

LoRa 1W 470MHz RF MODULE

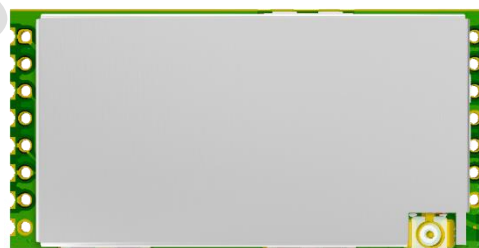
WENSHING announced the **TRW- SX1278 1W** (LoRa) long-range wireless data transmission module in May 2024. Utilizing advanced LoRa spread spectrum technology, it is designed for remote wide-area IoT applications, compliant with the high-power FCC PART 90.205 30dBm specifications.

The **TRW- SX1278 1W** boasts strong anti-interference capabilities, enhancing reliability and transmission efficiency. Its extensive coverage makes it particularly suitable for remote monitoring applications. Additionally, it offers a rich variety of interfaces and configuration options, ensuring flexibility in application.

The **TRW- SX1278 1W** features a super high receiver sensitivity of -148dBm and a maximum power of up to >32dBm, enabling ultra-long-range wireless transmission. It is suitable for applications across various fields including IoT (Internet of Things), smart cities, transportation, industrial control, automated agriculture, healthcare, and military.

Application

- Remote-controlled aircraft
- Unmanned vehicles
- Smart homes
- Smart streetlights
- Logistics tracking
- Agricultural automated irrigation
- Equipment communication



18mm * 35.4mm * 3.85mm

Features

- Frequency 470MHz
- Receiver sensitivity -148dBm
- Utilizing SX1278 chip
- Automatic frequency control AFC
- FSK/OOK Mode
- SPI Serial port
- Transmit power 30dBm
- Operating voltage 3.6 ~ 5.5V
- Signal strength detection AGC
- 127dB RSSI Dynamic range

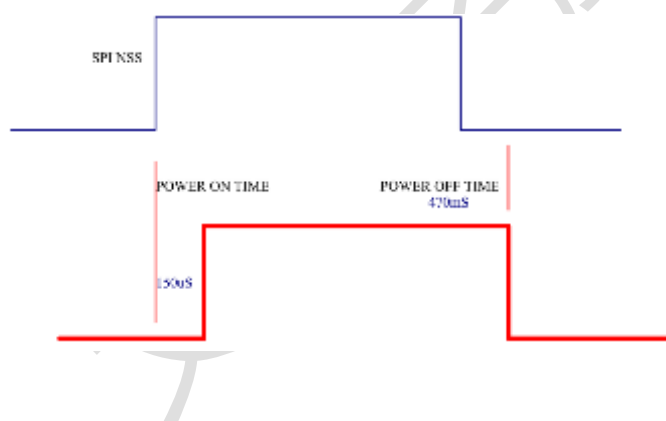
Version History

Version	Date	Changes
V1.01	May. 10, 2024	1 st Edition
V1.02	May. 21, 2024	2 st Edition

Specifications

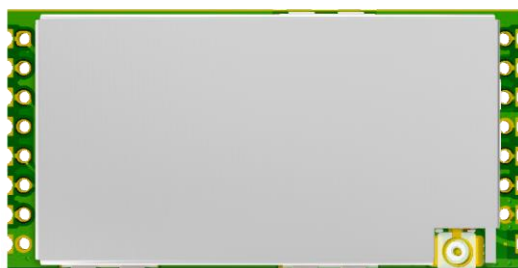
Model : [TRW- SX1278 1W](#)

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Frequency Range	420		500	MHz	470MHz (Center frequency)
Receiver Sensitivity	-148			dBm	0.03125bps
Transmit Power	30			dBm	
Data Rate	0.03125		8	Kbps	LoRa Protocol
Supply Voltage, VCC	3.6		5.5	V	DC
TX Current		760		mA	4V Test
RX Current		20		mA	4V Test
Power down Current			0.1	uA	Power down Mode
Power up time	150			uS	Disable to Enable time
Operating Temperature	-40		+80	°C	



* When the SPI NSS is at a HIGH level, the module is powered on; When the NSS is at a LOW level, the module is powered off.

