

# **iBT-11/iBT-11S/iBT-11-02/iBT-11-02S**

## **Bluetooth 4.0 Low Energy Module**

(  **Bluetooth® Qualified QDID : B021245** )

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### 1. Overview

iBT-11/iBT-11S/iBT-11-02/iBT-11-02S are Bluetooth modules that supporting Bluetooth v4.0 Low Energy specification. It is implemented by using the TI CC2541 chip. iBT-11/iBT-11S/iBT-11-02/iBT-11-02S 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 (iBT-11, iBT-11S) or external antenna (iBT-11-02, iBT-11-02S)
- RoHS compliant
- Dimension:
  - iBT-11 19.10mm(L)x15.15mm(W)x1.8mm(H)
  - iBT-11S 19.10mm(L)x15.15mm(W)x2.6mm(H)
  - iBT-11-02 14.50mm(L)x15.15mm(W)x1.8mm(H)
  - iBT-11-02S 14.50mm(L)x15.15mm(W)x2.6mm(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

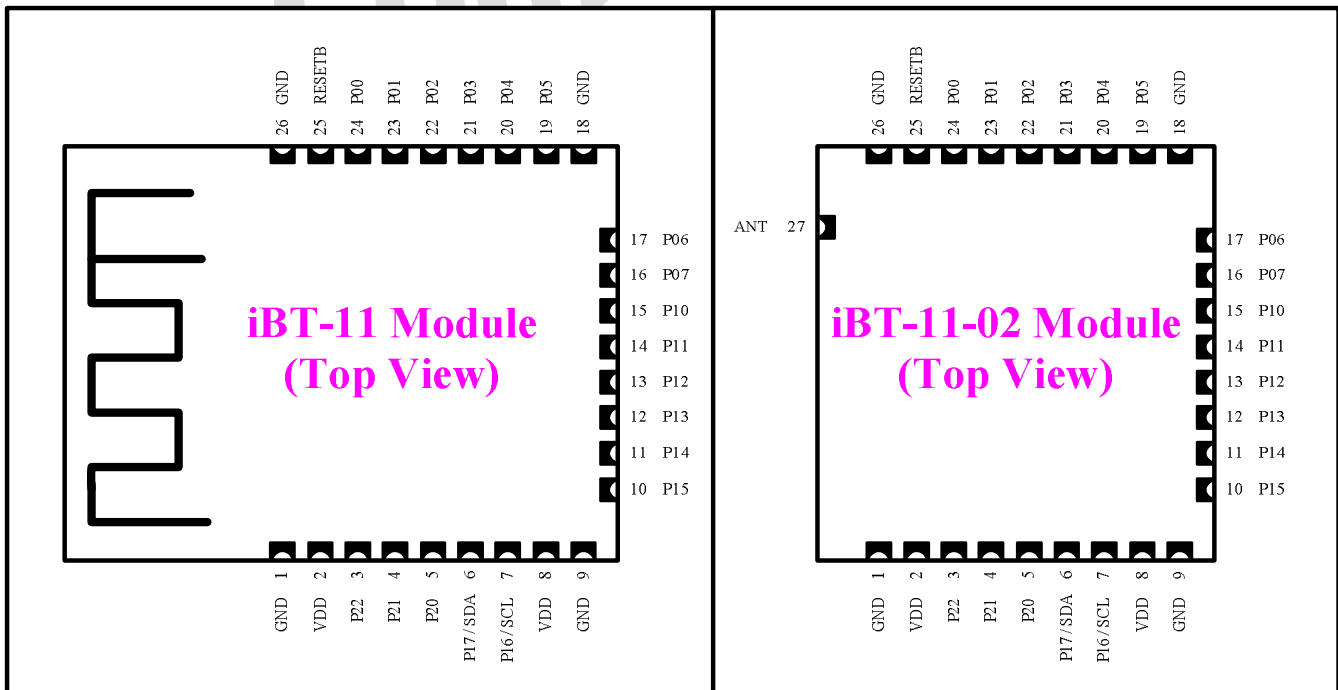


Figure 1 iBT-11/iBT-11S/iBT-11-02/iBT-11-02S Pin Diagram

### 5. Ordering Information

Part No.	Dimension			PCB Antenna	Metal Shield Can
	Length	Width	Height		
iBT-11	19.10 <sup>+0.5</sup> / <sub>-0.1</sub> mm	15.15 <sup>+0.5</sup> / <sub>-0.1</sub> mm	1.8 <sup>+0.2</sup> / <sub>-0.2</sub> mm	√	-
iBT-11S	19.10 <sup>+0.5</sup> / <sub>-0.1</sub> mm	15.15 <sup>+0.5</sup> / <sub>-0.1</sub> mm	2.6 <sup>+0.2</sup> / <sub>-0.2</sub> mm	√	√
iBT-11-02	14.50 <sup>+0.5</sup> / <sub>-0.1</sub> mm	15.15 <sup>+0.5</sup> / <sub>-0.1</sub> mm	1.8 <sup>+0.2</sup> / <sub>-0.2</sub> mm	-	-
iBT-11-02S	14.50 <sup>+0.5</sup> / <sub>-0.1</sub> mm	15.15 <sup>+0.5</sup> / <sub>-0.1</sub> mm	2.6 <sup>+0.2</sup> / <sub>-0.2</sub> mm	-	√

### 6. Pin Description

Pin No.	iBT-11 / iBT-11S Pin Name	iBT-11-02 / iBT-11-02S Pin Name	Pin Type	Pin Descriptions
1	GND	GND		Negative power supply
2	VDD	VDD		Positive power supply
3	P22	P22	B	Programmable I/O pin
4	P21	P21	B	Programmable I/O pin
