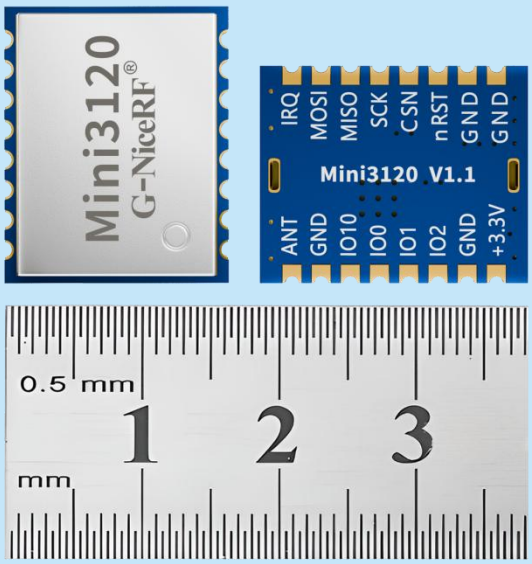
Mini3120 wireless transceiver module

- Ultra-compact size, high sensitivity, 2 km transmission distance in open areas
- TCXO Crystal Oscillator, with a frequency deviation stability of 0.5ppm

Product Specification



Catalogue

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Note: Revision History

Revision	Date	Comment
V1.0	2025-7	First release
V1.1	2025-8	Update the product description

1. Descriptions

Mini3120 is a high-performance, low-power wireless transceiver chip that supports half-duplex wireless communication. It operates in the 433/470/868/915 MHz frequency bands and can be customized to support frequencies from 190 to 1110 MHz. This chip features strong anti-interference capability, high sensitivity, high transmission power, low power consumption, and long communication range. It offers a maximum receiving sensitivity of -124 dBm and a maximum output power of 20 dBm Additionally, it supports various data packet formats and multiple encoding/decoding schemes, allowing for flexible integration into a wide range of application scenarios.

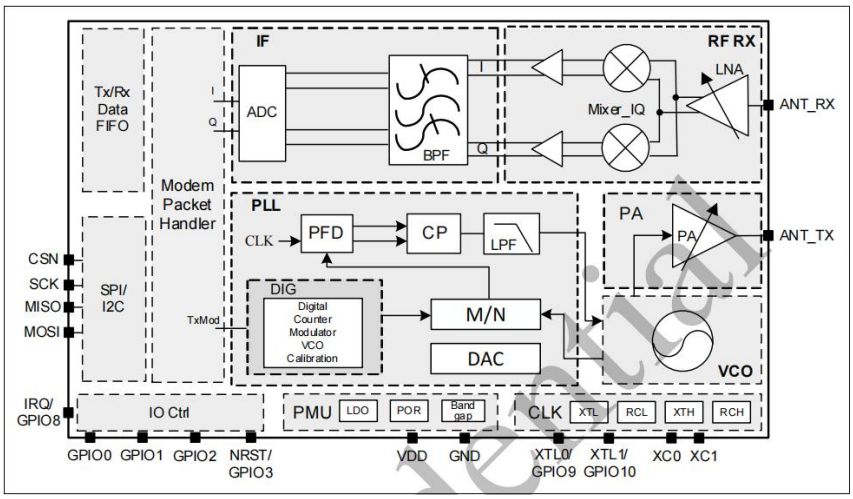
2. Features

- Operating Voltage Range: 2.0-3.8V
- Frequency Range:433/470/868/915 MHz
- Sensitivity：-124dBm @2.4Kbps
- Maximum output power：20 dBm
- Low receive current: 6.1mA@DCDC
- Sleep current < 1.0uA
- Data transfer rate: 2-500Kbps @2(G)FSK,MSK
- Supports RSSI and LQI
- Supports Automatic Frequency Control (AFC)
- Supports Duty Cycle reception and transmission
- Supports automatic ACK
- Supports transparent transmission and packet mode
- Supports data whitening, FEC, CRC,Manchester encoding, and other features

3. Applications

- Smart Factory
- Smart Water Management
- Smart Agriculture
- Smart Healthcare
- Smart Community
- Smart Firefighting

