Lierda
利尔达

Hardware specification

WB25 series LoRaWAN node module

catalogue

WB25 series LoRaWAN node module

WB25 series LoRaWAN node module is a wireless communication node module developed by Lierda Technology Group. Based on SEMTECH's RF integrated chip SX1262 development block. It has the characteristics of wide transmission power range, low receiving sensitivity and strong anti-interference ability, and provides ultra-long distance, high-speed concurrent, stable and collection-free communication solution for low-power IoT scenarios.

Applicable scenarios

-Automated Building Circulation System

-Smart Home

-Temperature and humidity sensors

-Wireless remote control, drones

-For applications requiring high communication distance

Product features

- **Operating frequency band**
- 470～510MHz
- 860～930MHz
- **High Link Budget**
- Sensitivity：-124dBm@SF7_BW125KHz
- Transmit power: Max. 22 dBm
- **Communication interface**
- half-duplex
- **Ultra-low power consumption**
- power supply：typical DC3.3V
- Transmit current：

120mA@TX power_17dBm

（470～510MHz）

130mA@TX power_22dBm

（860～930MHz）

- **Communication interface**
- UART

Document revision history

V	Date	Change description
R	2022-08-17	Initial release
R	2023-04-17	Update dimension drawing

1 Specification

Table1-1 Module limit parameters

Main parameters	Performance		Remakes
	Min	Max	
Supply voltage（V）	-0.3	+3.7	Exceeding the limit could damage the chip
Max RF input power（dBm）	-	+10	
Operating temperature（℃）	-40	+85	

Table1-2 Module operating parameters[1]

Main parameters	Performance		Remakes
	Min	Max	
Supply voltage（V）	1.8~3.6		
Operating temperature(℃)	-40~85		
Operating frequency band(MHz)	470～510	860～930	
Frequency deviation(KHz)	-6.5～6.5	-2～2	
Emission current(mA)	Vmin=110 Vtype=120 Vmax=130	Vmin=120 Vtype=130 Vmax=140	@TX POWER 22dBm
Receive current (mA)	Vtype=5.5 Vmax=7	Vtype=7 Vmax=8	
Sleep current (uA)	Vtype=2		
Transmit power(dBm)	Vmin=21 Vtype=22 Vmax=23		
Reception sensitivity(dBm)	Vmin=-123 Vtype=-124 Vmax=-125		SF 7_BW 125KHz
Communication interface	2*UART		
Digital interface level	3.3V TTL		

[1]The above test conditions :temperature: 25℃, center frequency: 490M,915M, working voltage: 3.3V

Table1-3 Digital I / O specification

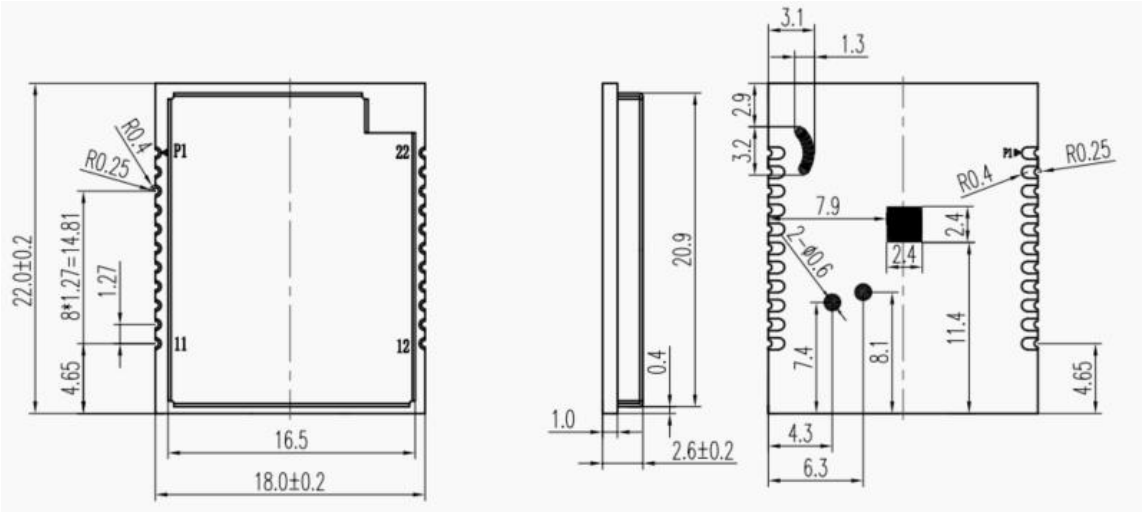
Main parameters	Performance			VCC_IO	Remakes
	Min	Typical	Max		
VIH(V)	0.7*VCC_IO	-	VCC_IO+0.3	3.3V	-
VIL(V)	-0.3	-	0.3*VCC_IO	3.3V	-
VOH(V)	VCC_IO-0.6	-	VCC_IO	3.3V	-
VOL(V)	0	-	0.4	3.3V	-

