



RN52m DataSheet

v1.3.0-en

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1. Revision History

Date	Version	Description
2020/01	1.0.0	First Release
2021/08	1.1.0	Change dimension data to high resolution
2021/11	1.2.0	Change dimension data (Chip Antenna)
2022/04	1.2.1	Change Module 3D Picture
2023/02	1.3.0	Add Certification

2. Overview



The RN52m module (based nRF52832 SoC) is a powerful, highly flexible ultra-low power multiprotocol SoC ideally suited for Bluetooth® low energy (previously called Bluetooth Smart), ANT and 2.4GHz ultra low-power wireless applications. The RN52m is built around a 32-bit ARM® Cortex™-M4F CPU with 512kB + 64kB RAM. The embedded 2.4GHz transceiver supports Bluetooth low energy, ANT and proprietary 2.4 GHz protocol stack. It is on air compatible with the nRF51 Series, nRF24L and nRF24AP Series products from Nordic Semiconductor.

Bluetooth 5

The RN52m has hardware support on-chip for Bluetooth 5. This includes high throughput and advertising extension.



Processing power

The RN52m incorporates a powerful Cortex-M4F processor enabling the most demanding applications with complex arithmetic requirements to be realized in a single chip solution. The IC supports DSP instructions, a Floating Point Unit (FPU), single-cycle multiply and accumulate, and hardware divide for energy-efficient process of computationally complex operations.

Multiprotocol radio

The 2.4GHz radio supports multiple protocols including Bluetooth low energy, ANT and 2.4GHz proprietary. The radio has high definition RSSI and highly automated functionality, including EasyDMA for direct memory access during packet send and retrieve. Nordic provides protocol stacks for Bluetooth low energy. ANT protocol stacks are available from ANT here: www.thisisant.com.

Power Efficiency

The RN52m module is an extremely power efficient device that can run from a supply between 1.7V and 3.6V. All individual peripherals and clocks offer complete flexibility of power down when not required for task operation thus minimizing power consumption to a minimum. The IC has a comprehensive system of automated and adaptive power management features. These features range across the entire IC's operation from power supply switching to peripheral bus/EasyDMA memory management, to automated shut down of all but the absolute essential peripherals required to perform a task.

SoftDevice

The RN52m is supported by the S132 SoftDevice, a Bluetooth 5 pre-qualified protocol stack.