4. Block Diagram

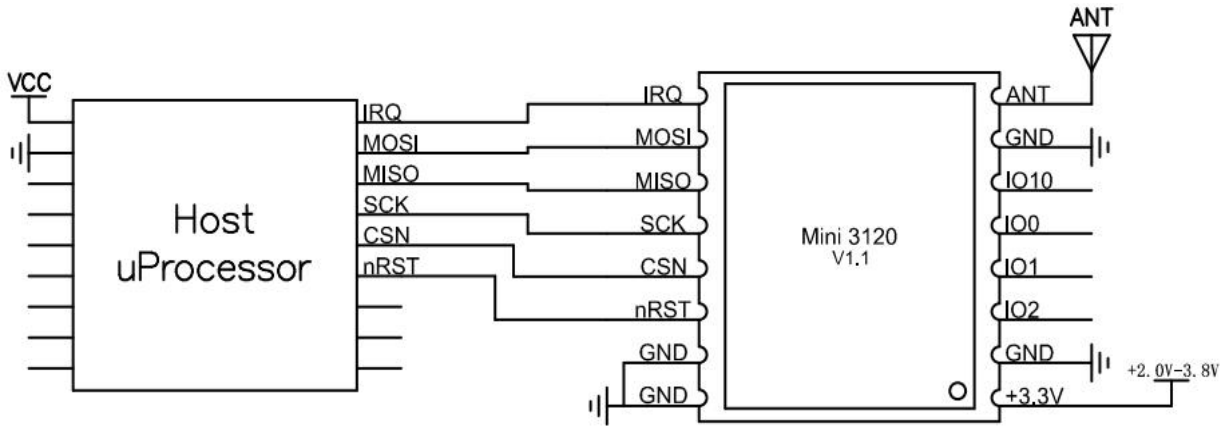


Confidential

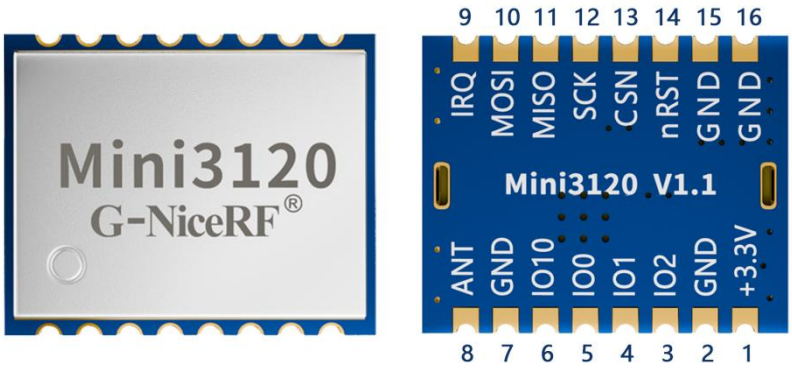
5. Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
Operation Condition					
Working voltage	2	3.3	3.8	V	
Temperature range	-40		85	℃	
Current Consumption					
RX current		6.1		mA	@DCDC Mode
		<10		mA	@LDO Mode
TX current		<120		mA	@20dBm
Sleep current		<1		uA	
RF Parameter					
Frequency range	408	433	450	MHz	@433MHz
	470	490	510	MHz	@470MHz
	850	868	890	MHz	@868MHz
	900	915	930	MHz	@915MHz
Modulation Rate	2		500	Kbps	2(G)FSK
Output power	-20		20	dBm	
Receiving sensitivity		-124		dBm	@DR=2.4Kpbs,Fdev=1.2kHz

6. Typical application circuit

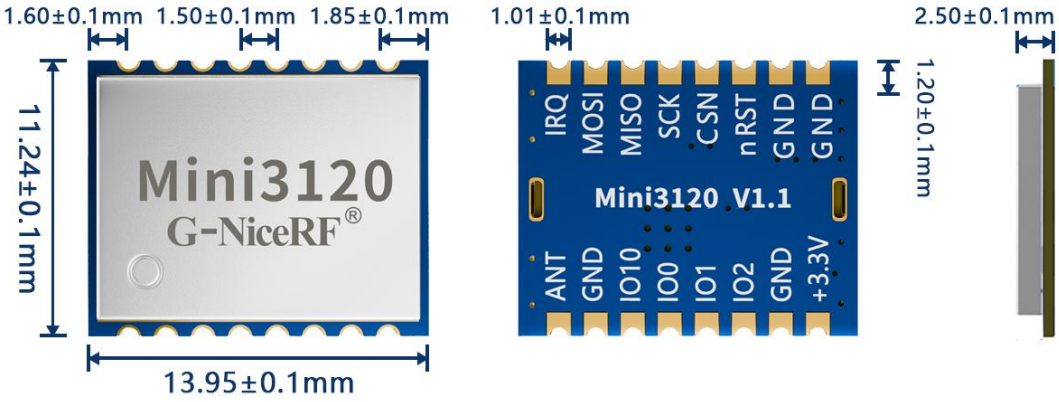


7. Pin definition



Pin NO	Pin name	IO	Description
1	+3.3v		External Power Supply Positive Terminal
2,7,15,16	GND		External Power Supply Negative Terminal
3	IO2	0-VCC	Connect to the chip's GPIO02 pin; refer to the chip datasheet for specific functions
4	IO1	0-VCC	Connect to the chip's GPIO01 pin; refer to the chip datasheet for specific functions
5	IO0	0-VCC	Connect to the chip's GPIO00 pin; refer to the chip datasheet for specific functions
6	IO10	0-VCC	Connect to the chip's GPIO10 pin; refer to the chip datasheet for specific functions
8	ANT		Connect to an external 50Ω antenna
9	IRQ	0-VCC	Interrupt Signal
10	MOSI	0-VCC	SPI Data Input Signal
11	MISO	0-VCC	SPI Data Output Signal
12	SCK	0-VCC	SPI Serial Clock
13	CSN	0-VCC	SPI Chip Select Signal
14	nRST	0-VCC	Reset Pin

8. Mechanism Dimension(Unit:mm)



9. Product order information

Product Name	Description
Mini3120-433	Working frequency 433MHz
Mini3120-470	Working frequency 470MHz
Mini3120-868	Working frequency 868MHz
Mini3120-915	Working frequency 915MHz

10. Function Demonstration Board



1. Function Description

The Mini3120 wireless module demo board mainly implements bidirectional communication (Master and Slave) in GFSK mode, as well as testing functions for Sleep mode, transmission power (TxTest), and reception sensitivity (RxTest).

