

A32-S400A22S1a Product Manual

Based on SX126X with shield cover 433/470/490MHz, 158mW
LoRa Spread Spectrum, IPEX Interface RF Transceiver
Module

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Status: Controlled status

Based on SX126X with shield cover 433/470/490MHz, 158mW LoRa Spread Spectrum, IPEX Interface RF Transceiver Module

1. Product Overview

A32-S400A22S1a is a 433/470/490MHz (China band), about 158mW, high speed, high stability, industrial grade, integrated wireless transceiver RF module. The module adopts the original SEMTECH SX126X RF chip, working in the 410~525MHz ISM band, with metal shield, strong anti-jamming performance. The module has sufficient transmitting power, excellent spectral characteristics, very small harmonics, small channel crosstalk, small size, and some devices reach military grade standards.



2. Product Features

- SX126X RF chip
- High-performance IPEX antenna interface and stamp port with transmission distance up to 5.0km^[1]
- Ultra-low power processing, minimum power consumption $\leq 1\mu A$
- Operating frequency band 410~525MHz
Frequency adjustable, channel spacing adjustable
GFSK, FSK, MSK, GMSK, LORA, OOK modulation
- 256 byte buffer
- Communication Interface
4-Pin hardware SPI communication interface
Recommended rate 4Mbps, maximum rate up to 10Mbps
- Wide range of air rates^[2]
Adjustable air rate, 0.3-6 2.5kbps (LORA mode)
- Power adjustable, maximum power about 22dBm^[3]
- Four working modes^[4]
Sleep mode (sleep down)
Standby mode (standby)
Sending mode (send)
Receive mode (receive)
- Supply voltage range^[5]
2.0V~3.6VDC
- Emission current
The measured emission current is about 108mA at an emission power of 22dbm
- Reception sensitivity
Down to -148dBm
- Ultra-small size, SMD package
19.65*16mm
Module weight about 1.5g

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Remarks: [1] clear and open, no obstacle interference; maximum power, height 2m, air rate 2.4kbps

[2] The higher the airspeed, the closer the transmission distance; the lower the airspeed, the longer the transmission distance.

[3] See SX126X chip manual for transmit power details

[4] The four operating modes are described in the SX126X chip manual.

[5] Higher than 3.6V will cause permanent damage to the module

3. Series Products

Module Model	Carrier frequency (Hz)	Chip Solutions	Package	Size (mm)	Maximum transmit power (dBm)	Communication distance (km)	Antenna Form
A32-S900A22S1a	850~931MHz	SX126X	SMD	19.65*16mm	22	5	IPEX

1. Module pin compatible
2. Different frequency modules, can not communicate with each other

4. Electrical parameters

Conditions: Tc = 25° C, VCC = 3.3V

Parameter s	Parameter Name	Description	Minimum value	Typical values	Maximum value	Unit
Voltage Configuration	Supply voltage ^[1]		2.0	3.3	3.6	VDC
	Communication level	The communication level is generally less than the supply voltage, VCC in 0.7*VCC refers to the supply voltage	0.3*VCC		0.7*VCC	V
Current consumption	Emission current ^[2]	@22dbm		108		mA
	Receiving current			8		mA
	Turn-off current		0.2	1		uA
RF parameters	Operating Frequency Band	Adjustable working frequency band, adjustable channel interval	410	433	525	MHz
	Transmitting power	Maximum 22dBm, about 158mW		22		dBm
	Reception sensitivity			-148		dBm
	airspeed	0.3-62.5kbps	0.3k	2.4k	62.5k	bps
Working Environment	Operating temperature		-40		+85	°C
	Working humidity	Relative humidity, non-condensing	10%		90%	
	Storage temperature		-40		+125	°C

Note: [1] supply voltage higher than 3.6V will cause damage to the module; the lower the voltage, the lower the transmit power will also be

