

BTM010

Bluetooth 4.0 Low Energy Module Specification

BTM010

Bluetooth 4.0 Low Energy Module

1. Overview

BTM010 are Bluetooth modules that supporting Bluetooth v4.0 Low Energy specification. It is implemented by using the TI CC2541 chip. MB411-01 are designed for applications that requires low energy consumption.

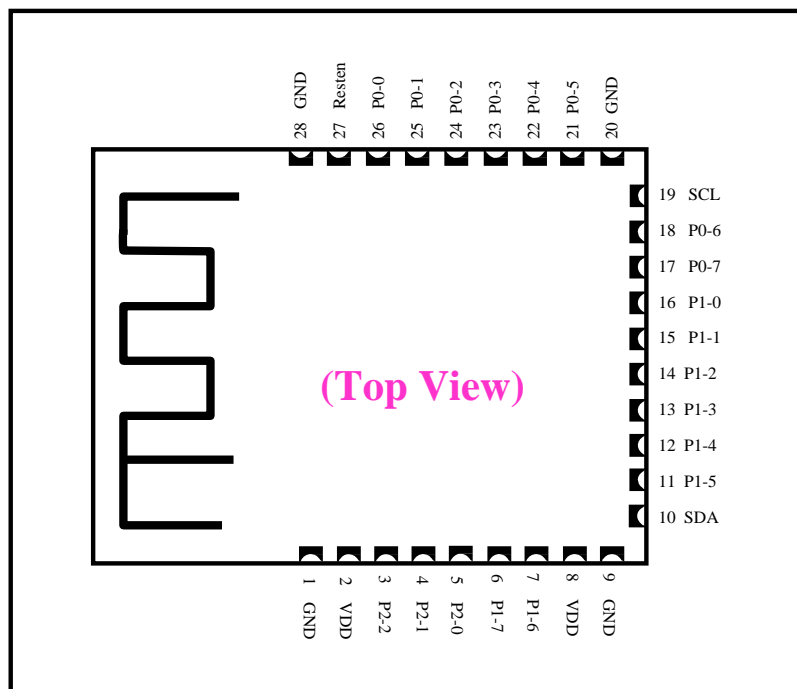
2. Features

- A single chip radio and baseband IC for Bluetooth applications
- Fully Qualified Bluetooth Smart (V4.0 Low Energy single mode) specification
- Enhanced 8051 MCU core with 256k flash memory
- Support 3 simultaneous live connections in central role
- Coin battery friendly 2.0V – 3.6V operation
- Hardware I2C master / slave interface
- Low power consumption, < 30uA on the average of once-a-second communication
- 10mS data transfer latency
- Programmable transmitter power
- Support BLE stack including GAP, GATT, SM and L2CAP
- Build-in PCB antenna
- RoHS compliant
- Dimension:
 - MB411-01 19 mm(L)x15.2mm(W)x2.5mm(H)

3. Applications

- Proximity and Lost-prevention key fob
- Wireless Keyboard and Mouse
- RC and Interactive Toy
- Medical and Healthcare monitoring
- Sports and Fitness equipment

4. Pin Drawing



BTM010 Pin Diagram

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5. Ordering Information

Part No.	Dimension	PCB Antenna
MB411-01	19.30mm (L) x 15.15mm (w) x 2.5mm (H)	✓

6. Pin Description

Pin No.	MB411-01	Pin Type	Pin Descriptions
1	GND		Negative power supply
2	VDD		Positive power supply
3	P2-2	B	Programmable I/O pin, or debug clock
4	P2-1	B	Programmable I/O pin or debug data
5	P2-0	B	Programmable I/O pin
6	P1-7	B	Programmable I/O pin
7	P1-6	B	Programmable I/O pin
8	VDD		Positive power supply
9	GND		Negative power supply
10	SDA	B	Programmable I/O pin, or I2C data pin
11	P1-5	B	Programmable I/O pin
12	P1-4	B	Programmable I/O pin
13	P1-3	B	Programmable I/O pin
14	P1-2	B	Programmable I/O pin
15	P1-1	B	Programmable I/O pin, 20-mA drive capability
16	P1-0	B	Programmable I/O pin, 20-mA drive capability
17	P0-7	B	Programmable I/O pin
18	P0-6	B	Programmable I/O pin
19	SCL	B	Programmable I/O pin, or I2C clock pin
20	GND		Negative power supply
21	P0-5	B	Programmable I/O pin
22	P0-4	B	Programmable I/O pin
23	P0-3	B	Programmable I/O pin
24	P0-2	B	Programmable I/O pin
25	P0-1	B	Programmable I/O pin
26	P0-0	B	Programmable I/O pin
27	Resten	I	Active low reset signal
28	GND		Negative power supply