5	P20	P20	B	Programmable I/O pin
6	P17 / SDA	P17 / SDA	B	Programmable I/O pin, or I2C data pin
7	P16 / SCL	P16 / SCL	B	Programmable I/O pin, or I2C clock pin
8	VDD	VDD		Positive power supply
9	GND	GND		Negative power supply
10	P15	P15	B	Programmable I/O pin
11	P14	P14	B	Programmable I/O pin
12	P13	P13	B	Programmable I/O pin
13	P12	P12	B	Programmable I/O pin
14	P11	P11	B	Programmable I/O pin
15	P10	P10	B	Programmable I/O pin
16	P07	P07	B	Programmable I/O pin
17	P06	P06	B	Programmable I/O pin
18	GND	GND		Negative power supply
19	P05	P05	B	Programmable I/O pin
20	P04	P04	B	Programmable I/O pin
21	P03	P03	B	Programmable I/O pin
22	P02	P02	B	Programmable I/O pin
23	P01	P01	B	Programmable I/O pin
24	P00	P00	B	Programmable I/O pin
25	RESETB	RESETB	I	Active low reset signal
26	GND	GND		Negative power supply
27	-	ANT	A	This is the Antenna connection pin. For iBT-11-02 or iBT-11-02S only.

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  
 A Analog

**Table 1 iBT-11/iBT-11S/iBT-11-02/iBT-11-02S 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 <sub>pk</sub>	0 - 70	mA
Storage Temperature	T <sub>STG</sub>	-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
<b>Input Voltage Levels</b>						
V <sub>IL</sub>	Input low voltage				0.5	V
V <sub>IH</sub>	Input high voltage		2.5			V
<b>Output Voltage Levels</b>						
V <sub>OL</sub>	Output low voltage	I <sub>OL</sub> = -4mA			0.5	V
V <sub>OH</sub>	Output high voltage	I <sub>OH</sub> = 4mA	2.4			V
<b>Input and Tri-state Current with</b>						
	I/O Pad leakage current		-1	0	1	uA
	Input Capacitance		1		5	pF
<b>Current Consumption</b>						
	Operating Current, RX active			18		mA
	Operating Current, TX active	0 dBm TX Power		18		mA
	Standby Current, TX & RX inactive	Sleep mode		1		uA