2.1. Features

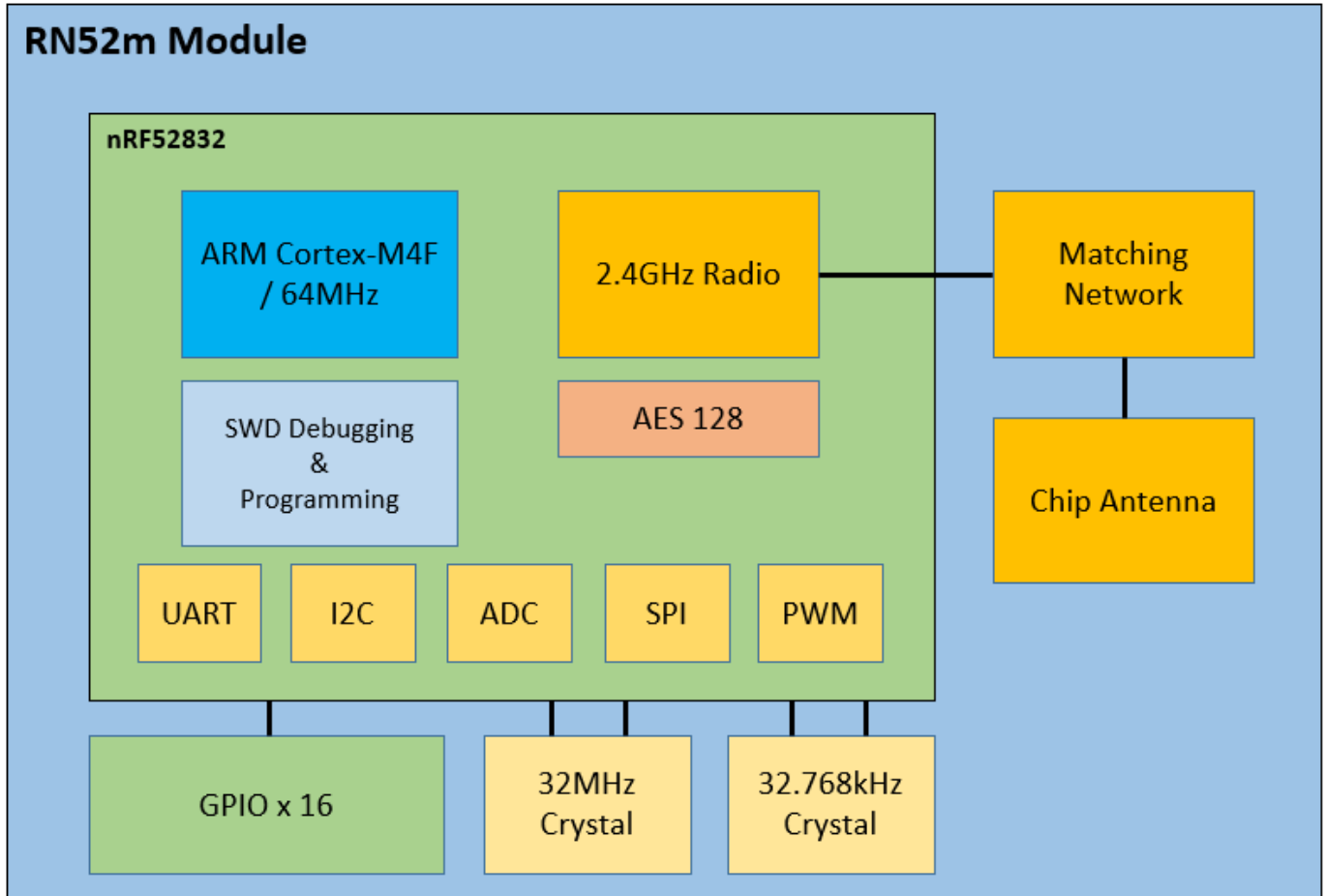
- 2.4 GHz transceiver
 - -96 dBm sensitivity in Bluetooth® low energy mode
 - Supported data rates: 1 Mbps, 2 Mbps Bluetooth® low energy mode
 - -20 to +4 dBm TX power, configurable in 4 dB steps
 - On-chip balun (single-ended RF)
 - 5.3 mA peak current in TX (0 dBm)
 - 5.4 mA peak current in RX
 - RSSI (1 dB resolution)
- ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz
 - 215 EEMBC CoreMark® score running from flash memory
 - Serial wire debug (SWD)
 - Trace port
- Flexible power management
 - 1.7 V–3.6 V supply voltage range
 - Fast wake-up using 64 MHz internal oscillator
- Memory
 - 512 kB flash/64 kB RAM
- Nordic SoftDevice ready
- Support for concurrent multi-protocol
- 12-bit, 200 ksps ADC - 8 configurable channels with programmable gain
- 64 level comparator
- 15 level low power comparator with wakeup from System OFF mode
- Temperature sensor
- 30 general purpose I/O pins
- 3x 4-channel pulse width modulator (PWM) unit with EasyDMA
- Digital microphone interface (PDM)
- 5x 32-bit timer with counter mode

- Up to 3x SPI master/slave with EasyDMA
- Up to 2x I2C compatible 2-wire master/slave
- I2S with EasyDMA
- UART (CTS/RTS) with EasyDMA
- Programmable peripheral interconnect (PPI)
- Quadrature decoder (QDEC)
- AES HW encryption with EasyDMA
- Autonomous peripheral operation without CPU intervention using PPI and EasyDMA
- 3x real-time counter (RTC)
- Single crystal operation

