



# TG-02-Kit Specification

Version V1.0.0

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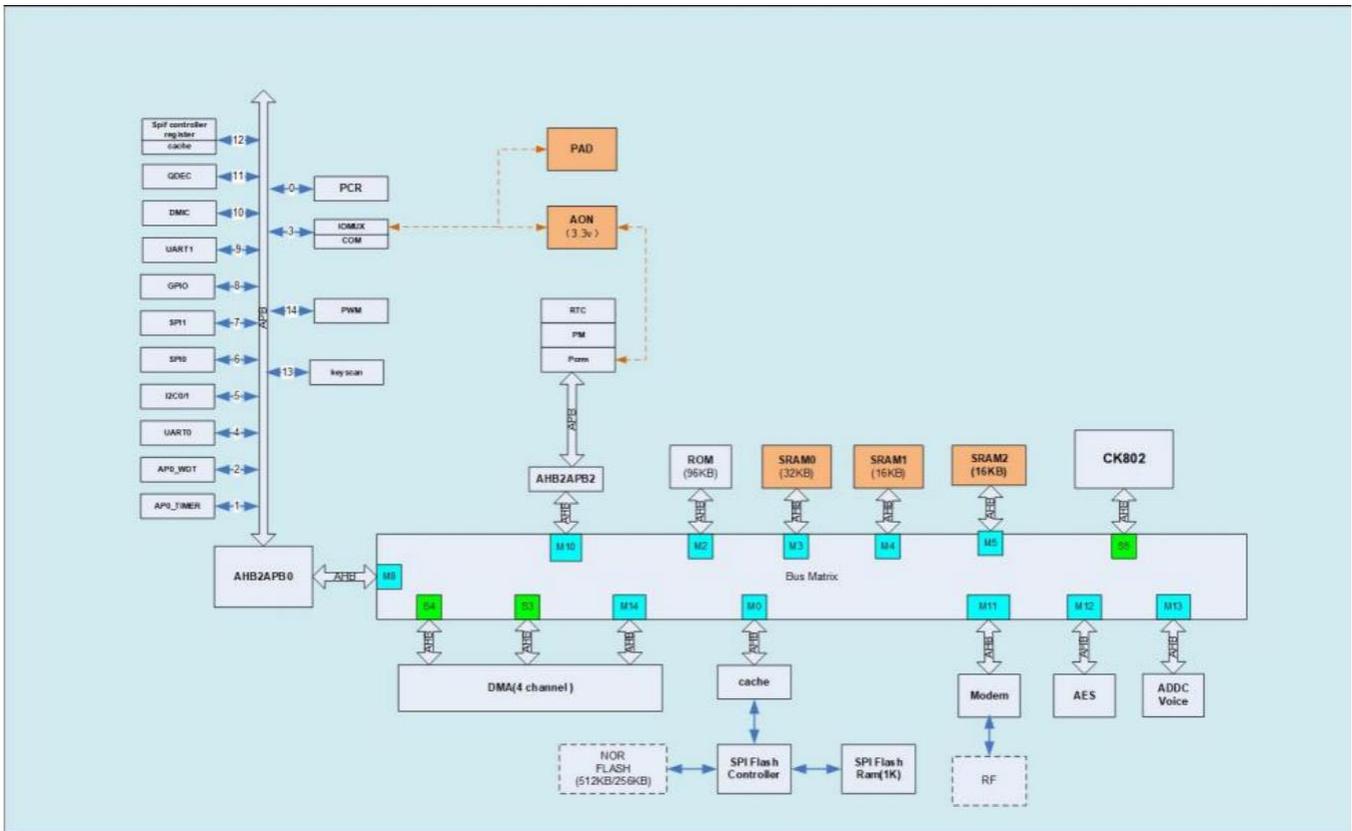
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# 1. Product Overview

TG-02-Kit is a Bluetooth development board developed by Shenzhen Ai-Thinker Technology Co., LTD. The core processor chip TG7120B(SOP16) is a highly integrated bluetooth System-level chip (SoC) with low power consumption, designed for Internet of Things (IoT), mobile devices, wearable electronic devices, smart home and other applications.

