



A07-S868A10S2a User Manual

Based on CC1101 868MHz with shield, 10mW,
RF transceiver module with stamp hole interface



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1. Product Overview

A07-S868A10S2a is an 868MHz, 10mW, high stability, diffraction Strong performance, excellent penetrating ability, industrial-grade radio frequency receiver integrating wireless transceiver send module. The module adopts the CC1101 RF chip design imported from Texas Instruments Developed, comes with FEC and interleaving coding, and has strong anti-interference ability.

2. Product Features

- Transmission distance up to 1km^[1]
- Super low power consumption, the lowest power consumption is about 0.5uA
- Operation frequency 850-880MHz
 - Frequency adjustable, recommending 868±10MHz
 - Support 2-FSK, GFSK and MSK modulation
- Data FIFO
 - Transmission length: 1-64 bytes each data packet
 - Receiving length: 1-64 bytes each data packet
- Communication interface
 - Hardware SPI interface of 4-Pin
 - 1Mbps data speed is recommended, Max speed is up to 10Mbps.
- Multiple levels of airspeed
 - Programmable control of air speed ranges from 0.6k to 500k
 - Adjustable by software, recommend using low airspeed
- Transmission Power
 - Programmable control of transmit power, see CC1101 chip manual for details.
 - Transmit power can reach +10dBm in the supported frequency bands
- 4 operation modes^[4]
 - Stand by
 - Sleep
 - Send
 - Receive
- supply voltage range
 - 1.8V-3.6VDC
- Transmitting current
 - When the transmitting power is 10dBm, the transmitting current is tested as 38mA
- Receiving sensibility
 - Receive sensitivity measured at 1.2k airspeed is better than -111dBm
- Ultra-small volume, in-line package
 - 12 * 12mm
 - Module weight is about 3.5g

Remarks:

- 1) Open, sunny, no obstacles; The max power, height 1.5m, data speed 1Kbps
- 2) The airspeed is higher, the distance is closer; The airspeed is lower, distance is longer
- 3) For four operation modes, please see chip manual CC1101
- 4) Voltage higher than 3.6V will damage the module permanently

3. Series Products

Table 3-1

Model Number	Carrier Frequency (Hz)	IC	Package	Size (mm)	Max Transmit Power (dBm)	Range (km)	Antenna type
AS07-M1101S	433M	CC1101	SMD	20.8*12.2	10	1	Spring antenna/external
AS07-M1101D-TH	433M	CC1101	DIP	28*15	10	0.7	Spring antenna
A07-S433A10S2a	433M	CC1101	DIP	28*15	10	0.7	SMA-KE