2.2. Application

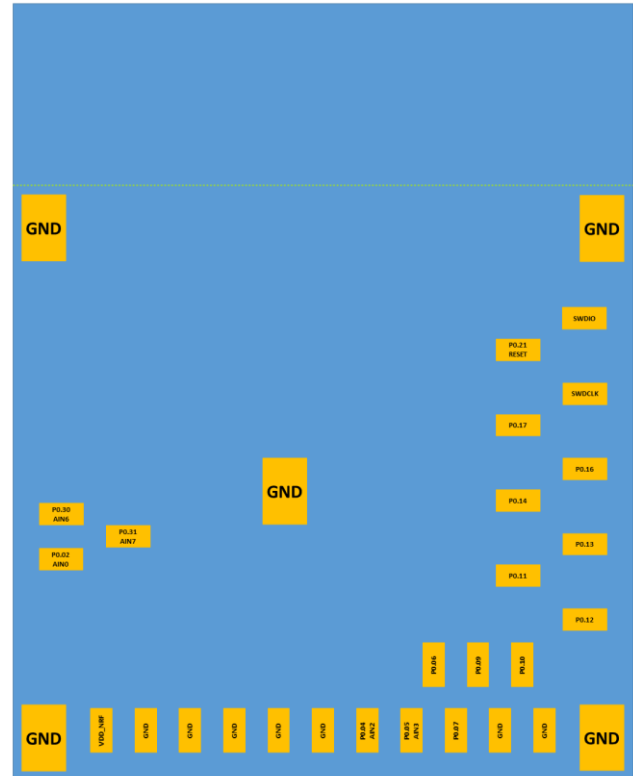
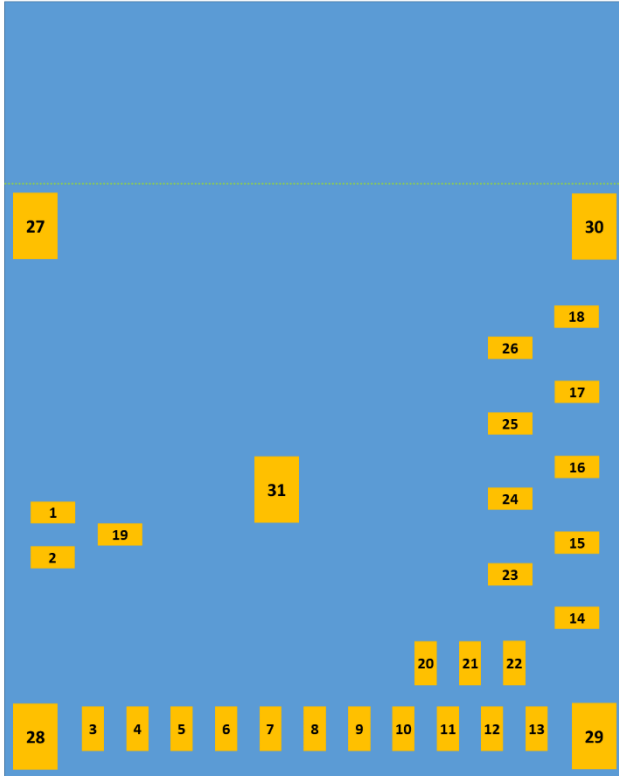
- Internet of Things (IoT)
 - Home automation
 - Sensor networks
 - Building automation
 - Industrial
 - Retail
- Computer peripherals and I/O devices
 - Mouse
 - Keyboard
 - Multi-touch trackpad
- Interactive entertainment devices
 - Remote control
 - Gaming controller
- Beacons
- Personal Area Networks
 - Health/fitness sensor and monitor devices
 - Medical devices
 - Key-fobs + wrist watches
- Remote control toys
- Wireless Mesh Network

2.3. Block Diagram



The RN52m module includes a matching network for chip antenna and external 32.768k crystal.