TG-02-Kit development board features a high-performance low-power 32-bit CK802 processor, 64KB SRAM, 512KB Flash, 96KB ROM, 256 bit efuse. In addition, the TG-02-Kit development board supports security mechanisms under the BLE protocol, applications and OTA upgrades, and has a variety of unique hardware security mechanisms, hardware encryption supports AES algorithm.

TG-02-Kit provides rich peripheral interfaces, including UART, PWM, ADC, I2C, SPI, PDM, DMA and up to 11 IO ports. The TG-02-Kit development board supports Bluetooth Low Energy: BLE5.1, BLE Mesh. Bluetooth rate support: 125Kbps, 500Kbps, 1Mbps, 2Mbps. Support broadcast extension, multi-broadcast, channel selection.



**Figure 1 Main chip architecture diagram**

## 1.1. Characteristic

- Support BLE5.1, Rate support: 125Kbps, 500Kbps, 1Mbps, 2Mbps
- 64 KB SRAM, 512KB flash, 96 KB ROM, 256 bit efuse
- Support UART/GPIO/ADC/PWM/I2C/SPI/PDM/DMA
- Package: DIP-19
- Multiple sleep modes are supported and the deep sleep current is less than 1uA
- General AT commands to get started quickly
- Support secondary development, integrated Windows development environment

## 2. Main parameters

**Table 1 Description of the main parameters**

<b>Development board model</b>	TG-02-Kit
<b>Suitable module</b>	TG-02
<b>Package</b>	SMD-20
<b>Size</b>	45.54*29.93(±0.2)mm
<b>Antenna</b>	On-board antenna
<b>Frequency</b>	2400 ~ 2483.5MHz
<b>Operating temperature</b>	-40 °C ~ 85 °C
<b>Storage temperature</b>	-40 °C ~ 125 °C , < 90%RH
<b>Power supply</b>	Support voltage: 5V, Supply current ≥200mA
<b>Interface</b>	UART/GPIO/ADC/PWM/I2C/SPI/PDM/DMA
<b>IO</b>	11
<b>UART rate</b>	Default 115200 bps
<b>Bluetooth</b>	BLE5.1
<b>Security</b>	AES-128
<b>SPI Flash</b>	512KB

### 2.1. The power supply selection

You can choose one of the following two power supply methods to power the TG-02-Kit:

- Powered by Micro-USB interface (default)
- 3V3 and GND or 5V and GND pin header power supply

It is recommended to choose the first power supply method: Micro-USB interface power supply.

### 2.2. Static electricity requirements

TG-02-Kit development board is a static-sensitive device and requires special precautions when handling it.



**Figure 2 ESD preventive measures**

## 2.3. Electrical characteristics

**Table 2 Electrical characteristics table**

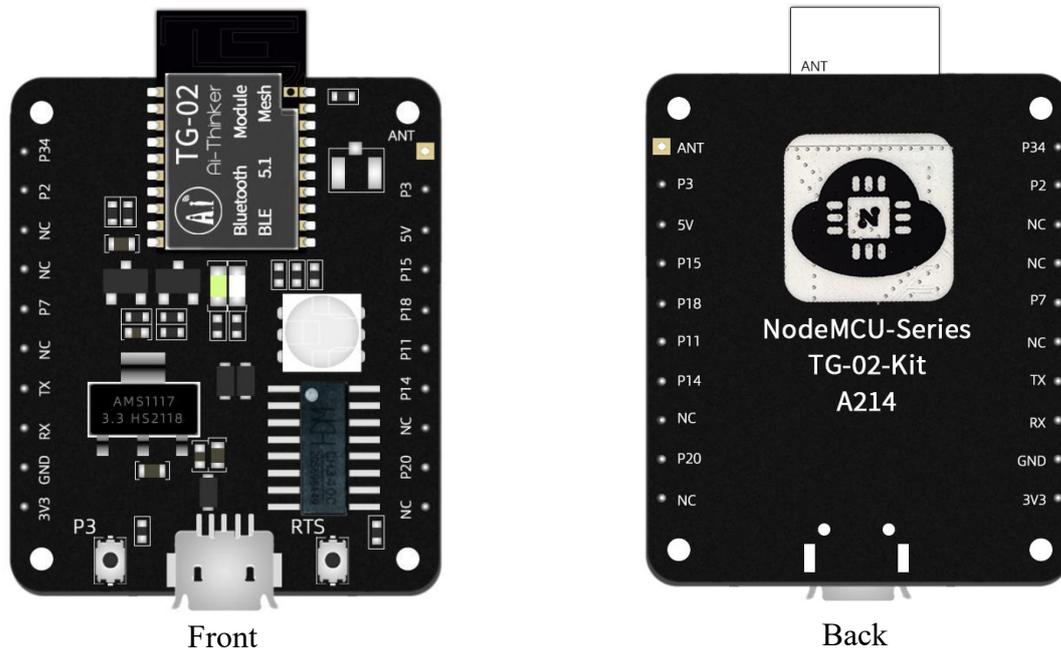
Parameters		Conditions	Min.	Typical value	Max.	Unit
Interface power supply (Micro-USB)		VCC	4.5	5	5.3	V
Supply voltage (pin header)		VCC	2.7	3.3	3.6	V
I/O	VIL/VIH	-	-0.3/0.75VCC	-	0.25VCC/VCC+0.3	V
	VOL/VOH	-	N/0.8VIO	-	0.1VIO/N	V
	IMAX	-	-	-	12	mA

