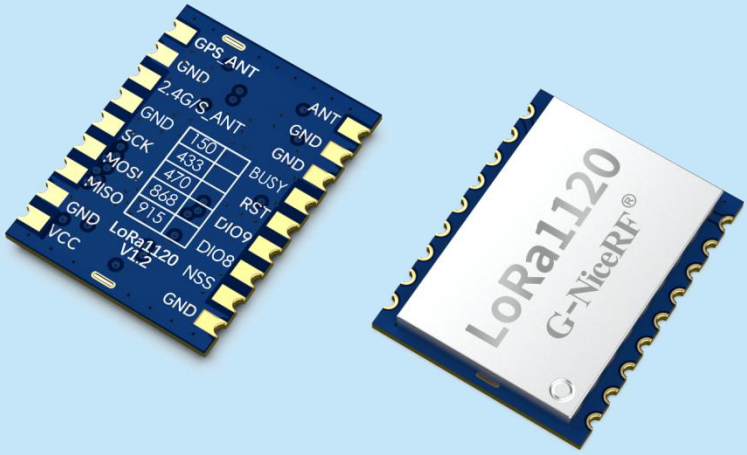
LoRa1120 Multi-Band Wireless Communication Module

- Multi-Band: Sub-GHz,2.4GHz and S-band (satellite communication)
- Low-power scanning :GNSS (GPS/BeiDou) and 802.11b/g/n Wi-Fi passive scanning
- Compatible with LoRaWAN, Sigfox protocols, and low-power Bluetooth beacons
- Supports AES-128 encryption and decryption algorithms, LR-FHSS technology
- Round-Trip Time of Flight (RTToF) ranging

Product Specification



Catalogue

Note: Revision History

Revision	Date	Comment
V1.0	2025-3	First release

1. Descriptions

LoRa1120 adopts Semtech's LR1120 chip, an ultra-low-power module designed specifically for global geolocation applications. It supports multi-band LoRa and long-range frequency hopping spread spectrum (LR-FHSS) communication, operating in the sub-GHz and 2.4GHz industrial, scientific, and medical (ISM) bands, as well as the S-band authorized for satellite communication. The module integrates a cloud-native multi-constellation Global Navigation Satellite System (GNSS) scanner and a passive WiFi MAC address scanner, both of which are serviced through Semtech's LoRaCloud™. The LR1120 complies with the physical layer requirements of the LoRaWAN standard specification released by the LoRa Alliance while maintaining configurability to meet various application and proprietary protocol needs.

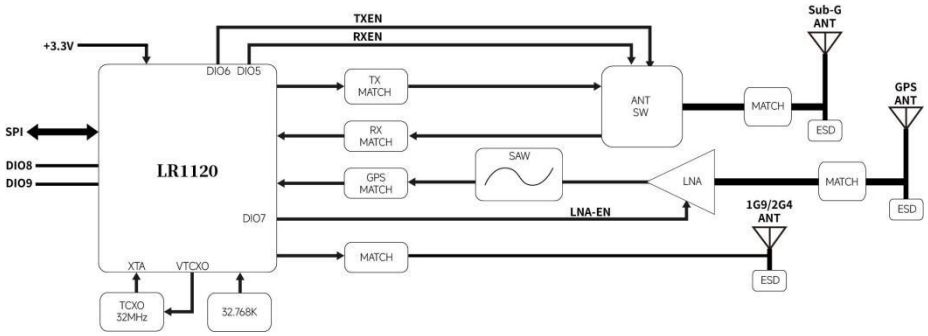
2. Features

- Sub-GHz Bands: 433/470/868/915MHz (Customizable : 150~960 MHz)
- S Bands:1900MHz～2200MHz
- 2.4 G Bands : 2400MHz～2500MHz
- S Bands sensitivity : up to -132dBm @BW=125KHz,SF=12
- Sub-GHz Bands sensitivity :up to -144dBm @BW=62.5KHz,SF=12
- 2.4 GHz sensitivity : up to -129 dBm @ BW=406 KHz, SF=7
- Electrostatic Protection (ESD)
- Supports LR-FHSS
- Supports LoRaWAN and Sigfox protocol
- Supports AES-128 encryption and decryption
- Sub-GHz range over 5 km in open areas
- Transmit power adjustable, up to 22dBm
- Sleep current < 1μA
- Receive current <7 mA
- Small size, stamp hole design

