Ra-07 Datasheet

Version V1.0

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Change History of Revision

Version	Date	Contents of Revision Change	Compilation	Verify
V1.0	2019.12.28	Initial release	Xie Yiji	

Contents

1. Product overview

The Ra-07 LoRaWAN module feature the Lora long range modem that provides ultra-long range communication , Ultra low power and high interference immunity whilst minimising current consumptio. The ASR6501 chip Integrated LoRa radio transceiver, LoRa modem and 32-bit RISC MCU. The MCU uses ARM Cortex M0 + core and operates at 48MHz. The working frequency range of ASR6501 can support continuous coverage of 150MHz ~ 960MHz; support LoRa modulation mode and (G) FSK modulation mode.

The ASR6501 supports ultra-high sensitivity and transmit power . It is suitable for long-distance LPWAN communication and has high transmission efficiency.

Features

- With strong anti-interference ability, can work normally in complex interference environment
- Minimum receiving sensitivity：-137dBm （SF=12/BW=125KHz）
- Max Transmit power: +20dBm
- Operate frequency：410MHz~525MHz（Default）
- The voltage of power supply input：3.3V
- Transmit current：107mA （Full load power consumption）
- Receive current：6mA
- Sleep current：3uA

Parameters

Figure 1 Main Parameter

Model	Ra-07
Size	16*16*3±0.2mm
Package	SMD18
Antenna	Stamp hole pad / IPEX terminal
Frequency Range	410MHz~525MHz（default）
Transmit power	19dBm±1
Receive sensitivity	-136dBm±1
Interface	UART/GPIO/PWM/SWD/ADC/I2C
Operating temperature	-40℃ ~ 85 ℃
Storage environment	-40 ℃ ~ 125 ℃ , < 90%RH
Power supply range	Power supply voltage 3.3V
Power consumption	Sleep mode: 3uA
	Standby mode: 6mA
	Full load mode（TX: 21dBm）: 107mA

2. Electrical parameter

Electrical Characteristics

The Absolute Maximum Rating

Any following absolute maximum ratings exceeding may cause chip damage

Name	Min	Typ	Max	Unit
Supply voltage	2.7	3.3	3.6	V
Operating temperature	-40	-	+85	℃
Storage temperature	-40	-	+125	℃

Power consumption

Mode	Typ	Unit
Transmit power consumption (21dBm)	107	mA
Standby power consumption	6	mA
Sleep	3	uA