## 2.4. Bluetooth RF Performance

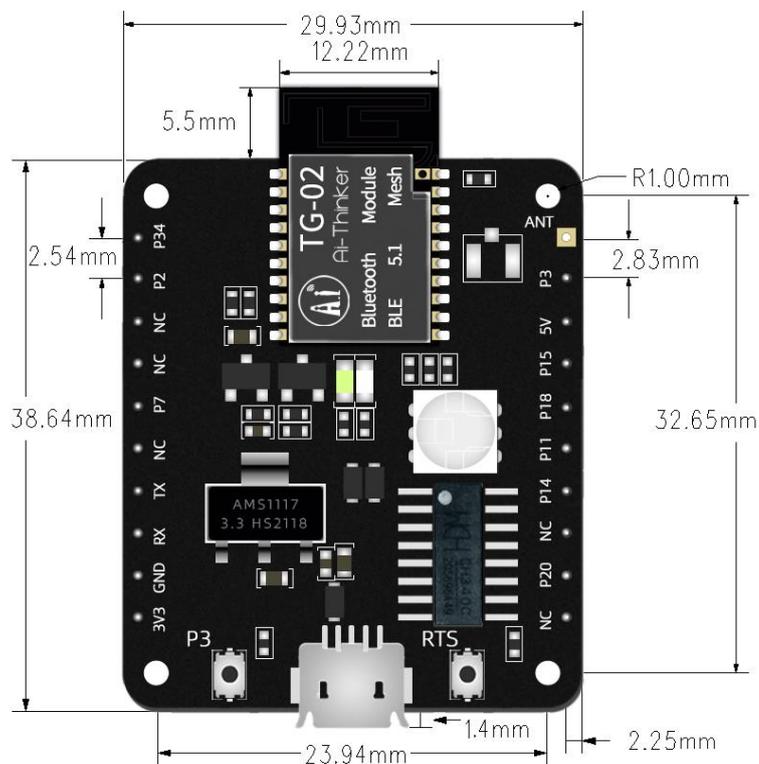
**Table 3 Bluetooth RF performance Table**

Description	Typical value			Unit
Working frequency	2400 - 2483.5			MHz
<b>Output Power</b>				
Model	Min.	Typical value	Max.	Unit
BLE 2Mbps	-20	8	10	dBm
BLE 1Mbps	-20	8	10	dBm
BLE 500Kbps	-20	8	10	dBm
BLE 125kbps	-20	8	10	dBm
<b>Receive Sensitivity</b>				
Model	Min.	Typical value	Max.	Unit
BLE 2Mbps	-	-94	-	dBm
BLE 1Mbps	-	-95	-	dBm

