



Ai-Thinker

# GP-01-Kit Specification

Version V1.0

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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.

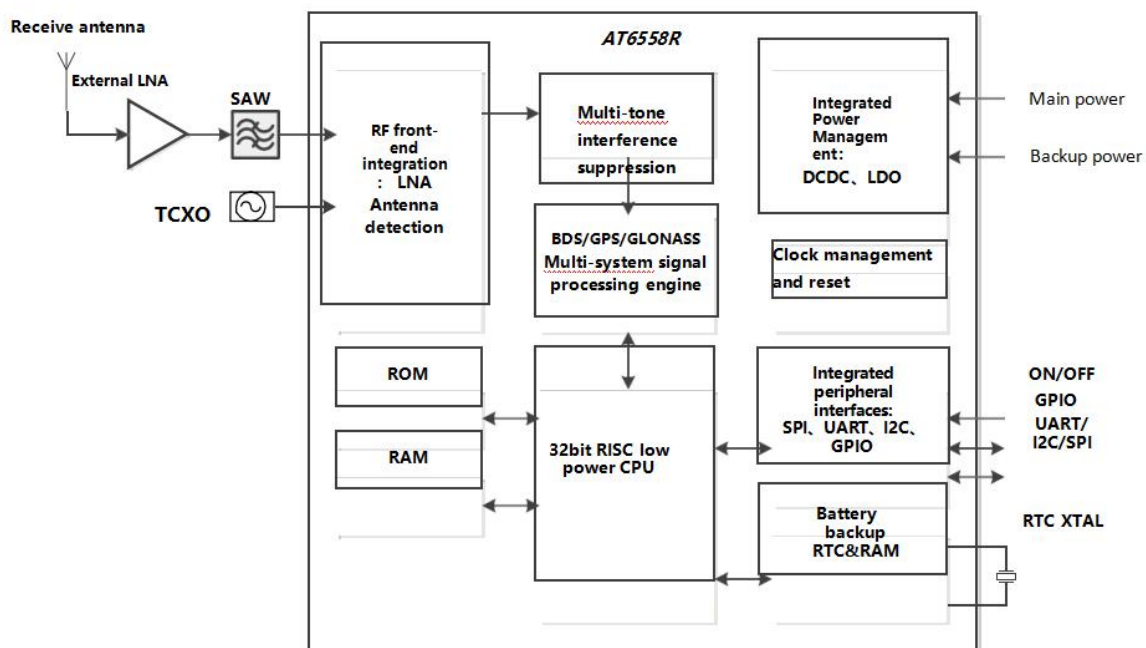


Figure 1 Architecture diagram of the chip

## 1.1. main parameters

**Table 1 main parameters instruction**

<b>Model</b>	GP-01-Kit
<b>Size</b>	23.4*12.2*24(±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>	Typical 5V (support Micro USB 5V power supply)
<b>UART rate</b>	Maximum support 256000bps
<b>Certification</b>	RoHS

## 2. Electrical parameters

### 2.1. Performance indicators

**Table 2 Electrical parameter description**

Technical parameter	Test items	Value	Unit
TTF	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	<2	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	23	mA
	Sleep mode	20	uA
	Standby	8	uA

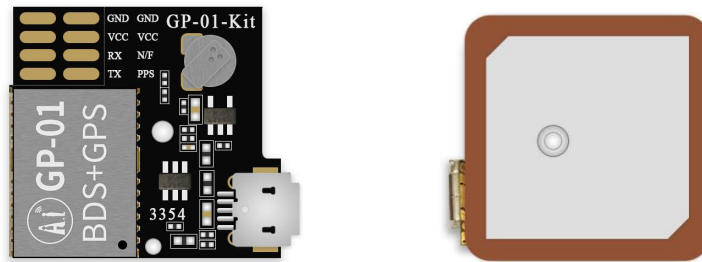
## 2.2. Simulation characteristics

**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 26MHz		160		ms
3	TCXO Crystal frequency <sup>1</sup>			26		MHz
4	TCXO Amplitude		0.5	1.5		Vpp
5	Active antenna Detection current		2.5			mA

