

OMx02

LoRa Module with Open Source

OMx02 is a highly integrated low-power half-duplex RF transceiver module embedding high-speed low-power MCU and high-performance RF chip with LORA modem which is capable of achieving significant longer range than existing RF transceiver based on FSK or OOK modulation. OMx02 can support secondary development to realize an application of LoRaWAN with the SDK supplied by ManThink, OMx02 have abundant hardware resource to realize different function which include SPI, IIC, AD and DIO.

This module uses LoRa modem to improve the sensitivity up to -137dBm, significantly extending the transmission distance under a low power. Under LoRaWAN protocol, the start network can solve the problem of collision and low power consumption through gateway solution.

OMx02 module's interface voltage 2.6-3.6 V with consuming only 13 mA at the receiving mode. If there is no packet to transmit, the module consumption is only 3uA which is very suitable for a battery-powered system.

Using the OMX02 module in an application minimize the need or an expensive and time-consuming RF development. Fast time to market is possible with this pre-qualified module.

Apply

- Wireless water/heat/gas meter reading
- Wireless sensor
- Intelligent instrument and meter
- Intelligent lighting control
- Auto data collection
- Remote control and sensing
- Smart building and security
- Robot control
- Power system monitoring
- Wireless warehousing, logistics management

Feature

- LoRaWAN class-A compliant
- Globally unique 64-bit identifier
- Four band and 16 channels support
- Transmission distance > 5000 m
- Frequency CN470/EU868/US915
- High sensitivity -137dBm
- Maximum transmission power 20dBm
- Low sleep current 3uA
- Receiving mode current 13mA
- Super small size 17.8mm*13mm*2.0mm

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1. Module Overview

The OMx02 is an ultra-long range, high-performance module for wireless communication. It operates in the license free frequency band .

The OMx02 uses Semtech's patented LoRa modulation technique which combines Spread spectrum modulation and forward error correction techniques to increase the range and spectrum modulation and forward error correction techniques to increase the range and robustness of radio communication links compared with traditional FSK or OOK based modulation. Typically examples of OMx02 receive performances are given in the following table.

Table 1 : performance of LoRa with different parameters

Signal Bandwidth/[kHz]	Spreading Factor	Sensitivity/[dBm]
125	7	-123
125	12	-138
250	7	-121
250	12	-135
500	7	-116
500	12	-130

The module is solderable like a SMD component and can easily be mounted on a simple carrier board with a minimum of required external connections.

2. Global Electrical Characteristics

Table 2 : Global Electrical Characteristics

Radio Frequency	410~510MHz(OM402),860~1020MHz(OM802)
Step Frequency	1KHz
Transmission Power	5~20dBm,
Receiving Sensitivity	-138dBm@292bps
Air Transfer Rate	292bps~5.4kbps
Working Humidity	10%~90% (no condensation)
Working Temperature	-45°C~85°C
The power Supply	2.6~ 3.6V
ESD(Human Body Model)	2000V
Transmission Current (typical)	120mA@100mW
Harmonic Suppression	≤1GHz: <-36dBm, >1GHz: < -30dBm
CAD/ Receives Current(typical)	13mA
Sleep Current(typical)	3uA
Size	17.8mm x 13.0mm x 2.0mm
Antenna Impedance	50Ω

3. Module Package

3.1 Pin Definition

1	S1MOSI/PD6	GND	23
2	S1MISO/PD7	VCC	22
3	S1SS/PD4	RESET	21
4	PC7	SWCLK	20
5	S1SCK/PD5	SWDIO	19
6	PE30	GND	18
7	PC6	UART1-TX/PC4	17
8	PC5	UART1_RX/PC3	16
9	PB1	I1SDA/PC2	15
10	NC1	I1SCL/PC1	14
		GND	13
		ANT	12
		GND	11

Figure 1 : description of pins and top view

OMX02 module has nine pins, specific definitions as the following table:

Table 3 : description of the pin

Pin	Name	Direction	Function
1	S1MOSI/PD6	Input/output	Refer the datasheet of KL17x
2	S1MISO/PD7	Input/output	Refer the datasheet of KL17x
3	S1SS/PD4	Input/output	Refer the datasheet of KL17x
4	PC7	Input/output	Refer the datasheet of KL17x
5	S1SCK/PD5	Input/output	Refer the datasheet of KL17x
6	PE30	-	Refer the datasheet of KL17x
7	PC6	Input/output	Refer the datasheet of KL17x
8	PC5	Input/output	Refer the datasheet of KL17x
9	PB1	Input/output	Refer the datasheet of KL17x
10	NC1	-	Keep the Pin float
11	GND	-	Digital GND
12	AND	-	Should be connected to antenna
13	GND	-	Digital GND
14	I1SCL/PC1	-	Refer the datasheet of KL17x

