

MCR-SGLA00391T0 Datasheet

规格书



莱智科技
LAI ZHI KE JI

The Company reserves the right to make further statements regarding improvements in reliability, functionality and design of the product.

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1. Functional Features

The MCR-SGLA00391T0 wireless module is a high performance IoT wireless transceiver based on the SEMTECH RF integrated chip LLCC68.

Ideal for remote wireless applications, the LLCC68 sub-GHz wireless transceiver features a high-efficiency power amplifier of up to +22 dBm; the module supports LoRa modulation for LPWAN use cases and (G)FSK modulation for legacy use cases, and is highly parameterizable to meet the requirements of a wide range of applications for both industrial and consumer use.

1.1. Parameter characteristics

- Operating Voltage: 1.8~3.6 V ;
- Operating frequency band: 902.9MHz~924.9MHz;
- Maximum transmit power: $\geq 19\text{dBm}$;
- Ultra-high reception sensitivity: $\leq -125\text{dBm}$;
- Support modulation: LoRa, GFSK;
- Ultra-low power consumption, static power consumption less than 5uA;
- SMD small package, suitable for all kinds of highly integrated applications;

1.2. Application Areas

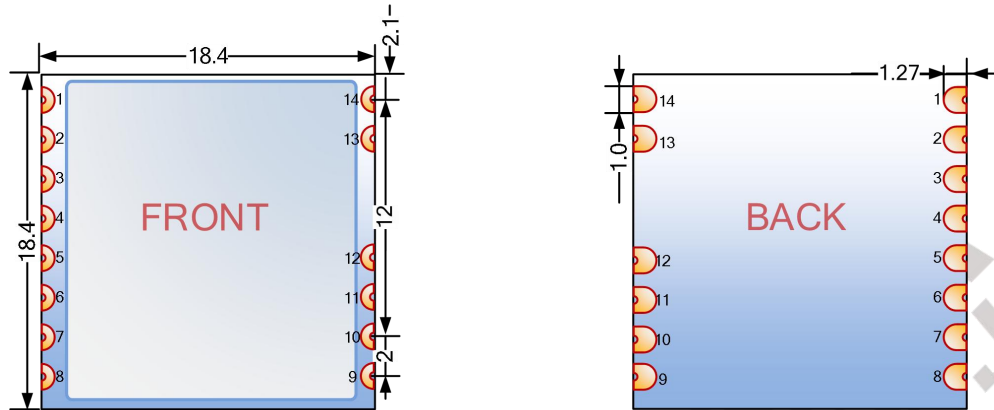
- Wireless meter reading (water, gas, heat, electricity)
- Wireless Ordering Machine
- Industrial data acquisition, transmission, intelligent control
- Remote control and remote data acquisition systems
- Home Wireless Security
- Active RFID Tag Identification
- Remote irrigation management system

2. Specification

Parameters	Performance		Remarks
operating voltage	1.8 to 3.6 V		Generally select 3.3V
operating temperature	-40 to 85 ° C		
Operating humidity	10%~90%		non-condensing
operating frequency	902.9MHz~924.9MHz		Supported Settings
power wastage	Transmit state @22dBm	≤ 160 mA	Room temperature DC-DC mode
	Receive status @ LORA modulation	≤ 7 mA	Room temperature DC-DC mode
	sleep state	≤ 5 uA	Room temperature standby hibernation
Maximum Transmit Power	19 ± 1 dBm		Supported Settings
modulation method	LORA\GFSK		Recommended LORA Applications
communications rate	FSK modulation: 0.6kbps~300kbps		Supported Settings
	LoRa modulation: 1.76kbps~62.5kbps		Supported Settings
Interface Type	perforations		See the interface description section for details
Dimensions (without antenna)	18.4 x 18.4 (mm)		See exterior description section for details

3. Hardware Layout and Interface Description

The module external dimensions and pinout are shown below:



Unit: mm
Tolerance $\pm 0.3\text{mm}$

The pin functions are described in the table below:

Pin	interface	functionality
1	RST	Hardware reset, mandatory, pull-up inside module
2	DIO1	IO Multiplexing Pins
3	DIO2	IO Multiplexing Pins
4	BUSY	Chip operating status indication, busy status
5	SW2	HF switching control, SW1=0, SW2=1, transmit
6	SW1	HF switching control, SW1=1, SW2=0, receive
7	GND	power supply
8	VCC	power supply
9	MISO	SPI Pin
10	MOSI	SPI Pin
11	NSS	SPI Pin
12	SCK	SPI Pin
13	GND	electric power source
14	RF	connection with high-ranking officials