**7.4. RF Characteristics**

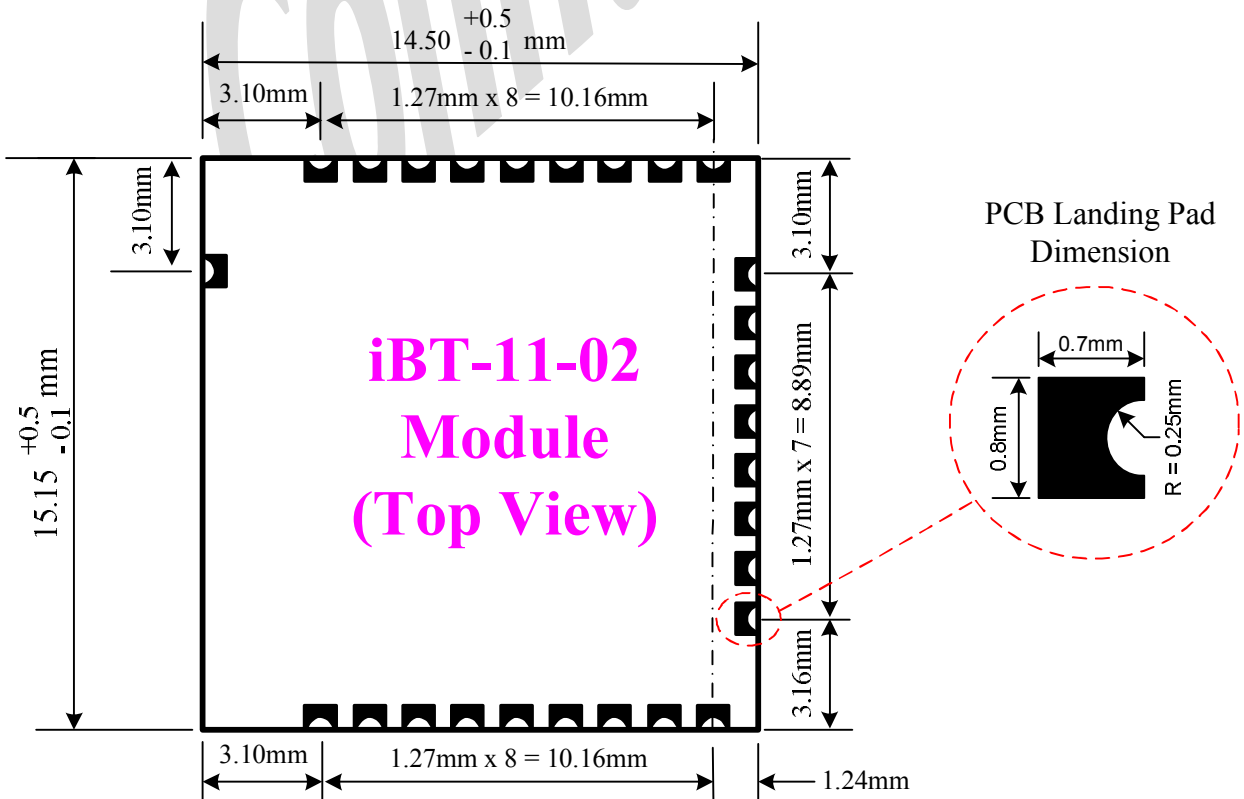
