

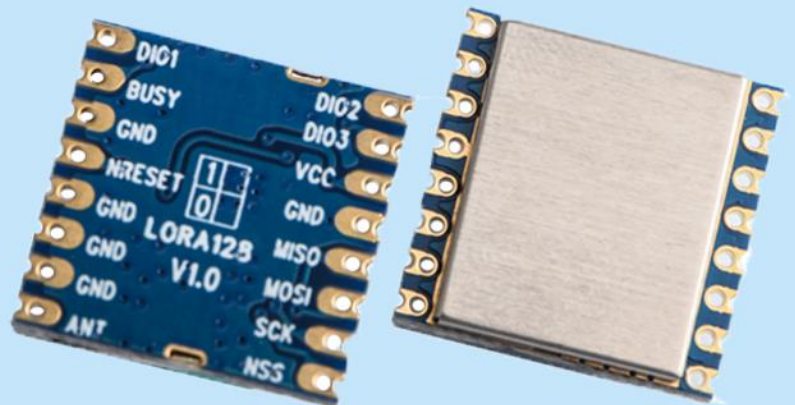
2. 4G LoRa Transceiver Module

Product Specification

20mW, 2.4GHz

Range Measurement Wirelessly

LoRa Modulation



Catalogue

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Note: Revision History

Revision	Date	Comment
V1.0	2018-11	First release
V1.1	2018-12-15	Update PIN definition

1. Overview

LoRa1280/1281 is 2.4G wireless transceiver module. This module use SX1280/SX1281 from Semtech. It is LoRa modulation with maximum 12.5dBm output power. This wireless module has good sensitivity and good ant-interference. Also Lora1280 can measure the range between the transmitter and receiver.

2. Features

- Operating frequency range: 2400-2500MHZ
- Packet communication mode (receiving FIFO 256 bytes)
- LoRa modulation
- Data transfer rate: @LoRa=0.476-202 Kbps
- Operating voltage range: 1.8-3.7 V
- Maximum output power: 12.5dBm
- Operating temperature range: -40~+85° C
- Sensitivity up to -132dBm@LoRa

3. Applications

- Wireless remote
- Toy control
- Smart home
- Health monitoring

4. Electrical Characteristics

★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	1.8	3.3	3.7	V	
Temperature range	-40		85	°C	
Current consumption					
RX current		<10		mA	
TX current		<60		mA	@Vcc=3.3V,12.5dBm
Sleep current		<1		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	-18		12.5	dBm	@VCC=3.3V
Receiving sensitivity		-132		dBm	LoRa@0.476Kbps

5. Performance

Note: The power level in the following description is the display value of our DEMO board, and the module can also set other more levels through the register.

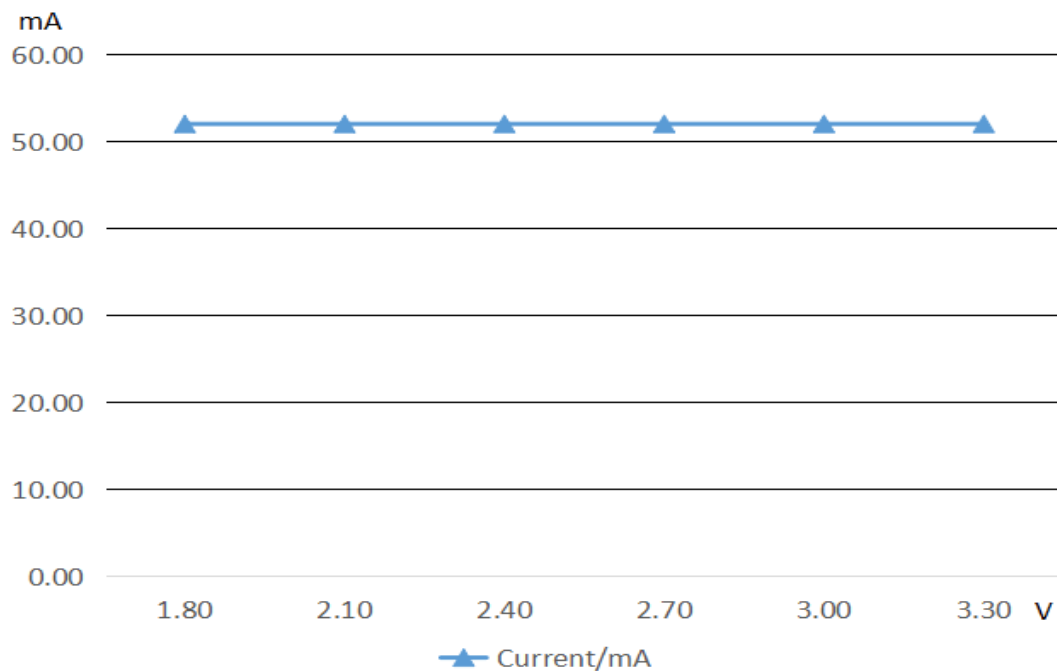
- The output power parameter indicators corresponding to the module under different power levels are shown in the following table:

Test conditions: @ANT connected to 50 ohm load Frequency: 2480MHZ VCC=3.3V

Register value	Power level	Output power (dBm)	Tx Current (mA)
13	9	12.2	51
10	8	9.6	42
7	7	6.9	33
4	6	4	28.3
1	5	0.9	23.7
-3	4	-2.3	20.2
-6	3	-5.7	17.7
-9	2	-8.9	16
-12	1	-12.6	14.7
-15	0	-15.5	14.1

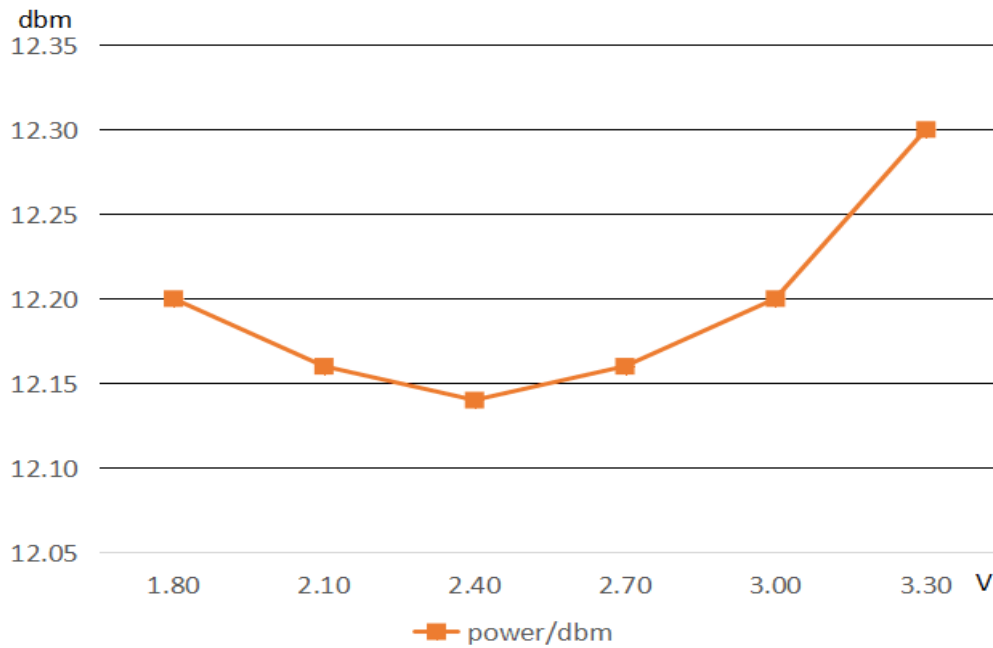
- Voltage VS TX current

Test conditions: @ANT connected to 50 ohm , Frequency: 2480MHZ Power level = 9

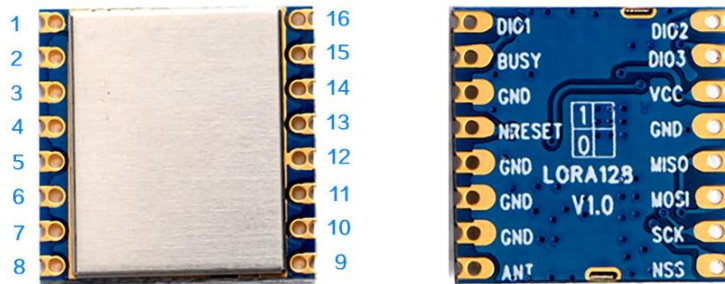


➤ Voltage VS TX power

Test conditions: @ANT connected to 50 ohm, Frequency: 2480MHZ Power level = 9



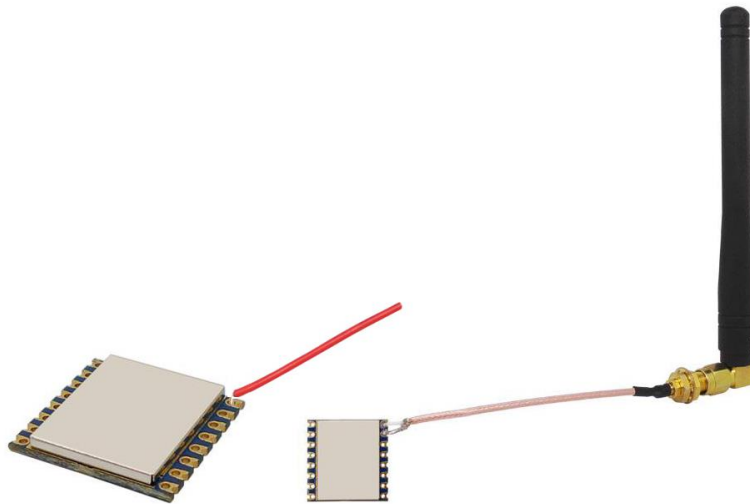
6. Pin definition



Pin NO.	Pin name	Description
1	DIO2	Directly connected to the chip pin, configurable general-purpose IO (see the chip SX1280/1281 specification for details)
2	DIO3	Directly connected to the chip pin, configurable general-purpose IO (see the chip SX1280/1281 specification for details)
3	VCC	Connected to the positive pole of the power supply (1.8-3.7V)
5	MISO	SPI data output pin
6	MOSI	SPI data input pin
7	SCK	SPI clock input pin
8	NSS	Module chip select pin
9	ANT	Connect with 50 ohm coaxial antenna
4,10,11,12,14	GND	Connected to the negative pole
13	NRESET	Chip reset trigger pin, active low
15	BUSY	Status indicator foot (see SX1280/1281 specification for details)
16	DIO1	Directly connected to the chip pin, configurable general-purpose IO (see the chip SX1280/1281 specification for details)

