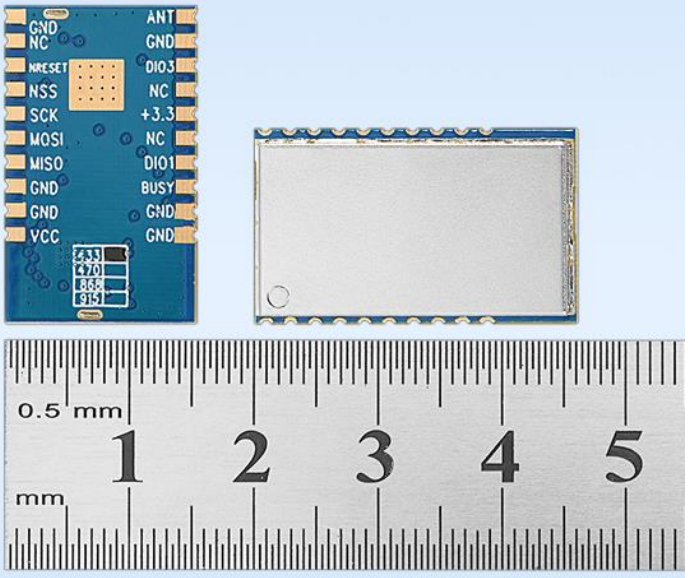
Product Specification

1W/30DBM
ULTRA SMALL SIZE

INCREASED BY 4DBM ON THE BASIS OF HIGH SENSITIVITY LORA



Catalogue

Note: Revision History

Revision	Date	Comment
V1.0	2020.9	First release

1、Overview

LoRa1268F30-Mini is a small size, low current, high power wireless transceiver module. It integrates Semtech's SX1268 chip and an external LNA. It has increased 4dB on the basis of high sensitivity LoRa, its communication distance and receiving sensitivity All far exceed other FSK and GFSK solutions. At the same time, customers can also choose to add a band-pass filter to further improve the anti-interference ability.

Another feature of LoRa1268F30-Mini is low voltage. The wireless module is designed with an output power of 30dBm@4V, the receiving current is less than 11mA, and the sensitivity is as high as -148dBm. It is especially suitable for battery-powered scenarios. The ultra-long distance is also very suitable for remote industrial control applications.

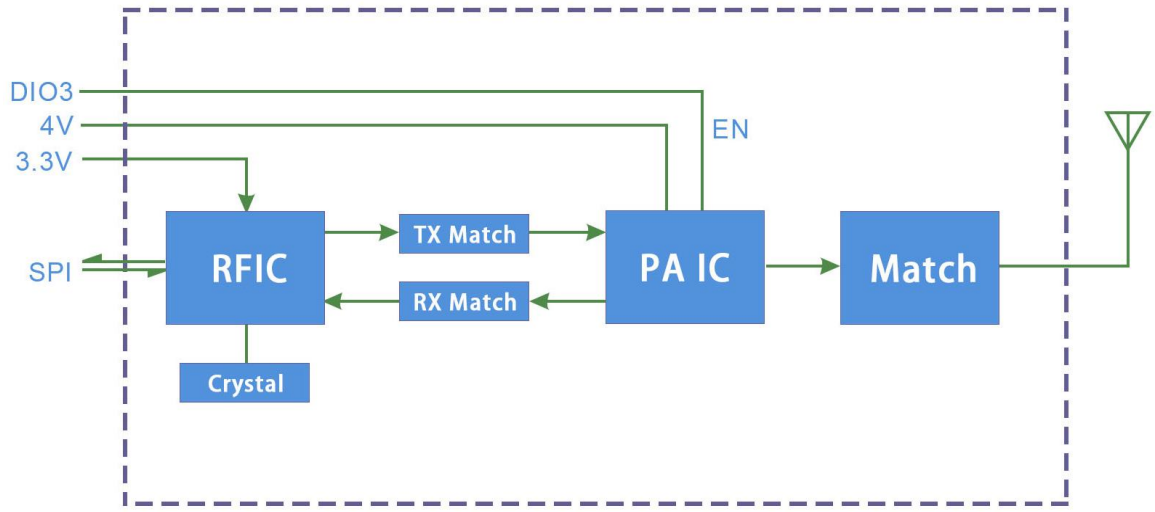
2、Features

- Size：Small
- Frequency Range：410-450 MHz
- Receive current < 11 mA
- Sensitivity up to -148dBm @LoRa
- 256 bytes FIFO
- Modulation mode：LoRa ®、(G)FSK
- Data transfer rate：@FSK,0.6-300 Kbps @LoRa ®, 0.018-62.5 Kbps
- Maximum output power：30dBm@4V

