

XY30 productspecification

RTKGPSModules



Version

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XY30productspecification	1
RTKGPSModules	1
1Overview	3
1.1 Product Features	3
1.2 Application scenarios	3
2 Product framework	4
3 Module size	4
4 Pin definition	5
5 Technical Specifications	5
5.1 Recommended working conditions	5
5.2 Performance metrics	6
5.3 Design suggestions	6
5.4 Reference circuit	7
5.5 Notes	7
6 Process requirements	8
FIG. 4 Furnace temperature curve	8
7.Packing and shipping	9
7.1 Package size	9
7.2 Anti-static requirements	9
8 After-sales service	9
8.1 Warranty Service	9

1 Overview

XY30 is a high performance BDS/GNSS single frequency RTK navigation module. The product adopts the fourth-generation low-power GNSS SOC single chip AT6558 from China Microelectronics, which supports a variety of satellite navigation systems, including all satellites of China's Beidou-2 and Beidou-3, and the United States

GPS, Russia's GLONASS, Japan's QZSS, can receive satellite signals from the above satellite navigation systems at the same time, and realize joint positioning, navigation and timing. The product has the advantages of high sensitivity, low power consumption and low cost. The module supports RTK positioning mode, and the base station data supports RTCM3.2 protocol input. Interference suppression unit is integrated in the module to improve the stability in complex electromagnetic environment. In-module integration FLASH, support independent code upgrade and flexible parameter configuration. Module built-in antenna detection and antenna short circuit protection function

1.1 Product Features

- It supports all satellites of Beidou-2 and Beidou-3 from 1 to 63
- Support BDS/GPS/QZSS satellite navigation system single system positioning, as well as any combination of multi-system joint positioning.
- Supports A-GNSS
- Support RTCM3.2 protocol
- Cold start capture sensitivity: -148dBm
- Tracking sensitivity: -162dBm
- Standard positioning accuracy: 2.5m
- RTK positioning accuracy: 2cm+1PPM
- RTK convergence time: < 60s
- First location time: < 32s
- Low power consumption: continuous operation < 45 ma@3.3
- Built-in antenna detection and antenna short circuit protection support Mid-amble
- Power supply voltage input range: 3.0V ~ 3.6V, typical value 3.3V.
- Working temperature: -40°C ~ +85°C

1.2 Application scenarios

- Navigation terminal products
- High precision positioning terminal
- Wearable devices such as watches and bracelets
- webcam
- Smoke, gas, alarm and other security terminal products
- Power terminal products
- Industry terminal
- Vehicle positioning products