### 3. Appearance Dimensions

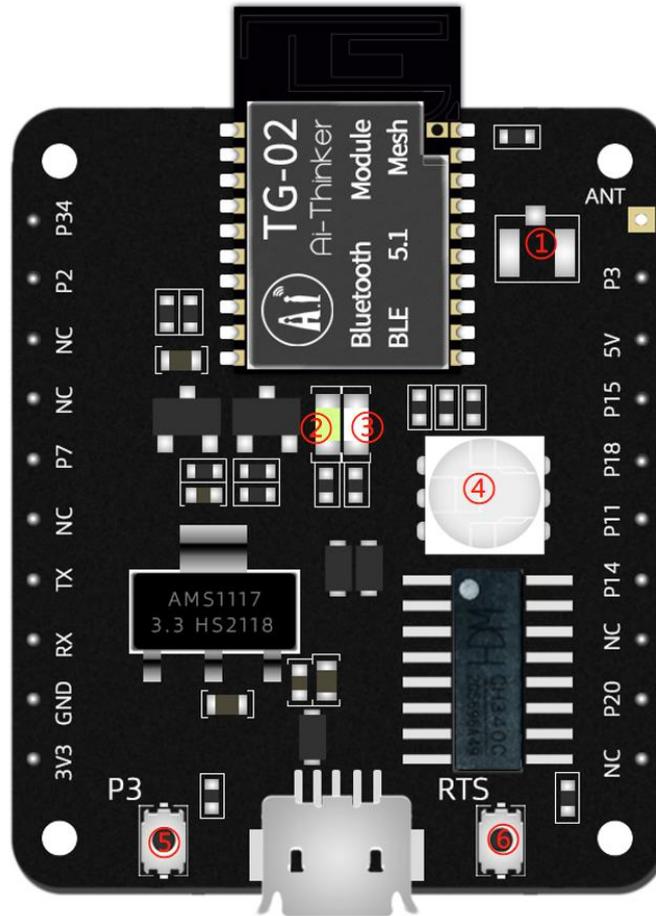


**Figure 3 Appearance of the development board (the picture and silk screen are for reference only, the actual product shall prevail)**



**Figure 4 Development Board Dimensions**

## 4. Description of indicator lights and buttons



**Figure 5 TG-02-Kit indicator light and button position**

**Table 4 TG-02-Kit indicator light and button position**

①	I-PEX pad
②	Cool light (Corresponding to P34)
③	Warm light (Corresponding to P2)
④	RGB light (Corresponding P18,P20,P15)
⑤	P3 button (corresponding to P3. Press and hold for more than 3s to automatically unbind and restart; after entering shallow sleep, short press P3 to exit hibernation)
⑥	Reset button

## 5. Pin definition

TG-02-Kit has a total of 20 interfaces, as shown in the pin diagram, the pin function definition table is the interface definition.