Table1-4 Module technical parameters

Main parameters	content		Remakes
Interface characteristic	Serial interface	UART	3.3V TTL\CMOS
	Serial baud rate	9600	
	Main antenna interface	Stamp hole 50Ω output	
Mechanical characteristic	Interface encapsulation type	Stamp hole（2×11pin×1.27mm）	
	PCBA尺寸	22(L) ×18(W) ×2.7（H）mm	(GB/T1804-c)

2 Dimension drawing and pin definition

2.1 Dimensional drawings



left view front view right view unit:mm

Figure2-1 Rf board dimensions

2.2 Hardware block diagram and pin definition

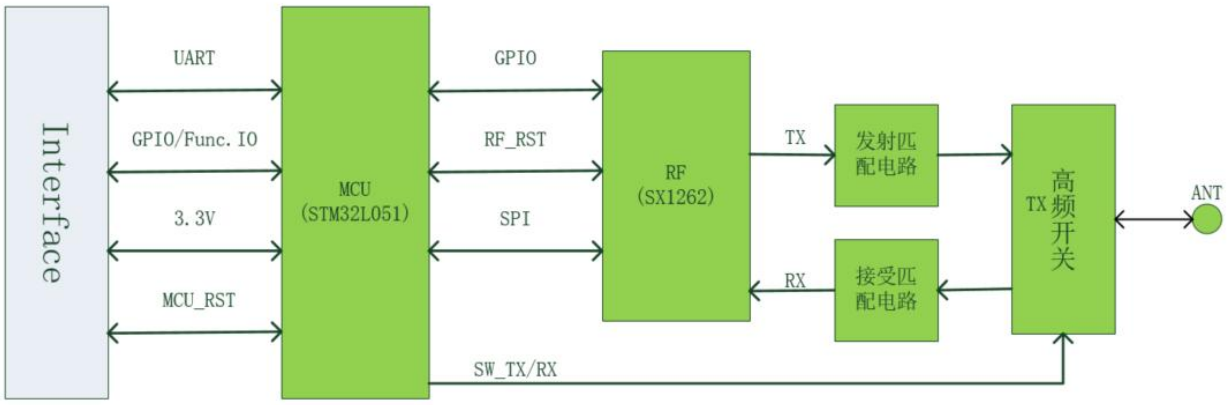


Figure 2-2 Hardware system block diagram

2.2.1 POWER

Table2-1 POWER

PIN	NAME	I/O	Default	Description
1	GND	Power	-	GND
2	GND	Power	-	GND
6	GND	Power	-	GND
12	GND	Power	-	GND
13	VCC	Power	-	Supply voltage 1.8~3.6V
20	GND	Power	-	GND
21	GND	Power	-	GND

