

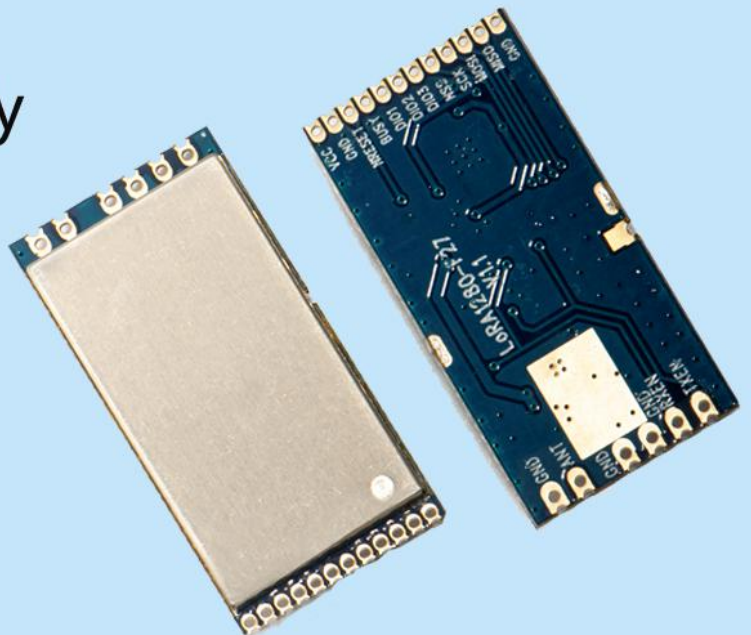
2.4G LoRa Transceiver Module

Product Specification

500mW, 2.4GHz

Range Measurement Wirelessly

LoRa Modulation



Catalogue

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Note: Revision History

Revision	Date	Comment
V1.0	2018-11	First release

1. Overview

LoRa1280/1281 is 2.4G wireless transceiver module. This module use SX1280/SX1281 from Semtech. And we add RF amplifier to get higher output power and longer range. It is LoRa modulation with maximum 500mW (27dBm) output power. This wireless module has good sensitivity and good ant-interference. Also Lora1280F27 can measure the range between the transmitter and receiver.