3、Applications

- Industrial meter reading
- Smart City
- Environmental sensor
- Parking lot sensor management
- Warehouse management
- Health products
- automated industry
- Street lamp
- security product
- Agricultural sensor
- Logistics management
- Remote control

4、Internal block diagram



5、Module performance indicator parameters

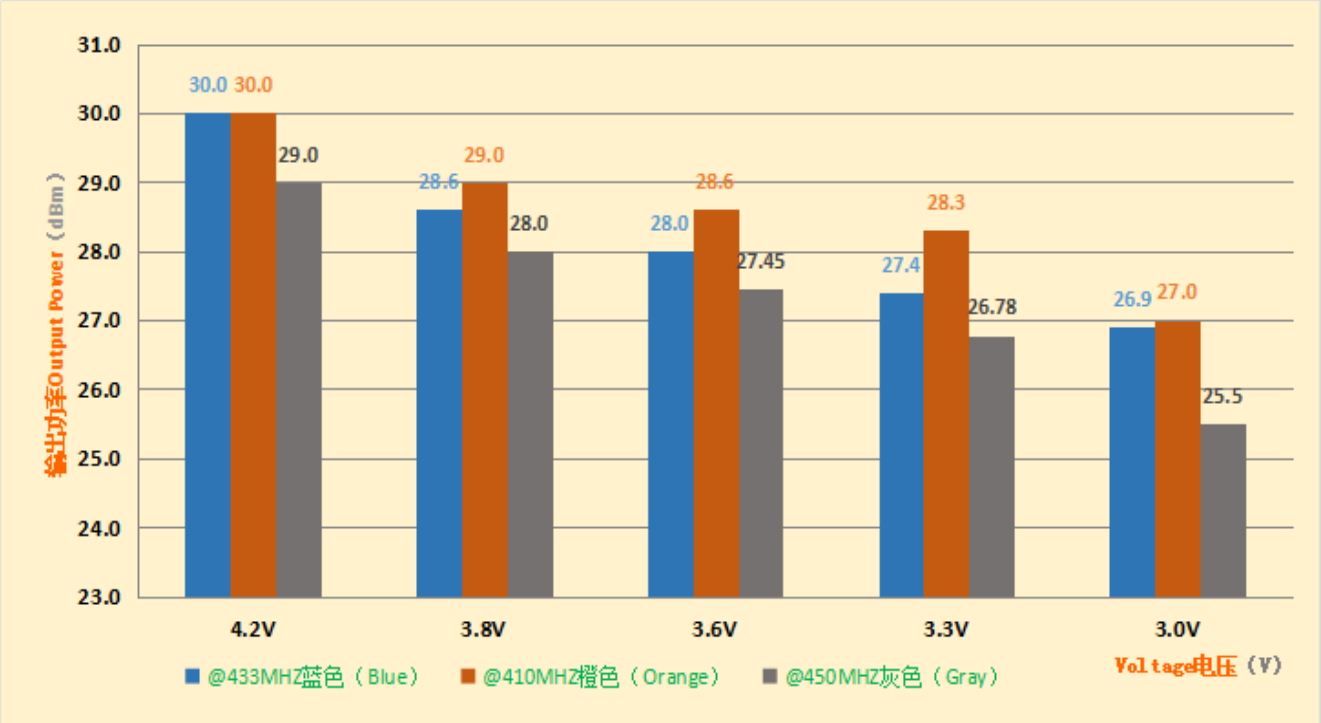
Parameter	Minimum	Typical	Largest	Unit	Condition
Operating conditions					
Operating voltage range	3	4	4.2	V	@VCC voltage
	1.8	3.3	3.5		@+3.3V
range of working temperature	-40	25	85	℃	
Current consumption					
Receiving current		<11		mA	@4V
TX Current		<1000		mA	@4V 30dBm
sleep current		<2		uA	
Radio frequency parameter					
Frequency Range	410	433	450	MHz	Receive without filter
	428	433	439	MHz	Add filter to improve anti-interference ability
Modulation rate	1.2		300	Kbps	@FSK
	0.018		62.5	Kbps	@LoRa®
Transmit power range	6	31.5	30	dBm	@4V
Receiving sensitivity		-122		dBm	@FSK data=1.2 Kbps Fdev=50 KHz
		-136		dBm	@Lora BW=125 KHz SF = 10 CR=4/5

