



# GP-02-Kit Specifications

Version V1.1

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**Document development/revision/revocation resume**

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## 1. Product Overview

GP-02-Kit is a highly integrated SOC development board with ceramic antenna and high performance BDS/GNSS multi-mode satellite navigation receiver. The main chip is AT6558R satellite positioning chip. Integrated radio frequency front end, digital baseband processor, 32-bit RISC CPU, power management and active antenna detection and protection functions. Support a variety of satellite navigation systems, including China's BeiDou Navigation Satellite System (BDS), the United States' GPS, and Russia's GLONASS, which can realize multi-system joint positioning.

GP-02-Kit follows the NMEA protocol and sends instructions through serial communication to control the work content of the development board.

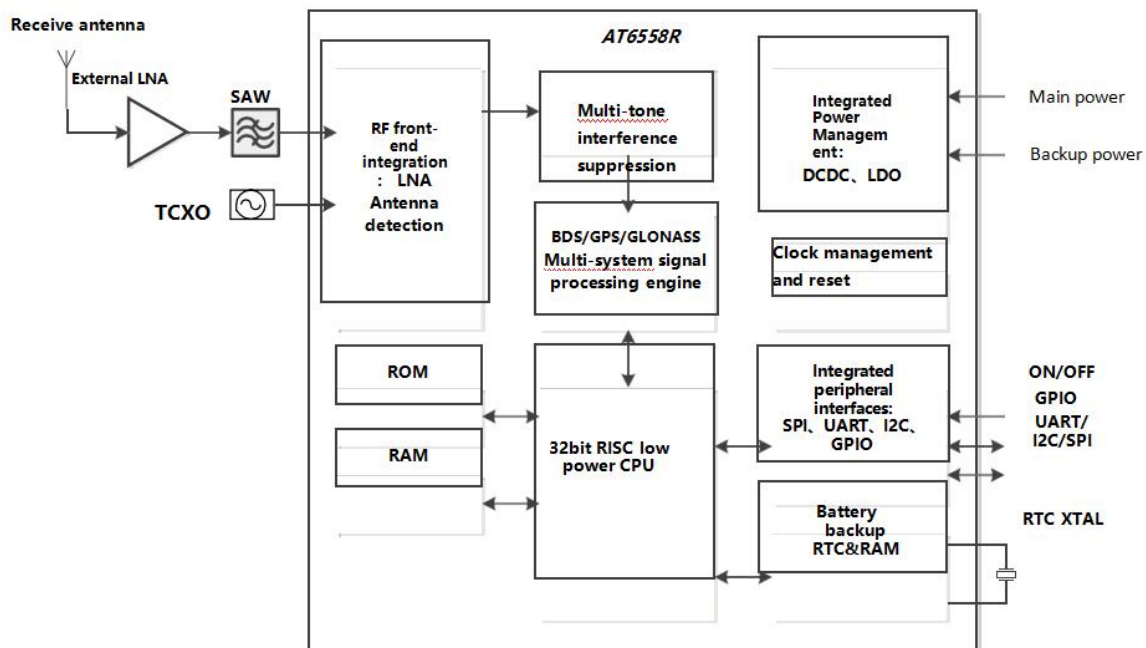


Figure 1 Architecture diagram of the chip

## 1.1. main parameters

**Table 1 main parameters instruction**

<b>Model</b>	GP-02-Kit
<b>Size</b>	20.3*18.0*3.1(±0.2)MM
<b>Operating temperature</b>	-40 °C ~ 85 °C
<b>Storage environment</b>	-40 °C ~ 125 °C , < 90%RH
<b>Power supply</b>	5V
<b>UART rate</b>	Maximum support 256000bps
<b>Certification</b>	RoHS

## 2. Electrical parameters

### 2.1. Performance indicators

**Table 2 Electrical parameter description**

<b>Technical parameter</b>	<b>Test items</b>	<b>Value</b>	<b>Unit</b>
TTFF	Cold Start	≤32	s
	Hot Start	≤1	s
	Recapture	≤1	s
Sensitivity	Cold Start	-148	dBm
	Hot Start	-156	dBm