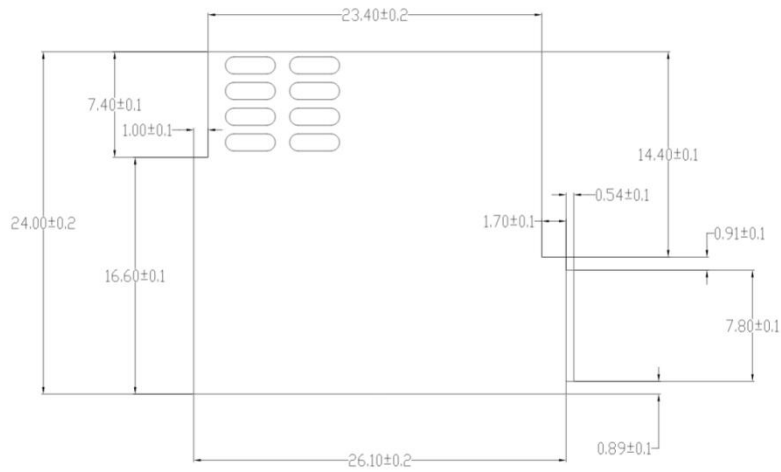
6	Active antenna Short circuit protection current		45	50	60	mA
7	Antenna detection circuit voltage drop	enter3.3V, 50mAload			0.3	V
8	Working current	@3.3V BDS+GPS		23		mA
9	Battery backup current			8		uA
10	Sleep mode current	ON_OFF=0		20		uA
11	RTC Crystal frequency			32.768		kHz
12	RTC Crystal Equivalent Series resistance $R_s$				80	K $\Omega$
13	RTC Crystal Series capacitance			8		pF

### 3. Appearance



**Figure 2 Appearance**(for reference only)

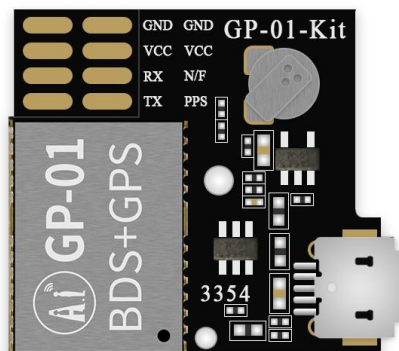




**Figure 3 Dimensions**

## 4. Pin definition

The GP-01 module has a total of 9 interfaces. As shown in the pin diagram, the pin function definition table is the interface definition.