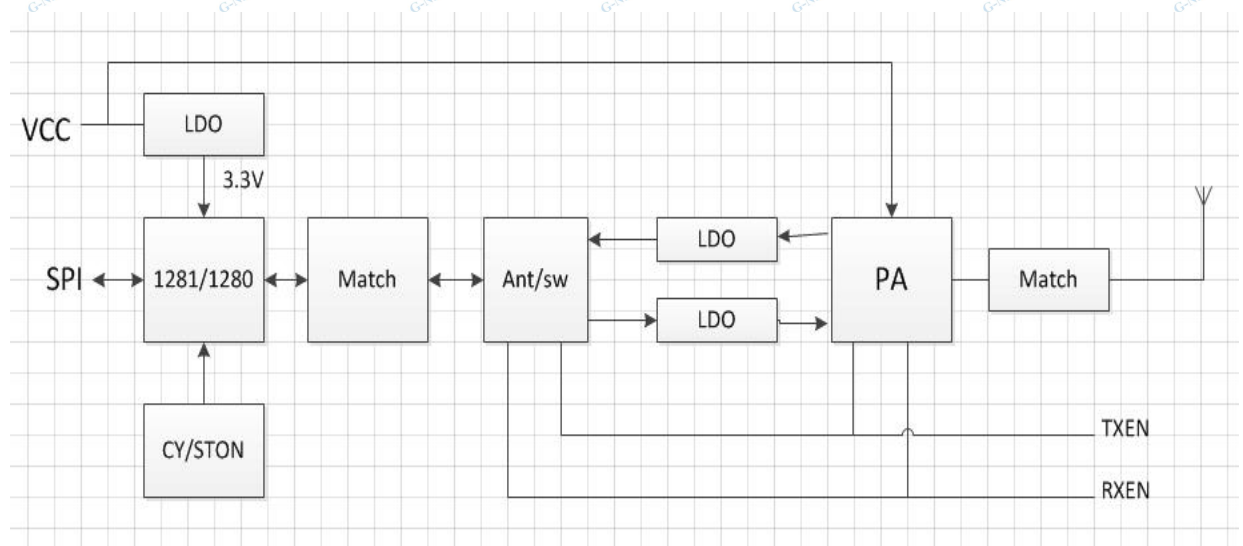
2. Features

- Operating frequency range: 2400-2500MHZ
- Maximum output power: 27.0dBm
- Sensitivity up to -132dBm@LoRa
- Data transfer rate: @LoRa=0.476-202kPbs
- LoRa modulation
- Packet communication mode (receiving FIFO 256 bytes)
- Operating voltage range: 2.0-5.5V
- Operating temperature range: -40~+85° C

3. Applications

- Wireless remote
- Smart home
- Toy control
- Tire pressure monitoring
- Health monitoring
- Tag reader

4. Internal block diagram



5. Performance parameter

- ★ The following parameters are obtained by connecting the instrument with a 50 ohm