RF parameters

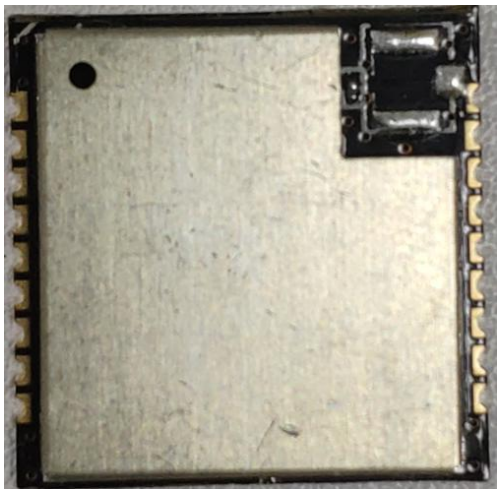
Transmit power

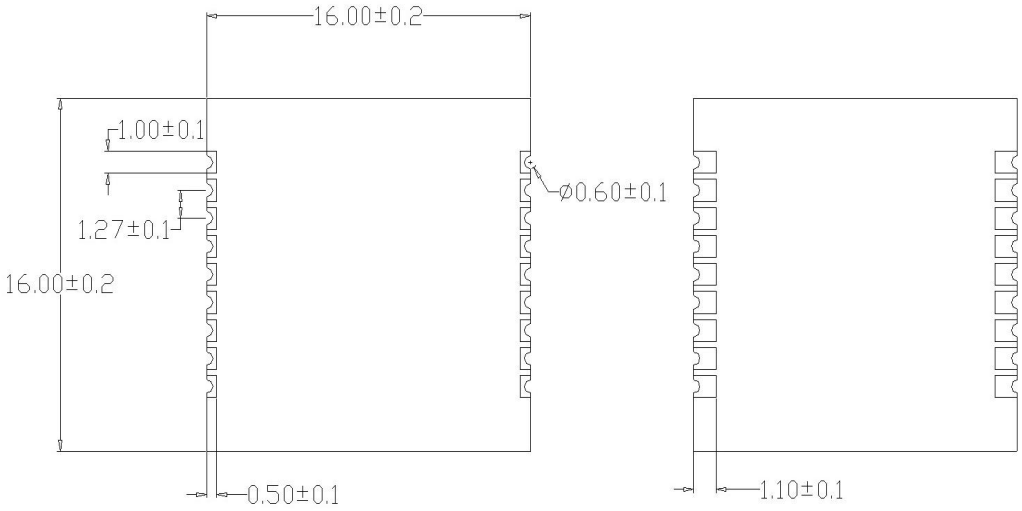
Name	Min	Typ	Max	Unit
Average power（525MHz）	18	19	20	dBm
Average power（410MHz）	18	19	20	dBm

Receive sensitivity

Name	Min	Typ	Max	Unit
Receive sensitivity	-137	-136	-135	dBm

3. Appearance size





正面　　背面

4. Pin definition

Ra-07 has 18 interfaces，Refer to figure，table　is definition of interfaces.