[2] The power supply capacity must be greater than 200mA

5. Module Function

5.1 Recommended connection diagram

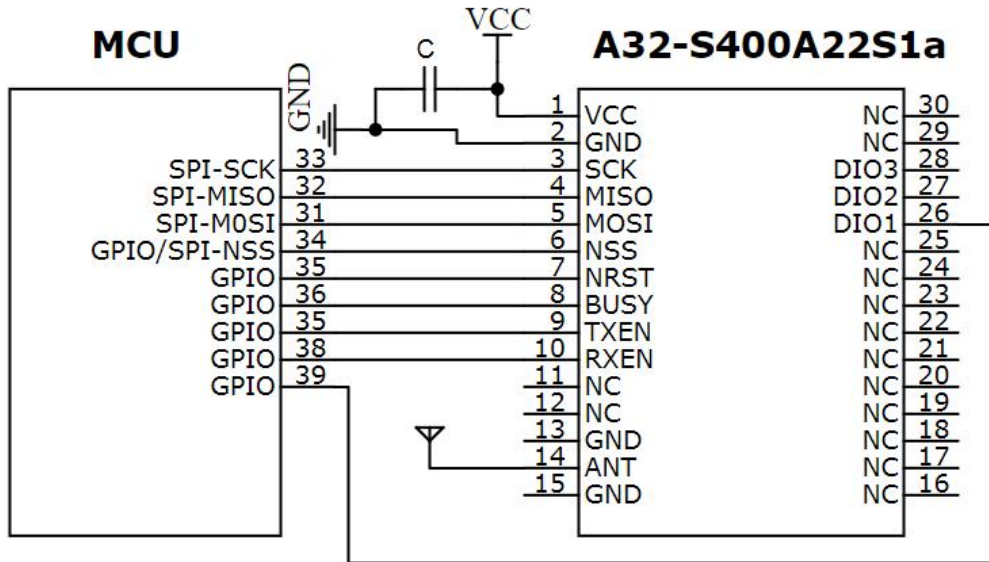


Figure 5-1 Recommended connection diagram

5.2 Pin Definition

Pin Definition Table

Pin Serial Number	Pin Name	Pin Orientation	Pin Usage
1	VCC	Input	Power supply
2	GND	Output	Power Ground
3	SCK	Input	SPI Clock
4	MISO	Output	SPI Data
5	MOSI	Input	SPI Data
6	NSS	Input	SPI Chip Selection
7	NRST	Input/output	SX126X reset control pins
8	BUSY	Input/output	SX126X Interrupt Control Pins
9	TXEN	Input	Module transmit control pin (TXEN = 1, RXEN = 0)
10	RXEN	Input	Module receive control pins (TXEN = 0, RXEN = 1)
13	GND		Reference place

14	ANT	Output	Antenna Interface
15	GND		Reference place
26	DIO1	Input/output	General-purpose I/O port, configurable with various functions, corresponding to SX126X DIO1
27	DIO2	Input/output	General-purpose I/O port, configurable with various functions, corresponding to SX126X DIO2, which can be left unattended if not in use
28	DIO3	Input/output	General purpose I/O port, can be configured with various functions, corresponding to SX126X DIO3, can be left unattended if not in use
11, 12, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 29, 30	NC		Empty feet, recommended suspension

Pin definition, software driver and communication protocol of the module are described in the SX126X data sheet.

SPI Pin Function

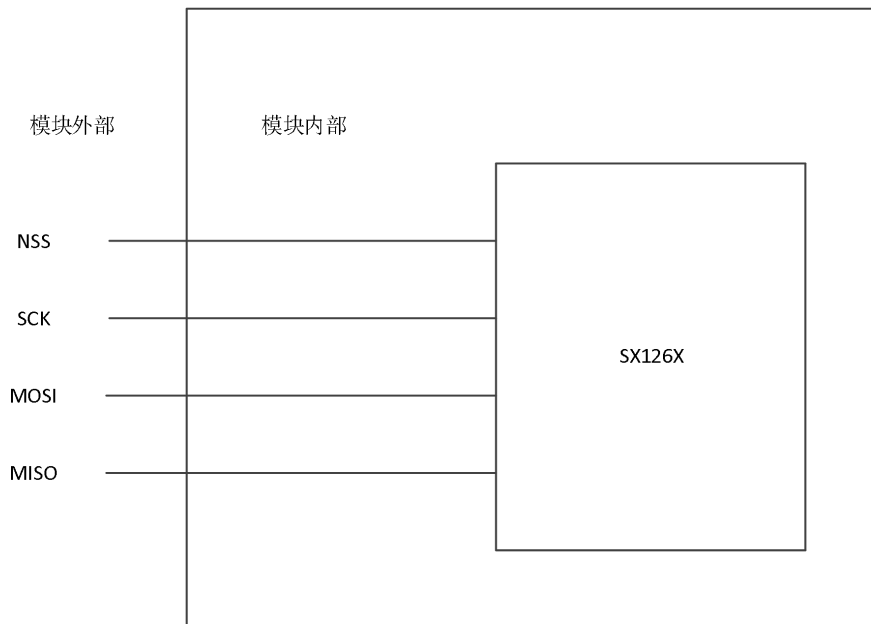
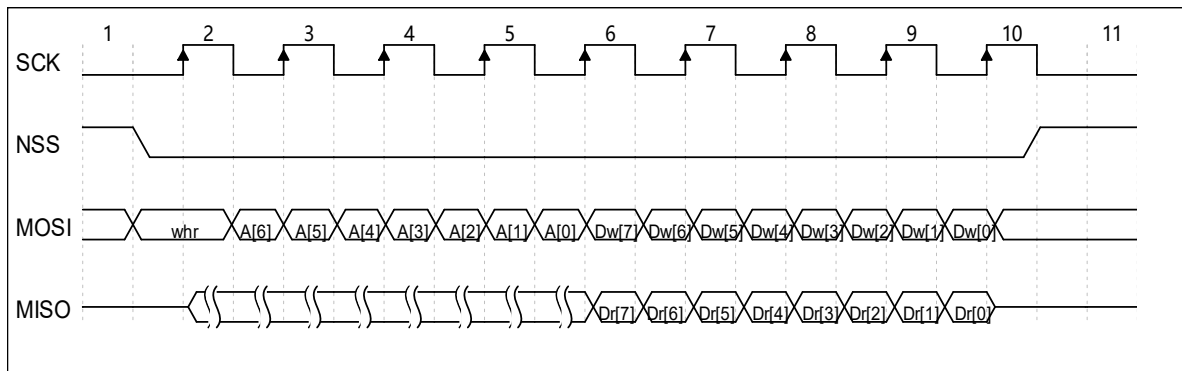