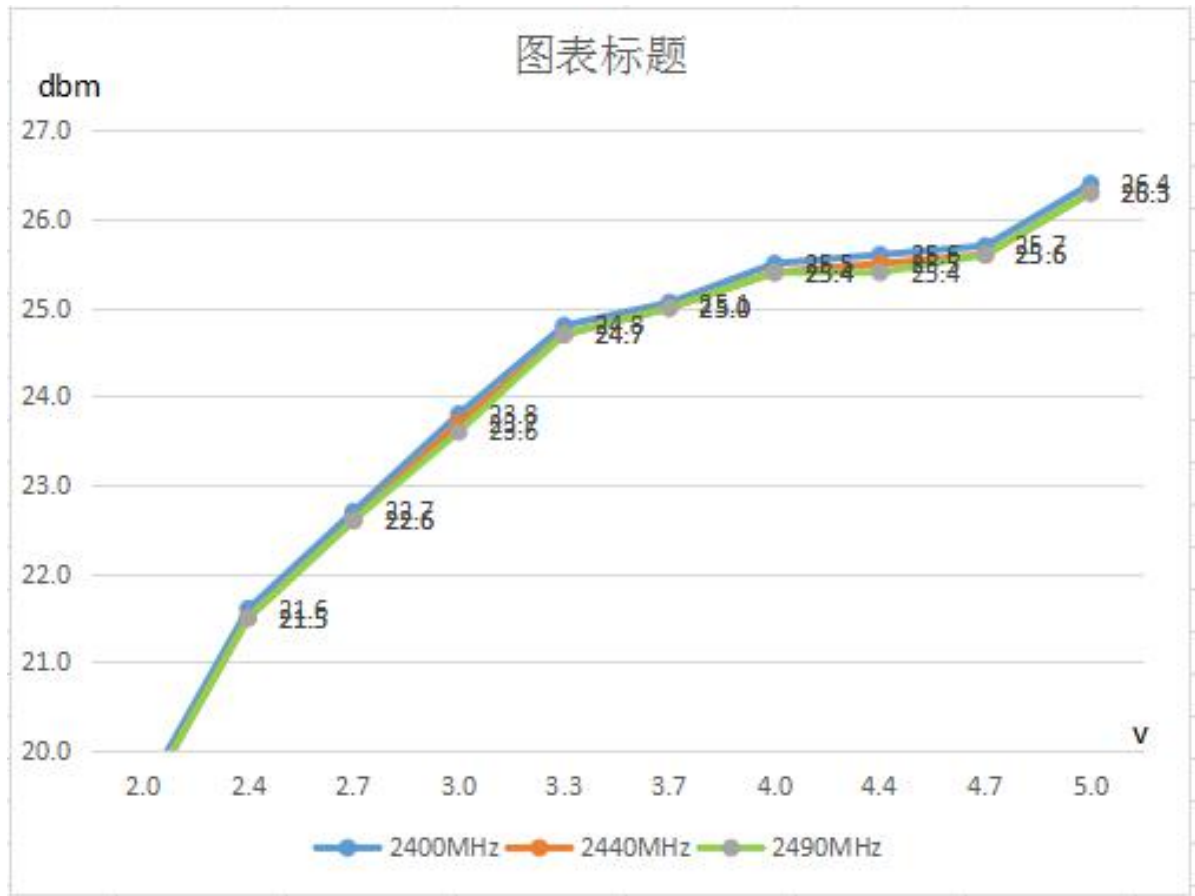
copper axis. @VCC=3.3V

Parameter	Min	Typ.	Max.	Unit	Condition
Operation condition					
Working voltage	2	5	5.5	V	
Temperature range	-40		85	°C	
Current consumption					
RX current		<17		mA	
TX current		<600		mA	@Vcc=5V, 27dBm
Sleep current		<6		uA	
RF parameter					
Frequency range	2400		2500	MHZ	
Modulation rate	0.476		202	kpbs	@LoRa
	260		1300	kpbs	@FLRC
	125		2000	Kbps	@FSK
Output power range	1		27	dBm	
Receiving sensitivity	26	26.5	27	dBm	@VCC=5V
Frequency range		-132		dBm	LoRa@0.476kPbs

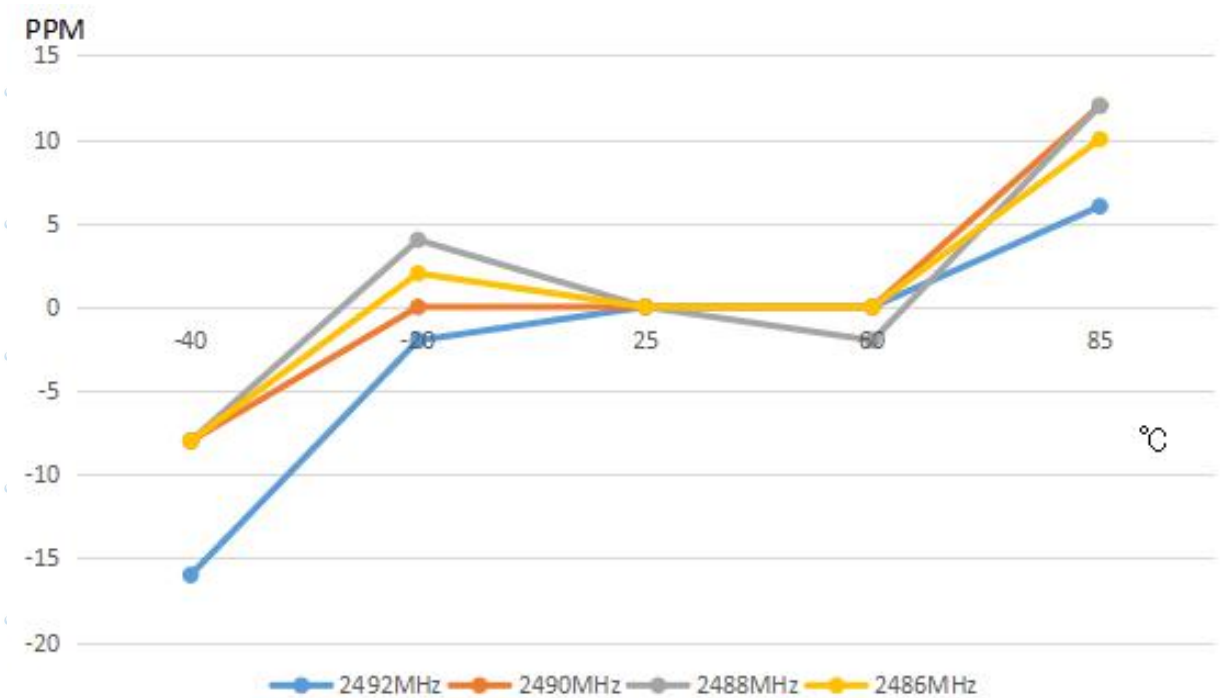
★ The following data is tested with DEMO board and tested at 2440MHZ working frequency.

