LoRa 1W 470MHz RF MODULE

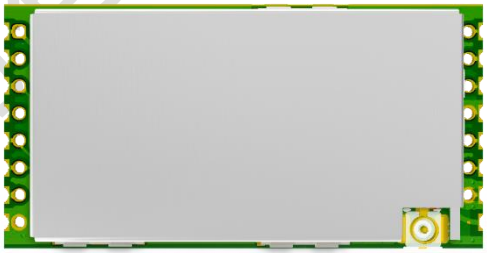
WENSHING released the TRW-LLCC683X (LoRa) long-range wireless data transmission module in May 2024. Adopting advanced LoRa spread spectrum technology, it is based on long-range wide-area IoT applications and complies with the high-power FCC PART 90.205 30dBm standard.

The TRW-LLCC683X boasts robust anti-interference abilities, improving both reliability and transmission efficiency. Its extensive coverage makes it particularly ideal for remote monitoring applications. Furthermore, it offers a wide range of interfaces and configuration options, allowing for versatile use.

The TRW-LLCC683X offers exceptionally high reception sensitivity at -148dBm and can deliver a maximum power output of 33dBm (almost 2W), supporting extremely long-distance wireless transmission. This makes it ideal for a wide range of applications in fields like IoT, smart cities, transportation, industrial control, automated agriculture, healthcare, and the military.

Application

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



18mm * 35.4mm * 3.2mm

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

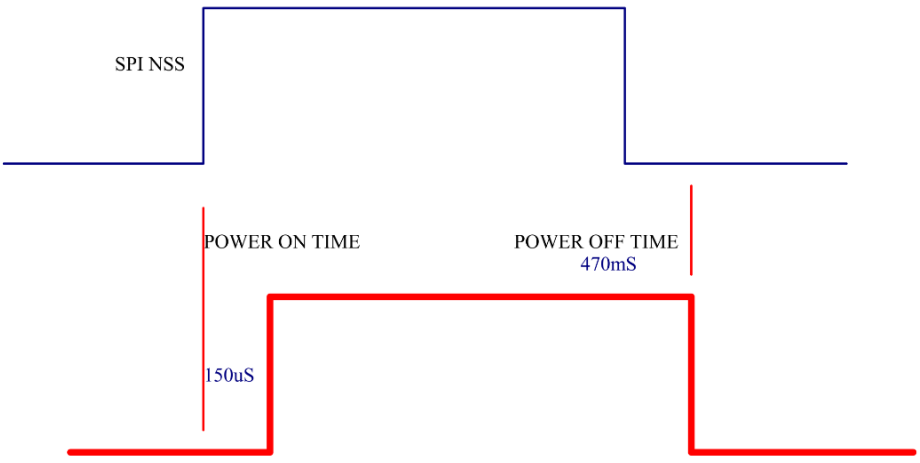
Version	Date	Changes
V1.01	May. 10, 2024	1st. Edition
V1.02	May. 21, 2024	2st. Edition

Specifications

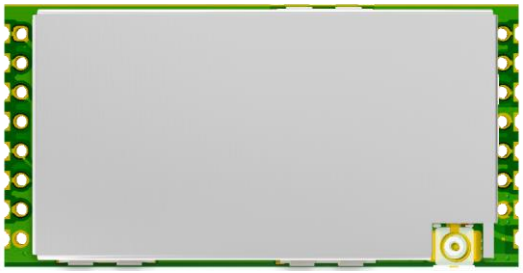
Model：TRW-LLCC683X

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		730		mA	4V Test
RX Current		20		mA	4V Test
Power down Current			0.1	uA	Power down Mode
Power up time	50			ms	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.