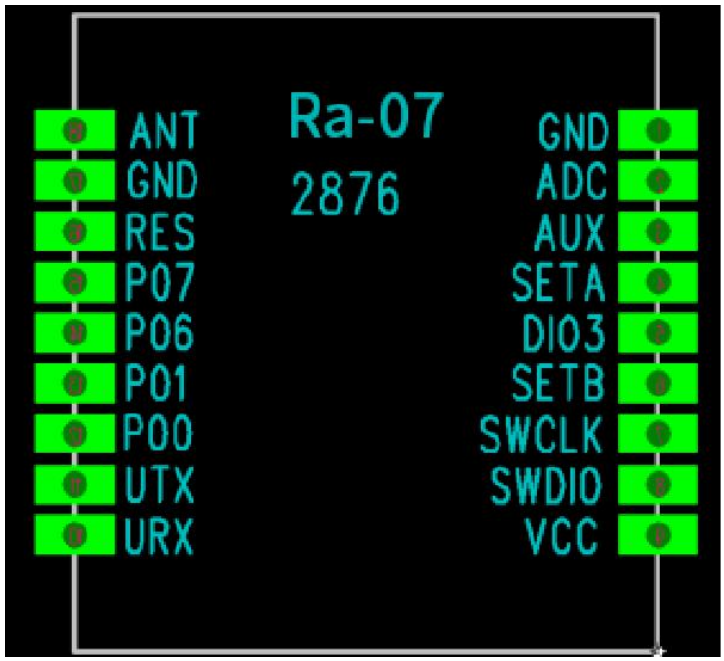


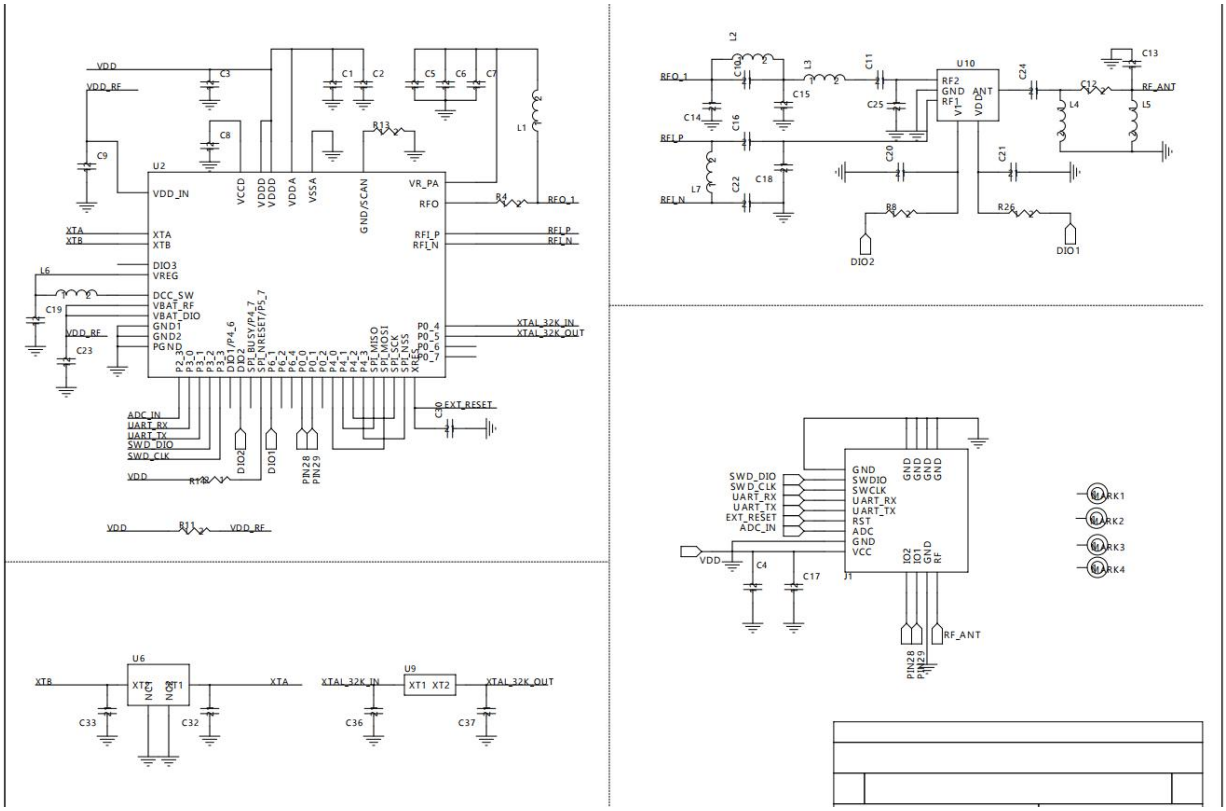
Figure　Ra-07 Pin diagram

Table　Pin function definition

No.	Name	Function
1	GND	Ground
2	ADC	ADC input pin
3	AUX	MCU GPIO
4	SETA	MCU GPIO
5	DIO3	Multipurpose digital I/O-external TCXO32M supply voltage, cannot be external GPIO
6	SETB	MCU GPIO
7	SWCLK	SWD Clock pin
8	SWDIO	SWD Data pin
9	VCC	Power supply
10	URX	UART RX pin
11	UTX	UART TX pin
12	P00	GPIO pin