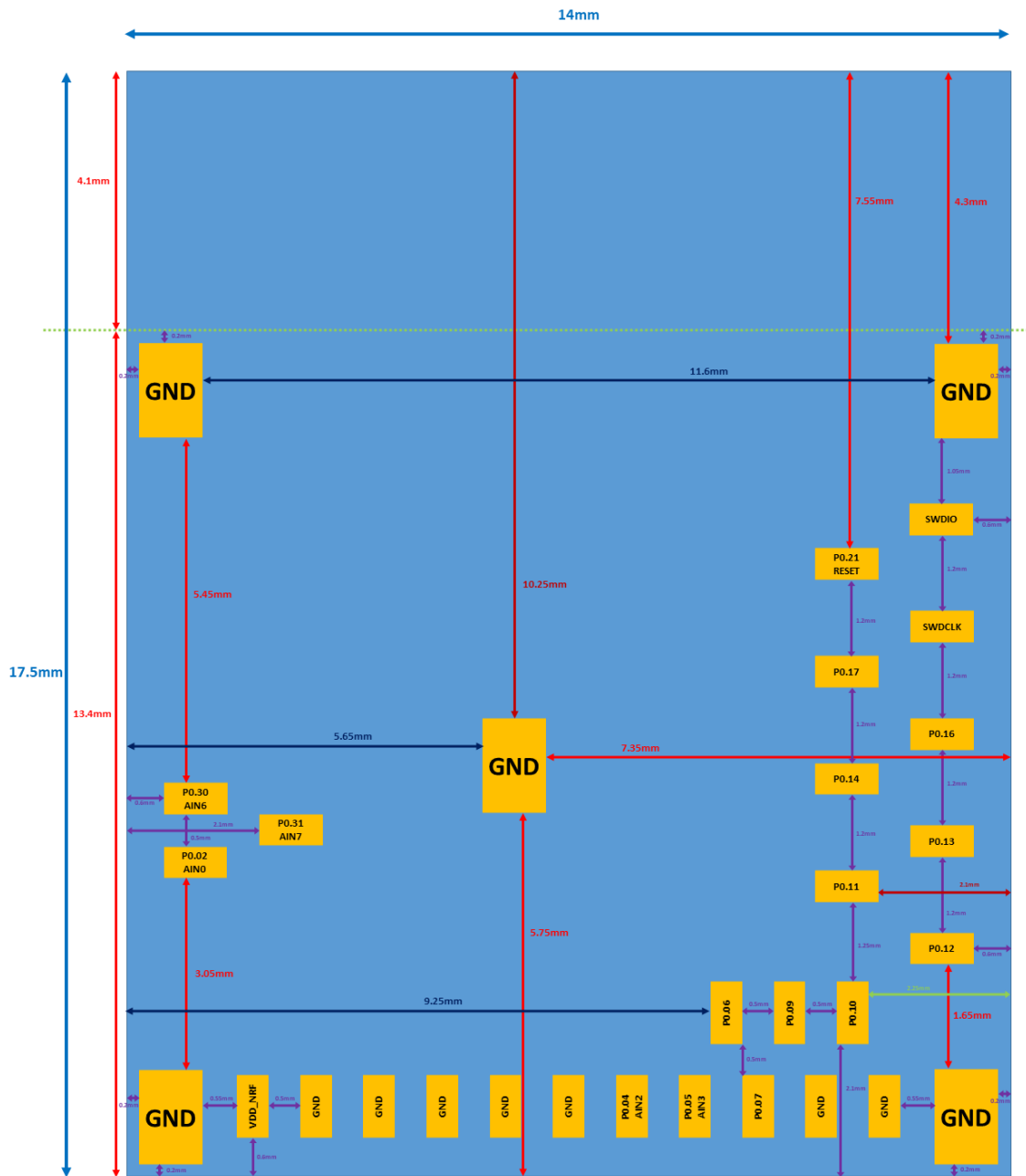
3. Pin Assignments and Functions (Top View)



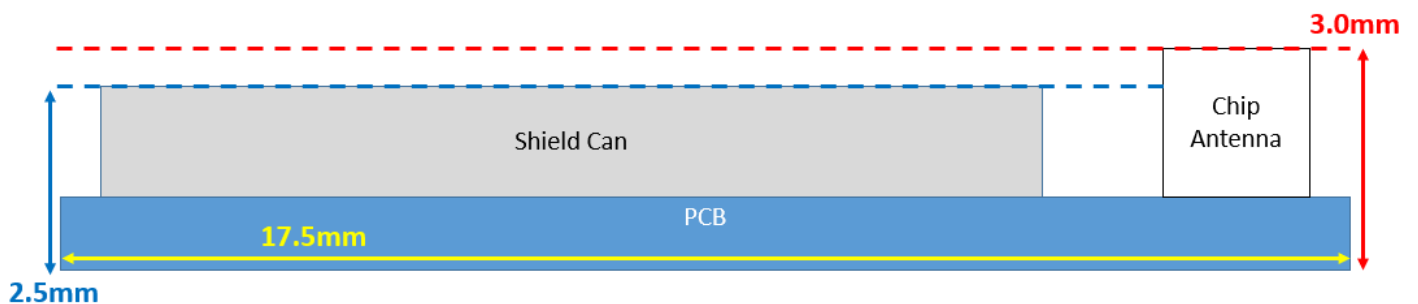
Pin	Pin Name	Pin Function	Description
1	P0.30 AIN6	Digital I/O Analog input	General purpose I/O COMP input SAADC input
2	P0.02 AIN0	Digital I/O Analog input	General purpose I/O COMP input SAADC input
3	VDD_NRF	Power	Power supply.
4	GND	Power	Ground (0 V).
5	GND	Power	Ground (0 V).
6	GND	Power	Ground (0 V).
7	GND	Power	Ground (0 V).
8	GND	Power	Ground (0 V).
9	P0.04 AIN2	Digital I/O Analog input	General purpose I/O COMP input SAADC input
10	P0.05 AIN3	Digital I/O Analog input	General purpose I/O COMP input SAADC input
11	P0.07	Digital I/O	General purpose I/O
12	GND	Power	Ground (0 V).

