

**22dBm | ultra-low power consumption  
LoRa transceiver module**

## **Product Specification**



# Catalogue

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## Note: Revision History

Revision	Date	Comment
V1.0	2019-7	First release

## 1. Overview

The LoRa1268 wireless module uses Semtech's SX1268 device, ultra-low receive current and sleep current, and sensitivity of -148dBm. Built-in 64KHz crystal oscillator can wake up the microcontroller periodically under low power consumption. The module antenna switch is integrated and controlled by the chip, which saves the resources of the external MCU. The compact size and 22dBm (160mW) output power have great advantages in IoT and battery-powered applications.

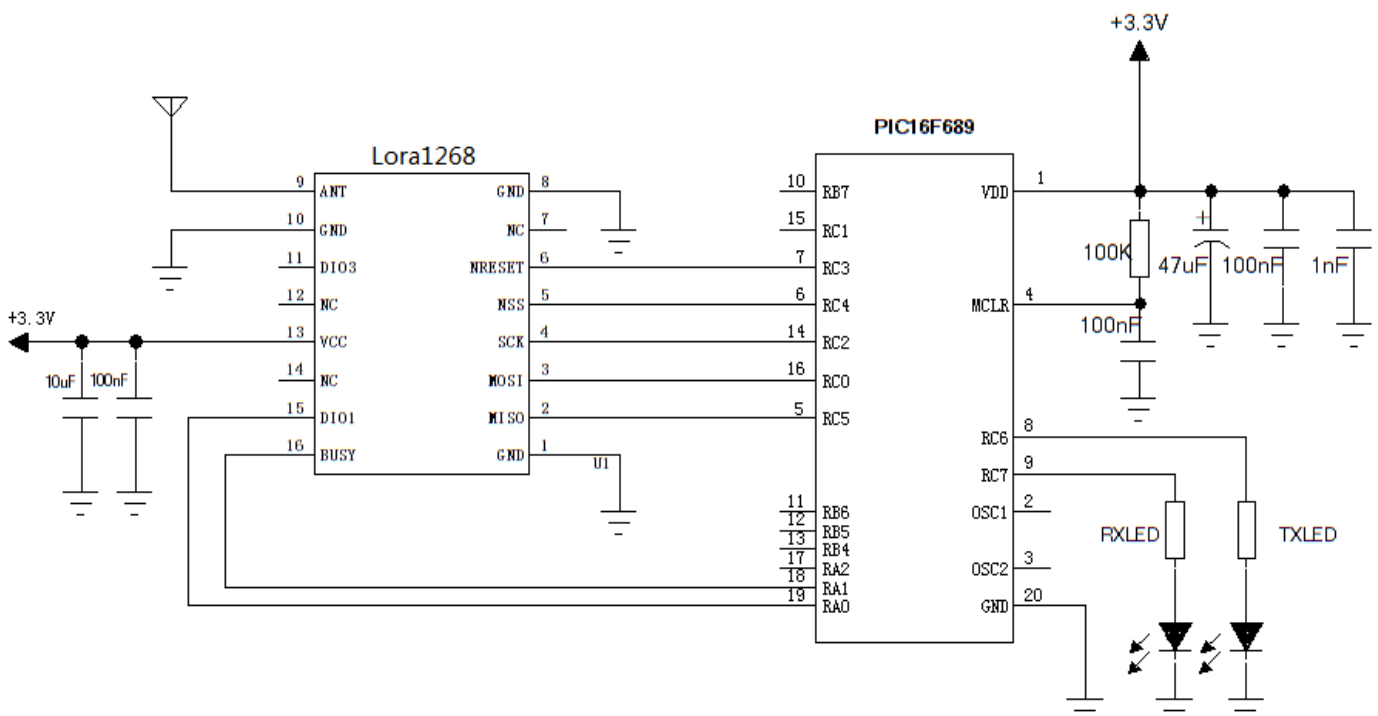
## 2. Features

- Frequency Range: 433/490 MHz
- Sensitivity up to -148dBm @Lora
- Maximum output power: 22dBm (160mw)
- Lora TM、(G)FSK
- Data transfer rate: 0.018-62.5 Kbps
- Packet engine up to 256 bytes with FIFO and CRC

## 3. Applications

- Smart meters
- Supply chain and logistics
- Building automation
- Agricultural sensor
- Smart cities
- Retail store sensors
- Asset tracking
- Street lights
- Parking sensors
- Environmental sensors
- Healthcare
- Safety and security sensors
- Remote control applications