4. Electrical Parameters

Table 4-1 Electrical Parameters of A07-S868A10S2a

Test Condition: Tc=25°C, VCC=3.3V

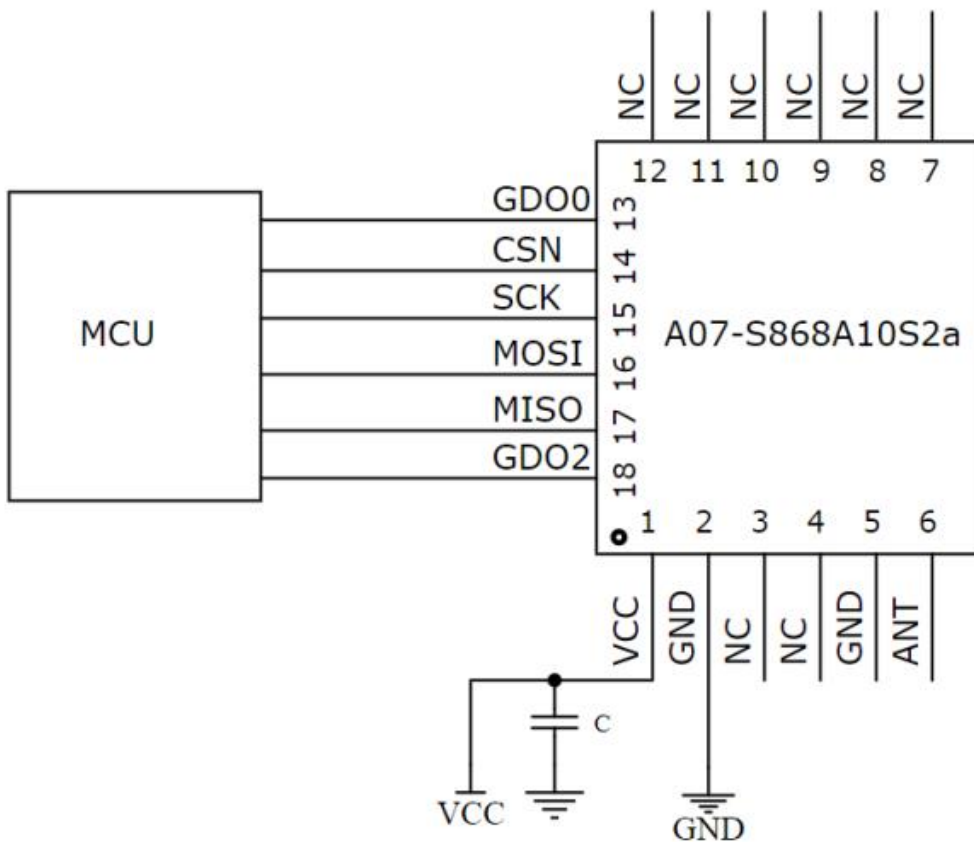
Parameter	Parameter Name	Description	Min Value	Typical Value	Max Value	Unit
Voltage	Supply voltage ^[1]		1.8	3.3	3.6	VDC
	Communication level	The communication level is generally smaller than the supply voltage, and VCC in 0.7*VCC refers to the supply voltage.	0.3*VCC		0.7*VCC	V
Current	Transmitting current ^[2]			38		mA
	Receiving current	The module is in the receiving working mode		18		mA
	Turn off current	The module set as power down mode		0.5		uA
RF Parameters	Operating frequency	Adjustable, 850-880MHz	850	868	880	MHz
	Transmitting power	adjustable, Max 10dBm		10		dBm
	Receiving sensitivity	-111dBm@1.2kbps, receive sensitivity is detailed in the chip manual		-111		dBm
	Air speed	Programmable control (0.6Kbps-500kbps)	0.6K		500k	bps
Operation Environment	Operating temperature	Industrial grade	-40		+85	°C
	Operating humidity	Relative humidity, no condensation	10%		90%	
	Storage temperature		-40		+125	°C

Remarks:

- 1) Voltage higher than 3.6V will damage the module. The lower the voltage, the lower the transmission power.
- 2) Power supply capability must be greater than 100mA.

5. Module Functions

5.1 Recommended Connection Diagram



5-1 Recommended Connection Diagram

Explanation:

1. GDO0 is a general-purpose IO, see CC1101 data sheet for details
2. GDO2 is generally configured as an IRQ-like function, and it is recommended to use the external interrupt of the micro controller for connection. It can also not be connected, and the SPI query method is used to obtain the interrupt status.
3. When developing and debugging, do not place the transceiver module too close, so that the data will not be received, this is because the receiver is in a saturated state
4. The SPI communication rate should not be set too high, usually about 1M is OK
5. After CC1101 resumes IDLE mode or configures sleep mode, it is recommended to re-initialize the power configuration table

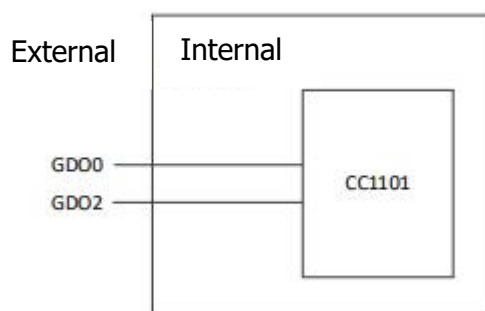
5.2 Pin Definition

Table 5-1 Pin Definition of A07-S868A10S2a

Pin No.	Pin Name	Pin Direction	Pin Description
1	VCC		Power supply, range 1.8-3.6V
2	GND		Ground, connect to power reference ground
3	NC		Empty
4	NC		Empty
5	GNG		Reference Ground
6	ANT	Output	Antenna Interface
7	NC		Empty
8	NC		Empty
9	NC		Empty
10	NC		Empty
11	NC		Empty
12	NC		Empty
13	GDO0	Input	Module information input Pin
14	CSN	input	Module chip select pin for starting an SPI communication
15	SCK	input	Module SPI bus clock
16	MOSI	input	Module SPI Data Input Pin
17	MISO/GDO1	output	Module SPI Data output Pin
18	GDO2	output	Module information output Pin
*See the CC1101 data sheet for pin definitions, software drivers, and communication protocols of the module. *			