	Recapture	-160	dBm
	Tracking mode	-162	dBm
Accuracy	Positioning accuracy	<5	m (1 $\sigma$ )
	Timing accuracy	<30	ns (1 $\sigma$ )
	Speed measurement accuracy	<0.1	m/s (1 $\sigma$ )
	Positioning update rate	1	Hz(max.5Hz)
Power consumption	BDS/GPS dual-mode continuous operation	80.19	mW
	Sleep mode	17.853	mW
	Standby	0.025	mW

## 2.2. Simulation characteristics

**Table 3 Description of analog characteristics**

No.	parameter	condition	Parameter index			Unit
			Minimum value	Typical value	Maximum value	
1	Reset voltage	@VDD_IO	2.35	2.45	2.6	V
2	Reset time	Crystal frequency 26.000MHz		160		ms
3	TCXO Crystal frequency <sup>1</sup>			26.000000		MHz
4	TCXO Amplitude		0.5	1.5		Vpp
5	Active antenna Detection current		2.5			mA
6	Active antenna Short circuit protection current		45	50	60	mA
7	Antenna detection circuit voltage drop	enter 3.3V, 50mA load			0.3	V
8	Working current	@3.3V BDS+GPS		23		mA
9	Battery backup current			8		uA
10	Sleep mode current	ON_OFF=0		20		uA
11	RTC Crystal frequency			32.768		kHz
12	RTC Crystal Equivalent Series resistance <i>Rs</i>				80	KΩ
13	RTC Crystal Series capacitance			8		pF



### 3. Appearance

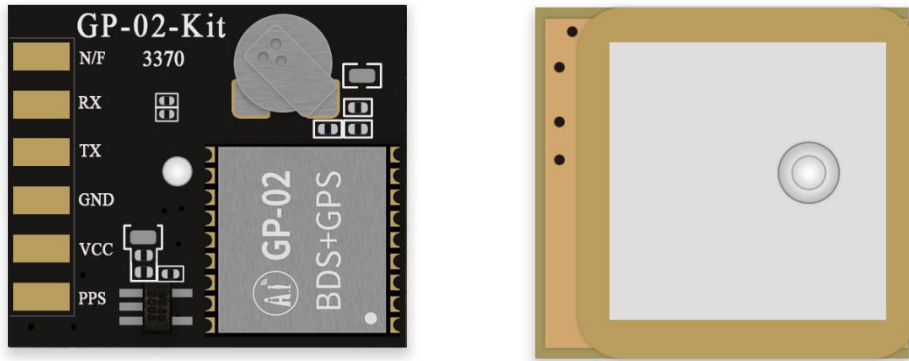


Figure 2 Appearance(for reference only)

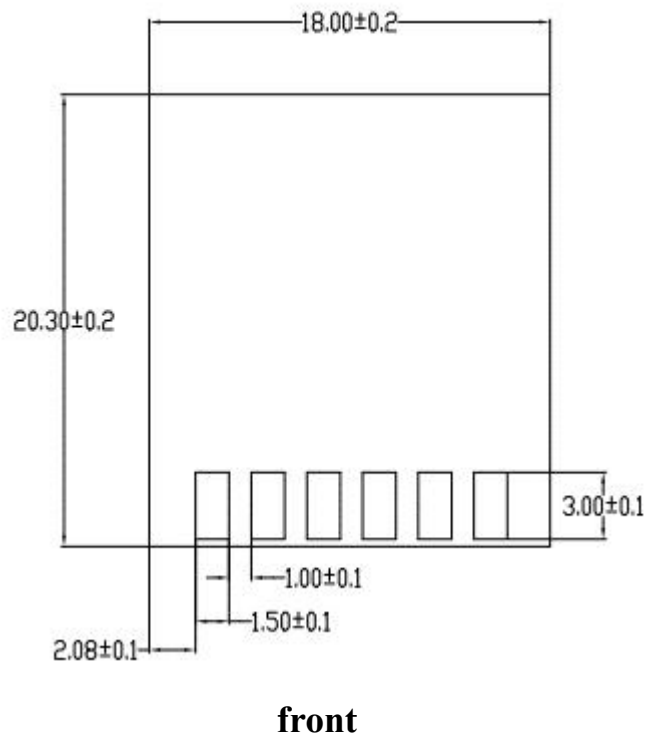
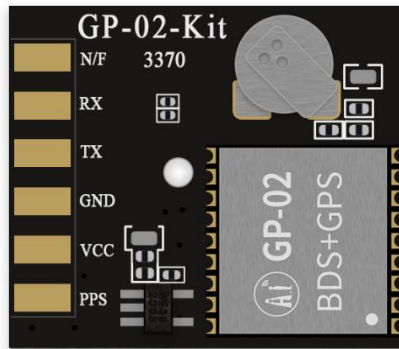