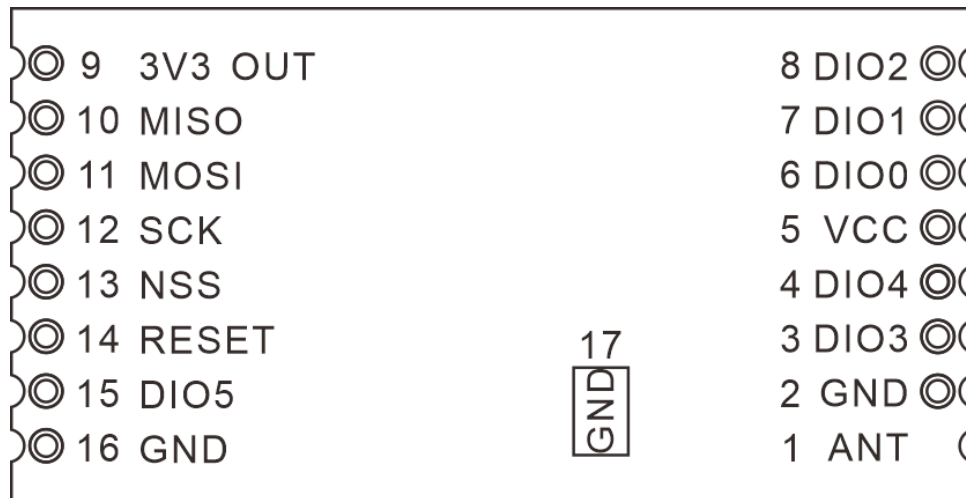
Front view



Bottom view

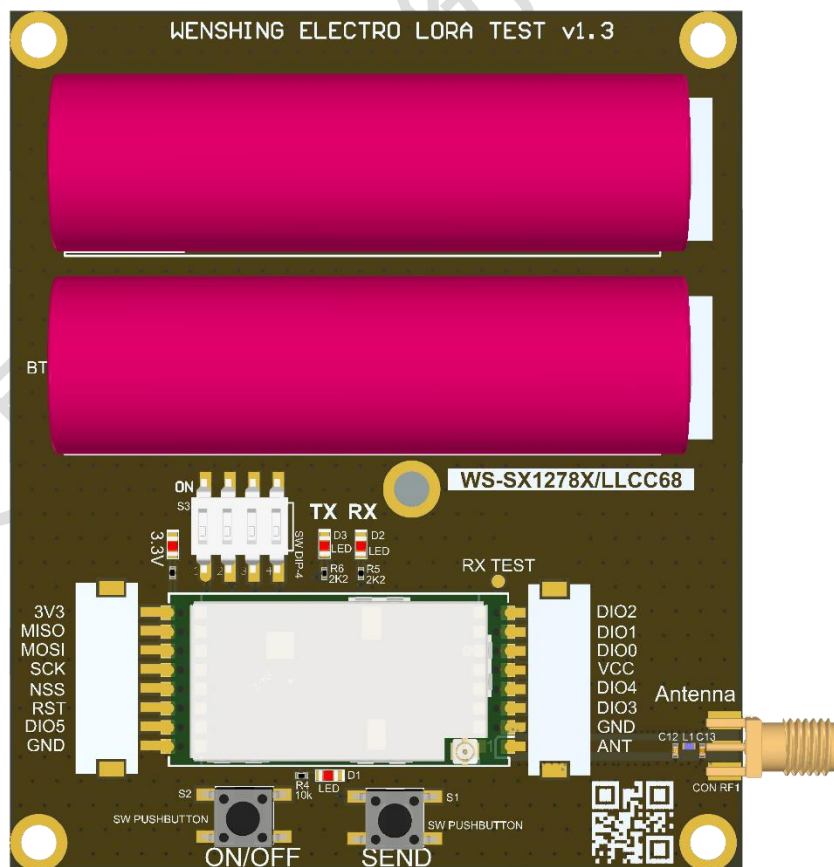
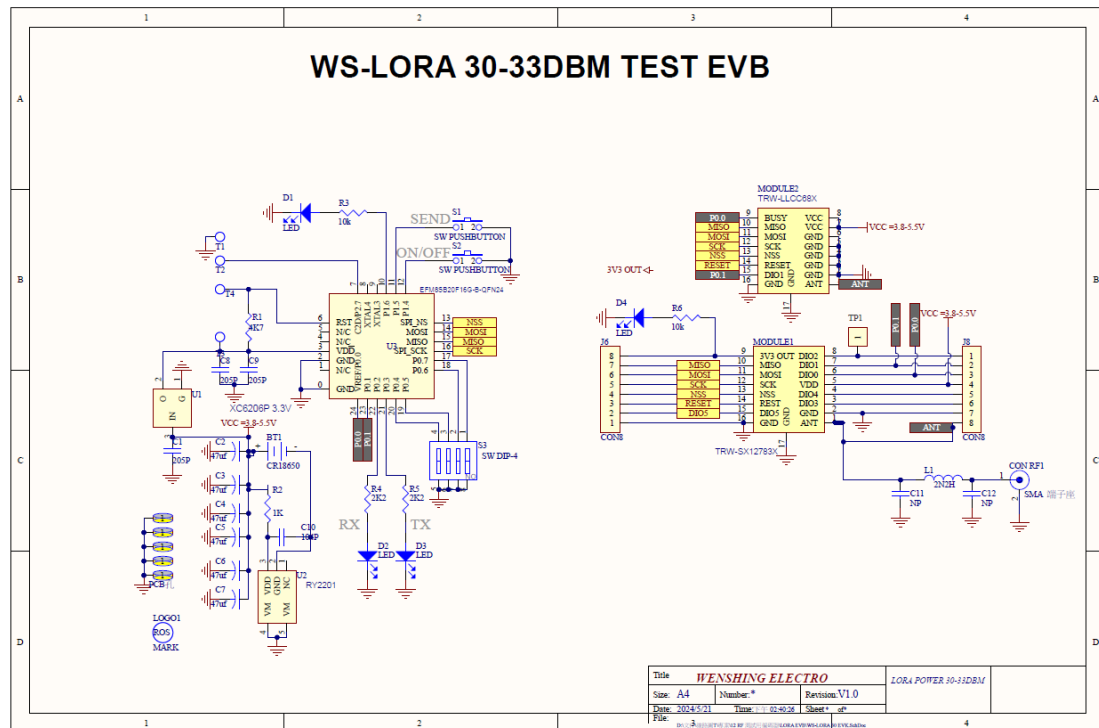