- **The transmit power of the module can be configured through software, and the corresponding values are shown in the table below：**

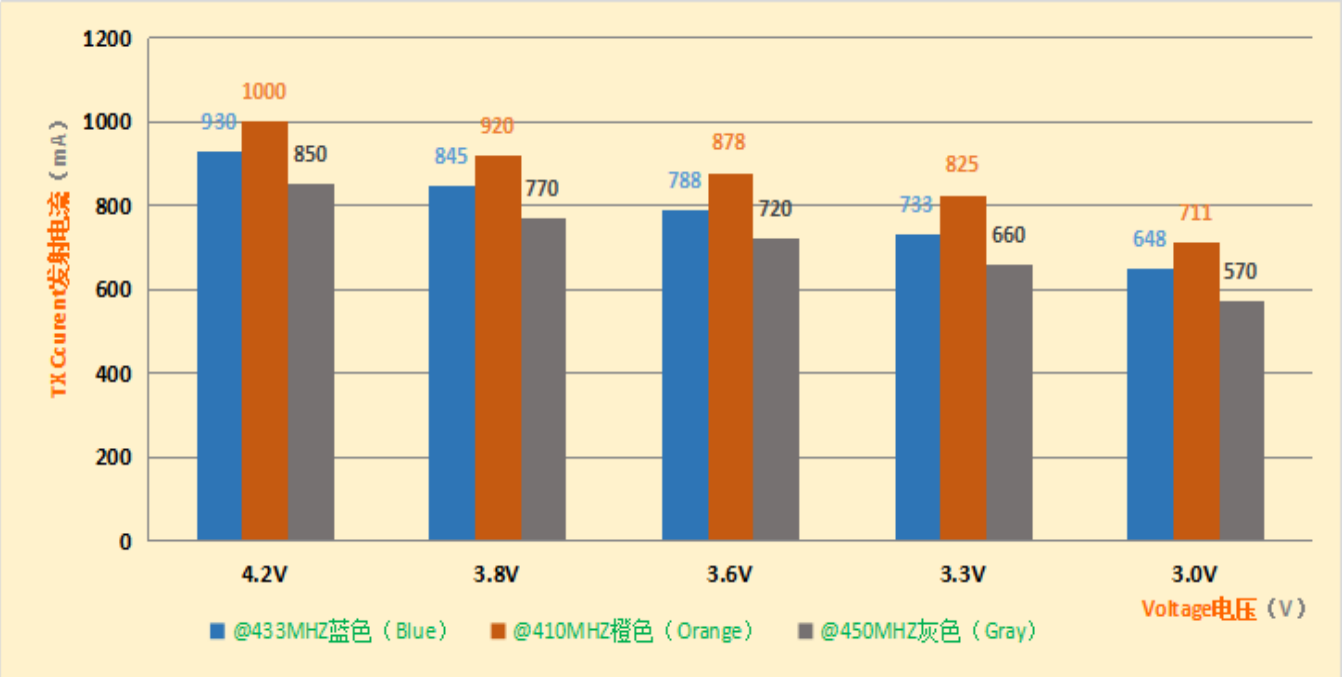
DEMO board power level		0	1	2	3	4	5	6	7	8	9
Register value（Power）		-5	-2	1	4	7	10	13	16	19	22
@433MHZ @4V	Power(dBm)	5.8	13.2	19	24	26.7	28.4	29.5	29.7	29.8	30.2
	Current(mA)	81	150	270	450	620	770	920	1000	1040	1080

Note: It is recommended that the maximum power of the customer is set to 6.