Note: Transmission power and reception sensitivity require instrument-based testing.

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:

With normal power supply, toggle the power switch to turn on the device. The LCD screen on the demo board will display the "Setting" interface. Briefly press the UP or DOWN key to move the cursor. When the cursor is on the parameter you wish to modify, press the SET key briefly to make the cursor flash. Then, use the UP or DOWN key to adjust the parameter. Press the SET key again to confirm the modification.

To enter the test function corresponding to the "Mode" parameter, long-press the SET key. Briefly press the SET key to return to the "Setting" interface.

3. Setting Interface Description





■Mode: Function ■POWER: Power ■Dev: Frequency Deviation

■FREQ: Frequency ■DR: Data Rate

4. Communication Test

Prepare two Mini3120 demo boards — set one to Master mode as the communication host, and the other to Slave mode as the communication client.(Make sure the communication parameters — FREQ, DR, and Dev — are set identically on both boards; otherwise, communication will fail.)

On the communication interface screen, the Tx_cnt and Rx_cnt values will continuously increase.

A red indicator light signifies a successful transmission, while a blue indicator light indicates a successful reception.

11. FAQ

a) Why module can not communicate properly?

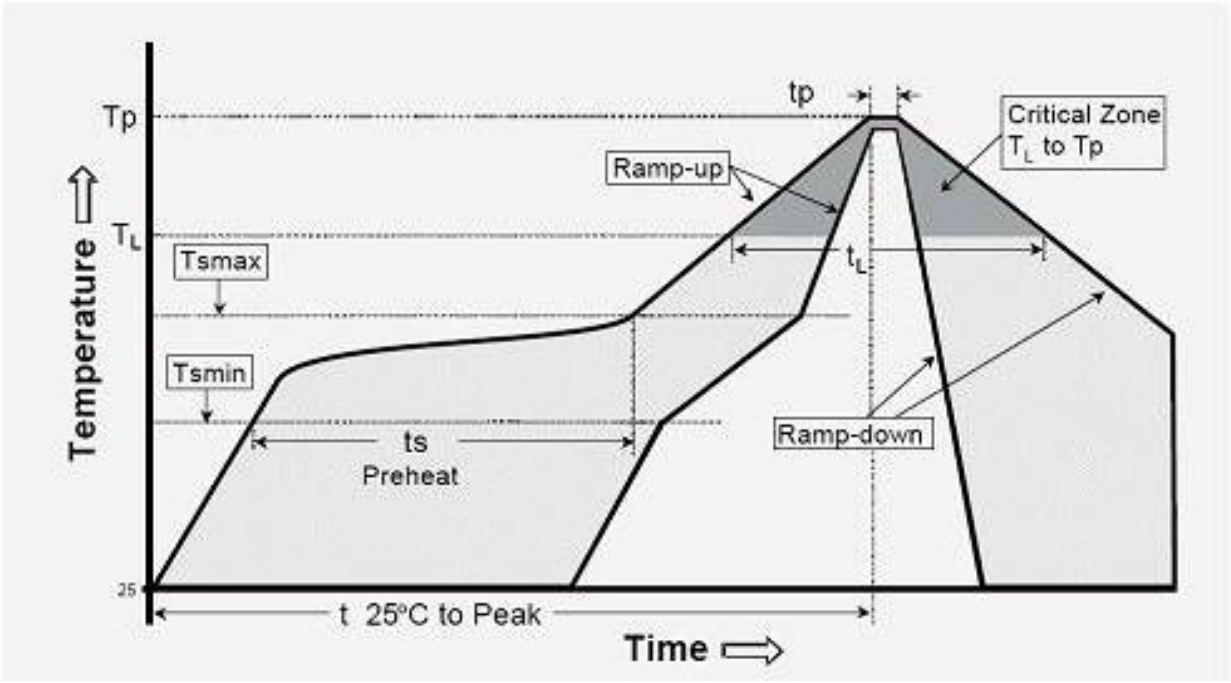
1) Check if there is power connection error;
2) Check if Module is in normal communication mode;
3) Check if frequency, channel, and mute are same;
4) Check if module is damaged;

b) Why transmission distance is not far as it should be?

1) Power supply ripple is too large;
2) The antenna types do not match, or not installed properly;
3) The same frequency interference;
4) The surrounding environment is harsh, strong interference sources.

Appendix : 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℃