Figure 5-4 SPI pin local connection diagram

The SPI timing diagram is as follows.



The first byte is the address byte, which is composed as follows.

1. wnr bit: wnr is 0 for read, 1 for write.
2. The remaining 7 bits are the address bits and the first bit is the high MSB.

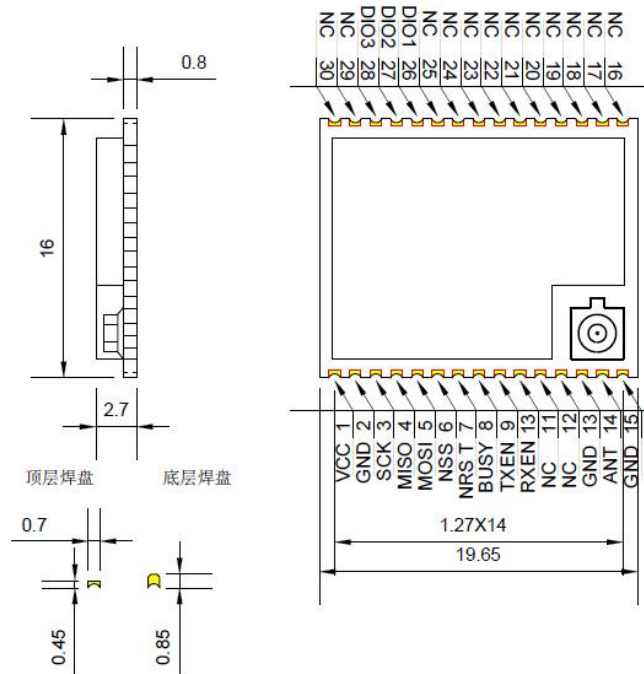
The second byte is the data byte, if MOSI transmits a write address or receives a read address through the host, the data byte transmitted is high byte first (MSB)

The registers provide three address modes, as follows.

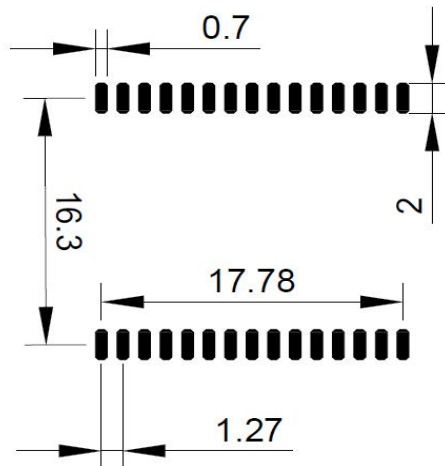
1. SINGLE single address: an address byte is determined by its highest bit wnr read/write control bit
2. BURST burst address: the address byte is followed by several data bytes, and between each data byte, the address byte is automatically incremented internally
3. FIFO wireless packet address: If the address byte is the same as the address of the FIFO, the address of the FIFO will inherit the address byte and the address will not be automatically increased internally. See SX276/8 datasheet for details

6. Package Information

6.1 Mechanical size(unit:mm)



6.2 Reference pad design (unit: mm)



7. Packaging method

7.1 Static bag packaging



Important Notes and Disclaimers

Due to the continuous improvement of hardware and software of the product, this specification is subject to change, and the latest version of the specification shall prevail in the end.

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

The pictures and diagrams used in this specification are for illustrating the functions of this product and are for reference only.

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

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