2 Product framework

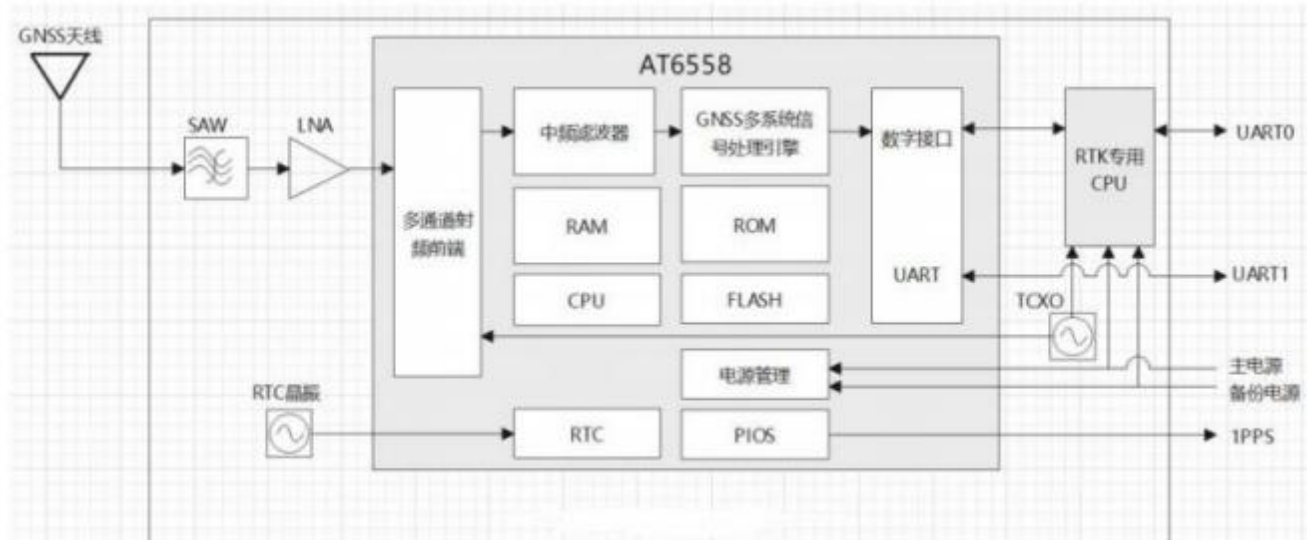


图1 产品架构图

3 Module size

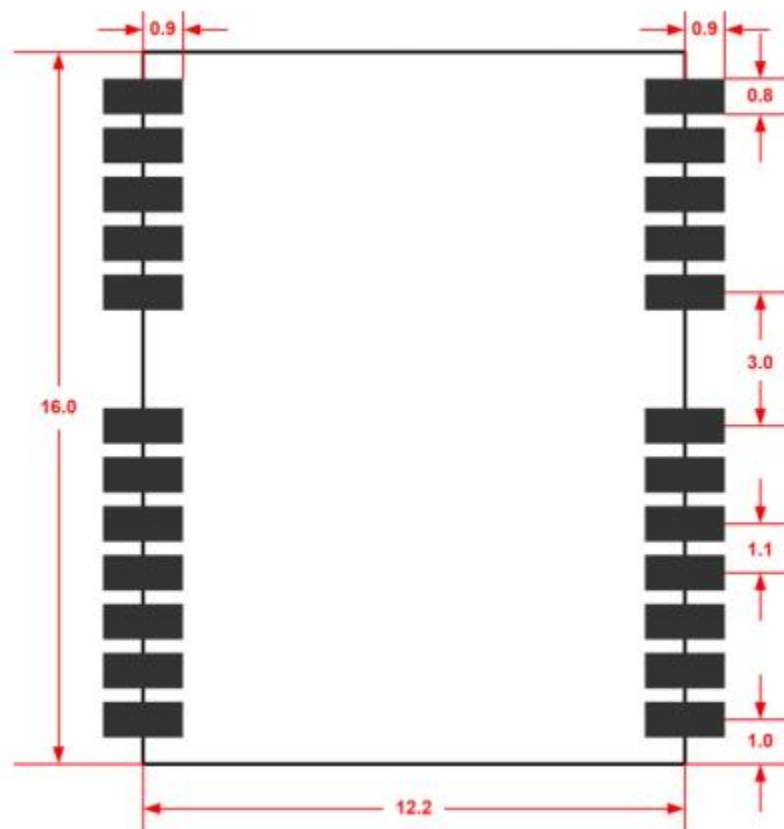


FIG. 2 Module size (unit mm)

4 Pin definition

Pin No.	Pin Name	Type	Description
1	NC	-	-
2	Reserved	-	-
3	1PPS	O	Second pulse output
4	Reserved	-	-
5、6、7	NC	-	-
8	nRST	I	Module reset input, low level effective, when not in use, the outside had better come up
9	VCC_RF	O	The power output can supply 3.3V to the antenna
10、12、13	GND	P	Ground
11	RF_IN	I	Antenna signal input
14、15	NC	-	-
16	TXD1	O	Auxiliary serial port data output
17	RXD1	I	Auxiliary serial port data input
18、19	Reserved	-	-
20	TXD0	O	Serial port data output
21	RXD0	I	Serial port data input
22	VBAT	I	RTC and SRAM backup power supply 1.5~3.6V
23	VCC	I	Module power supply : 2.7~3.6V
24	GND	P	Ground

Table 1 Pin definition

5 Technical Specifications

5.1 Recommended working conditions

Parameter	Min	Typ	Max	Unit
Operation Voltage	3.0	3.3	3.6	V
Operation Temperature	-40		85	°C

Table 2 Operating temperatur

5.2 Performance metrics

name	description
Signal reception	BDS/GPS/QZSS
Cold start TTFF	≤32s
Warm start TTFF	≤1s
Recapture the TTFF	≤1s
RTK convergence time	60s
Cold start capture sensitivity	-148dBm
Hot start capture sensitivity	-156dBm
Sensitivity of recapture	-160dBm
Tracking sensitivity	-162-dBm
Positioning accuracy	SPS:<2.5mm; RTK 2cm
Speed measurement accuracy	<0.1m/s
Location update rate	1Hz
Serial port characteristics	4800~115200bps
Protocol	NMEA0183
Backup battery	1.5~3.6V
Power supply	2.7~3.6V
Typical power consumption	45mA
Dimensions	16*12.2*2.4mm
Operating temperature	-40~85℃
Storage temperature	-40~85℃

Table 3 Performance parameters

5.3 Design suggestions

To achieve high performance, active antenna operation mode is recommended. In order to achieve the effect of high precision positioning, please use a high precision antenna that meets the performance requirements. Application information:.

