

# **iBT-20/iBT-20S/iBT-20-02/iBT-20-02S**

## **Bluetooth 4.1 Low Energy Module**

**( Bluetooth<sup>®</sup> Qualified QDID : ???????)**

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### 1. Overview

iBT-20/iBT-20S/iBT-20-02/iBT-20-02S are Bluetooth modules that supporting Bluetooth v4.1 Low Energy specification. It is implemented by using the ST BlueNRG-1 chip. iBT-20/iBT-20S/iBT-20-02/iBT-20-02S 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 (V4.1 Low Energy) specification
- Cortex M0 MCU core with 160k flash memory
- 24kB RAM
- Support up to 2 masters and 3 slaves connections
- Coin battery friendly 2.0V – 3.6V operation
- Hardware I2C master / slave interface
- Low power consumption
- Programmable transmitter power
- Support BLE stack including GAP, GATT, SM and L2CAP
- Build-in PCB antenna (iBT-20, iBT-20S) or external antenna (iBT-20-02, iBT-20-02S)
- RoHS compliant
- Dimension:
  - iBT-20 19.10mm(L)x15.15mm(W)x1.8mm(H)
  - iBT-20S 19.10mm(L)x15.15mm(W)x2.6mm(H)
  - iBT-20-02 14.10mm(L)x15.15mm(W)x1.8mm(H)
  - iBT-20-02S 14.10mm(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

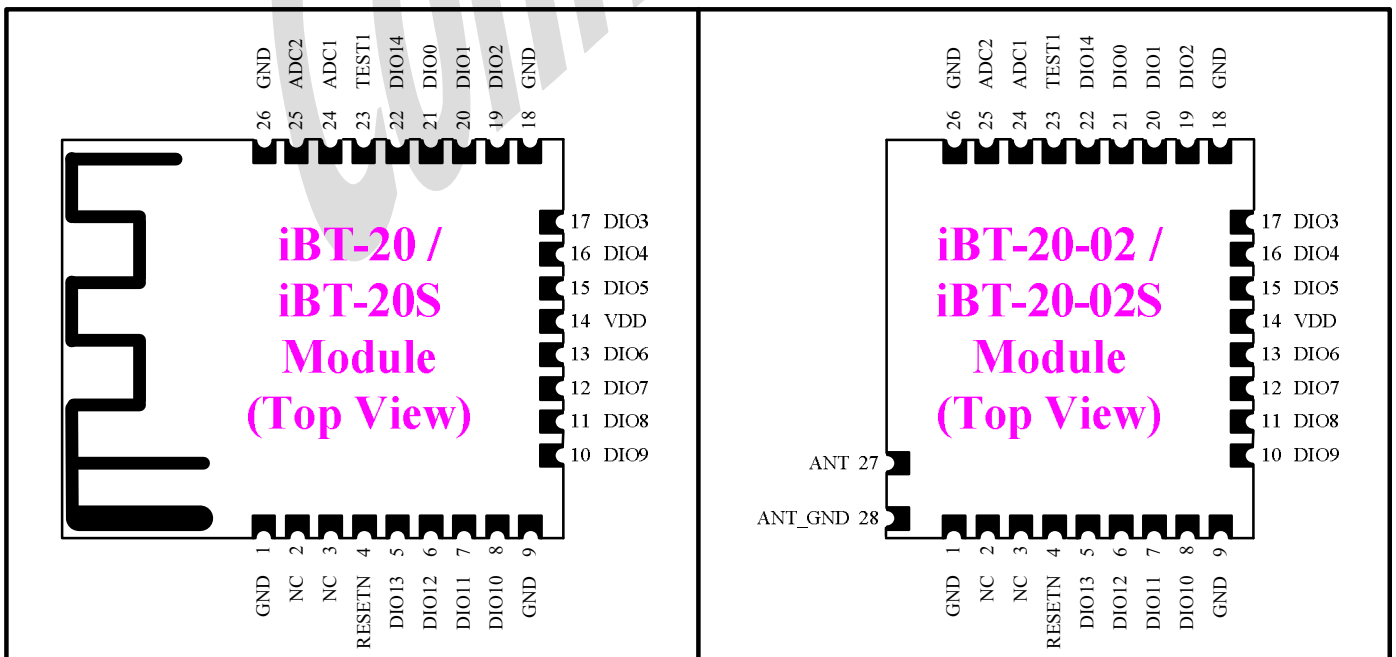


Figure 1 iBT-20/iBT-20S/iBT-20-02/iBT-20-02S Pin Diagram

## 5. Ordering Information

Part No.	Dimension			PCB Antenna	Metal Shield Can
	Length	Width	Height		
iBT-20	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-20S	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-20-02	14.10 <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-20-02S	14.10 <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	-	√