Power level	Output Power (dBm)	Tx current (mA)	Register value
9	26.4	520	13
8	25.5	426	10
7	23.4	343	7
6	20.85	268	4
5	18.26	229	1
4	15.2	182	-2
3	12.3	155	-5
2	9.3	138	-8
1	6.0	130	-12
0	3.0	125	-15

➤ The output power under different frequencies and voltages are shown in the figure below:

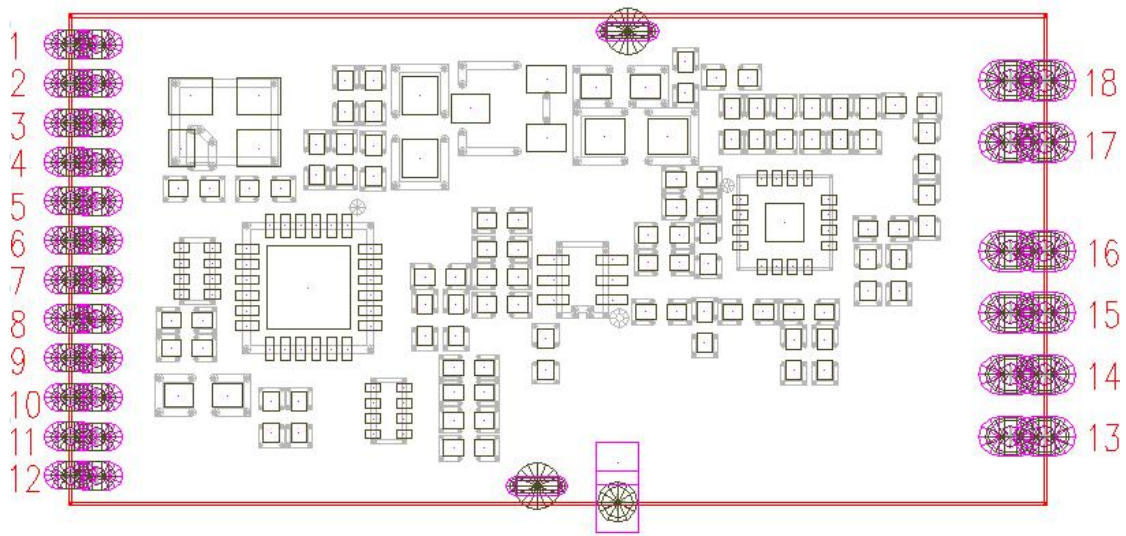


➤ The corresponding crystal frequency offset at different temperatures and frequencies are shown in the figure below:



Pin definition

6. Pin definition

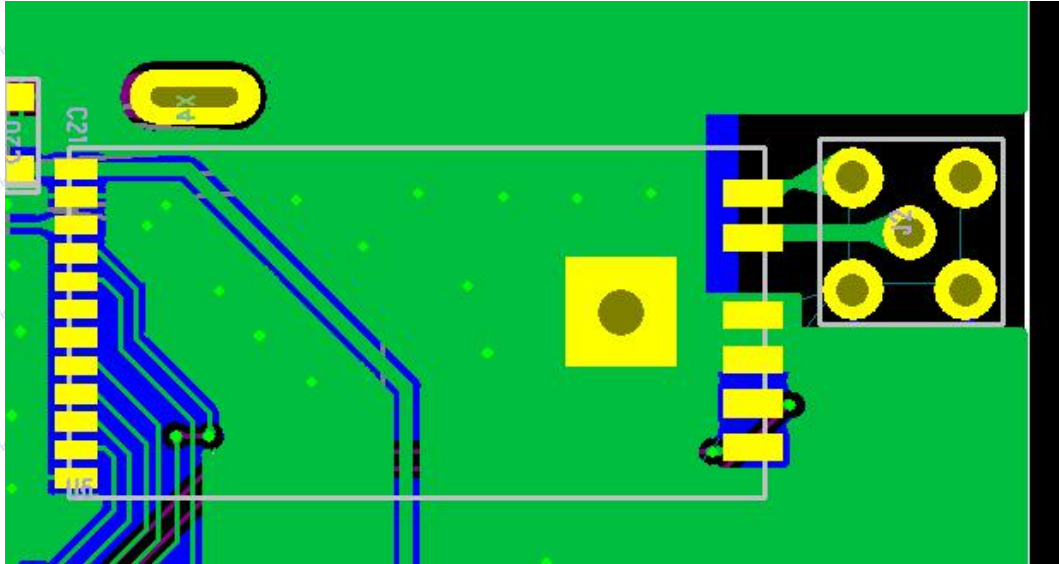


Note: All IO high level is 3.3V when powered by 5V

Pin NO.	Pin name	Description
1	VCC	Positive power supply
2	GND	Power ground
3	NRESET	Chip reset trigger pin, active low
4	BUSY	Status indicator foot (see SX1280/1281 specification for details)
5	DIO1	Directly connected to the chip pin, configurable general-purpose IO (see the chip SX1280/1281 specification for details)
6	DIO2	Directly connected to the chip pin, configurable general-purpose IO (see the chip SX1280/1281 specification for details)
7	DIO3	Directly connected to the chip pin, configurable general-purpose IO (see the chip SX1280/1281 specification for details)
8	NSS	Module chip select pin
9	SCK	SPI clock input pin
10	MOSI	SPI data input pin
11	MISO	SPI data output pin
12,15.16	GND	Connected to the negative pole
13	TXEN	Transmit control pin (high level when transmitting, low level when receiving)
14	RXEN	Receive control pin (high level when receiving, low level when transmitting)