O4 4mA output pad
 OD Open drain output pad
 I Input
 IS Schmidt Trigger Input
 B Bidirectional

SPU Strong Pull-up
 SPD Strong Pull-down
 WPU Weak Pull-up
 WPD Weak Pull-down

Table 1 BTM010 Pin Description Table

7. Electrical Specification

7.1. Absolute Maximum Rating

Item	Symbol	Rating	Unit
Power Supply Voltage	VDD	-0.4 to 3.7	V
Peak Current	I _{pk}	0 - 70	mA
Storage Temperature	T _{STG}	-40 to 85	°C

7.2. Recommended Operating Condition

Item	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	VDD	2.0	3.0	3.6	V
RF Operating Temperature		0	25	80	°C
Operating Temperature		-20	25	70	°C

7.3. Digital Input / Output Port Characteristics

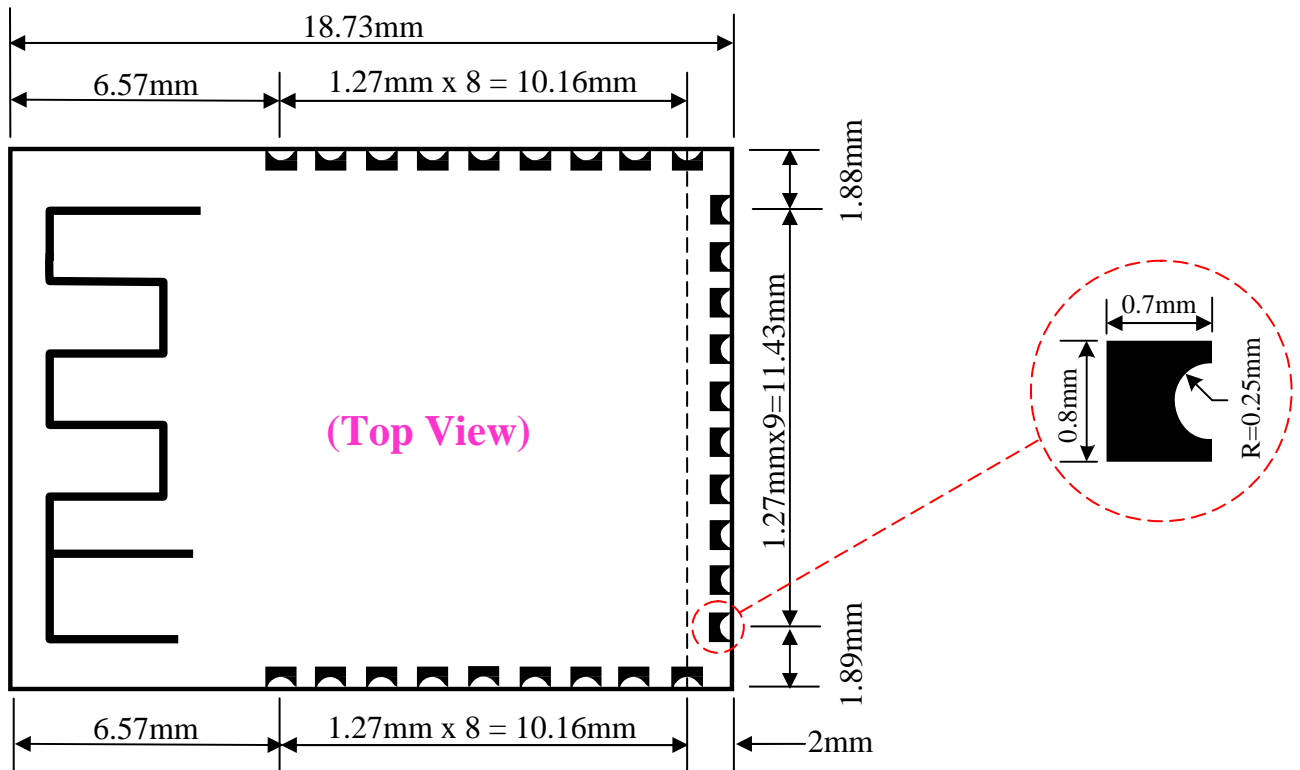
VDD=3.0V, operating temperature = 25 °C unless specified otherwise

