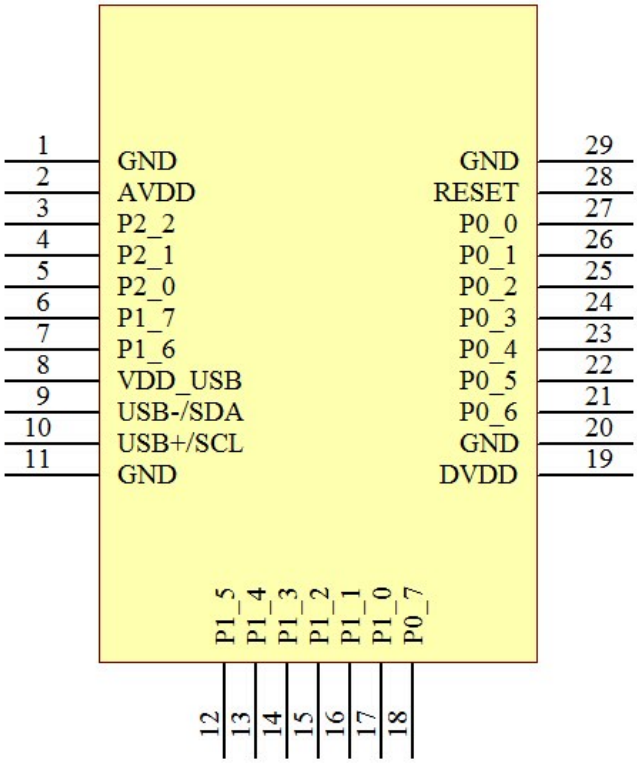

Fig. 3: The pinout of BDE-BLEM201 (TOP)

Table 2: Pin definitions of BDE-BLEM201

Pin Number	Pin Name	Definitions
1	GND	Power ground
2	AVDD	Power supply for analog circuit
3	P2.2	GPIO
4	P2.1	GPIO
5	P2.0	GPIO
6	P1.7	GPIO
7	P1.6	GPIO
8	NC	NC
9	SDA	Serial clock of I2C
10	SCL	Serial data of I2C
11	GND	Power ground
12	P1.5	GPIO
13	P1.4	GPIO
14	P1.3	GPIO

15	P1.2	GPIO
16	P1.1	GPIO
17	P1.0	GPIO
18	P0.7	GPIO
19	DVDD	Power supply of digital circuit
20	GND	Power ground
21	P0.6	GPIO
22	P0.5	GPIO
23	P0.4	GPIO
24	P0.3	GPIO
25	P0.2	GPIO
26	P0.1	GPIO
27	P0.0	GPIO
28	RESET	Reset pin, active low
29	GND	Power ground
30	RF GND	RF ground
31	RF	Power port
32	RF GND	RF ground

Table 3: Peripheral IO pin mapping

PERIPHERAL / FUNCTION	P0								P1								P2		
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	2	1	0
ADC	A7	A6	A5	A4	A3	A2	A1	A0											
Operational amplifier						O	-	+											
Analog comparator			+	-															
USART 0 SPI Alt. 2			C	SS	MO	MI													
											MO	MI	C	SS					
USART 0 UART Alt.2			RT	CT	TX	RX													
											TX	RX	RT	CT					
USART 1 SPI Alt.2			MI	MO	C	SS													
									MI	MO	C	SS							
USART 1 UART Alt.2			RX	TX	RT	CT													
									RX	TX	RT	CT							
TIMER 1 Alt.2		4	3	2	1	0													
	3	4												0	1	2			
TIMER 3 Alt.2												1	0						
									1	0									
TIMER 4 Alt.2															1	0			
																			0
DEBUG																	DC	DD	
OBSSEL											5	4	3	2	1	0			