## 4. Typical application circuit

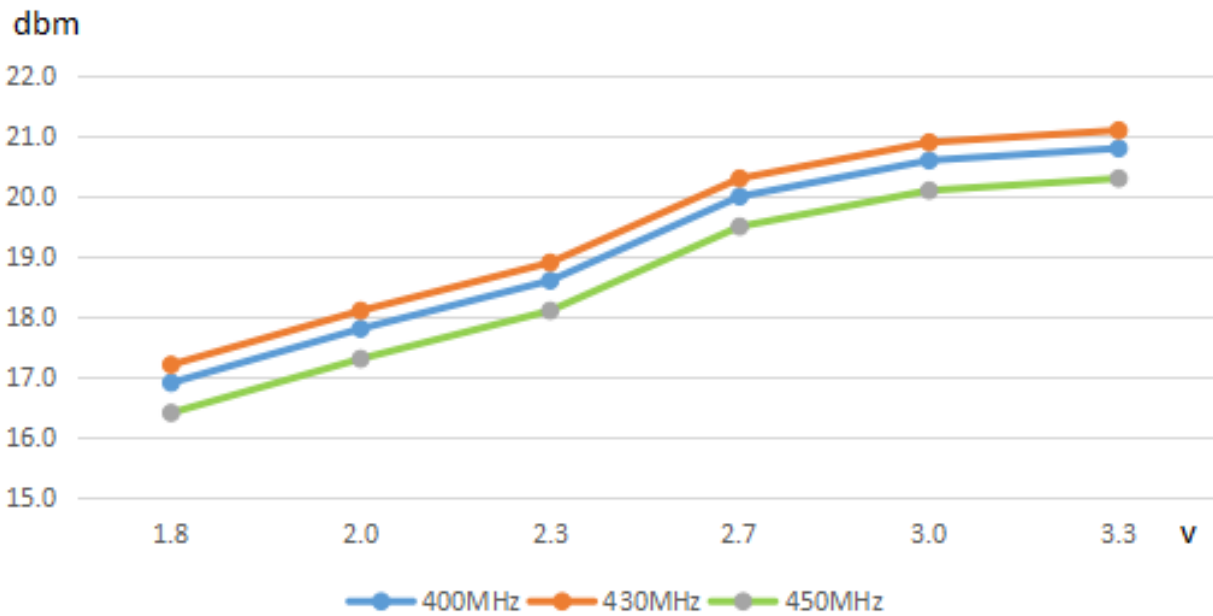


## 5. Performance parameters (@Vcc=3.3v ANT connected to 50 ohm load)

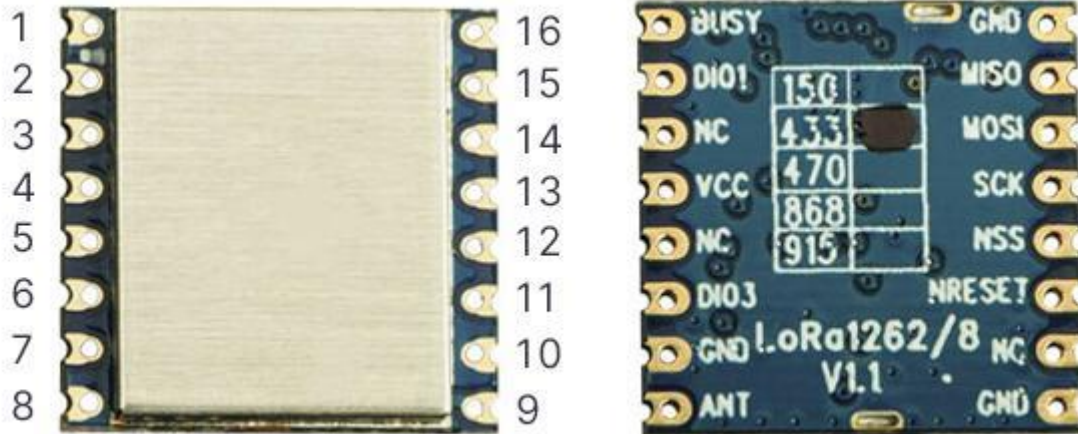
Parameter	Min	Typ.	Max.	Unit	Condition
Operation condition					
Operating voltage range	1.8	3.3	3.7	V	
range of working temperature	-40		85	°C	
Current consumption					
RX current		< 5		mA	10ppm crystal
TX current		< 110		mA	
Sleep current		1.9		uA	OFF mode (SLEEP mode with cold start) All blocks off
		2.3		uA	SLEEP mode (SLEEP mode with warm start) Configuration retained
		2.9		uA	SLEEP mode (SLEEP mode with warm start) Configuration retained + RC64k
		0.56		mA	STDBY_RC mode RC13M, XOSC OFF
		2.35		mA	STDBY_XOSC mode XOSC ON
RF parameter					
Frequency range	400	433	450	MHZ	@433MHZ
	470	490	510	MHZ	@490MHZ
Transmit power range	-15	22		dBm	
Receiving sensitivity		-133		dBm	@Lora BW=125KHz_SF = 10_CR=4/5