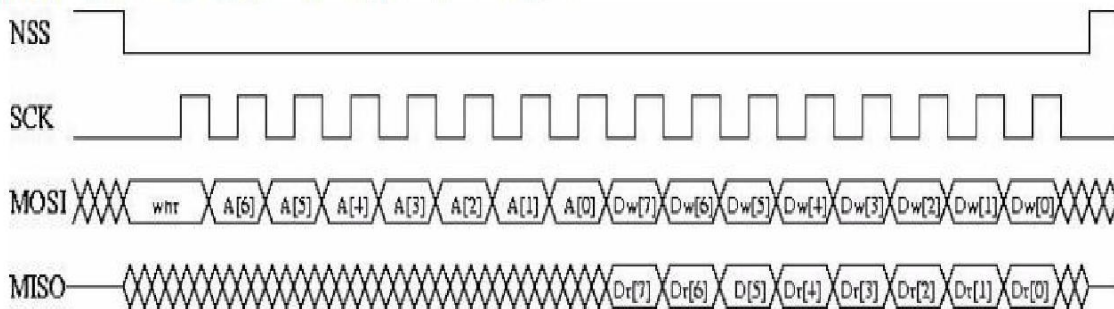
4. Basic Operation

Insert the module on the user's board and use the microcontroller to communicate with the module using SPI to control its control registers and the receiver.

The wireless data transmitting and receiving function can be accomplished by operating the transmitter cache. The timing sequence of module register read/write operation is shown in the figure.

Refer to the latest LLCC68 datasheet for details.

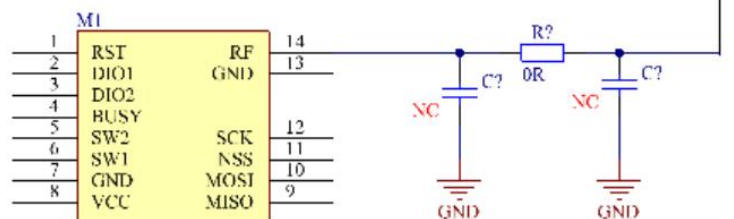
The figure below shows a typical SPI single access to a register.



5. Reference Circuits

When users use this module, between the antenna interface of the module and the antenna interface of the user's baseboard, it is recommended to add a π -type antenna matching circuit in order to facilitate the matching and debugging of the antenna output performance in the later stage, and note that the design of the antenna matching circuit should be designed according to the RF requirements.

Reserved π -type matching network



6. Annotations

1、Power supply

It is recommended to use DC regulated power supply to power the module, the power supply ripple factor is as small as possible, the module needs to be reliably grounded, and please note that the power supply positive and negative poles are correctly connected, such as the reverse connection may lead to permanent damage to the module. The best power supply range for RF performance is 2.5~3.5V, too low voltage will affect the RF performance, too high may damage the chip;

2、 antenna selection

Module antenna can not be surrounded by other metal objects nearby, otherwise it will seriously affect the communication distance;

3、ESD Electrostatic discharge protection

This module applies ESD protection to the power supply side and RF side, and is suitable for applications that require high ESD protection, such as power meters.

4、Development Notes

MCR-SGLA00391T0 module is made based on LLCC68 chip, its driver package is compatible with SX1262\SX1268 series, need to pay attention to the reception bandwidth and LoRa modulation spreading factor SF is used in the following range:

LoRa® Rx/Tx, BW = 125 - 250 - 500 kHz

LoRa® SF = 5 - 6 - 7 - 8 - 9 for BW = 125 kHz

LoRa® SF = 5 - 6 - 7 - 8 - 9 - 10 for BW = 250 kHz

LoRa® SF = 5 - 6 - 7 - 8 - 9 - 10 - 11 for BW = 500 kHz

Generally speaking, the reception sensitivity of the RF chip is relatively poor at the integer multiple of its crystal frequency, and it is recommended that users pay attention to avoiding the mirror frequency of its module crystal when choosing the operating frequency, i.e., the integer multiple of the crystal frequency, and the crystal frequency of this module is 32MHz.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247.

2.3 Specific operational use conditions

The module can be used for mobile applications with a maximum 1.89dBi antenna. The host manufacturer installing this module into their product must ensure that the final product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in this manual.

2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a host printed board microstrip trace antenna etc.

2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and user's body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.7 Antennas

Antenna Specification are as follows: Type: External antenna Gain:1.89dBi Max. This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a „unique“ antenna coupler. As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating “Contains **Lora module, Model:MCR-SGLA00391T0 , FCC ID:2BH8O-SGLA00391T0**” with their finished product

2.9 Information on test modes and additional testing requirements

Host manufacturer must perform test of radiated & conducted emission and spurious emission, e.t.c according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Federal Communication Commission (FCC) Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications made to this device not expressly approved by Suzhou Chaoqiansi Information Technology Co., Ltd may void the FCC authorization to operate this device.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

RF exposure statement:

The transmitter must not be colocated or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a Minimum distance of 20cm between the radiator and any part of your body.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTES

Co-location warning:

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

OEM integration instructions:

This device is intended only for OEM integrators under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module. As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:

The end product must be labeled in a visible area with the following: “Contains Transmitter Module **FCC ID:2BH80-SGLA00391T0**”.

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/ warning as show in this manual.