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

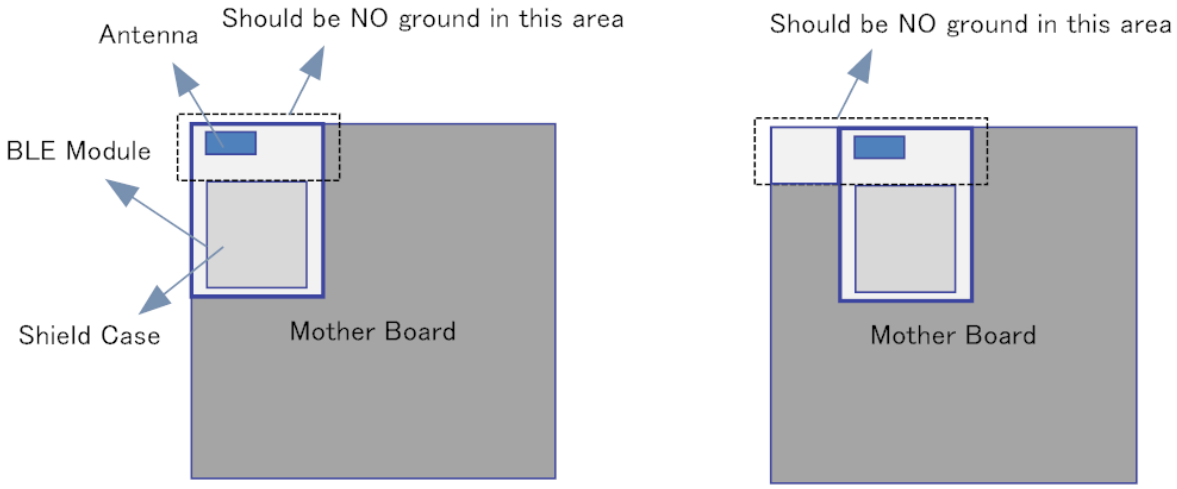

Fig. 4: Recommended location in X-Y plane

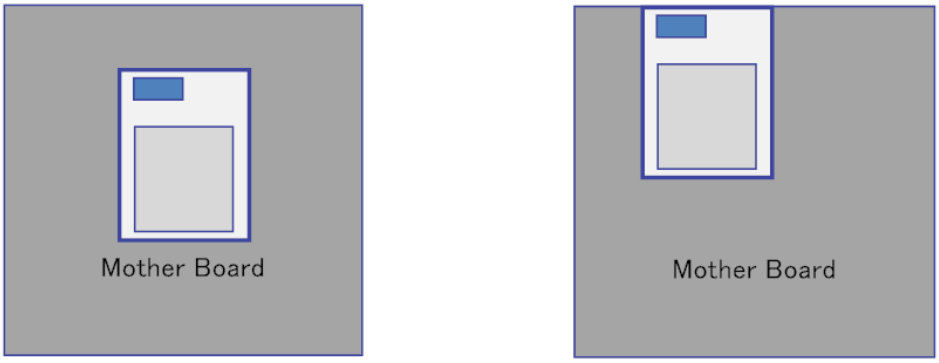

Fig. 5: Not recommended location in X-Y plane

- Location in Z plane

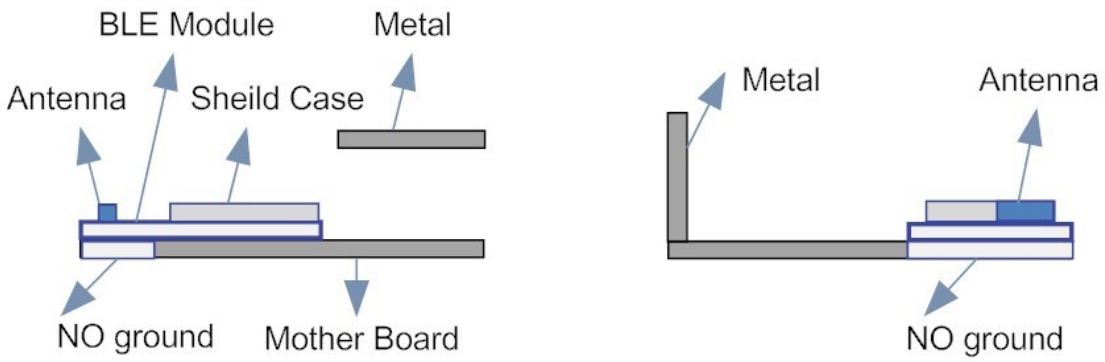

Fig. 6: Recommended location in Z plane

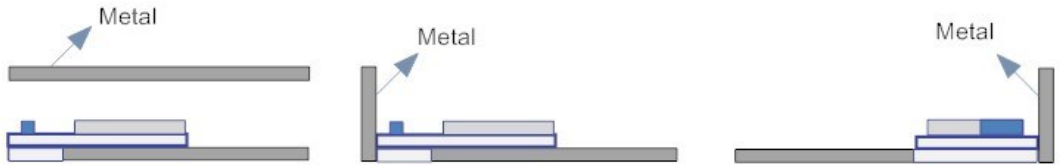