2.2.3 UART

Table2-2 UART

PIN	NAME	I/O	Description
18	TXD	Output	TX
19	RXD	Input	RX

2.2.3 SWD

Table2-3 SWD

PIN	NAME	I/O	Default	Description
9	SWDIO	I/O	-	NC
10	SWCLK	I/O	-	NC

2.2.4 Function interface description

Table2-4 Function interface description

PIN	NAME	I/O	Default	Description
7	BUSY	I/O	Low	BUSY Status indication
8	STAT	I/O	Low	ACK Result indication
14	NRST	Reset	High	Reset
15	WAKE	I/O	Low	WAKE
16	MODE	I/O	Low	MODE SWITCH

2.2.5 ANT

Table2-5 ANT

PIN	NAME	I/O	Default	Description
22	ANT	RF	-	RF_OUTPUT

2.2.6 Other

Table2-6 Other

PIN	NAME	I/O	Default	Description
3	P1	I/O	Low	GPIO
4	P2	I/O	Low	GPIO
5	P3	I/O	Low	GPIO
11	P0	I/O	Low	GPIO
17	BOOT	-	-	NC

3 Hardware design instructions

3.1 Power supply circuit

The node module adopts 3.3V working voltage, and the typical current consumption under the maximum transmitting power of 22dBm is 130mA. In order to prevent the abnormal operation of the RF board due to the load change, the maximum output current of the external 3.3V power supply is recommended to meet the requirements above 300mA, and the power wiring is as short as possible.

3.2 Antenna interface

A type of circuit reserved between the rf pin of the module and the antenna interface is mainly used to match the antenna input impedance later. See "3.3 Typical Reference Design Circuit" for details.

3.3 Typical reference design circuit

Figure 3-1 is the typical design circuit of the module, and the use of other pins is adjusted accordingly according to the actual application requirements.

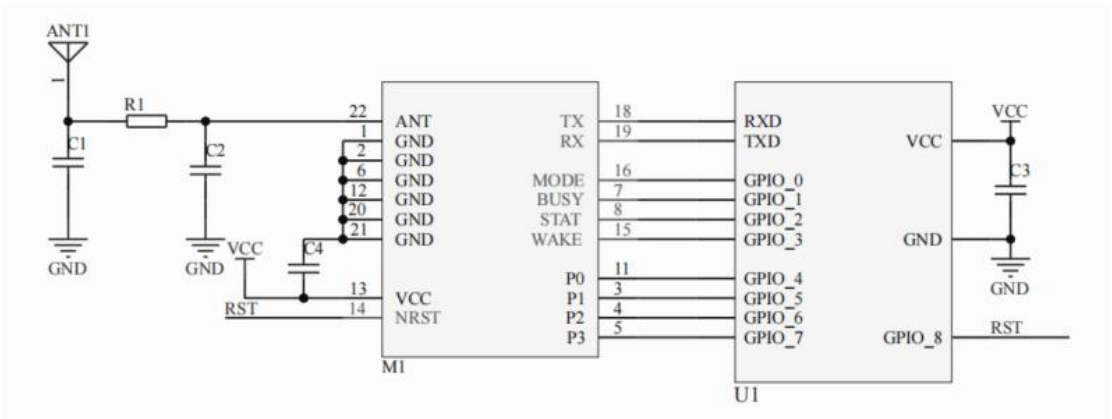


Figure 3-1 Point-to-point communication flow chart

3.4 Disable frequency point description

Disable frequency point refers to the frequency point with extremely poor module performance, and it is strictly prohibited to use.It is recommended that the frequency point used in the customer application is at least 1MHz from the disabled frequency point.

Disable frequency points: 472MHz, 480MHz, 496MHz,880MHz, 912MHz.

4 Frequently Asked Questions

4.1 Modules cannot communicate even at close range

- Confirm that the configuration of the transmit and receive sides do not match, different configurations do not communicate properly.
- Voltages are abnormal, low voltages can lead to transmission abnormalities.
- Low battery, low battery voltage will be pulled down when transmitting causing a transmission abnormality.
- Antenna soldering abnormality RF signal is not reaching the antenna or π circuit is soldered incorrectly.