13	GND	Power	Ground (0 V).
14	P0.12	Digital I/O	General purpose I/O
15	P0.13	Digital I/O	General purpose I/O
16	P0.16	Digital I/O	General purpose I/O
17	SWDCLK	Digital Input	Serial wire debug clock input for debug and programming
18	SWDIO	Digital I/O	Serial wire debug I/O for debug and programming
19	P0.31 AIN7	Digital I/O Analog input	General purpose I/O COMP input SAADC input
20	P0.06	Digital I/O	General purpose I/O
21	P0.09	Digital I/O	General purpose I/O
22	P0.10	Digital I/O	General purpose I/O
23	P0.11	Digital I/O	General purpose I/O
24	P0.14	Digital I/O	General purpose I/O
25	P0.17	Digital I/O	General purpose I/O
26	P0.21 nRESET	Digital I/O	General purpose I/O. Configurable as system RESET.
27	GND	Power	Ground (0 V).
28	GND	Power	Ground (0 V).
29	GND	Power	Ground (0 V).
30	GND	Power	Ground (0 V).
31	GND	Power	Ground (0 V).

4. Module Layout



RN52m Dimension and Bottom Pad (Top View)



The recommended metal mask sizes for the bottom pad type of the RN52m module are shown below.

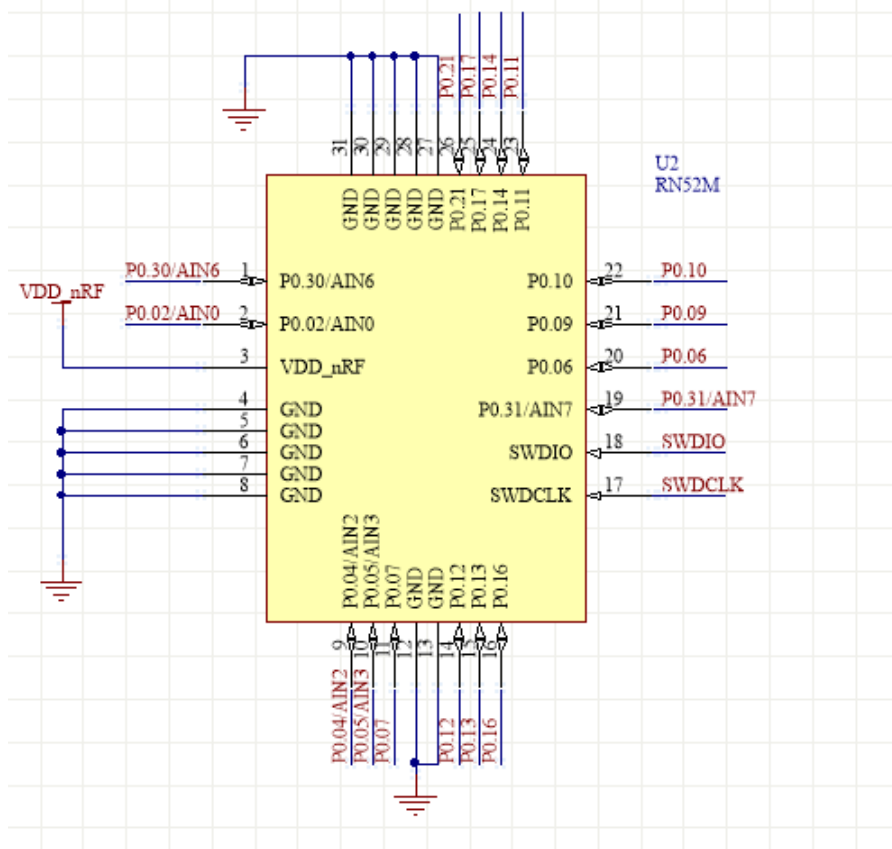
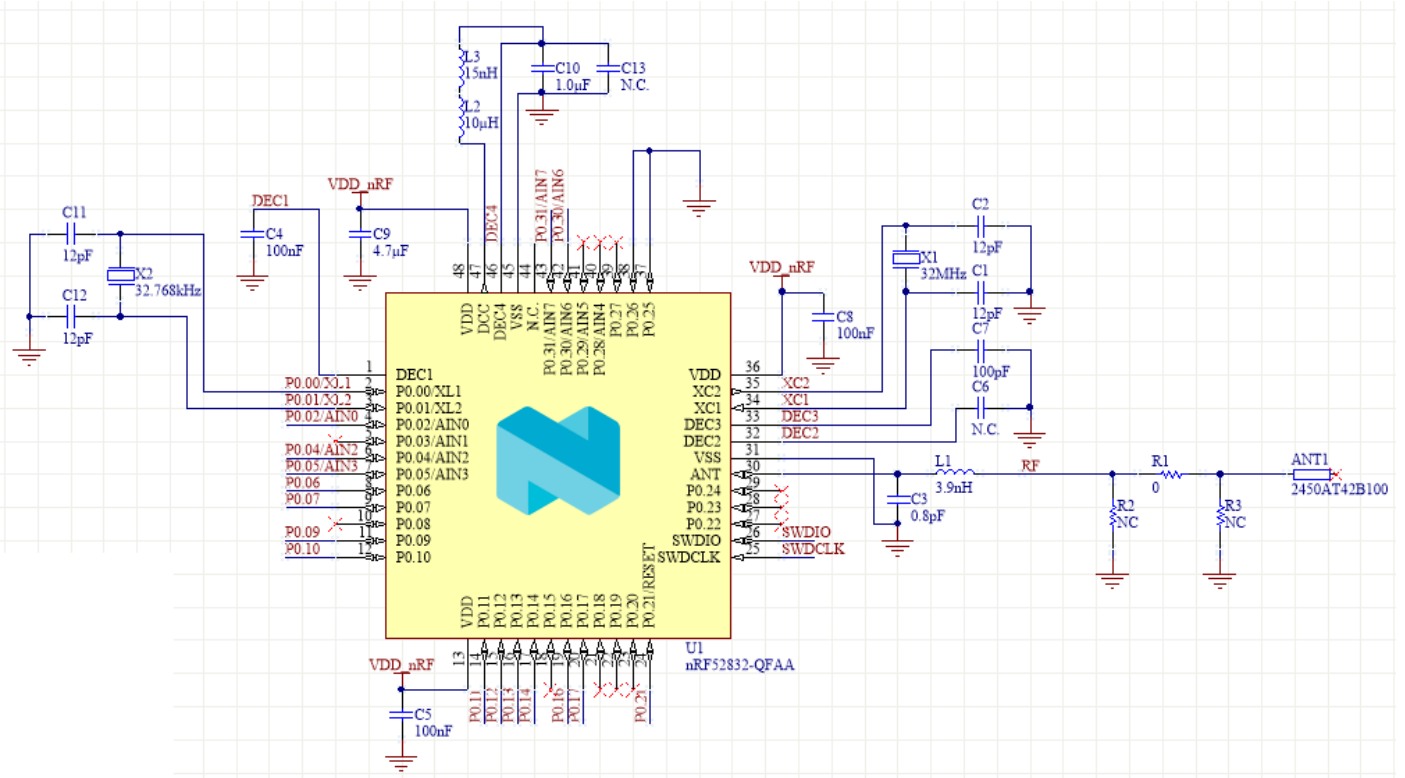
<Recommended metal mask for solder printing>