15	I1SDA/PC2	Input/output	Refer the datasheet of KL17x
16	UART1_RX/PC3	Input/output	Refer the datasheet of KL17x
17	UART1-TX/PC4	Input/output	Refer the datasheet of KL17x
18	GND	Input/output	GND
19	SWDIO	Input/output	Refer the datasheet of KL17x
20	SWCLK	Input/output	Refer the datasheet of KL17x
21	RESET	Input/output	Refer the datasheet of KL17x
22	VCC	Input/output	Connect to the power supply(2.6V-3.6V)
23	GND	Input/output	Digital GND

3.2 Module Dimensions

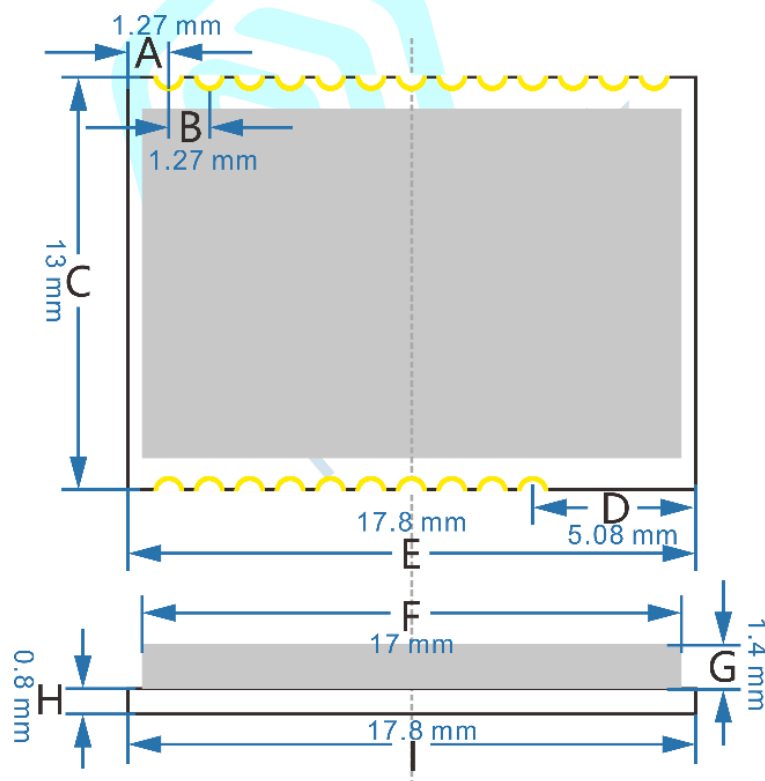


Figure 2 : Dimensions of the module

4. Typical Application Schematic

Maximum system

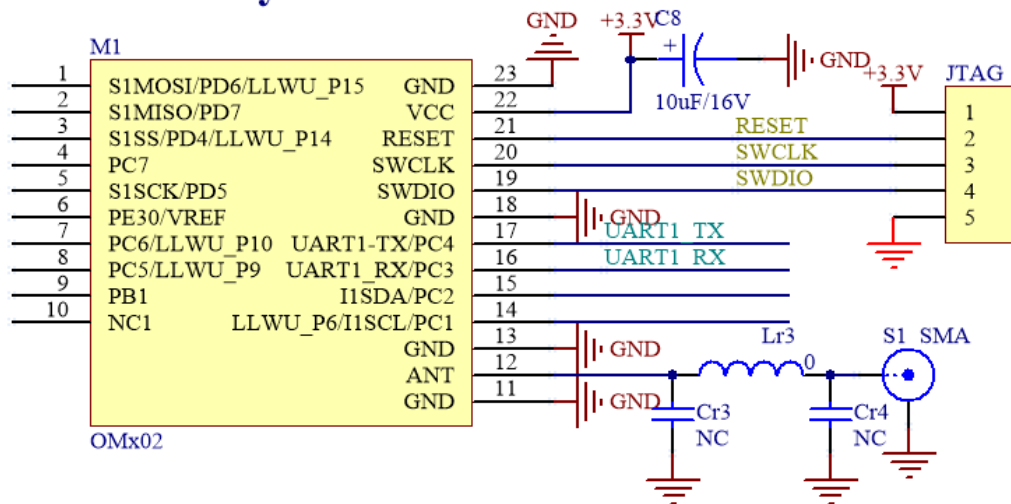


Figure 3 : Typical design

6. Other

6.1 Contact

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