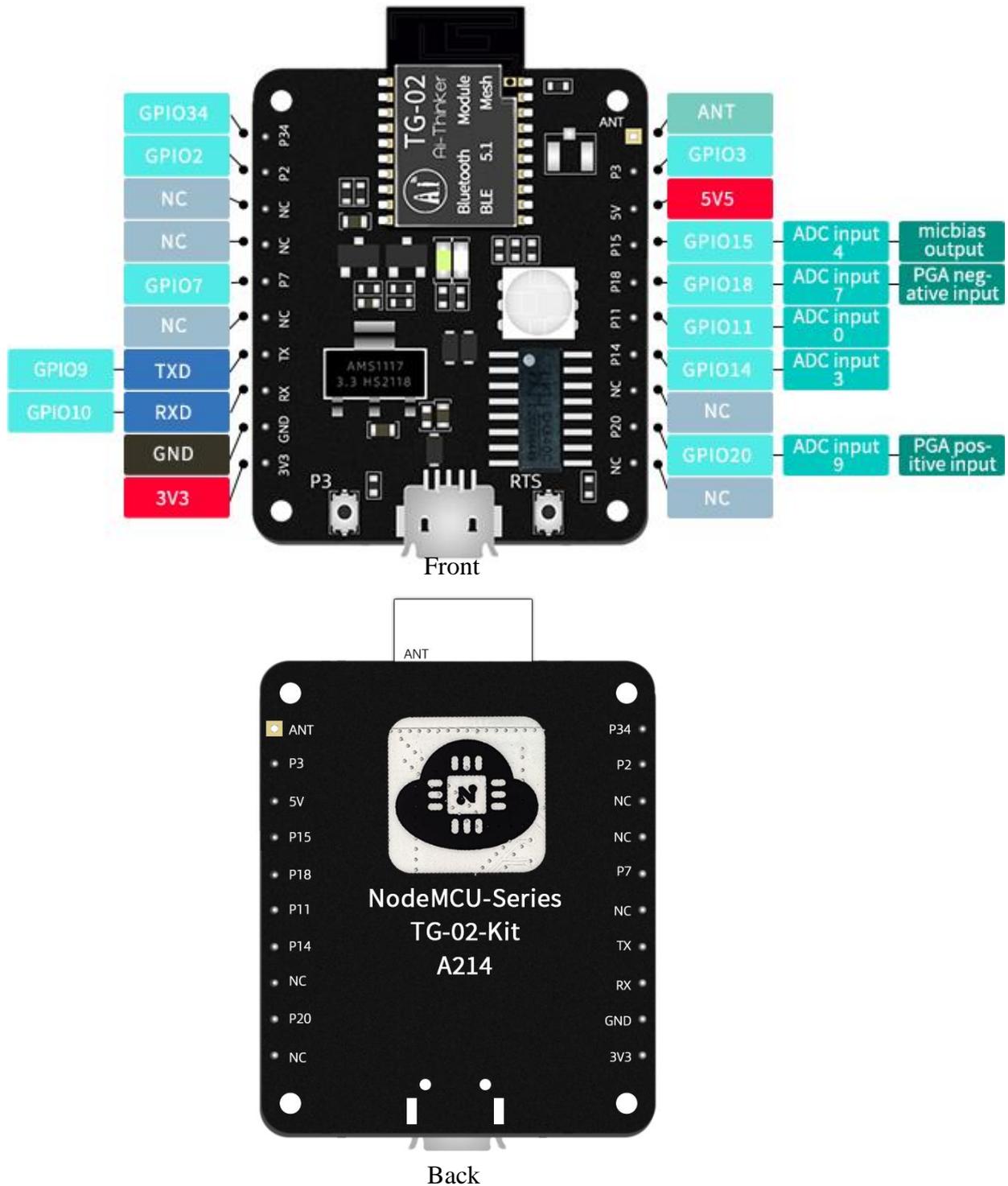
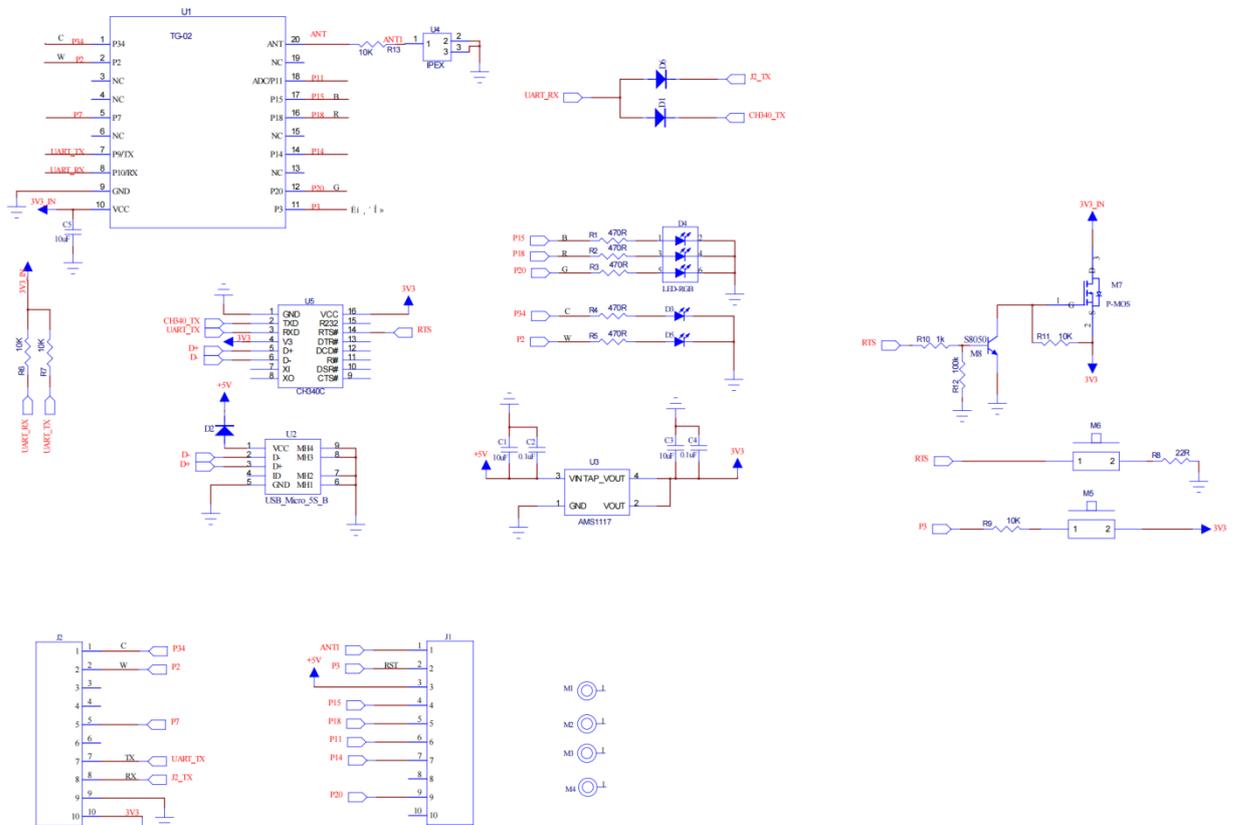