17	ANT	50 ohm coaxial antenna
18	GND	Can be connected to an ANT negative or left floating

7. Antenna and LAYOUT considerations



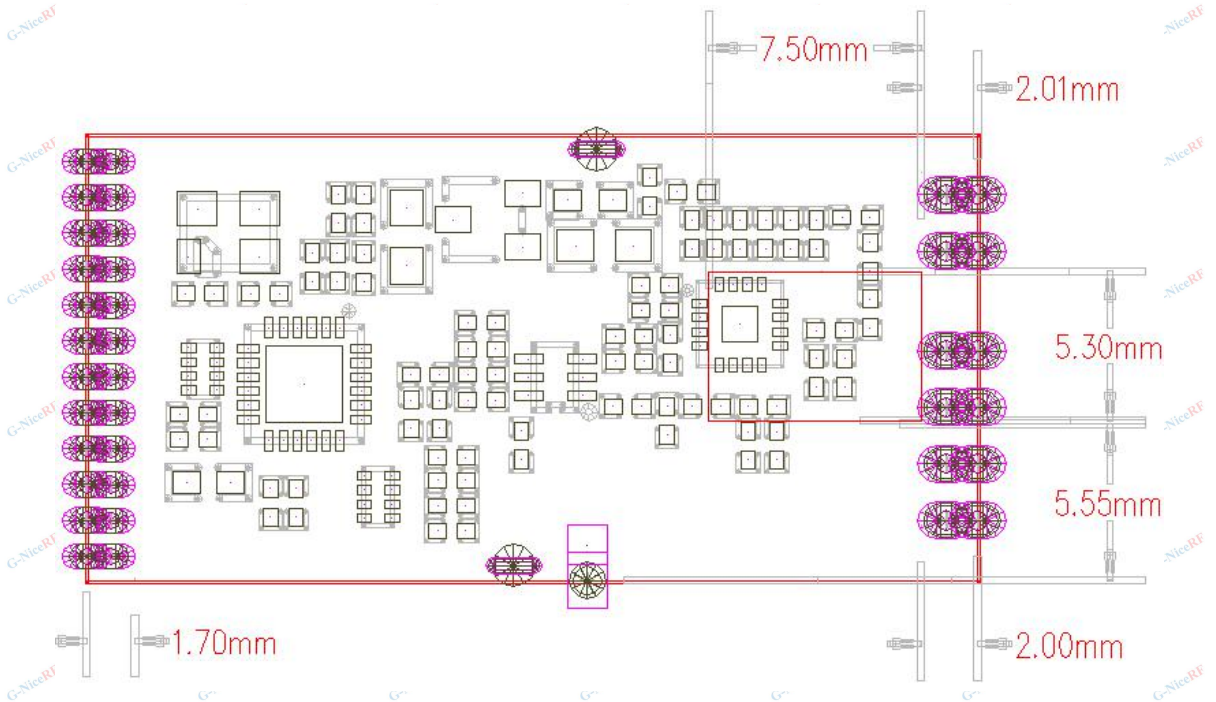
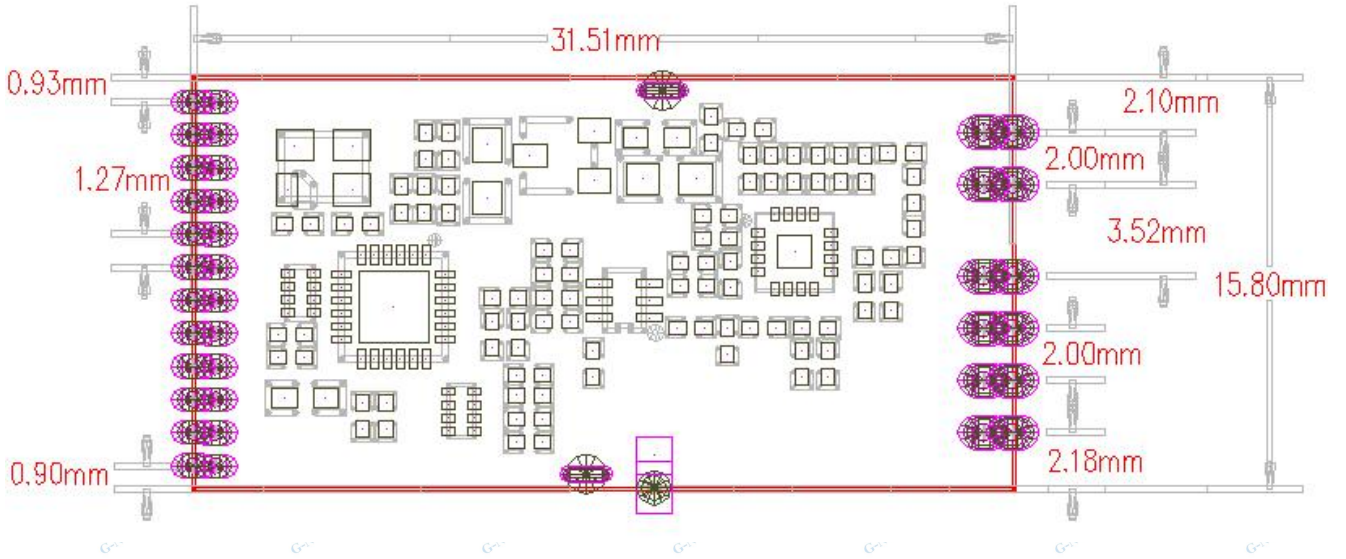
Note: The GND of the 18-pin should not be connected to the system ground as much as possible, which may affect the stability of the system and the receiving performance of the module. For external SMA, refer to the recommended circuit.

The antenna is an important part of the communication system. Its performance directly affects the parameters of the communication system. The antenna impedance required by the module is 50 ohms. The universal antenna has wires, and can also be used for SMA adapter straight/elbow/folding rods, small suction cups, etc. Users can purchase antennas according to their own application environment. In order to make the module work optimally, it is recommended to use the company. Antenna provided.

★ The following principles should be followed during antenna use to ensure the best communication distance of the module:

- The antenna should not be close to the ground surface, and the surrounding area should be kept away from obstacles;
- If the suction cup antenna is purchased, the lead wire should be straightened as much as possible, and the suction cup base should be attached to the metal object;