7. Communication Antenna

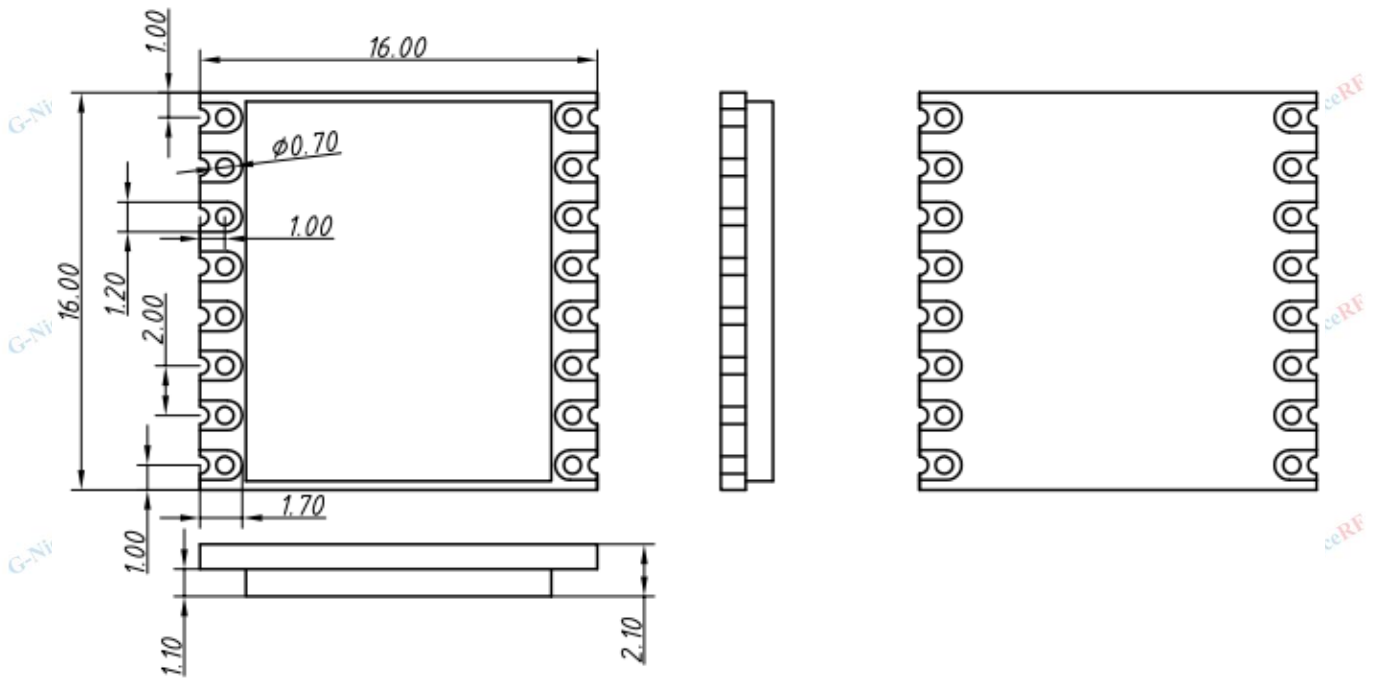
The antenna is an important part of the communication system. Its performance directly affects the parameters of the communication system. The antenna impedance required by the module is 50 ohms. The universal antenna has wires and spring antenna, and can also be used for SMA adapter straight/elbow/folding 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 antenna from our company.



★ 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 suck antenna is purchased, the lead wire should be straightened as much as possible, and the base should be attached to the metal object;