Pad	Pad size	Mask opening
Signal pad	0.5 x 1.0 mm & 1.0 x 0.5 mm	0.4 x 0.9 mm & 0.9 x 0.4 mm
Corner & Center pad	1.0 x 1.5 mm	0.7 x 1.0 mm

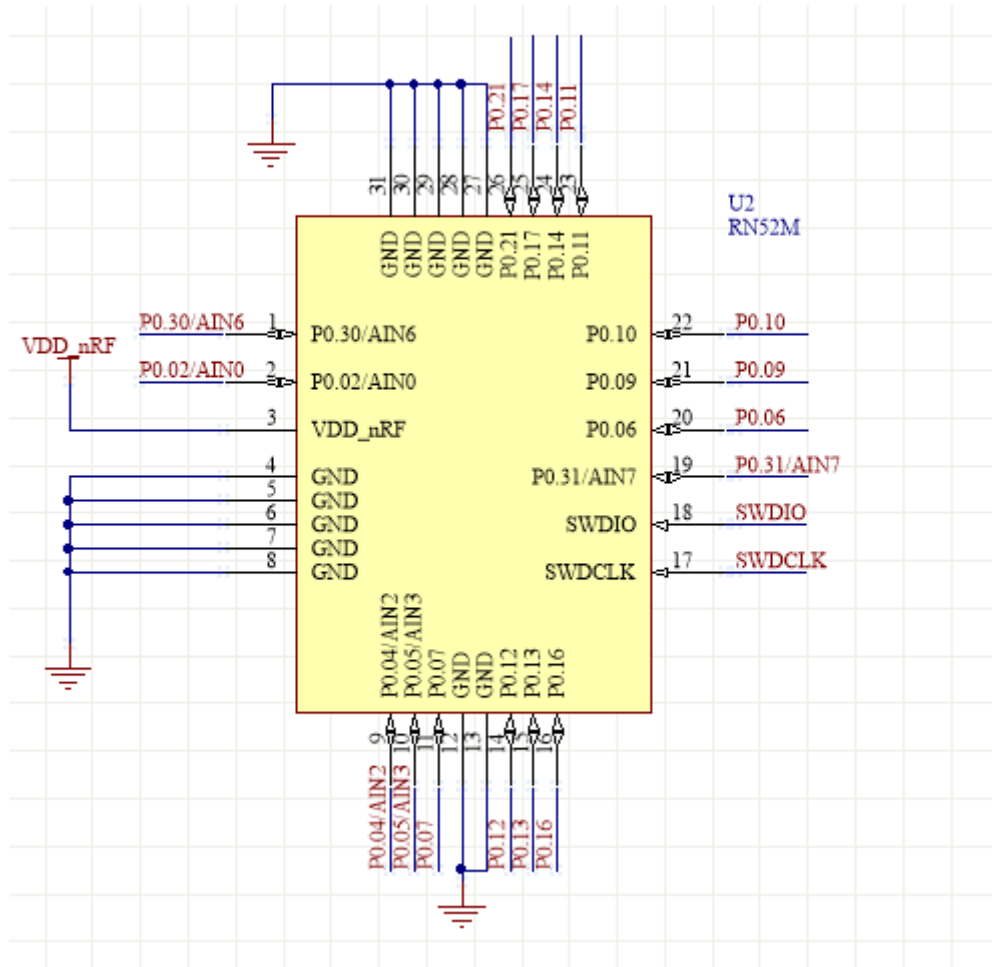
The metal mask thickness : t = 0.1mm

The solder volume should be same by changing the mask opening if different metal mask thickness is used.