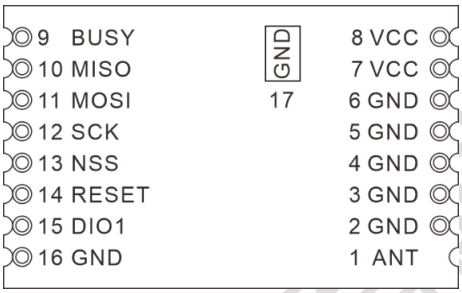


Front view



Bottom view

Pin Assignment

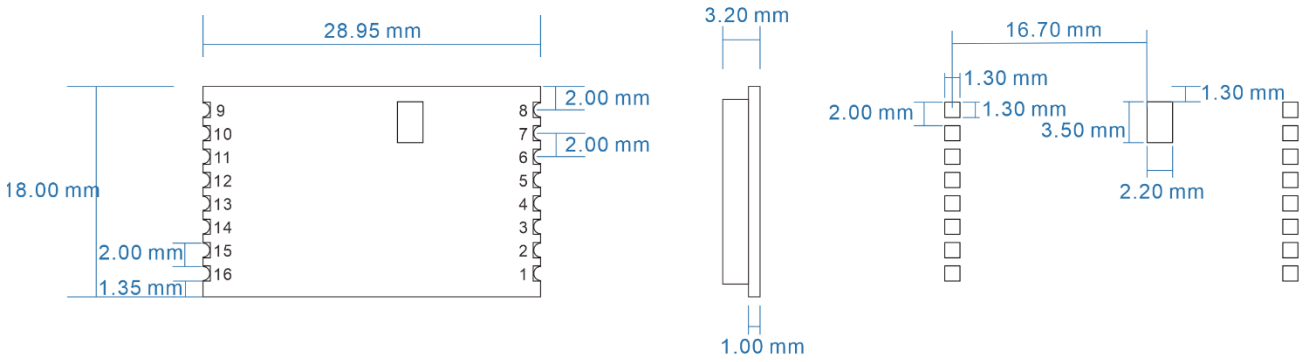


Pin	Name	I/O	Description
1	ANT	I/O	Antenna interface
2	GND	-	Ground
3	GND	-	Ground
4	GND	-	Ground
5	GND	-	Ground
6	GND	-	Ground
7	VDD	I	Power Supply voltage 3.6~5.5V
8	VDD	I	Power Supply voltage 3.6~5.5V
9	BUYS	O	Busy indicator
10	MISO	O	SPI Data output
11	MOSI	I	SPI Data input
12	SCK	I	SPI Clock input
13	NSS	I	SPI Chip select input
14	NRESET	I/O	Reset trigger input
15	DIO1	I/O	Digital I/O, software configured
16	GND	-	Ground
17	GND	-	Exposed ground pad