8. Mechanical Dimensions (Unit:mm)



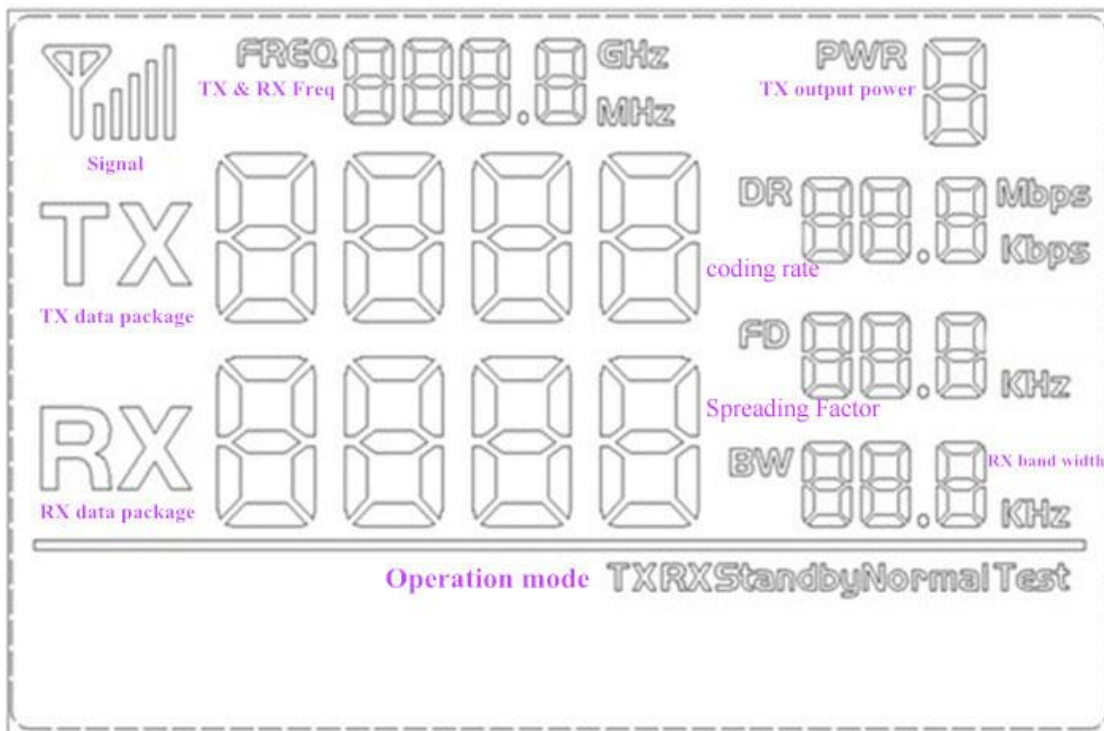
Appendix 1: Demo Board

The module is equipped with a standard DEMO board for customer 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.

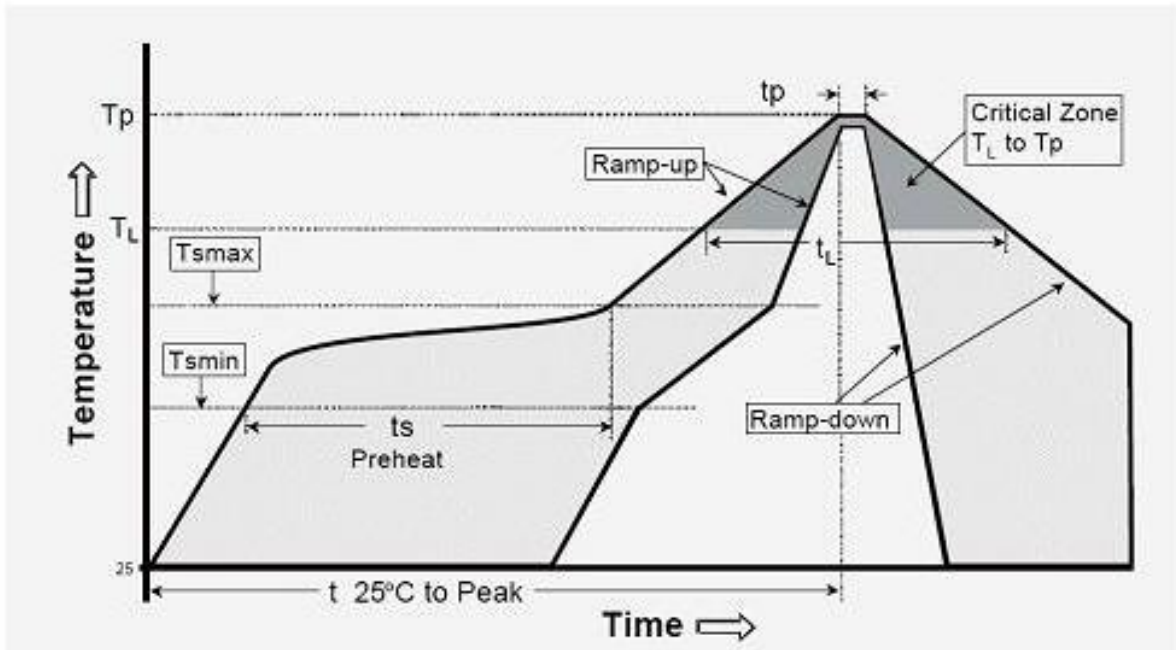
- 2) [UP/Down] Button

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