5. Module Schematics

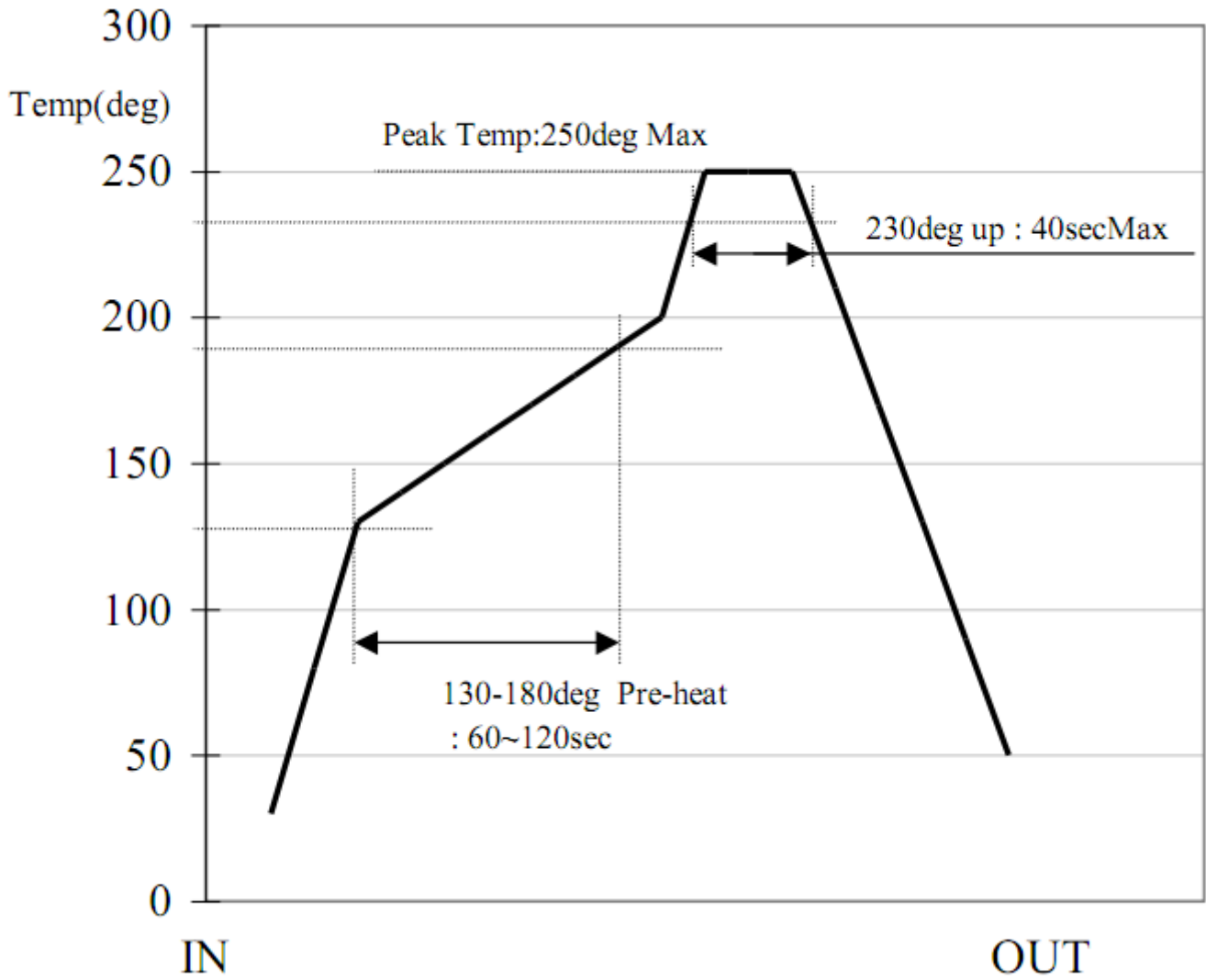


6. Module Reference



The RN52m module can operate only by connecting VDD and GND.

7. SMT Reflow Profile



8. Certification

8.1. KC (Republic of Korea)

1857-6803-8DD7-D3BA

방송통신기자재등의 적합등록 필증 Registration of Broadcasting and Communication Equipments	
상호 또는 성명 <i>Trade Name or Registrant</i>	(주)라이즈넷
기자재명칭(제품명칭) <i>Equipment Name</i>	특정소출력 무선기기(무선메이커통신시스템용 무선기기)
기기부호/추가 기기부호 <i>Equipment code /Additional Equipment code</i>	LARN8
기본모델명 <i>Basic Model Number</i>	RN52m
파생모델명 <i>Series Model Number</i>	RN52e, RN52c
등록번호 <i>Registration No.</i>	R-R-rin-RN52m
제조사/제조국가 <i>Manufacturer/Country of Origin</i>	(주)라이즈넷 / 한국
등록연월일 <i>Date of Registration</i>	2021-12-09
기타 <i>Others</i>	
위 기자재는 「전파법」 제58조의2 제3항에 따라 등록되었음을 증명합니다. It is verified that foregoing equipment has been registered under the Clause 3, Article 58-2 of Radio Waves Act.	
2021년(Year) 12월(Month) 09일(Day)	
 국립전파연구원장 Director General of National Radio Research Agency	
※ 적합등록 방송통신기자재는 반드시 "적합성평가표시" 를 부착하여 유통하여야 합니다. 위반시 과태료 처분 및 등록이 취소될 수 있습니다.	

8.2. FCC

TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

MICOM Labs
575 Boulder Court
Pleasanton, CA 94566

Date of Grant: 07/06/2022
Application Dated: 07/06/2022

RISENET Co.,Ltd.
F-1208, Smart Square, 328, Sandan-ro, Danwon-gu
Ansan-si, Gyeonggi-do, 15426
South Korea

Attention: JUN CHEOL OH

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: 2A7LK-RN52M
Name of Grantee: RISENET Co.,Ltd.
Equipment Class: Digital Transmission System
Notes: RN52m(wireless module)
Modular Type: Single Modular

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHz)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
	15C	2402.0 - 2480.0	0.0010		

Single Modular Approval. Output power listed is conducted power. OEM Integrators and end-users must be provided with transmitter operation conditions for satisfying RF exposure compliance. Only those antennas tested with the device or similar antennas with equal or lesser gain may be used with this transmitter. The antennas used with this transmitter must be installed to provide a minimum separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures. End-users must be provided with operating procedures for satisfying RF exposure compliance.



8.3. CE



CERTIFICATE of EXAMINATION



Certificate Validation

NOTIFIED BODY EU-TYPE EXAMINATION CERTIFICATE
SHEA1066-EU / 28 Jun 2022 / Rev A
Radio Equipment Directive (RED) 2014/53/EU

MiCOM Labs Inc., Notified Body Number 2280 declares, on the basis of the assessment of the tests and the technical documentation provided by the applicant that the following product complies with the essential requirements of the above noted Directive.

Product Name:
RN52m(wireless module)

Approval Holder Name:
RISENET Co.,Ltd.



Gordon Hurst, Product Certifier

This Certificate is Issued under the Authority of:
MiCOM Labs Inc., 575 Boulder Court, Pleasanton, California 94566, USA
Notified Body Number: 2280

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