Dimension

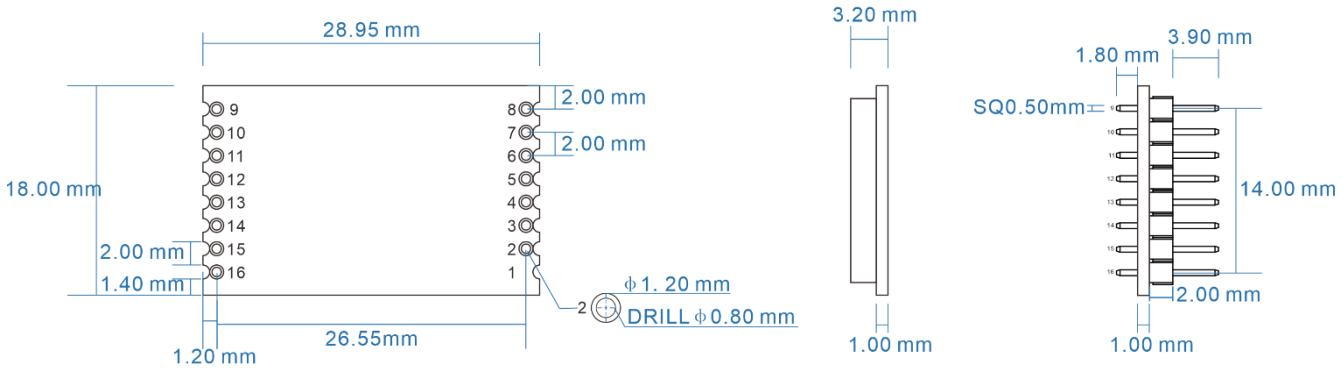
SMD

TRW-LLCC683S

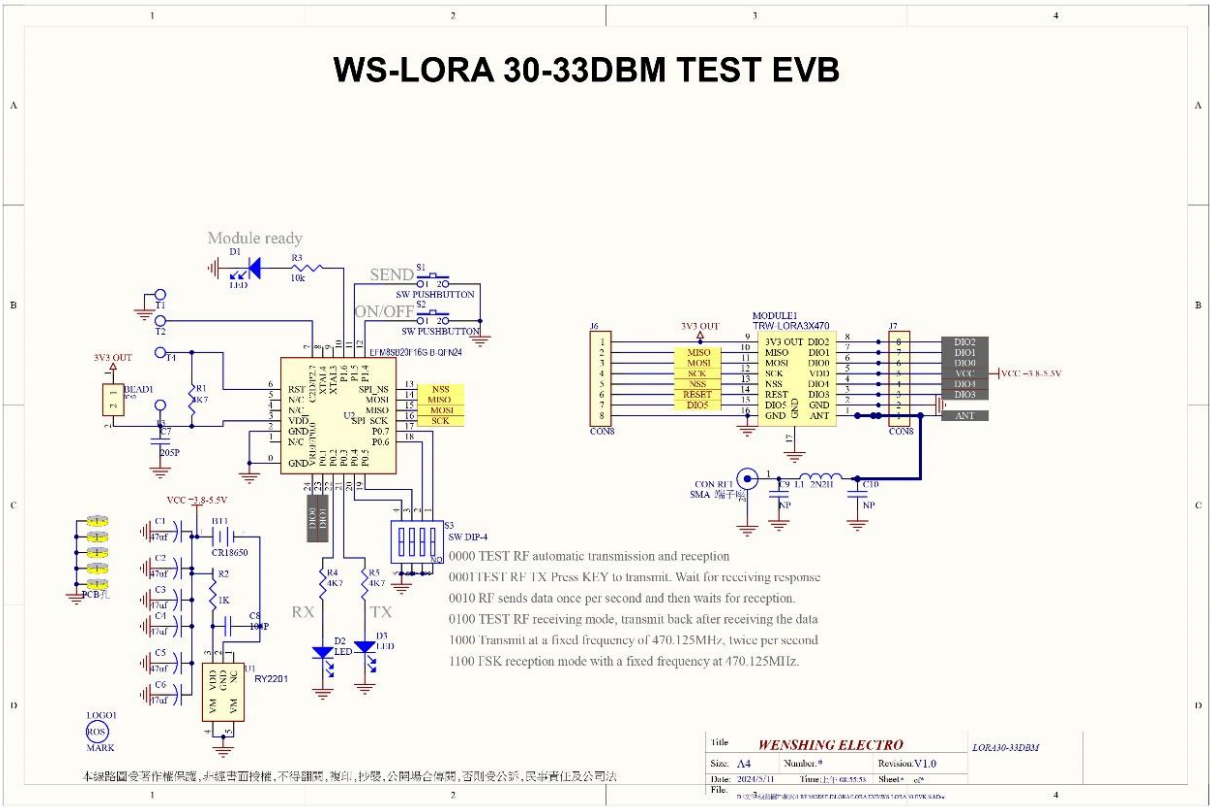


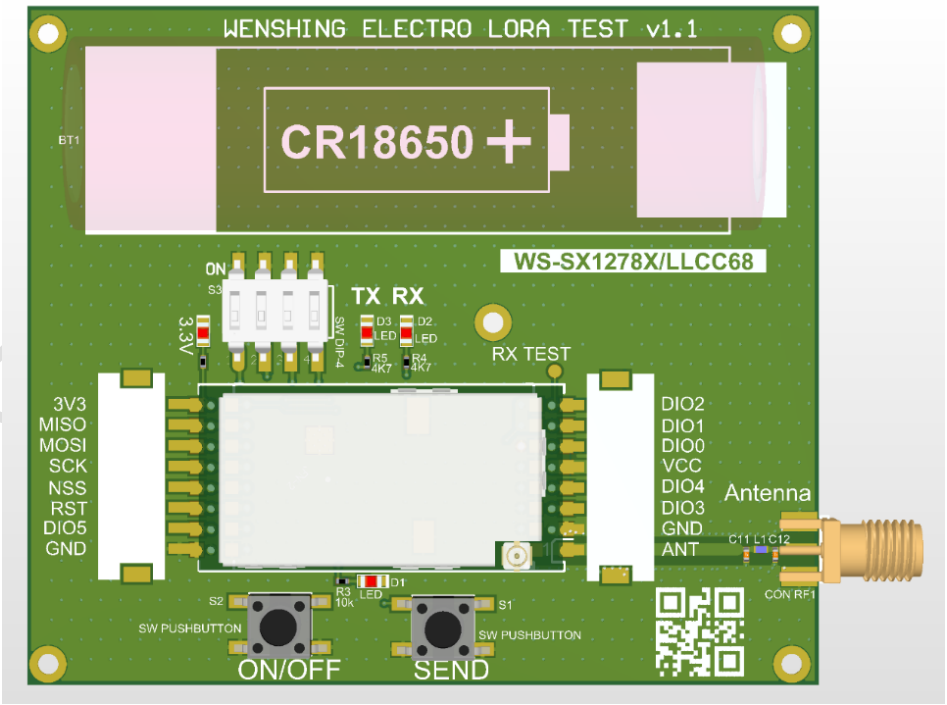
DIP

TRW-LLCC683D



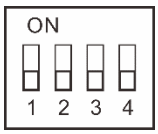
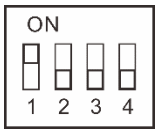
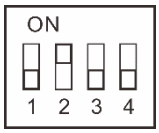
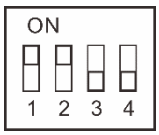
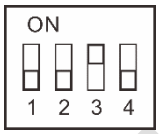
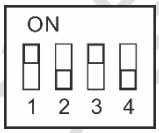
TEST EVB


WS-LORA 30-33DBM TEST EVB
Module ready
SEND
ON/OFF
SW PUSHBUTTON
MODULE1
TRW-LORA3X470
0000 TEST RF automatic transmission and reception
0001TEST RF TX Press KEY to transmit. Wait for receiving response
0010 RF sends data once per second and then waits for reception.
0100 TEST RF receiving mode, transmit back after receiving the data
1000 Transmit at a fixed frequency of 470.125MHz, twice per second
1100 FSK reception mode with a fixed frequency at 470.125MHz.
WENSHING ELECTRO
LORA30-33DBM


WENSHING ELECTRO LORA TEST v1.1
CR18650
WS-SX1278X/LLCC68
TX RX
RX TEST
3V3
MISO
MOSI
SCK
NSS
RST
DIO5
GND
DIO2
DIO1
DIO0
VCC
DIO4
DIO3
GND
ANT
Antenna
SW PUSHBUTTON
ON/OFF
SEND

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