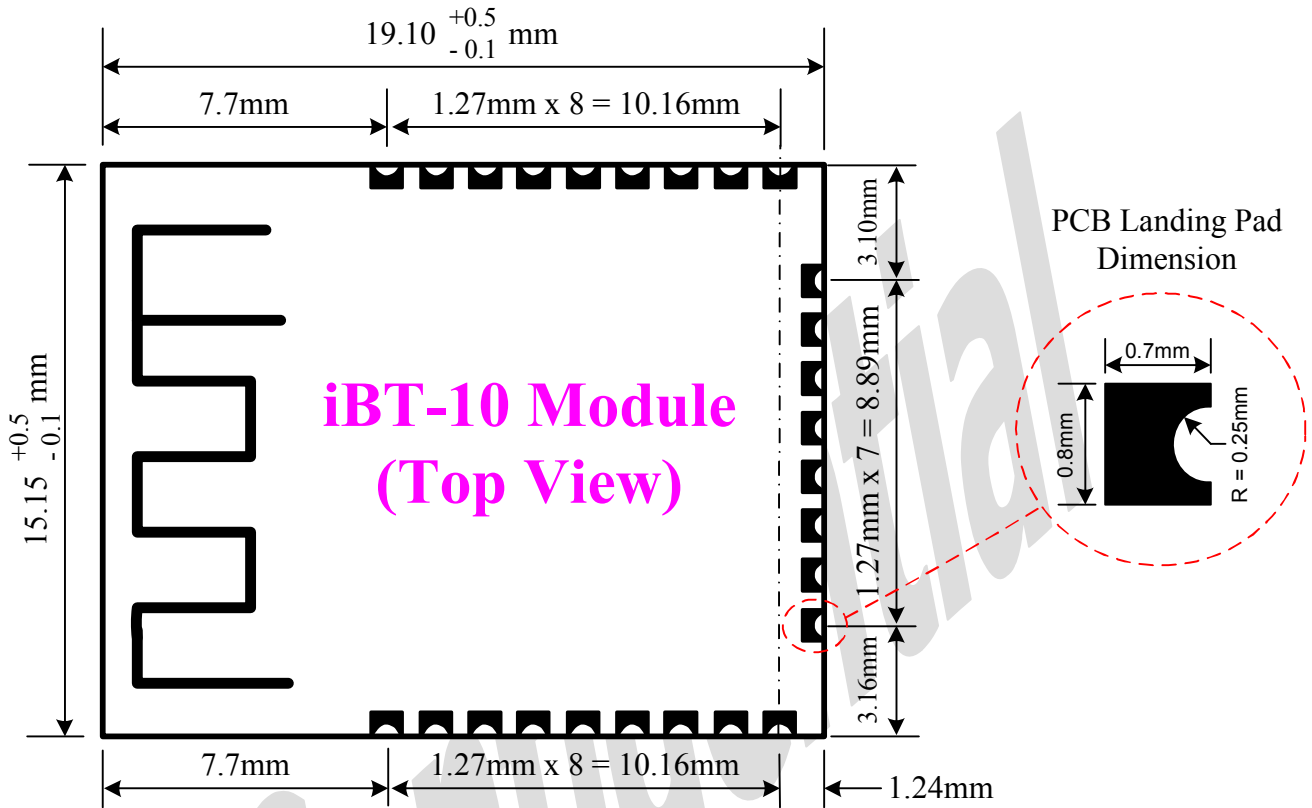
VDD=3.3V, operating temperature = 25 °C unless specified otherwise

Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm		-75		≤ -70

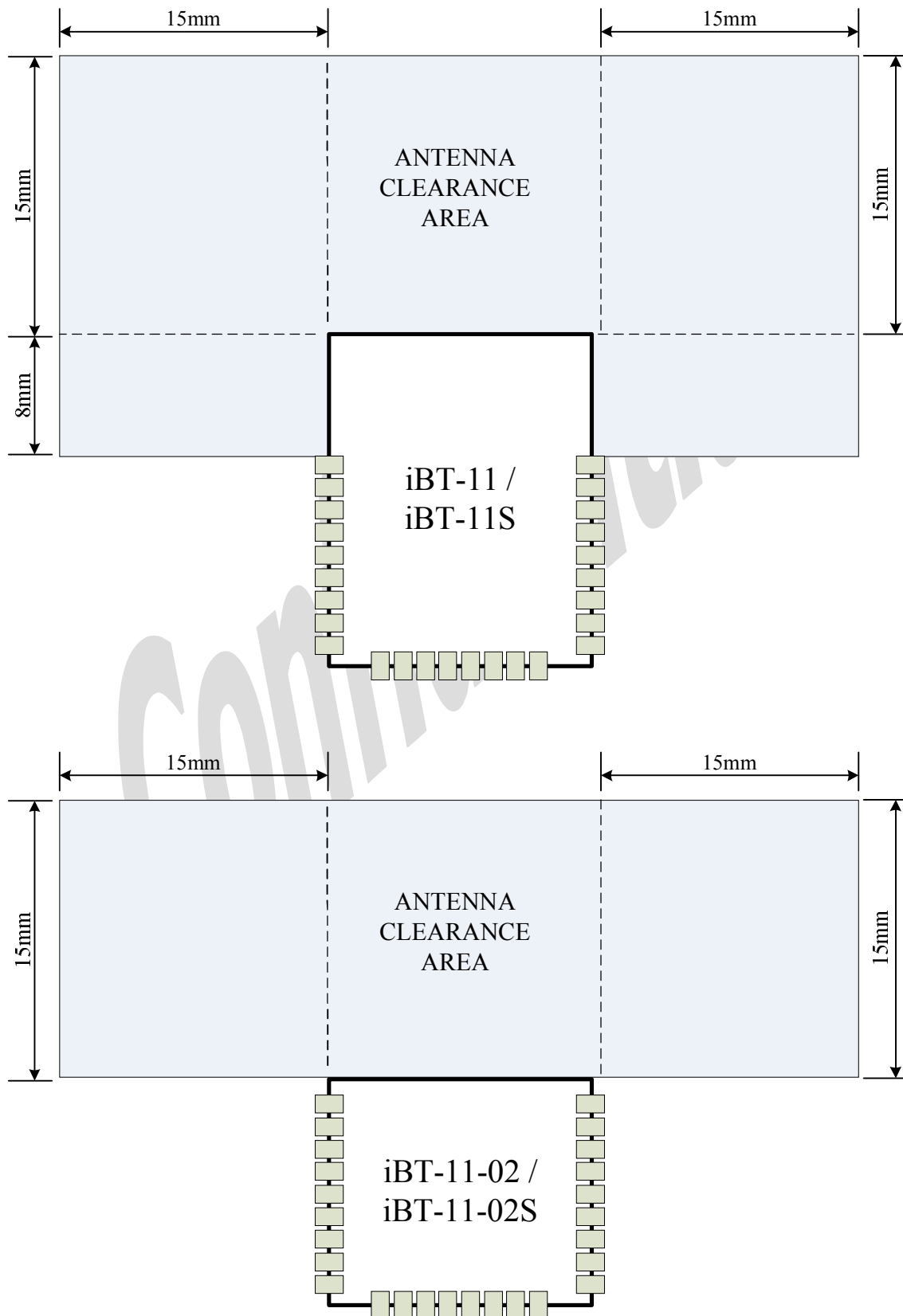
VDD=3.3V, operating temperature = 25 °C unless specified otherwise

Transmitter	Units	Condition	Value	Bluetooth Spec
RF Output Power	dBm	2402MHz	-5.17	-20 to +10
		2440MHz	-4.90	
		2480MHz	-4.41	
In Band Emission (+/- 2MHz)	dBm	2406MHz	-29.5	≤ -20
		2440MHz	-31.5	
		2476MHz	-35.1	
In Band Emission (+/- 3MHz)	dBm	2406MHz	-36.3	≤ -30
		2440MHz	-37.9	
		2476MHz	-39.1	
Carrier Frequency Offset	kHz	2402MHz	30	-150 to +150
		2440MHz	30	
		2480MHz	30	

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**7.5. Module Dimension**


### 7.6. PCB Layout Guideline



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