5.3 Pin Function

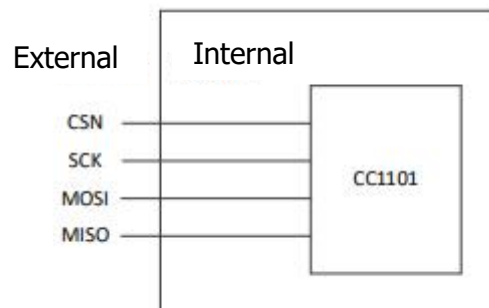
5.3.1 Function of GDO0, GDO2 Pin



Picture 5-2 GDO0, GDO2 Local Connection Diagram

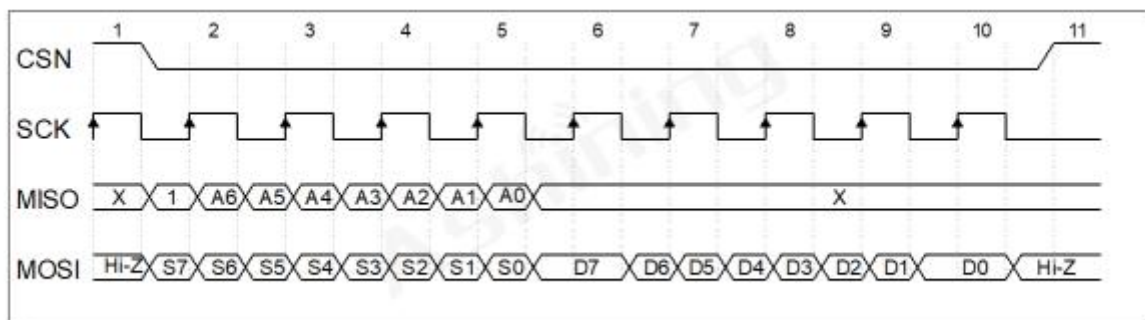
For the specific function configuration of GDO0 and GDO2 pins and module information output pin, refer to the CC1101 chip manual.

5.3.2 Function of SPI pin

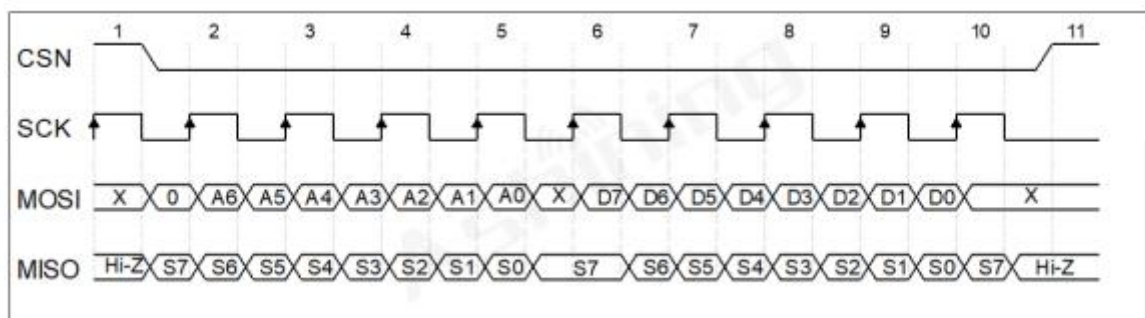


Picture 5-3 SPI Local Connection Diagram

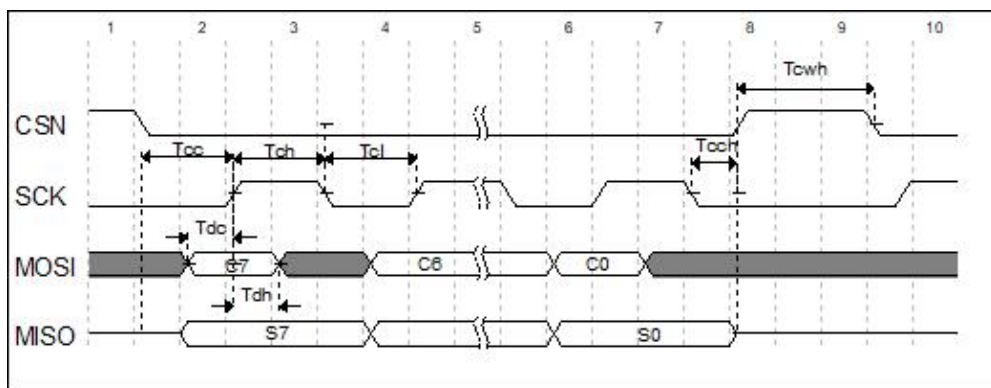
The SPI Sequence Diagram is as follows:



Picture 5-4 Sequence Diagram of SPI Read Operation



Picture 5-5 Sequence Diagram of SPI Write Operation



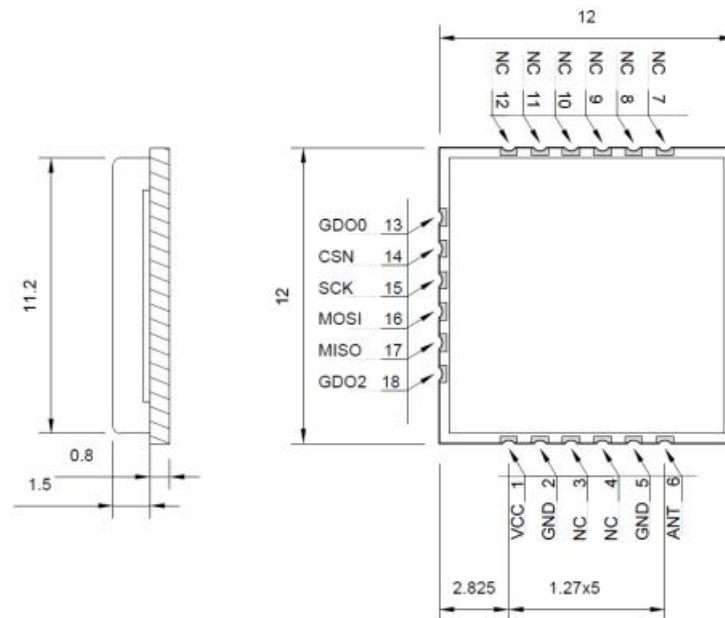
Picture 5-6 SPI Sequence Diagram of Parameters

Table 5-3

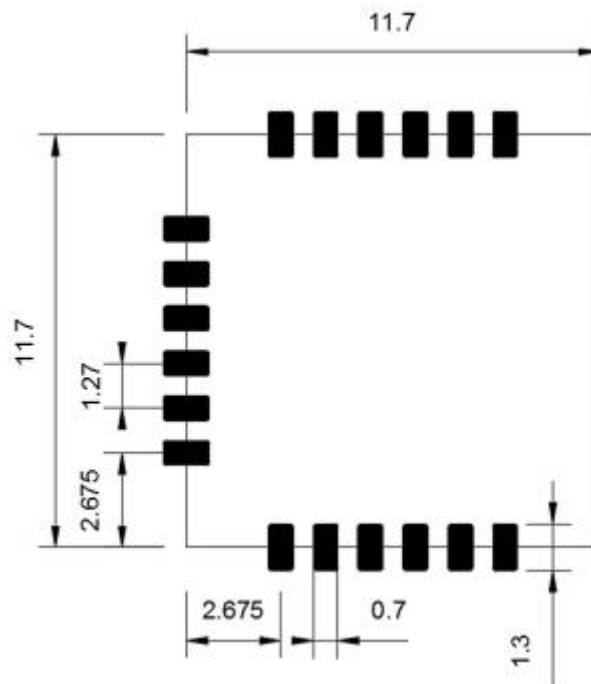
Parameters Symbols	Description	Min	Max	Unit
T _{cc}	Chip select clock setting	2		ns
T _{ch}	Clock high level time	50		ns
T _{cl}	Clock low level time	50		ns
T _{cch}	The selection time lasts	2		ns
T _{cwh}	Chip selection idle time	50		ns
T _{dc}	Data initialization clock	2		ns
T _{dh}	Data duration	2		ns

6. Package Information

6.1 Machine Size (unit: mm)



6.2 Reference Pad Design (unit: mm)



Important Remarks and Disclaimers

As the hardware and software of the product continue to improve, this manual may be subject to change, and the final version of the manual shall prevail.

Users of this product need to pay attention to the product dynamics on the official website, so that users can get the latest information of this product in time.

The pictures and diagrams used in this manual to explain the functions of this product are for reference only.

The measured data in this specification are all measured by our company at room temperature for reference only. Please refer to the actual measurement for details.

Chengdu Ashining Technology Co., Ltd. reserves the right of final interpretation and modification of all contents in this manual