- **@433MHz frequency band module under different working voltage, the output power of the module is shown in the figure below (register value 13):**



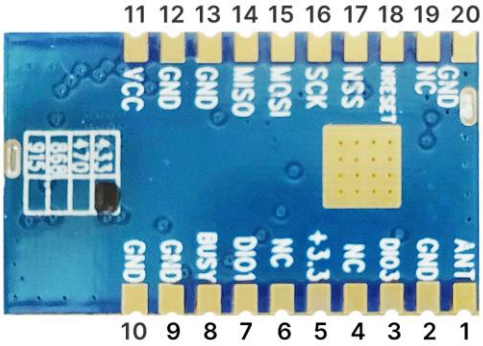
- **@433MHz frequency band module under different working voltage, the emission current value of the module is shown in the figure below (register value 13):**



6、Rate comparison table

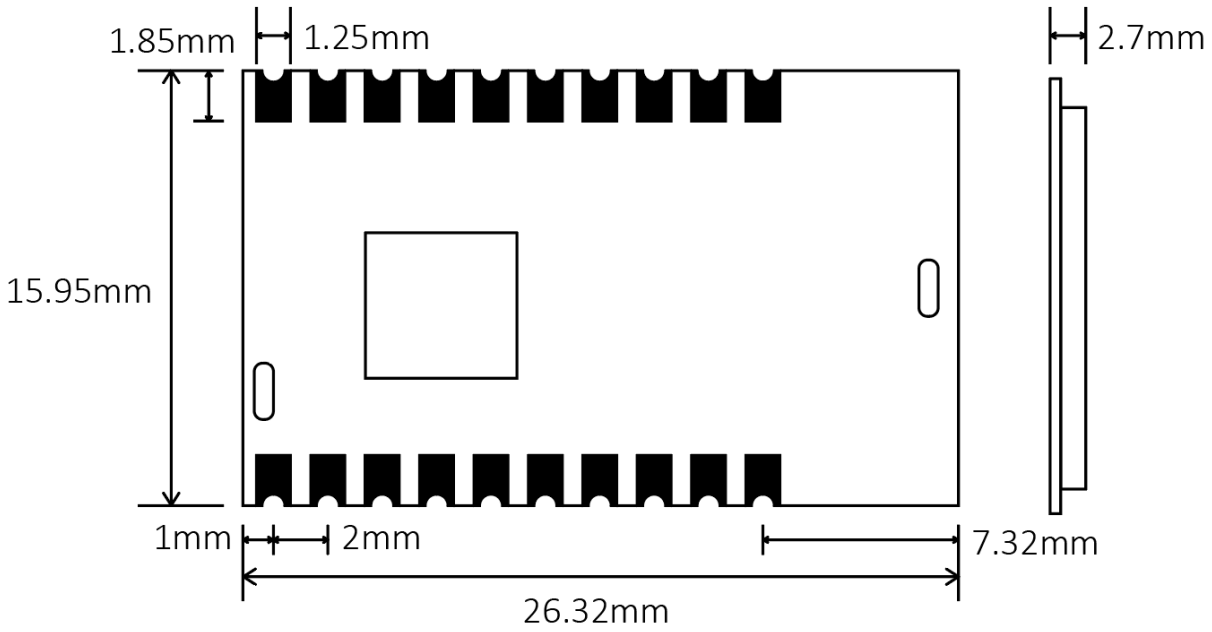
SingnalBandWidth	SpreadingFactor	Sensitivity(dbm)	ActualBandRate(bps)
62.5kHz	SF=7	-126	2169
62.5kHz	SF=8	-129	1187
62.5kHz	SF=9	-132	656
62.5kHz	SF=10	-135	296
62.5kHz	SF=11	-137	164
62.5kHz	SF=12	-139	91
125kHz	SF=7	-123	4338
125kHz	SF=8	-126	2375
125kHz	SF=9	-129	1312
125kHz	SF=10	-132	733
125kHz	SF=11	-133	328
125kHz	SF=12	-136	183
250kHz	SF=7	-120	8676
250kHz	SF=8	-123	4750
250kHz	SF=9	-125	2624
250kHz	SF=10	-128	1466
250kHz	SF=11	-130	778
250kHz	SF=12	-133	366
500kHz	SF=7	-118	17353
500kHz	SF=8	-121	9501
500kHz	SF=9	-124	5249
500kHz	SF=10	-127	2932
500kHz	SF=11	-129	1557
500kHz	SF=12	-130	830