4.2 Module power consumption anomaly

- The module is damaged due to static electricity, etc., resulting in abnormal power consumption.
- hen doing low-power reception, incorrect timing configuration etc. leads to module power consumption does not achieve the expected effect.
- Individually measured module or MCU are normal, the power consumption abnormalities appear in the joint tuning is due to the MCU and RF module connection pins are not handled properly.
- The working environment is harsh, in high temperature, high humidity, low temperature and other extreme environment module power consumption will fluctuate.

4.3 Insufficient module communication distance

- The antenna impedance is not matched properly resulting in low power being transmitted.
- There are objects such as metal around the antenna or the module is inside metal causing severe signal attenuation.
- There are other interfering signals in the test environment causing the module to communicate at a close distance.
- Insufficient power supply causes the module to transmit at an abnormal power level.
- The test environment is harsh and the signal attenuation is high.
- Module through the wall and other environments and then communicate with the other end, the wall, etc. on the signal attenuation is very large, most of the signal is bypassed through the wall signal attenuation is large.
- The module is too close to the ground is absorbed and reflected resulting in

poor communication.

5 operation instruction

5.1 Steel mesh opening design

In principle, the thickness selection of the steel network on the bottom plate is selected according to the comprehensive consideration of the packaging type of the devices in the plate, and the following requirements should be focused on:

The module pad position can be locally thickened to 0.15~0.20mm to avoid air welding;

5.2 Reflux welding operation instruction

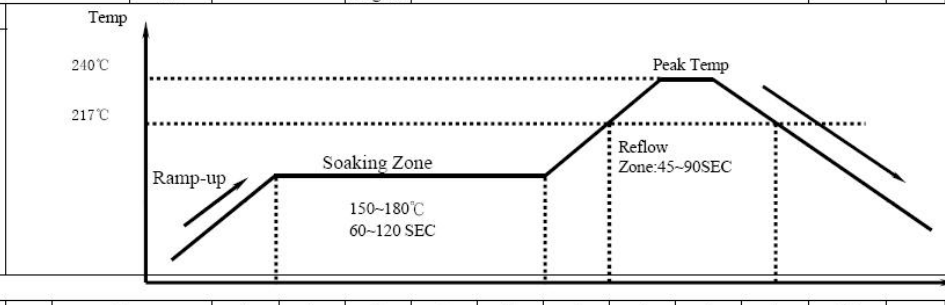
Note: This operation instruction is only suitable for lead-free operations and is for reference only.

Standard Operation Procedure (SOP)

批准	审核	作成	作成日

生产工段 Station	SMT			工序名 Station	回流焊
文件编号 Doc No.	MSOP-FL-RX1060N-G01	版本 Rev	A0	程序名 Program	003-RR-T-S606-S3

作业项目 — 曲线图



作业项目 — 温区参数

Zone	1	2	3	4	5	6	7	8	9	10
Top	150	150	180	180	180	195	210	240	250	240
Bottom	150	150	180	180	180	195	210	240	250	240
Conveyor speed	900	mm/min								

作业项目 — 曲线参

	峰值温度	浸温	熔锡温度	上升斜率	回焊斜率	降温斜率
Temp Range	240±5	150--180	217	25-150		183
Time ,		60--120S	45—90S	1--3 ℃/s	1—3 ℃/s	≤4℃/s

	物料名称 Description	规格	料号 P/N	位号 Location	用量（PCS	工具/设备	用量（PCS	编号	日期	修改内容
1						测温仪	1			
2						测温板	1			
3						耐高温手套	1			

5-1 Reflux welding operation instruction

6 contact us

Lilda Technologies Group Limited has always provided the most timely and comprehensive service to our customers. For any help, please contact our relevant personnel, or contact us as follows:

Data website：http://wsn.lierda.com

mail：wsn_support@lierda.com

Technology forum：http://bbs.lierda.com

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