

RF TRANSCEIVER MODULE

SPECIFICATION



WRF1278-433/470

Low power consumption, long range, high performance Lora RF transceiver module.

Specification

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2. Disclaimer

Because of the difference of the working environment and other factors, we try to make the document description is accurate, but it is still difficult to rule out the individual is not accurate or not detailed description. Therefore, this document is only for the purposes of the user's reference, We do not do any legal commitments and guarantees, if there is any objection, please contact us.

3. General Description

WRL1278 is a transceiver module, which provide ultra-long range spread spectrum communication while maintaining low current consumption .Featured with LoRa™ technic make the sensitivity can be -148 dBm combined with +20 dBm Power output .

LoRa™ also provides significant advantages in both blocking and selectivity over conventional modulation techniques, solving the traditional design compromise between range, interference immunity and energy consumption.

These devices also support high performance (G)FSK modes for systems including WMBus, IEEE802.15.4g. The WRF1278 deliver exceptional phase noise, selectivity, receiver linearity and IIP3 for significantly lower current consumption than competing devices.

4. Key Features

LoRa™ Modem.
168 dB maximum link budget. +20 dBm - 100 mW constant RF output.
Programmable bit rate up to 300 kbps.
High sensitivity: down to -148 dBm @Lora mode
Bullet-proof front end: IIP3 = -12.5 dBm.
TX current : 125mA @20dBm, 45mA @13dBm.
Low RX current of 10. mA, 200 nA register retention.
Power supply: 1.8- 3.7V,
Sleep current : 100nA,
FSK, GFSK, MSK, GMSK, LoRa™ and OOK modulation.
Built-in bit synchronizer for clock recovery.
Preamble detection.
127 dB Dynamic Range RSSI.
Automatic RF Sense and CAD with ultra-fast AFC.
Packet engine up to 256 bytes with CRC.
Built-in temperature sensor and low battery indicator.
Module Size: 16*16mm