3. Applications

- Drones
- Remote irrigation
- Smart home/Smart agriculture
- Industrial manufacturing

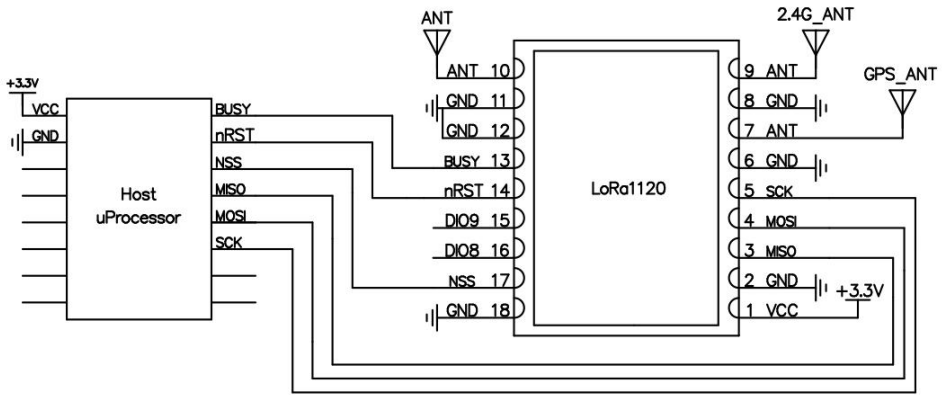
4. Block Diagram



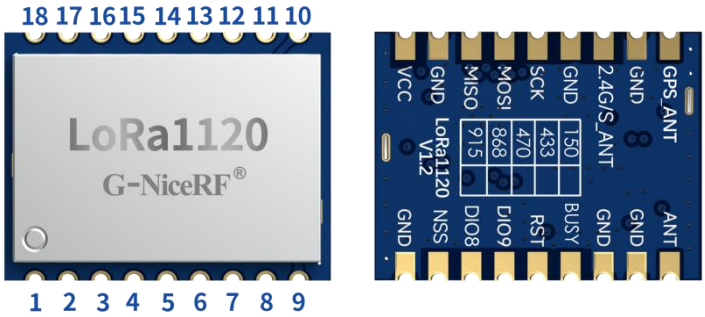
5. Electrical Characteristics

Parameters	Test condition	Min.	Typ.	Max	Unit
Voltage range		1.8	3.3	3.6	V
Operating Temperature		-40	25	85	℃
Maximum Input Signal			10		dBm
Current Consumption					
Transmit Current	433MHz		< 110		mA
	@2.4GHz		< 36		mA
Receive Current	@3.3V,2.4G		< 7		mA
	@3.3v,433MHz		< 6		mA
Sleep Current	@3.3V		< 1		uA
RF Parameters					
Frequency Range	@433MHz	400		460	MHz
	@470MHz	470		510	MHz
	@868MHz	850		890	MHz
	@915MHz	900		940	MHz
Transmit Power	@Sub-GHz	19	21		dBm
	2.4GHz	10	11		dBm
Receive Sensitivity	BW=62.5KHz,SF=12 @Sub-GHz		-142		dBm
	BW=125KHz,SF=12 @S Bands		-132		dBm
	BW=406KHz,SF=7 @2.4GHz		-129		dBm
Frequency Error			10		ppm
Modulation Rate (@Sub-GHz)	@LoRa	0.01		62.5	Kbps
	@FSK	0.6		300	Kbps
Modulation Rate (@S bands）	@LoRa	0.292		87.5	Kbps
Modulation Rate (@2.4G bands）	@LoRa	0.476		87.5	Kbps