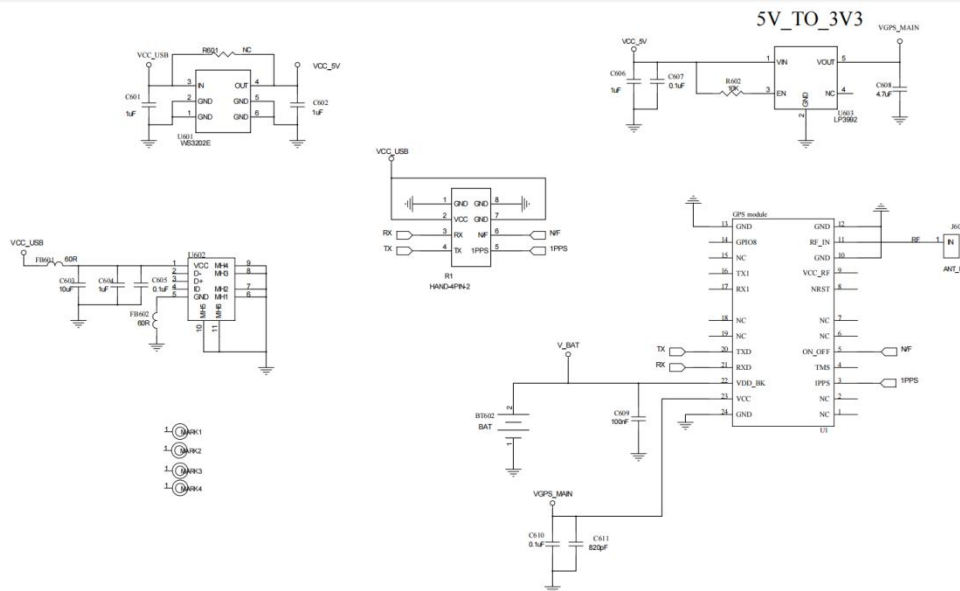


**Figure 4 Pin diagram**

**Table 4 Pin function definition**

No.	Name	Function Description
1	GND	Grounded
2	VCC	5Vpower supply
3	RX1	General GPIO, the default is RXD of UART0
4	TX1	General GPIO, the default is TXD of UART0
5	GND	Grounded
6	VCC	5Vpower supply
7	N/F	Shutdown control, keep high level during normal operation; internal pull-up
8	PPS	Time pulse signal
9	Micro USB	This interface only provides power supply function

## 5. Schematic diagram



**Figure 5 Schematic diagram of the development board**

## 6. Design guidance

### 6.1. power supply

GP-01-Kit supports 5V power supply, 5V power supply can use Micro USB interface.

### 6.2. Use of GPIO

TX and RX have been pulled up on the development board and can be used directly.

## 7. Reflow soldering curve

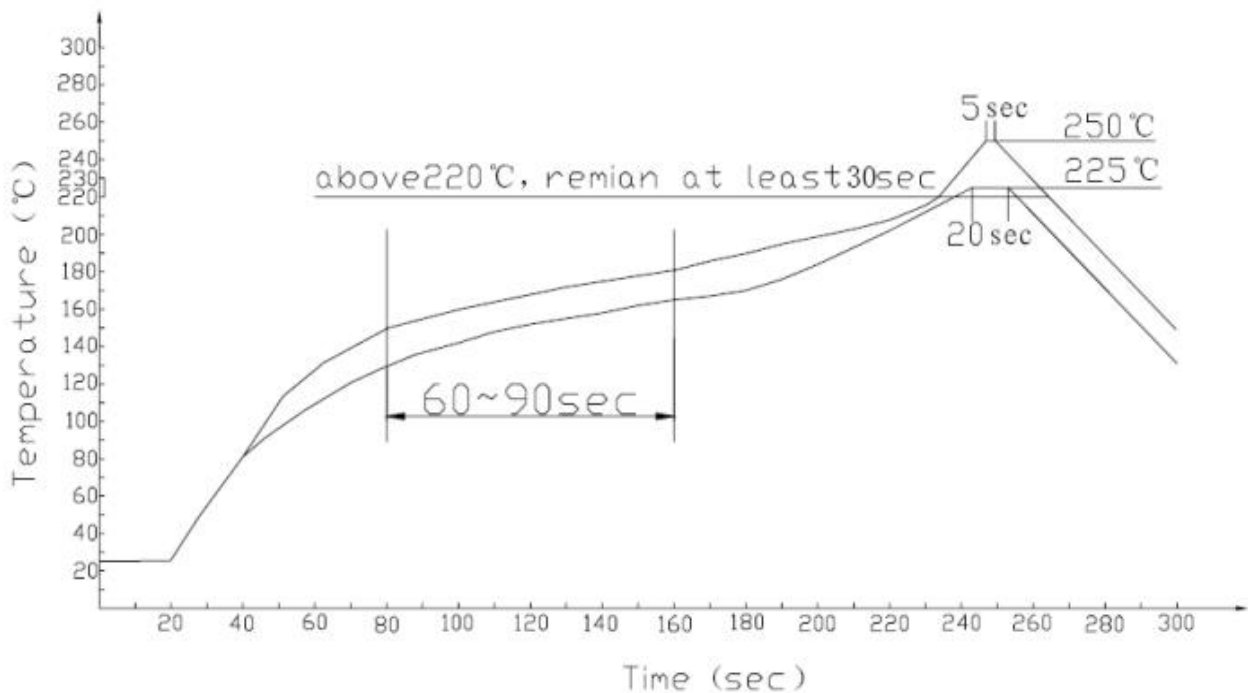


Figure 6 Reflow soldering curve

## 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 to150°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-01-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	5V	SMD-6	18*20.3(±0.2)MM	UART

development board				
Product related information: <a href="https://docs.ai-thinker.com/gps">https://docs.ai-thinker.com/gps</a>				

## 10. Contact us

Official website: <https://www.ai-thinker.com>

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