7、Pin definition



Pin number	Pin definition	I/O	Level standard	Description
1	ANT	O	-	Connect with 50 ohm coaxial antenna
2、20	GND			Power ground
3	DIO3	I	0-3.3V	Power amplifier enable pin, high level work, low level sleep
4、6、19	NC	-	-	Hang in the air
5	+3.3V	O	+3.3V	Internal RF chip voltage input (1.8-3.5V)
7	DIO1	O	0-3.3V	Digital IO, customizable
8	BUSY	O	0-3.3V	Used for status indication, see chip data for details.
9、10、12、13	GND			Power ground
11	VCC			Power amplifier power supply positive voltage input（3.7-4.2V)
14	MISO	O	0-3.3V	SPI data output
15	MOSI	I	0-3.3V	SPI data input
16	SCK	O	0-3.3V	SPI clock
17	NSS	I	0-3.3V	SPI chip select input
18	NRESET	I	0-3.3V	Reset trigger input

8、Mechanical size (unit： mm)



9、Frequently Asked Questions

a) Why can't the normal communication between the modules?

1) The power connection is wrong and the module is not working normally.

2) Check whether the frequency bands of each module and other RF parameters are consistent.

3) Whether the module is damaged.

b) Why is the transmission distance not far?

1) Power ripple is too large.

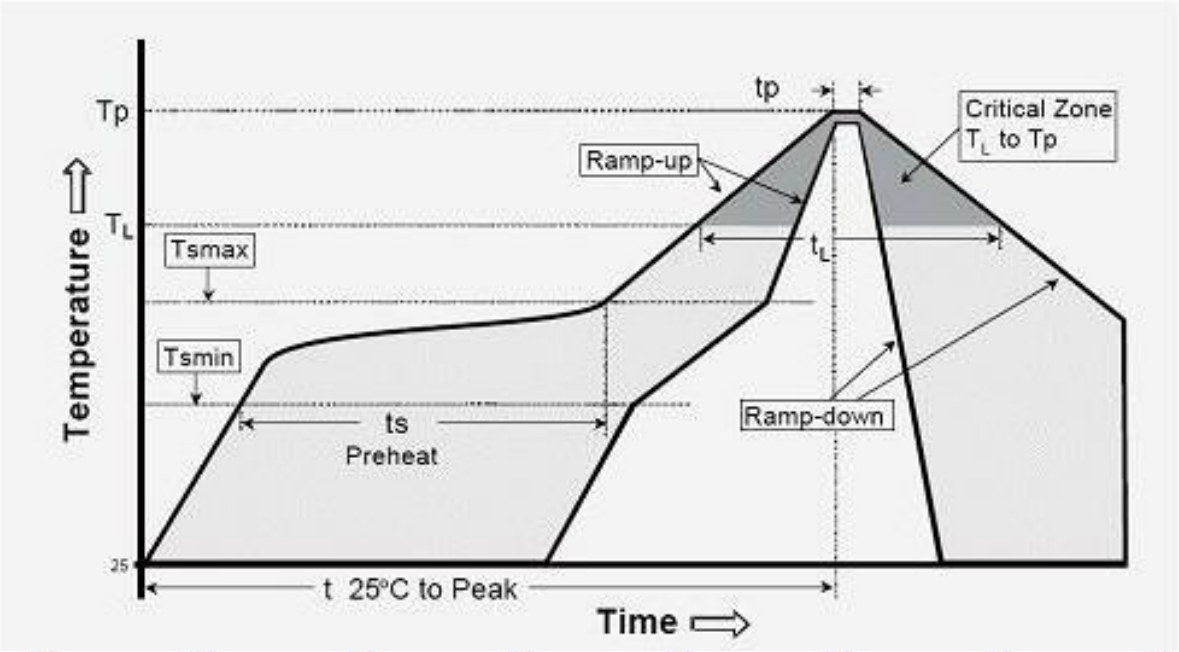
2) Antenna type is not matched or installed incorrectly.

3) Surrounding co-channel interference.

4) The surrounding environment is harsh and there are strong sources of interference.

Appendix 1: Furnace temperature curve

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 >=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℃