8. Mechanical Dimensions (Unit:mm)

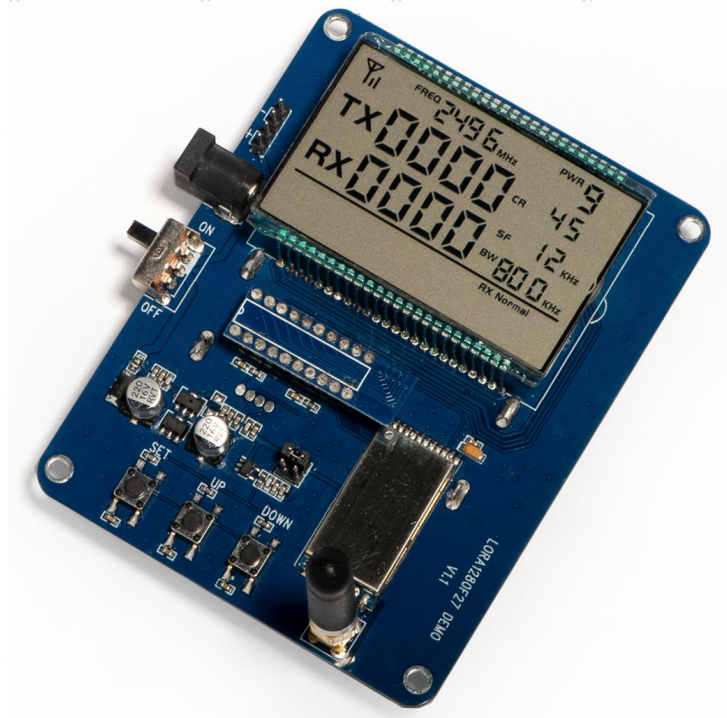


Highest: 3.2mm

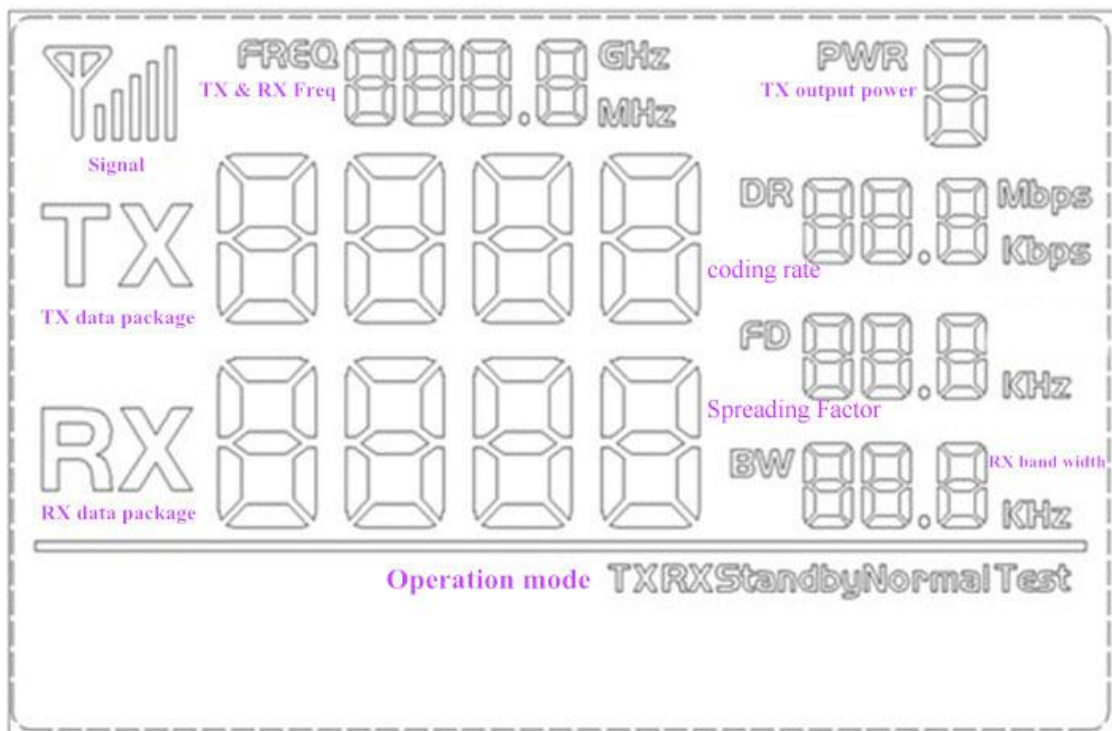
Appendix 1: Demo Board

The module is equipped with a standard DEMO board for customer's to debug the program and test distance.

It shows as below:



The LCD Full Segment is as below:



Users can set the parameters of the RF module such as working mode /frequency / transmitter power / transmission data rate through the buttons, and measure the wireless communication distance.