- The source antenna is directly connected to RF_IN.
- The RF_IN inside the module has been connected with the VCC_RF through the inductor for power supply.
- The module provides antenna detection and short circuit protection.
- In order to ensure that the module is in the best working condition, the active antenna gain range of 15 to 30dB is recommended

5.4 Reference circuit

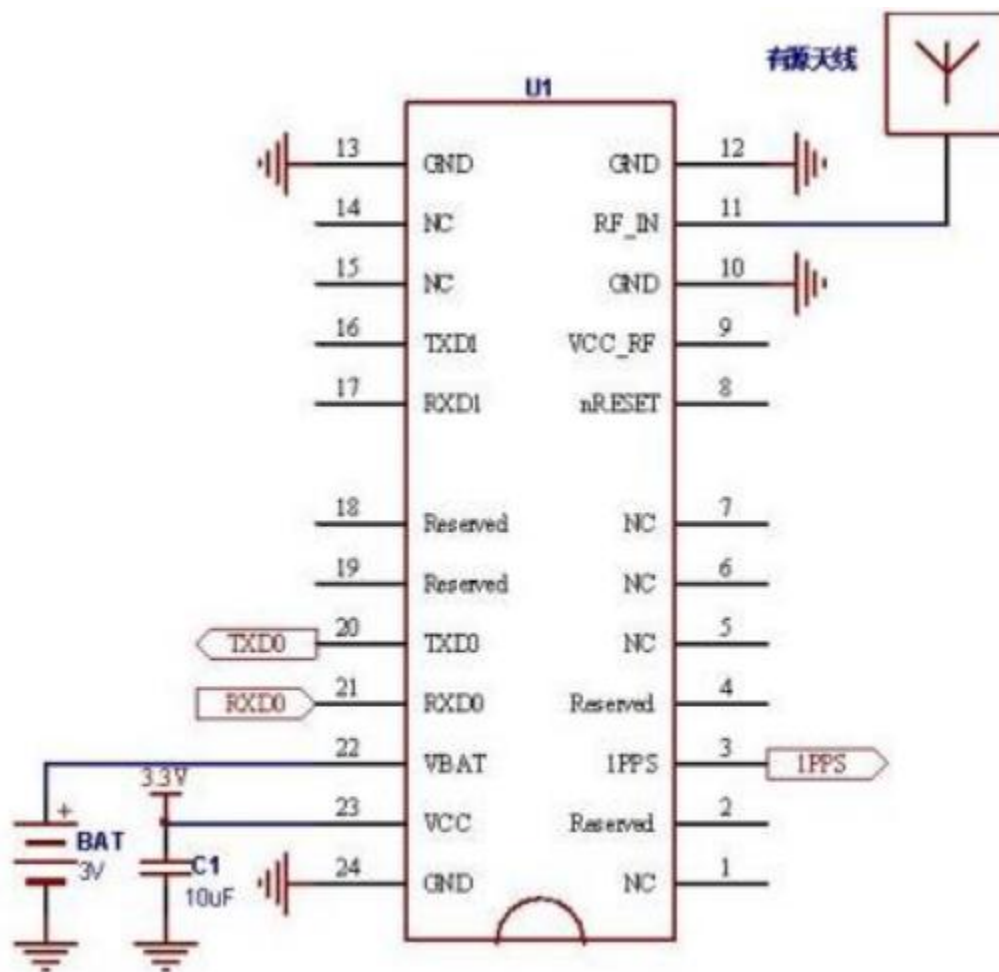


FIG. 3 Reference circuit used by the module

5.5 Notes

In order to ensure the best performance of XY30, users should pay attention to the following points when using this module:

Using low ripple LDO, power ripple is controlled within 50mVpp.

Digital signals with high frequency and large amplitude should be avoided as far as possible near the module, and special attention should be paid to good grounding during layout.

The antenna interface should be as close as possible to the RF input pin of the module, and pay attention to the impedance matching of 50 ohms

The module itself has active antenna access, disconnection, and short circuit detection circuits. When the antenna is accidentally short-circuited, the power supply of the antenna is limited (50mA) to protect it. When the status of the above three kinds of antenna ports changes, the corresponding information can be output from the serial port. The information is as follows:

- Antenna short circuit state : \$GPTXT,01,01,01,ANTENNA SHORT*63
- The antenna is disconnected : \$GPTXT,01,01,01,ANTENNA OPEN*25
- Normal state of antenna : \$GPTXT,01,01,01,ANTENNA OK*35

. When the module uses a passive antenna, the serial port output statements are open circuit

- The information is as follows : \$GPTXT, 01,01,01,ANTENNA OPEN*25

6 Process requirements

Lead-free reflow soldering process is recommended for SMT of the module, and the corresponding furnace temperature curve is shown as follows:

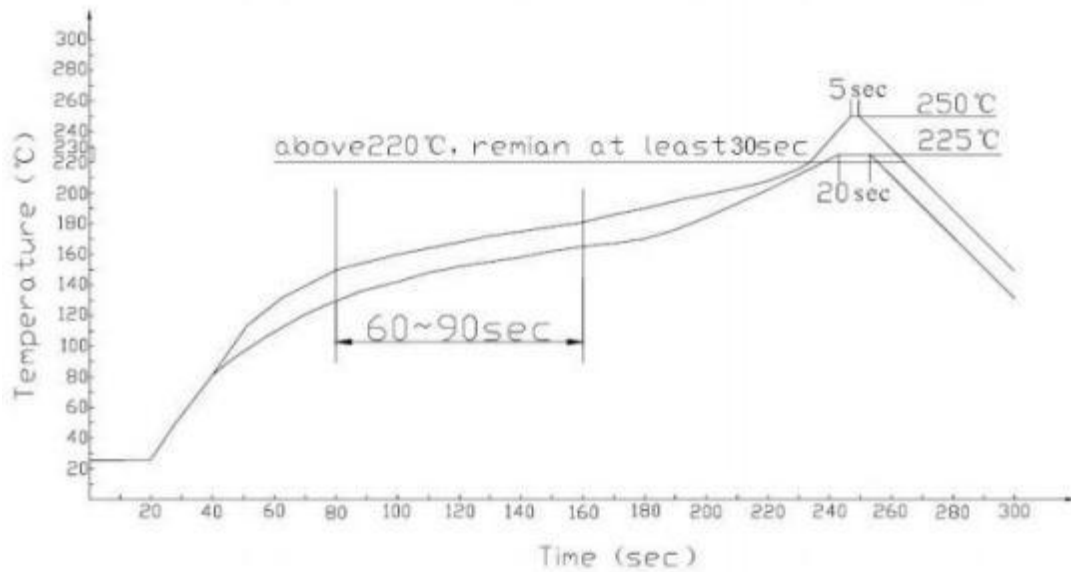


FIG. 4 Furnace temperature curve

The temperature parameter interval of lead-free reflow soldering process is divided as shown in the following table:

Table 4 Temperature parameters

region	Time	Rate of heating	Peak	Cooling rate
Preheating zone (40 ~ 150°C)	60 ~ 150s	$\leq 2.0^{\circ}\text{C/s}$	—	—
Average temperature zon (150 ~ 200°C)	60 ~ 120s	$< 1.0^{\circ}\text{C/s}$	—	—
Zone of return ($> 217^{\circ}\text{C}$)	60 ~ 90s	—	230-260°C	—
Cooling zone ($T_{\text{max}} \sim 180^{\circ}\text{C}$)	—	—	—	$1.0^{\circ}\text{C/s} \leq \text{Slope} \leq 4.0^{\circ}\text{C/s}$

- Preheating zone: the temperature is from 40°C to 150°C, the temperature rise rate is controlled at about 2°C/s, and the temperature zone time is controlled at 60 ~ 150s.
- Uniform temperature zone: the temperature is from 150°C to 200°C, stable and slow heating, the temperature rise rate is less than 1°C/s, and the time in this area is controlled at 60 ~ 120s (Note: this area must be slowly heated, otherwise it is easy to lead to poor welding)
- Reflux zone: the temperature ranges from 217°C to T_{max} to 217°C, and the whole interval time is controlled at 60 ~ 90s.
- Cooling zone: the temperature is from T_{max} to 180°C, and the maximum temperature drop rate can not exceed 4°C/s.
- It should not take more than 6 minutes for the temperature to rise from room temperature 25°C to 250°C.
- The reflow soldering curve is only the recommended value, and the client needs to make corresponding adjustments according to the actual production situation. The plate can relax the reflux time to 120s.

- The temperature standard of the package refers to the IPC/JEDEC J-STD-020D standard, and the temperature measurement method of the package refers to the JEP 140 standard. IPC/JEDEC J-STD-020D standard, package temperature measurement method in accordance with JEP 140 standard requirements.

JEP140 recommends: For devices with small thickness, the thermocouple is placed directly on the surface of the device when measuring the temperature of the package. For devices with large thickness, the thermocouple is drilled into the surface of the device for measurement. Due to the need to quantify the thickness of the device, it is recommended to use the method of drilling and embedding the thermocouple on the surface of the package body (except for particularly thin devices that cannot be drilled).

7. Packing and shipping

7.1 Package size

Modules are packaged in pallets.



FIG. 5 Package introduction

7.2 Anti-static requirements

Module is electrostatic sensitive product. The RF circuit on the module contains electrostatic sensitive devices. Please pay attention to electrostatic protection during welding, installation and transportation. Please do not directly touch RF_IN and other pins with bare hands, otherwise the module may be damaged.



8 After-sales service

8.1 Warranty Service

Within 12 months from the date of delivery of the product, under the condition that the user complies with the requirements stipulated in the manual, if there is any quality problem, our company is responsible for providing after-sales servi