13	P01	GPIO pin
14	P06	GPIO pin
15	P07	GPIO pin
16	RES	Reset pin
17	GND	Ground
18	ANT	Antenna

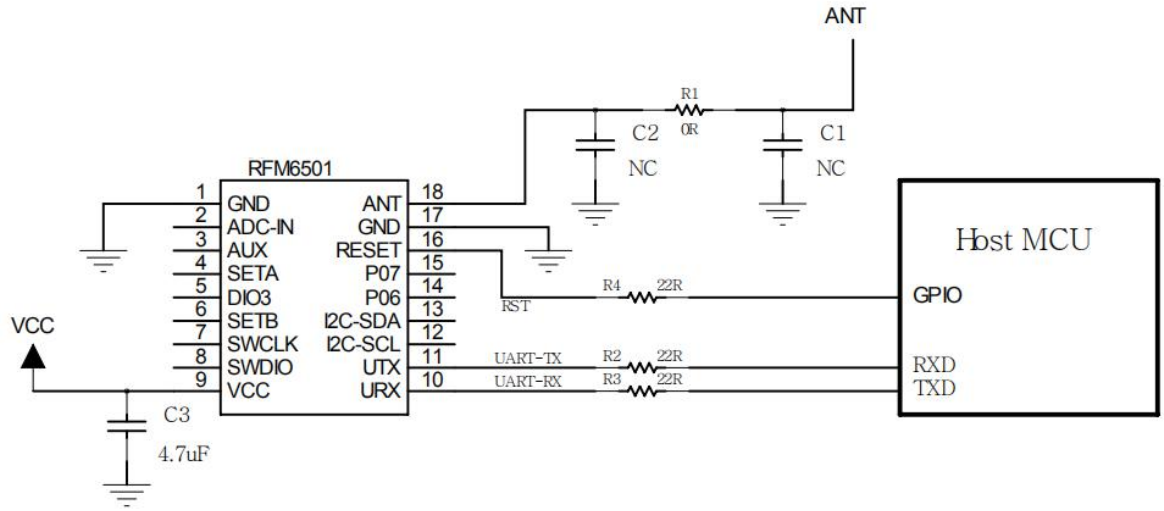
5. Schematics



6. Design Guidance

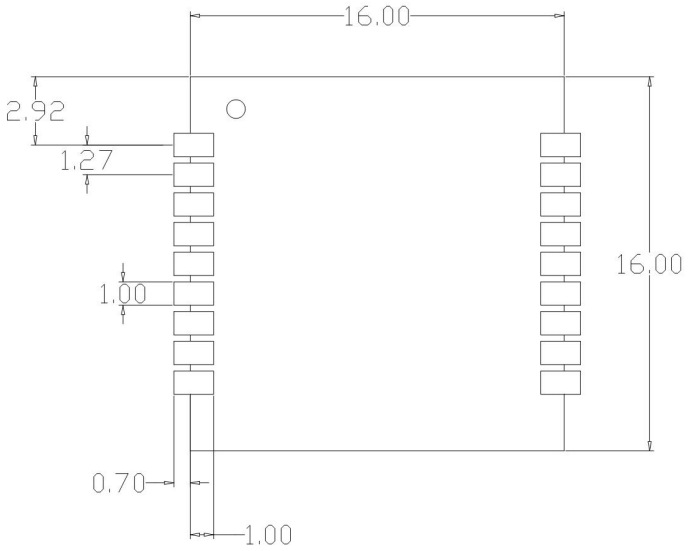
1、Application Circuit

Connect the module's serial port and reset pin RESET to the user's main control MCU to perform serial port communication.



2、Recommended module package design size

Note: Below is the Ra-07 module package diagram, it is recommended to design the PCB board according to this diagram, so that the module can work normally on the PCB board; and pay attention to the design of the pad, the design of the pads on the PCB can not be offset from the corresponding pads of the module, and the expansion of the PCB pads relative to the module pads does not affect the use of the module.



3、Antenna layout requirements

（1）、Put the module on board edge，metal components are prohibited to be placed around the antenna, and module are requested to far away from the high frequency components.

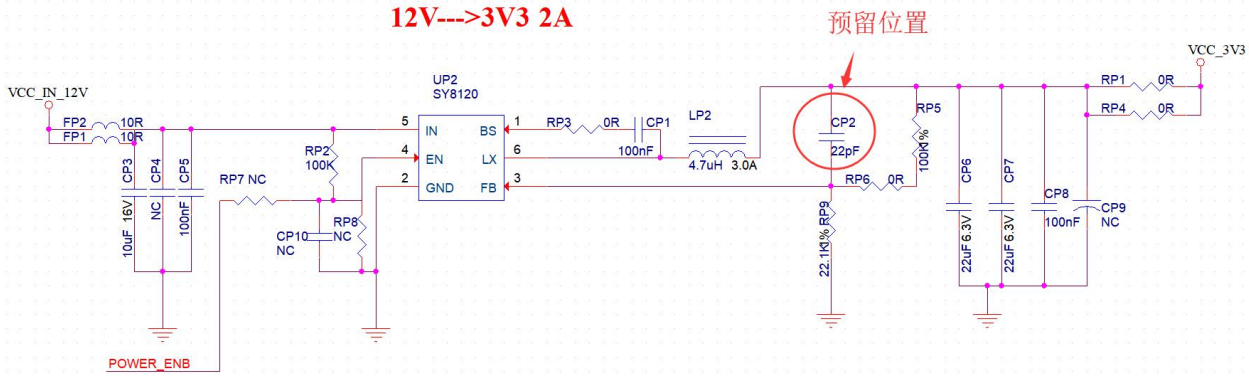
4、Power Supply

（1）、Recommended　3.3 V voltage, Peak:Current over 100mA .