## 6. Pin Description

Pin No.	iBT-20 / iBT-20S Pin Name	iBT-20-02 / iBT-20-02S Pin Name	App Name	Pin Type	Pin Descriptions
1	GND	GND	GND	P	Negative power supply
2	NC	NC	NC		No Connect
3	NC	NC	NC		No Connect
4	RESETN	RESETN	RESETN	I	Active low module reset
5	DIO13	DIO13		B	General purpose digital I/O pin
6	DIO12	DIO12		B	General purpose digital I/O pin
7	DIO11	DIO11	BT_RXD	B	General purpose digital I/O pin
8	DIO10	DIO10		B	General purpose digital I/O pin
9	GND	GND			Positive power supply
10	DIO9	DIO9		B	General purpose digital I/O pin
11	DIO8	DIO8	BT_TXD	B	General purpose digital I/O pin
12	DIO7	DIO7		B	General purpose digital I/O pin
13	DIO6	DIO6		B	General purpose digital I/O pin
14	VDD	VDD	VDD	P	Positive power supply, 1.7V – 3.6V
15	DIO5	DIO5		B	General purpose digital I/O pin
16	DIO4	DIO4		B	General purpose digital I/O pin
17	DIO3	DIO3		B	General purpose digital I/O pin
18	GND	GND	GND		Negative power supply
19	DIO2	DIO2		B	General purpose digital I/O pin
20	DIO1	DIO1		B	General purpose digital I/O pin
21	DIO0	DIO0	DRDY	B	General purpose digital I/O pin
22	DIO14	DIO14 / TEST0		B	General purpose digital I/O pin
23	TEST1	TEST1			Test Pin. No need to connect in application
24	ADC1	ADC1	AIN0	IA	ADC input 1
25	ADC2	ADC2	AIN1	IA	ADC input 2
26	GND	GND	GND		Negative power supply
27		ANT		RF	These two pins are for Antenna connection. For iBT-20-02 or iBT-20-02S only.
28	-	ANT_GND		RF	

I Input  
 IA Analog Input  
 B Bidirectional  
 RF RF I/O pin  
 P Power pin

**Table 1 iBT-20/iBT-20S/iBT-20-02/iBT-20-02S 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	1.7	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**