Figure 3 Dimensions

## 4. Pin definition

The GP-02 module has a total of 6 interfaces. As shown in the pin diagram, the pin function definition table is the interface definition.



**Figure 4 Pin diagram**

**Table 4 Pin function definition**

No.	Name	Function Description
1	N/F	Shutdown control, keep high level during normal operation; internal pull-up
2	RX0	General GPIO, the default is RXD of UART0
3	TX0	General GPIO, the default is TXD of UART0
4	GND	Grounded
5	VCC	5V power supply
6	PPS	Time pulse signal

## 5. Schematic diagram

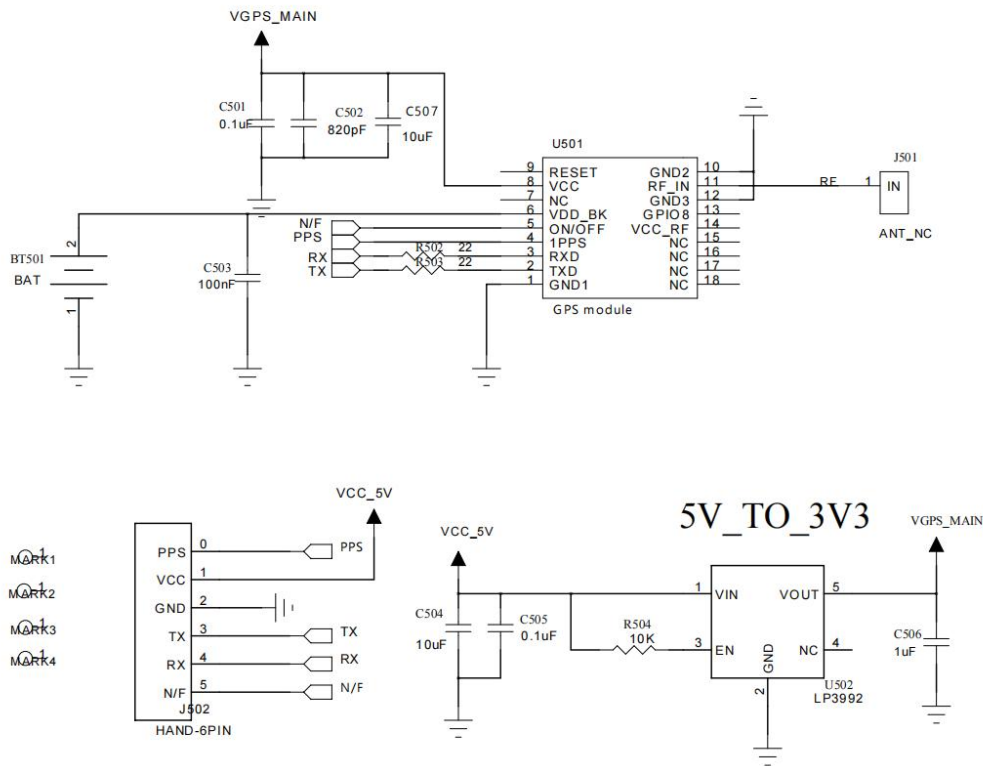


Figure 5 Schematic diagram of the development board

## 6. Design guidance

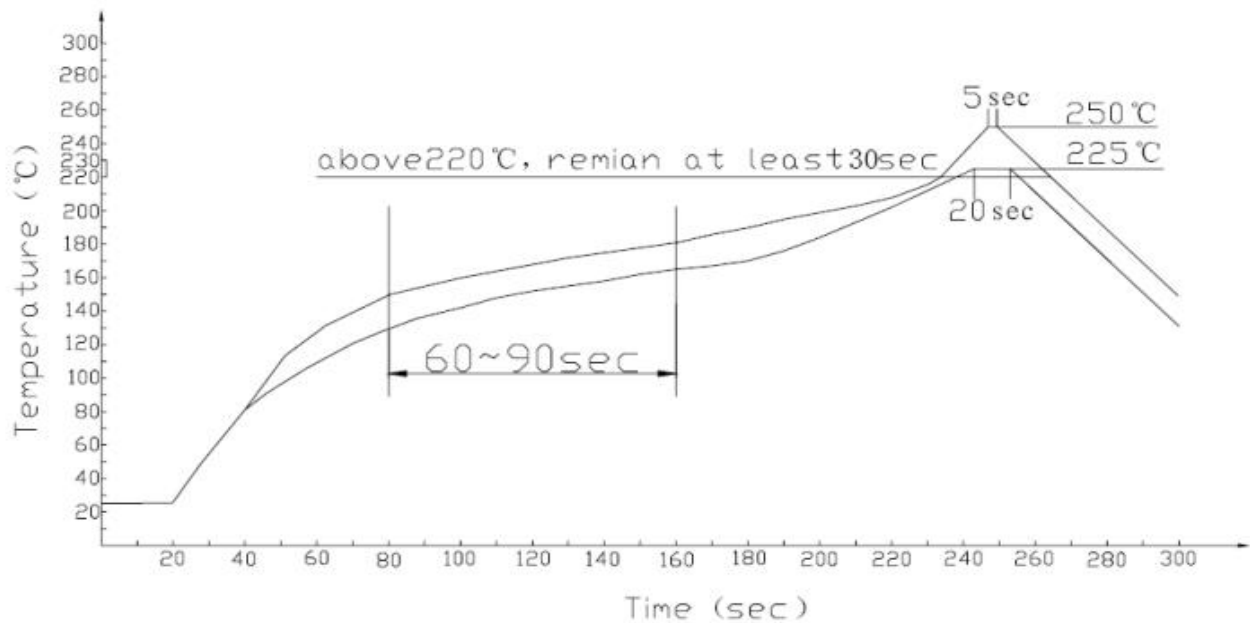
### 6.1. power supply

The recommended voltage is 5V.

### 6.2. Use of GPIO

The development board is connected to the RX communication interface to access the 22Ω of the TX, and it has continued to rush.

## 7.Reflow soldering curve



**Figure 6 Reflow soldering curve**

### Notice

Adjust the balance time to ensure the rationalization of the gas when the solder paste melts. If there are too many gaps on the PCB, the equilibration time can be increased.

Considering that the product is placed in the welding area for a long time (the temperature is above 180°C), in order to prevent damage to the components and the bottom plate, the placement time should be shortened as much as possible.

### Important characteristics of the curve:

Rising speed=1~4°C/sec, 25°C to 150°C

Average preheating temperature=140°C to 150°C, 60sec~90sec

Temperature fluctuation=225°C to 250°C, about 30sec

Descent speed=2~6°C/sec, to 183°C, about 15sec

Total time = about 300sec

## 8. Packaging Information

The packaging of the GP-02-Kit is to insert the pearl cotton electrostatic bag packaging

## 9. Related models

**Table 5 Related models**

Model	Power supply	Package	Size	Default communication interface
GP-01 module	3.3V	SMD-24	16.2*12.2*2.4(±0.2)MM	UART
GP-02 module	3.3V	SMD-18	10.3*9.9*2.4(±0.2)MM	UART
GP-01-Kit development board	5V	SMD-8	26*24.1(±0.2)MM	UART
GP-02-Kit development board	5V	SMD-6	18*20.3(±0.2)MM	UART
Product related information: <a href="https://docs.ai-thinker.com/gps">https://docs.ai-thinker.com/gps</a>				

## 10. Contact us

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