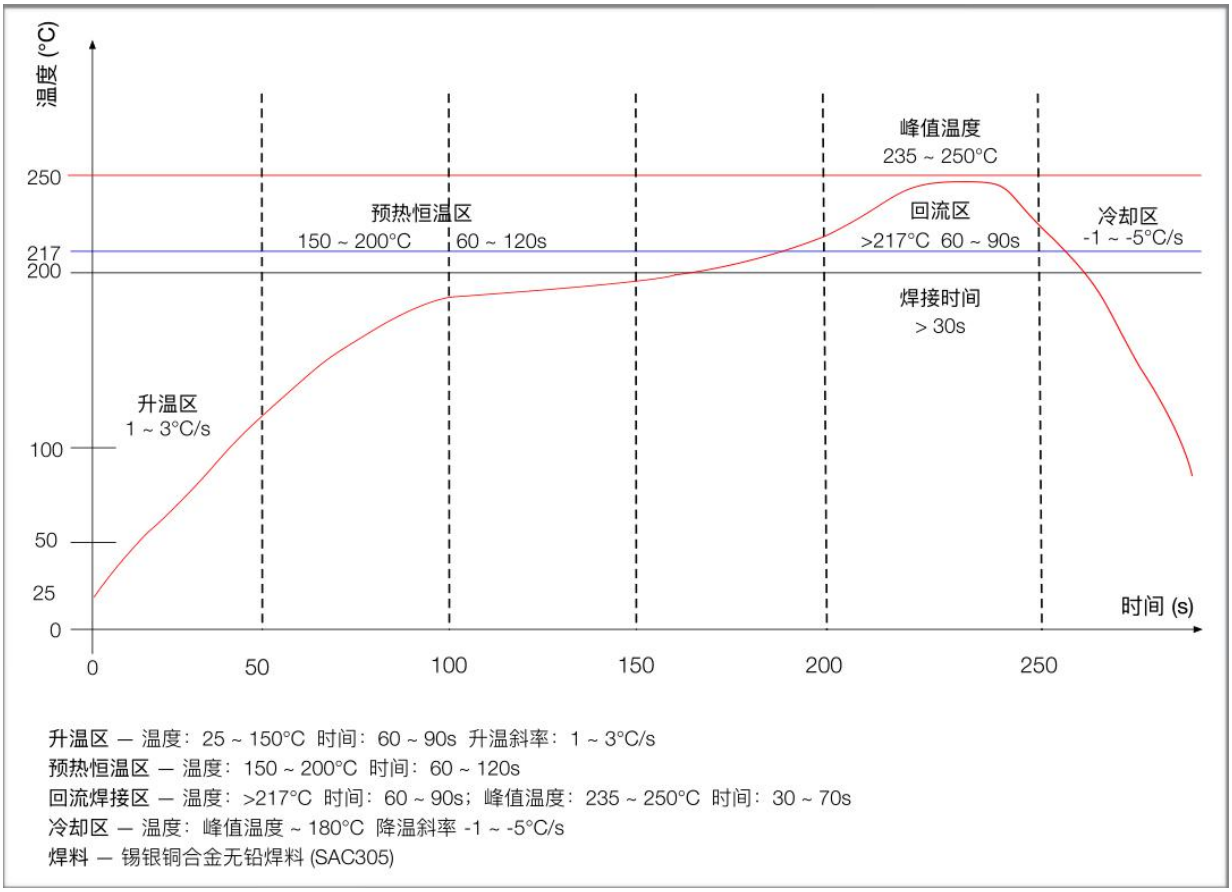
（2）、It is recommended to use the LDO power supply；If DC-DC is used, the ripple is controlled within 30 mV.

（3）、DC-DC power supply circuit is recommended to reserve the position of the dynamic response capacitor, and the output ripple can be optimized when the load change is large.

（4）、The power interface of 3.3V is suggest to increase ESD components.



7. Reflow Welding Curve



升温区 — 温度：25 ~ 150°C 时间：60 ~ 90s 升温斜率：1 ~ 3°C/s
预热恒温区 — 温度：150 ~ 200°C 时间：60 ~ 120s
回流焊接区 — 温度：>217°C 时间：60 ~ 90s；峰值温度：235 ~ 250°C 时间：30 ~ 70s
冷却区 — 温度：峰值温度 ~ 180°C 降温斜率 -1 ~ -5°C/s
焊料 — 锡银铜合金无铅焊料 (SAC305)

8. Package Information

As shown below,the packing of Ra-07 is a tape .

9. Contact us

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