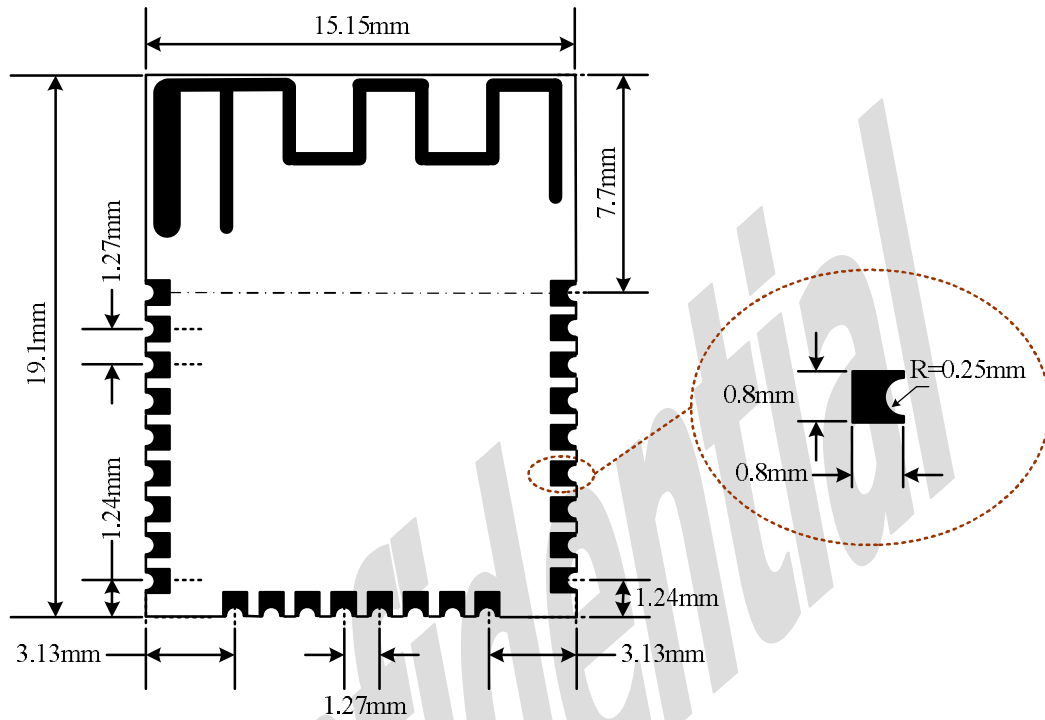
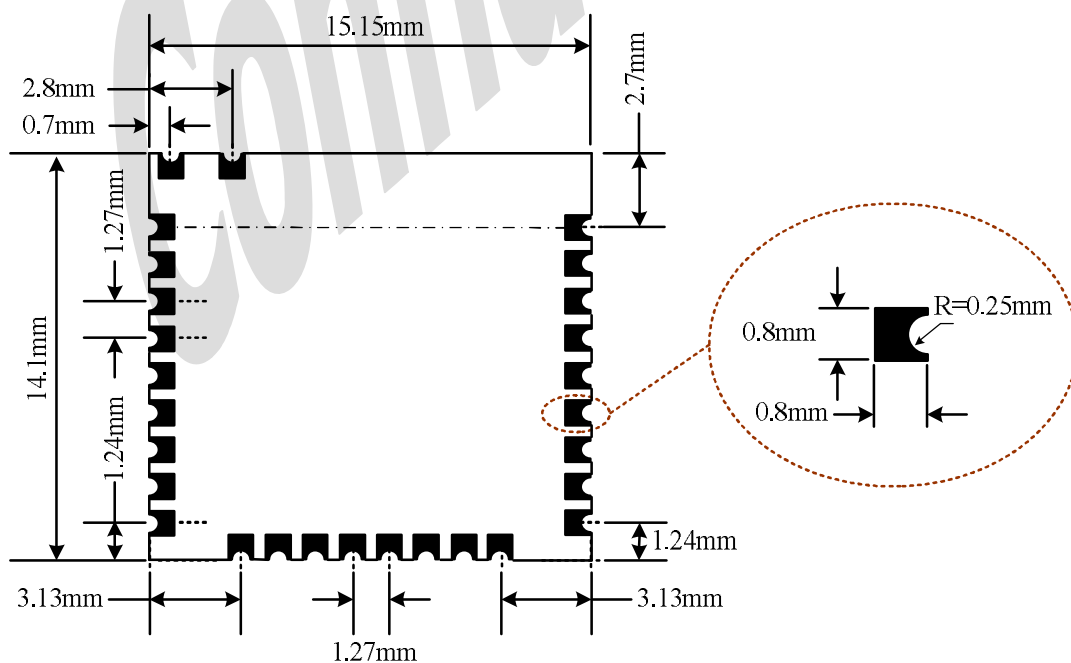
VDD=3.3V, operating temperature = 25 °C unless specified otherwise