6. Typical Schematic Circuit:

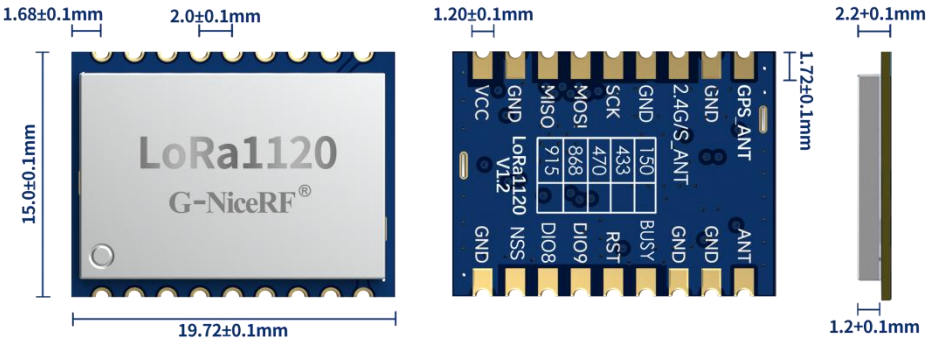


7. Pin Definition

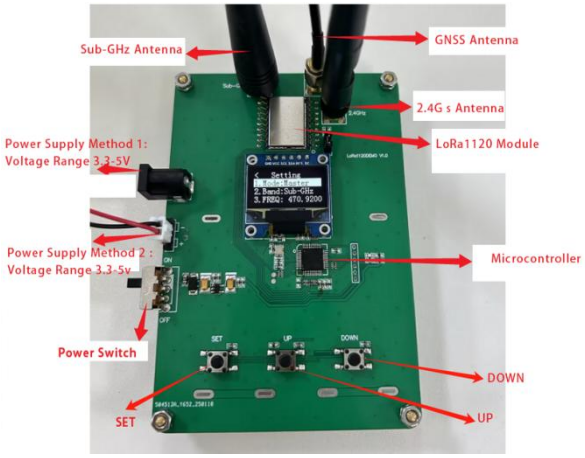


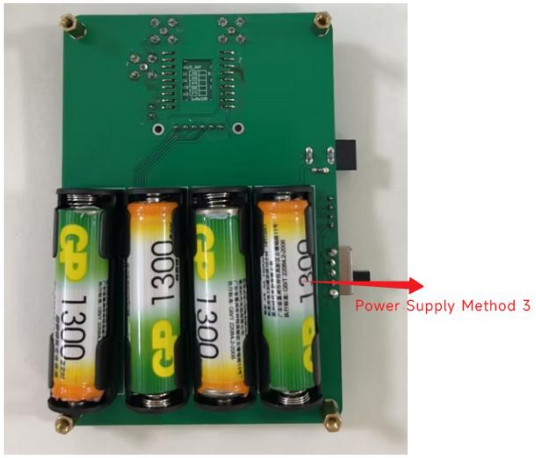
Pin NO.	Pin name	I/O	Description
1	VCC		Connect to the positive power supply
2,6,8,11,12, 18	GND		Connect to the negative power supply
3	MISO	O	SPI data output
4	MOSI	I	SPI data input
5	SCK	I	SPI clock input
7	2.4/S_ANT		2.4G and S-band antenna interface, external 50Ω antenna
9	GPS_ANT	I	GPS antenna interface, external 50Ω antenna
10	ANT		Sub-GHz band antenna interface, external 50Ω antenna
13	BUSY	O	Used for status indication, refer to the chip documentation for details
14	RST	I	Reset trigger input, refer to the chip datasheet for details
15	DIO9	IO	Multipurpose digital interface, refer to the chip datasheet for details
16	DIO8	IO	Multipurpose digital interface, refer to the chip datasheet for details
17	NSS	IO	SPI chip select input

8. Mechanism Dimension(Unit:mm)



Appendix 1: Function Demonstration Board





Note: Only one power supply method can be selected

1）Function Description

The LoRa1120 wireless module DEMO board primarily implements the following functions: inter-module communication, measuring module transmit power, measuring receive sensitivity, and measuring sleep current.