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Input Voltage Levels						
V _{IL}	Input low voltage				0.5	V
V _{IH}	Input high voltage		2.5			V
Output Voltage Levels						
V _{OL}	Output low voltage	IOL = -4mA			0.5	V
V _{OH}	Output high voltage	IOH = 4mA	2.4			V
Input and Tri-state Current with						
I/O Pad leakage current			-1	0	1	uA
Input Capacitance			1		5	pF
Current Consumption						
Operating Current, RX active				18		mA
Operating Current, TX active		0 dBm TX Power		18		mA
Standby Current, TX & RX inactive				50		uA

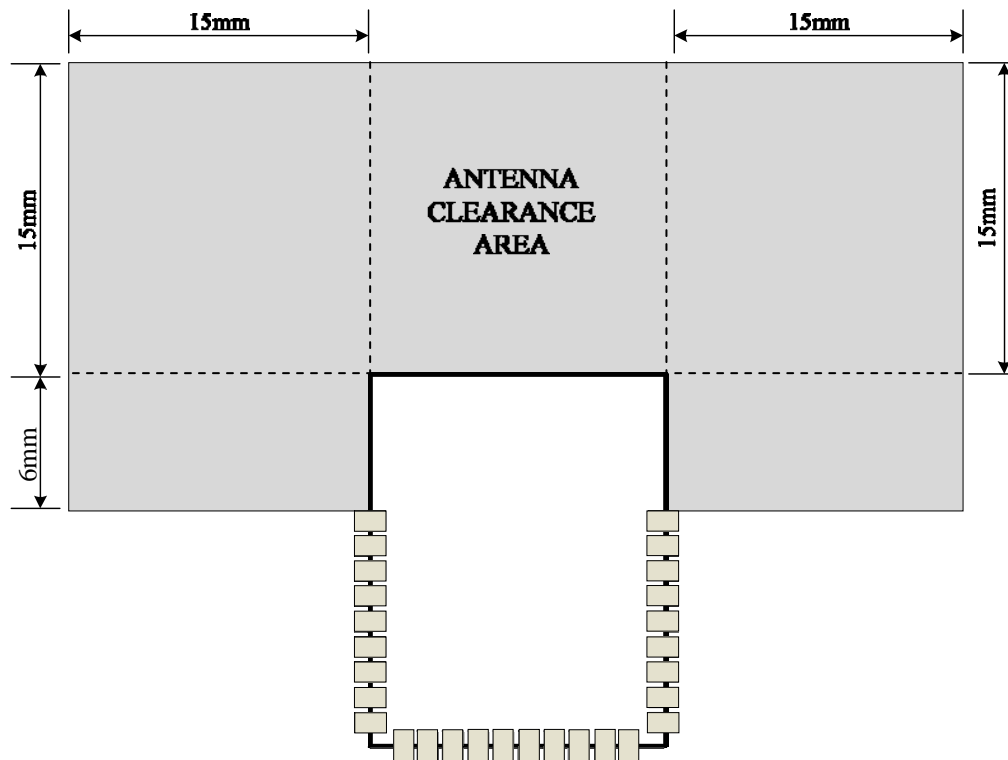
7.4. RF Characteristics

Item	Value
Communication:	BLE(Bluetooth 4.0 Low Energy)
Standard Compliance	CE/FCC
Antenna installation	PCB Printed Antenna
Antenna Gain	0 dBi
Frequency Range:	2.402GHz~2.480GHz
RF output power:	0 dBm
Receive Sensitivity:	-94dBm
Transmission Rate:	1Mbps

7.5. Module Dimension



7.6. PCB Layout Guideline



FCC Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

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 uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause 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 connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

"Contains Transmitter Module FCC ID: REY-BTM010"

When the module is installed inside another device, the user manual of this device must contain below warning statements; 1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation. 2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.