Pin Assignment



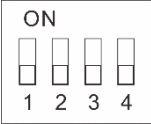
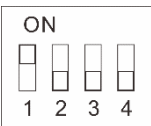
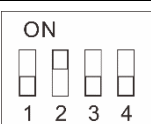
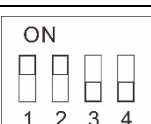
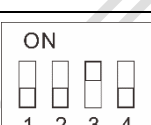
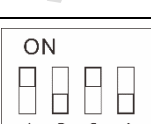
Pin	Name	I/O	Description
1	ANT	I/O	Antenna interface
2	GND	-	Ground
3	DIO3	I/O	Digital I/O, software configured
4	DIO4	I/O	Digital I/O, software configured
5	VCC	I	Supply voltage for RF 3.8~5.5V
6	DIO0	I/O	Digital I/O, software configured
7	DIO1	I/O	Digital I/O, software configured
8	DIO2	I/O	Digital I/O, software configured
9	3V3 OUT	O	LDO out 3.3V
10	MISO	O	SPI Data output
11	MOSI	I	SPI Data input
12	SCK	I	SPI Clock input
13	NSS	I	SPI Chip select input
14	NRESET	I/O	Reset trigger input
15	DIO5	I/O	Digital I/O, software configured
16	GND	-	Ground
17	GND	-	Exposed ground pad

TEST EVB



EVB test mode description

Upon powering on, the RF module communication is tested. When the RF module is detected, the "Module Ready" indicator light will turn on.

DIP switch	Description (Test Frequency: 470.125 MHz)
 0000	In FSK continuous receive test mode, 4.8K , dev5K, data is transmitted using an SG. The data waveform can be measured at TP1.
 0001	FSK continues to transmit and test, transmitting for 1 second and stopping for 2 seconds.
 0010	In FSK packet receive mode, Rate=4.8K , Fdev=5K, the mode will send a response packet after receiving a packet (the RX indicator light will flash once upon receiving). The TX indicator light will turn on during transmission and turn off after transmission is complete, then the system will return to receive mode.
 0011	In FSK active packet transmission mode, Rate=4.8K , Fdev=5K, the mode transmits a packet every second (the TX indicator light turns on during transmission and turns off after transmission is complete). It then waits for a response (the RX indicator light will flash once upon receiving a response).
 0100	In LoRa packet receive mode, BW=125KHz , SF=12, the mode will send a response packet after receiving a packet (the RX indicator light will flash once upon receiving). The TX indicator light will turn on during transmission and turn off after transmission is complete, then the system will return to receive mode.
 0101	In LoRa active packet transmission mode, BW= 125KHZ , SF=12, the mode transmits a packet every second (the TX indicator light turns on during transmission and turns off after transmission is complete). It then waits for a response (the RX indicator light will flash once upon receiving a response).

Note: After turning the dip switch to reset the test mode, please power on again.

- LoRa distance calculation reference:
<https://www.rfwireless-world.com/calculators/LoRaWAN-Range-calculator.html>
- Antenna length calculation reference:
https://rf.net.tw/Design_tools/ant_design.html

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