Figure 6 Schematic diagram of the development board pins

**Table 5 Pin function definition table**

No.	Name	Function
1	P34	GPIO34
2	P2	GPIO2
3	NC	Empty
4	NC	Empty
5	P7	GPIO7
6	NC	Empty
7	TX	TXD/GPIO9
8	RX	RXD/GPIO10
9	GND	Ground
10	3V3	3.3V power supply
11	NC	Empty
12	P20	GPIO20/ ADC input 9 / PGA positive input
13	NC	Empty
14	P14	GPIO14/ADC input 3
15	P11	GPIO11/ADC input 0
16	P18	GPIO18/ ADC input 7 / PGA negative input
17	P15	GPIO15/ ADC input 4 / micbias output
18	5V	5V power supply
19	P3	GPIO3
20	ANT	Antenna pin (Note: TG-02 uses the onboard antenna by default, no external connection is required)

## 6. Schematic



**Figure 7 Schematic diagram of the development board**

## 7.Product related models

**Table 6 Product related model list**

Model	Power Supply	Package	Size	Antenna
TG-02F	2.7V ~ 3.6V, I $\geq$ 200mA	SMD-22	24.0*16.0*3.1( $\pm$ 0.2)mm	Default on-board PCB antenna Optional external spring antenna
TG-02M	2.7V ~ 3.6V, I $\geq$ 200mA	DIP-18 Gold finger plug-in	18.0*18.0*2.8( $\pm$ 0.2)mm	On-board PCB antenna
TG-02	2.7V ~ 3.6V, I $\geq$ 200mA	SMD-20	18.6*12.2*2.8( $\pm$ 0.2)mm	On-board PCB antenna
TG-02F-Kit	5V, I $>$ 200mA	DIP-30	49.66*25.40( $\pm$ 0.2)mm	On-board PCB antenna
TG-02M-Kit	5V, I $>$ 200mA	DIP-20	32.73*28.45( $\pm$ 0.2)mm	On-board PCB antenna
TG-02-Kit	5V, I $>$ 200mA	DIP-19	45.54*29.93( $\pm$ 0.2)mm	On-board PCB antenna
Product related information : <a href="https://docs.ai-thinker.com">https://docs.ai-thinker.com</a>				

## 8. Product Packaging Information

Table 7 Packaging Information Sheet

Packing list	Packing method	Quantity per pack (static bag)	Quantity per pack (sealed bag)
TG-02-Kit	Foam + static bag	1pcs	20pcs

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