2）Key Functions

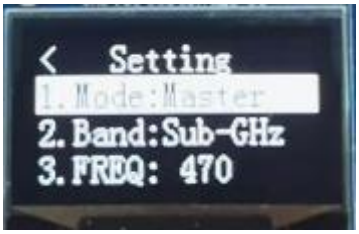
The demo board has three buttons: SET, UP, and DOWN. Their functions are as follows:

Buttons	Functions
SET Key Short Press	Confirm or enter the next level of the interface
SET Key Long Press	Return to the previous interface
UP Key Short Press	Move cursor up or increase parameter by 1
UP Key Long Press	Increase parameter
DOWN Key Short Press	Move cursor down or decrease parameter by 1
DOWN Key Long Press	Decrease parameter

Operation Method:

Ensure normal power supply, then toggle the power switch to turn on the power. The DEMO board screen will display the current function interface.Short press the SET key to enter the setting mode. To select an option, short press the SET key; to return, long press the SET key. Use the UP and DOWN keys to select the parameter you want to adjust. Finally, short press the SET key to complete the modification.

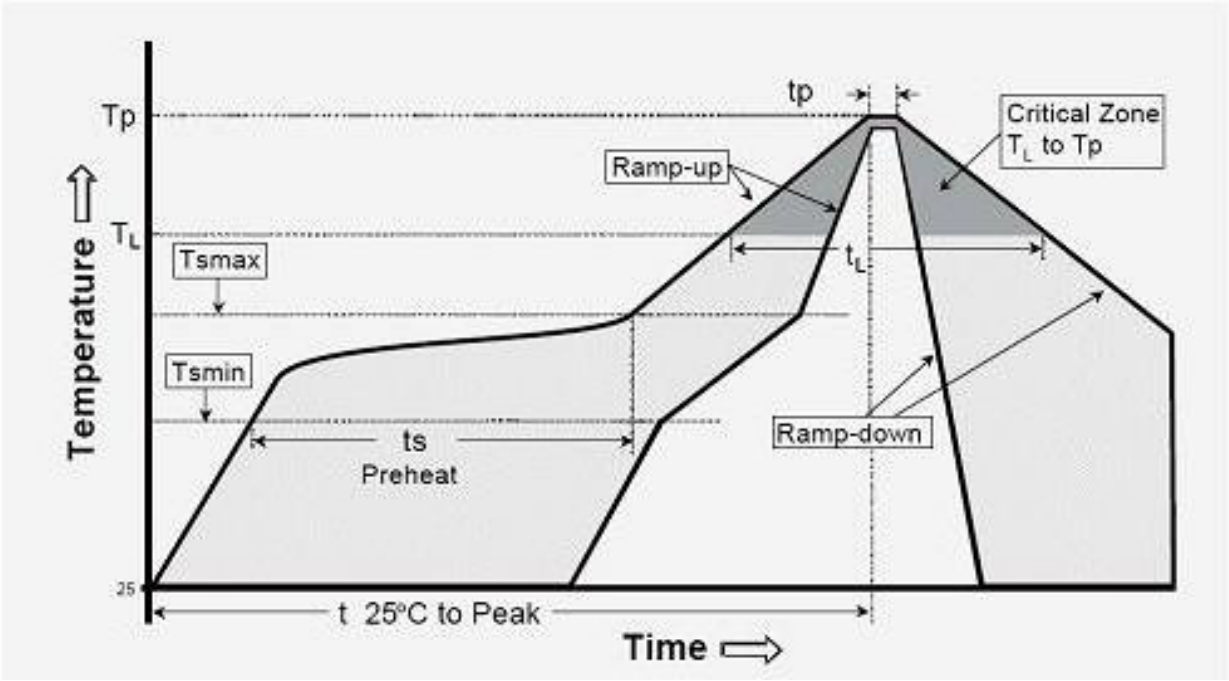
1) Setting Interface Description



- Mode: Function
- Band: Frequency Band
- FREQ: Frequency
- SF: Spreading Factor
- BW: Bandwidth
- POWER: Power
- CR: Coding Rat

Appendix 2: SMD Reflow Chart

Below reflow profile is recommended for SMT technology:



IPC/JEDEC J-STD-020B the condition for lead-free reflow soldering	big size components (thickness >=2.5mm)
The ramp-up rate (Tl to Tp)	3℃/s (max.)
preheat temperature - Temperature minimum (Tsmin) - Temperature maximum (Tsmax) - preheat time (ts)	 150℃ 200℃ 60~180s
Average ramp-up rate(Tsmax to Tp)	3℃/s (Max.)
- Liquidous temperature(TL)	217℃
- Time at liquidous(tL)	60~150 second
peak temperature(Tp)	245+/-5℃