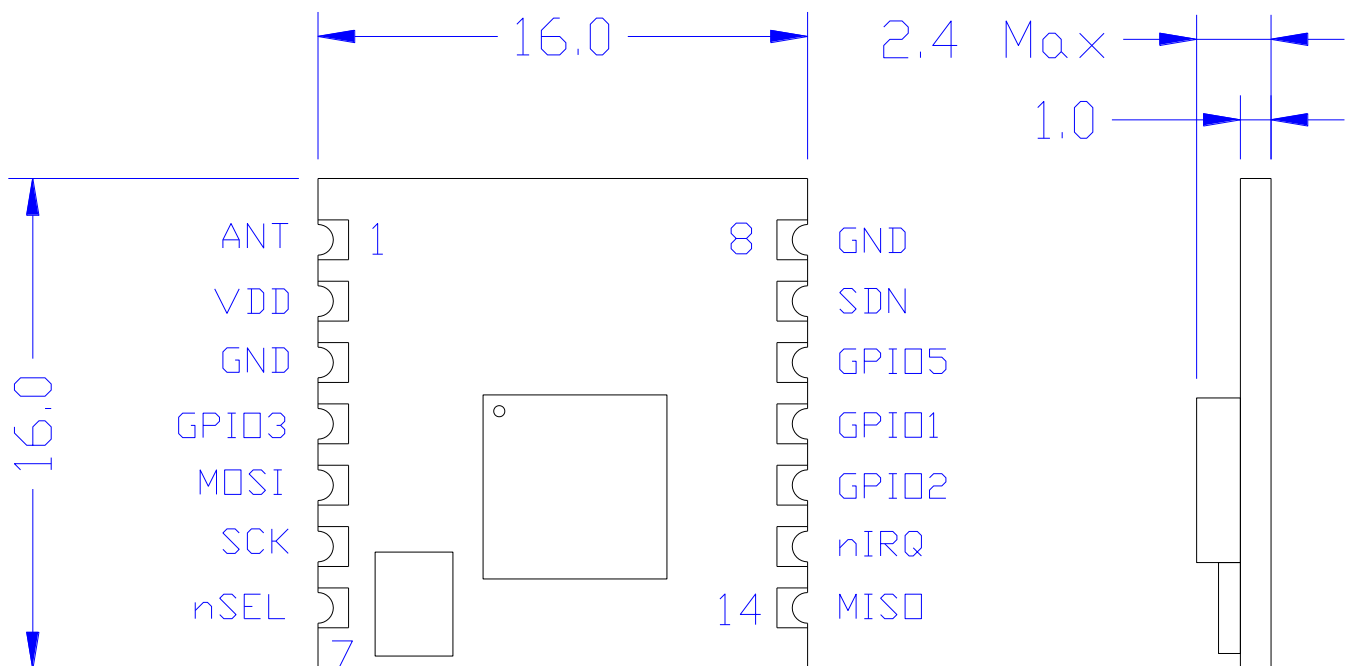
5. Typical Applications

- Automated Meter Reading.
- Home and Building Automation.
- Wireless Alarm and Security Systems. Industrial Monitoring and Control
- Long range Irrigation Systems

6. Pin Definition

No.	Definition	Type	Function
1	ANT		Antenna
2	VDD	S	Positive power supply
3	GND	S	Power Ground
4	GPIO3	I/O	
5	MOSI		Spi data input
6	SCK	I	Spi clock input
7	nSEL		SPI Chip select (active low)
8	GND	S	Power Ground
9	SDN		nRESET
10	GPIO5	I/O	
11	GPIO1	I/O	
12	GPIO2	I/O	
13	nIRQ		Interrupt inquiry
14	MISO		Spi data output

7. Outline



8. General Device Specifications

The WRL1278 incorporates the LoRa™ spread spectrum modem which is capable of achieving significantly

longer range than existing systems based on FSK or OOK modulation. With this new modulation scheme sensitivities

8 dB better than FSK can be achieved with a low-cost, low-tolerance, crystal reference. This increase in link budget provides

much longer range and robustness without the need for external amplification. LoRa™ also

provides significant advances in

selectivity and blocking performance, further improving communication reliability. For maximum flexibility the user may decide

on the spread spectrum modulation bandwidth (BW), spreading factor (SF) and error correction rate (CR).

Another benefit of the spread modulation is that each spreading factor is orthogonal - thus multiple transmitted signals can

occupy the same channel without interfering. This also permits simple coexistence with existing FSK based systems.

Standard GFSK, FSK, OOK, and GMSK modulation is also provided to allow compatibility with existing systems or standards

such as wireless MBUS and IEEE 802.15.4g.

The WRL1278 offers bandwidth options ranging from 7.8 kHz to 500 kHz with spreading factors ranging from 6 to 12, and

covering all available frequency bands. The WRL1278 offers the same bandwidth and frequency band options with

spreading factors from 6 to 9. The WRL1278 offers bandwidths and spreading factor options, but only covers the lower UHF

bands.

All voltages are referenced to VSS, the potential on the ground reference pin VSS

9. Absolute Maximum Ratings (non-operating)

Symbol	Parameter	Min	Max	Units
V _{dd}	Positive supply voltage	-0.5	3.9	V
T _{mr}	Temperature	-	-	°C
T _j	Junction temperature	-	-	°C
P _{mr}	RF input level		10	dBm
ESD	Electrostatic discharge		1000	V

Note Specific ratings apply to +20 dBm operation

10. Recommended Operating Range

Symbol	Parameter	Min	Max	Units
V _{dd}	Positive supply voltage	1.8	3.7	V
T _{op}	Ambient operating temperature	-40	85	°C
C _{lop}	Load capacitance on digital ports		25	pF

11. Field testing range

Band	Test condition	Distance
433 MHz band	Receiver Bandwidth=67KHz, data rate=1.2kbps, transmitter Fdev=200KHZ (matches with WRL1278) in free open area	> 9000M

12. Contact

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