➤ **Working Mode:**

- 1) Normal transmission mode: Send data packets at regular intervals (in the setup mode, no data packets are sent temporarily);
- 2) Normal receiving mode: power-on enters the receiving state, receives the data packet, and re-issues the correctly received data packet;
- 3) Normal transmission mode: the module is in the normal state;
- 4) Constant acceptance mode: the module is in the normal receiving state (no data is forwarded);
- 5) Sleep mode: The RF module is in the standby state.

➤ **Button Operation:**

1) [SET] Button

Press the [SET] button to enter into setting mode; Or press the [SET] button to be out of the setting mode upon the last parameter is done.

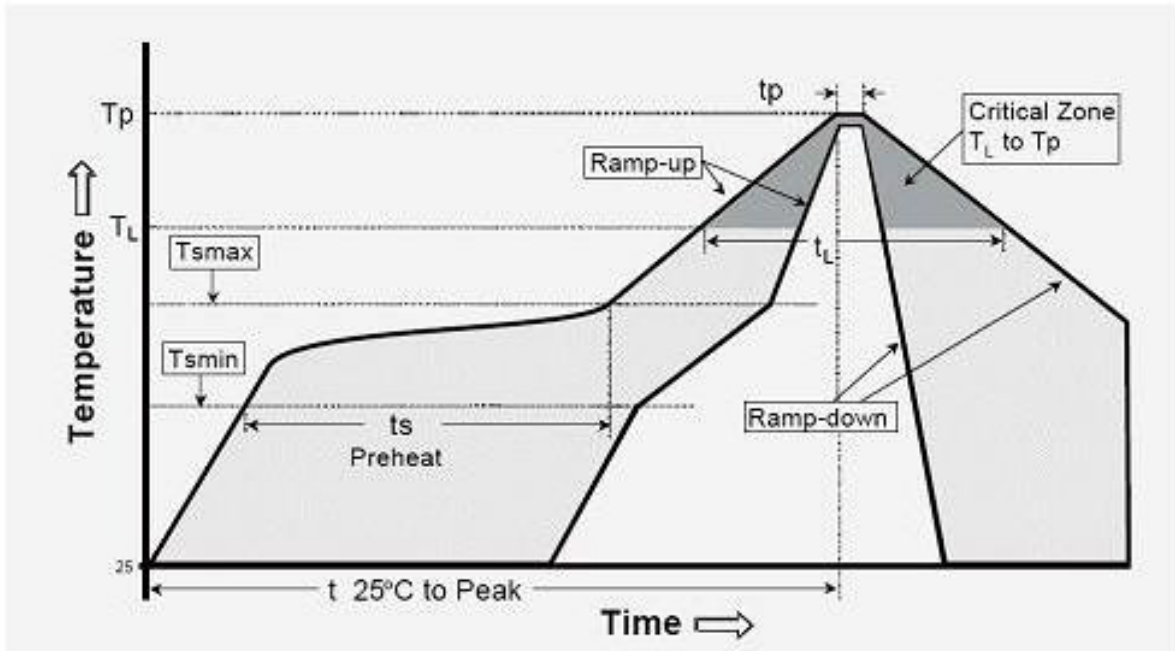
2) [UP/Down] Button

In the setting mode, press the button to modify the corresponding setting parameters.

Note: The DEMO board has FLASH memory inside, all the setting parameters will be saved automatically and keep unchanged even power-off.

Appendix 2: SMD Reflow Chart

We recommend you should obey the IPC related standards in setting the reflow profile:



IPC/JEDEC J-STD-020B the condition for lead-free reflow soldering	big size components (thickness $\geq 2.5\text{mm}$)
The ramp-up rate (T_L to T_p)	3°C/s (max.)
preheat temperature	
- Temperature minimum (T_{smin})	150°C
- Temperature maximum (T_{smax})	200°C
- preheat time (t_s)	60~180s
Average ramp-up rate (T_{smax} to T_p)	3°C/s (Max.)
- Liquidous temperature (T_L)	217°C
- Time at liquidous (t_L)	60~150 second
peak temperature (T_p)	245+/-5°C