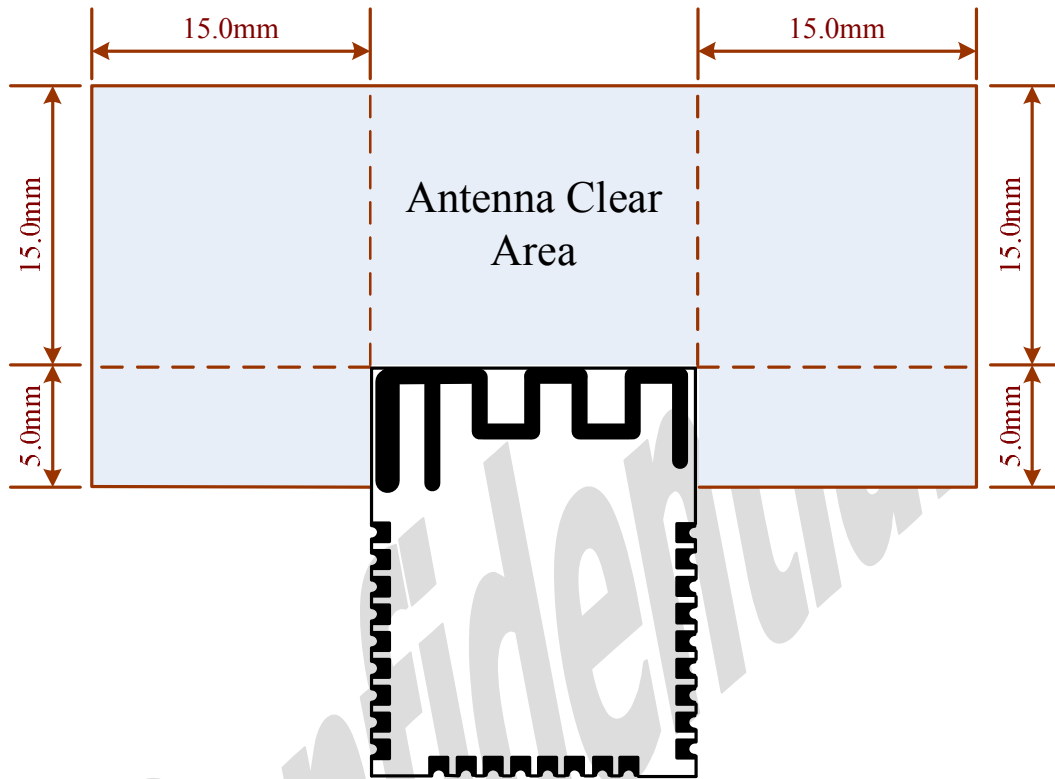
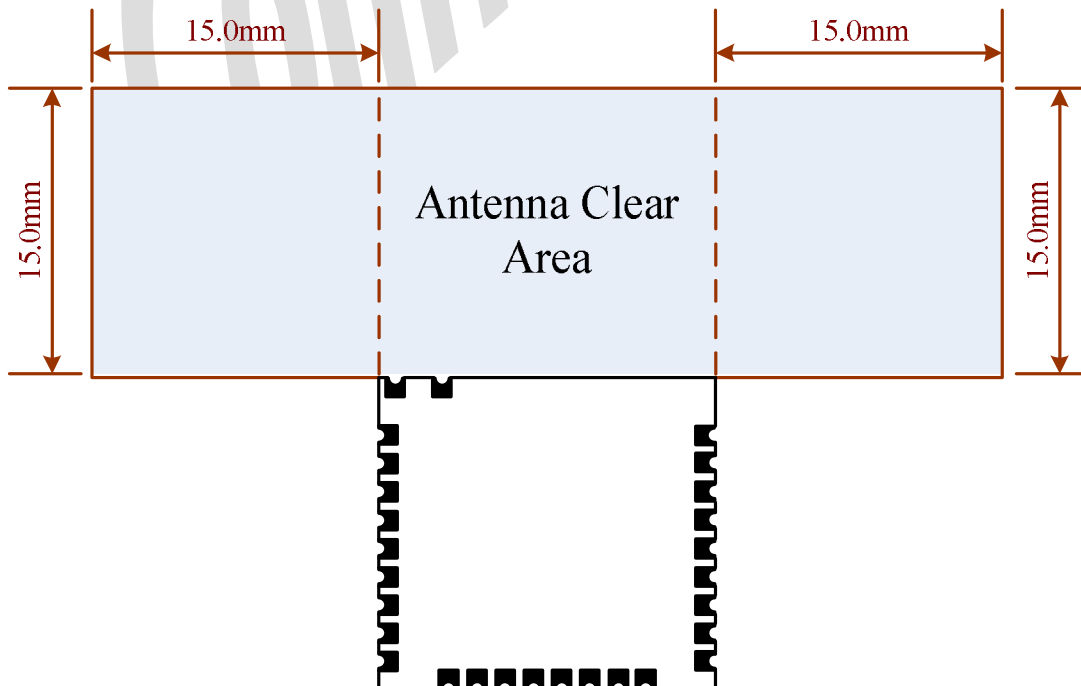
Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm		-75		≤ -70

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

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

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**7.5. Module Dimension**
**7.5.1. iBT-20 and iBT-20S (Top View)**

**7.5.2. iBT-20-02 and iBT-20-02S (Top View)**


**7.6. PCB Layout Guideline**
**7.6.1. iBT-20 and iBT-20S**

**7.6.2. iBT-20-02 and iBT-20-02S**


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