6. Module performance index

Frequency band	Power level	Current (mA)	Power (dBm)	Register value
433MHz	9	98	21.2	22
	8	80	17.8	19
	7	64	14.2	16
	6	54	11.5	13
	5	44	8.7	10
	4	37	6.0	7
	3	32	3.0	4
	2	26	0	1
	1	22	-2.5	-2
	0	20	-5	-5



## 7. Pin definition



Pin	Name	Description
1	GND	Power ground
2	MISO	SPI data output
3	MOSI	SPI data input
4	SCK	SPI clock input
5	NSS	SPI chip select input
6	NRESET	Reset trigger input
7、12、14	NC	Empty foot
8	GND	Power ground
9	ANT	50 ohm coaxial antenna
10	GND	Power ground
11	DIO3	Digital I/O, customizable
13	VCC	Power input (default 3.3V)
15	DIO1	Digital I/O, customizable
16	BUSY	Used for status indication, depending on the chip data.

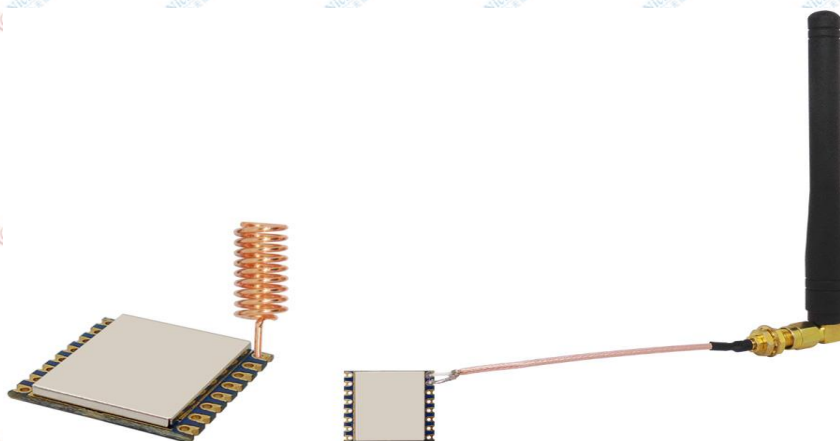
## 8. Pin comparison table

The LoRa1268 module are pin compatible with LoRa1278/1276-C1. Below is the difference between this 2 modules:

Module	LoRa1278/1276-C1	LoRa1268
1	GND	GND
2	MISO	MISO
3	MOSI	MOSI
4	SCK	SCK
5	NSS	NSS
6	NRESET	NRESET
7	DIO5	NC
8	GND	GND
9	ANT	ANT
10	GND	GND
11	DIO3	NC
12	DIO4	NC
13	VCC	VCC
14	DIO0	NC
15	DIO1	DIO1
16	DIO2	BUSY

## 9. Communication antenna

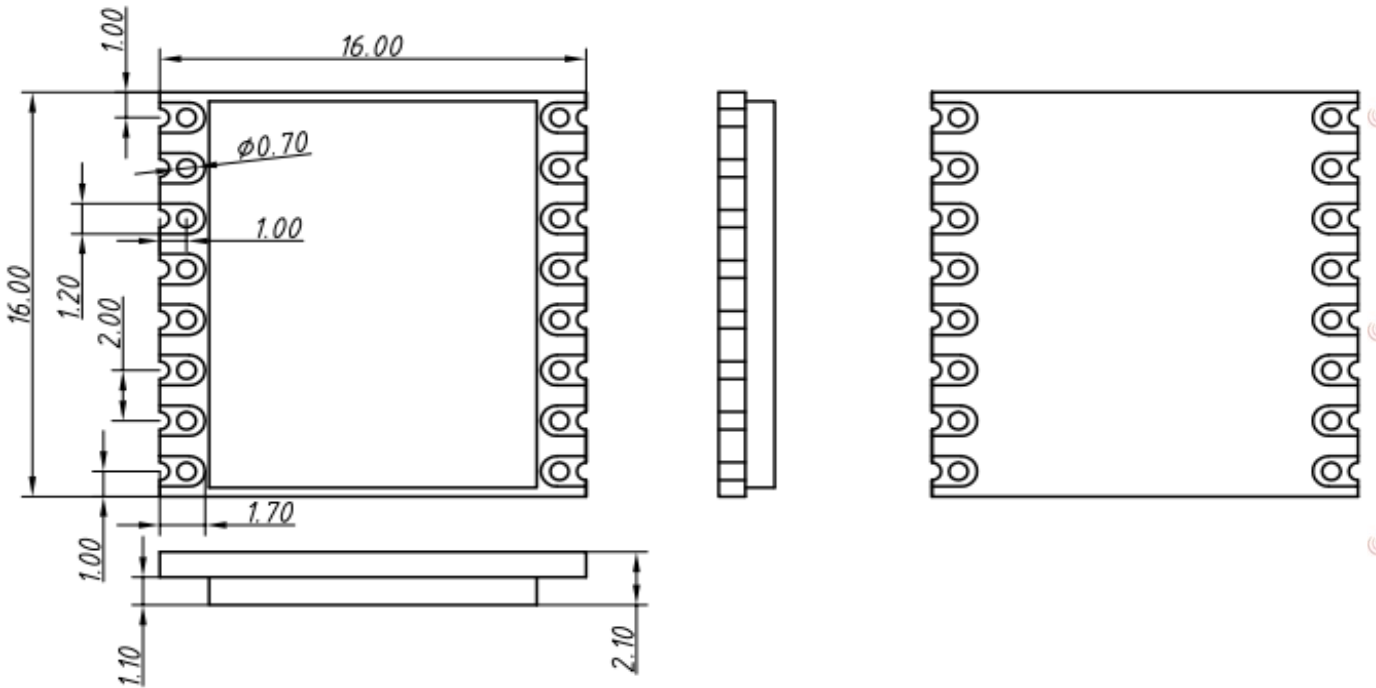
The antenna is an important part of the communication system. Its performance directly affects the parameters of the communication system. The antenna impedance required by the module is 50 ohms. The universal antenna has a spring antenna, and can also be used to connect the straight head/elbow/folding rod shape, small suction cup, etc. through SMA. Users can purchase the antenna according to their own application environment. In order to make the module work in the best working condition, it is recommended to use this. The antenna provided by the company