Fig. 7: Not recommended location in Z plane

Typical Solder Reflow Profile

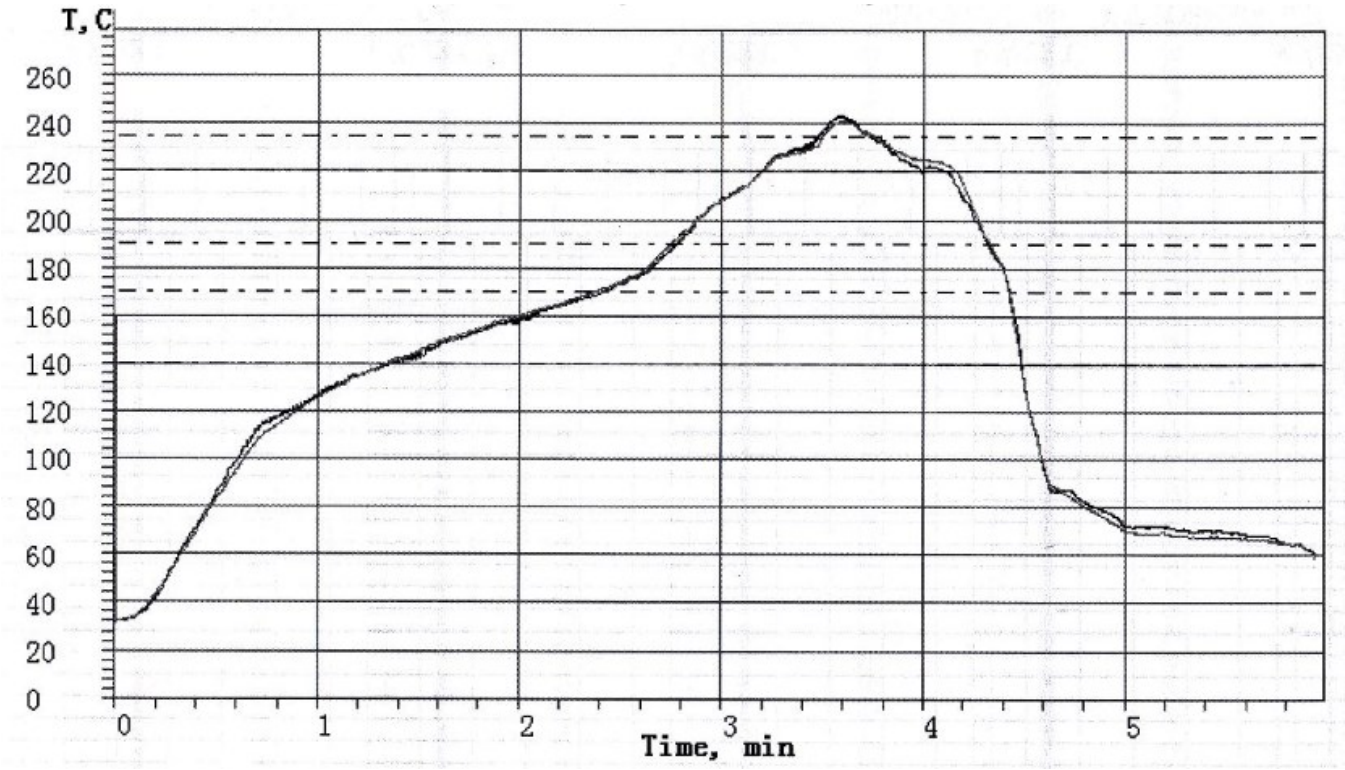

Fig. 8: Typical Solder Reflow Profile

Package Information

Fig. 9: Package information

Note：Operation Frequency：2402 MHz ~ 2480 MHz, tune up power with tolerance: -2+/-1dBm, GFSK modulation

Contacts

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