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

- Try not to be close to the ground surface of the antenna, and it is best to stay 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.

**10. Mechanical Dimensions(Unit: mm)**



**11. Order information**

LoRa1268-433

Product name

Frequency

For example: If the customer needs 433MHz Frequency, the order no. shall be LoRa1268-433.

At present, LoRa1268 products have the following models:

Order model	product type
LoRa1268-433	Sx1268 chip, module working center frequency band is 433MHZ
LoRa1268-490	Sx1268 chip, module working center frequency band is 868MHZ

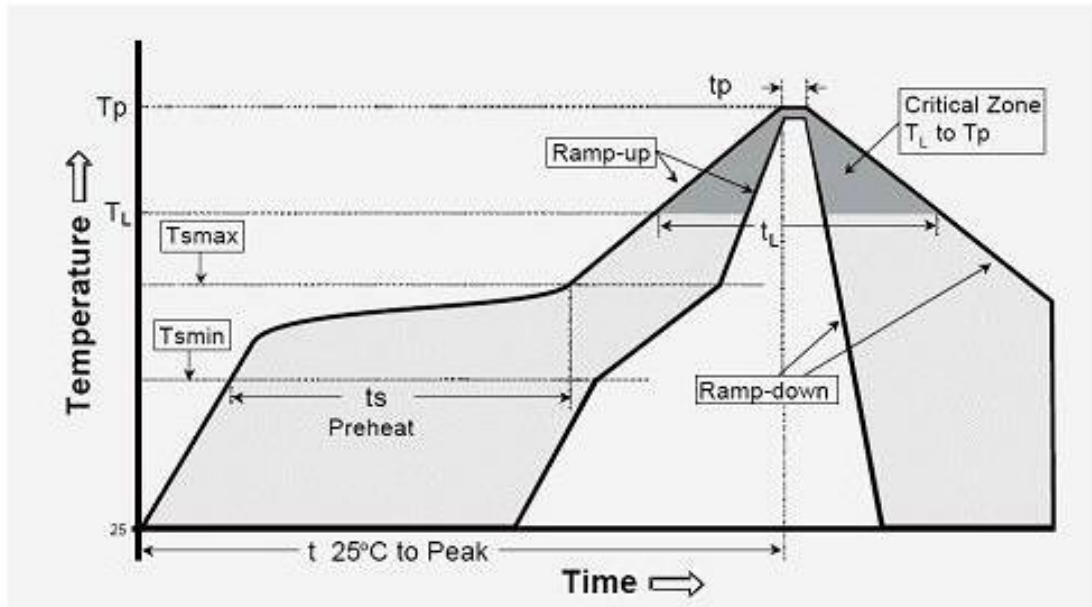


## 12. FAQ:

- a) Why module can not communicate properly?
  - 1) The power supply is connected incorrectly and the module is not working properly;
  - 2) Check whether the frequency band of each module and other RF parameters are consistent;
  - 3) Is the module 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 properly installed;
  - 3) The surrounding environment is harsh, strong interference sources;
  - 4) Surrounding co-channel interference;

Appendix 1: 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