E30-900M20S

SI4463 868/915MHz 100mW SPI Wireless Module



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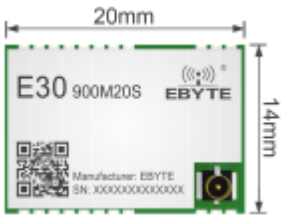
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1 OVERVIEW

1. 1 Brief Introduction

E30-900M20S is a hardware module (SPI) based on the SI4463 RF chip imported from Silicon Labs. It is a half-duplex, SMD integrated transceiver with transparent transmission available. With working frequency band 855-925MHz, transmitting power 100mW, it is suitable for a variety of environments. The original imported SI4463 RF chip from Silicon Labs(USA) features high receiving sensitivity and strong anti-interference, supporting the development of low power consumption as well. It has been widely used in various industries and has the characteristics of stable performance, long transmission distance, and strong ability of penetration and diffraction, etc.



1.2 Features

- The measured communication distance can reach 2500m;
- Maximum transmission power: 100 mW;
- Support 855-925MHz ultra-wide frequency band;
- Support air date rate of 1k~25kbps;
- Support 1.8~3.6V power supply, power supply over 3.3 V can guarantee the best performance;
- Industrial grade standard design, support -40 ~ 85 °C for working over a long time;

1.3 Application

- Home security alarm and remote keyless entry;
- Smart home and industrial sensors, etc.;
- Wireless alarm security system;
- Building automation solutions;
- Wireless industrial-grade remote control;
- Intelligent agriculture and oilfield solutions;
- Health care products;
- Advanced Meter Reading Architecture(AMI);
- Automotive industry applications.

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2 Specification and Parameter

2. 1 Limit Parameter

Main parameter	Performance		Remark
	Min	Max	
Power supply （V）	1.8	3.6	Voltage over 3.6V will cause permanent damage to module
Blocking power （dBm）	-	10	-
Operating temperature （℃）	-40	+85	Industrial grade

2.2 Operating Parameter

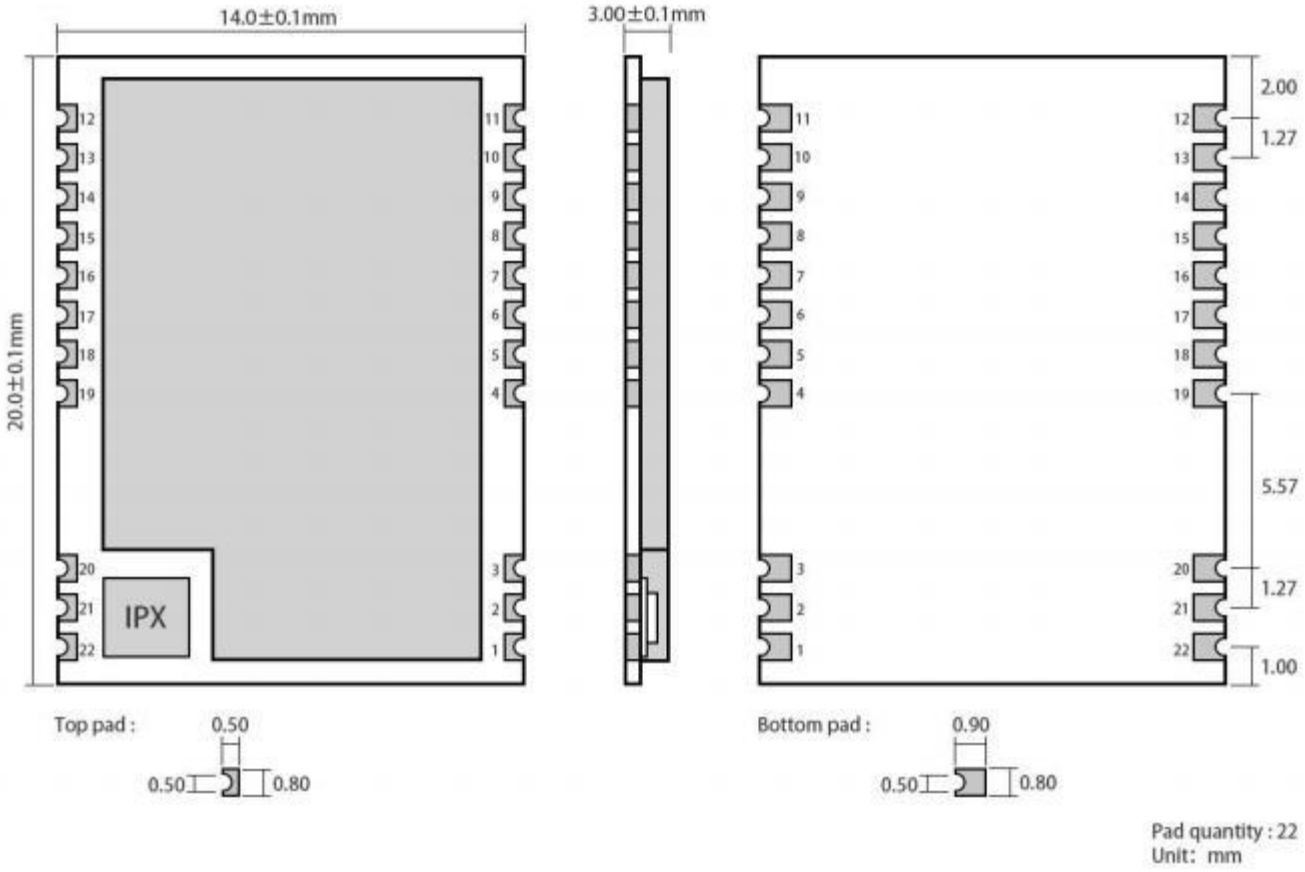
Main parameter		Performance			Remark
		Min	Typical	Max	
Operating voltage （V）		1.8	3.3	3.6	3.3 V ensures output power
Communication level （V）		-	3.3	-	-
Operating temperature （℃）		-40	-	+85	Industrial grade
Operating frequency （MHz）		855	-	925	-
Power Consump - tion	TX current （mA）	80	100	130	Instant power consumption
	RX current （mA）	-	16	-	-
	Sleep current （μA）	-	1.7	-	-
Max TX power （dBm）		19	20	21	-
Receiving sensitivity （dBm）		-115	-115	-116	Air data rate is1kbps

Main parameter	Description	Remark
Reference distance	2.5Km	Test condition：clear and open area, antenna gain: 5dBi，antenna height: 2.5m ， air data rate: 1kbps
Crystal frequency	26MHz	The module has a built-in passive patch crystal with an air speed limit of 433kbps (4-GFSK)
Modulation	GFSK	-
Communication Interface	SPI	Max. rate 10Mbps
Package	SMD	-
Interface method	Stamp Hole	-
Size	20*14mm	-
Antenna	IPEX/ STAMP	50 ohm impedance

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3 Size and Pin definition



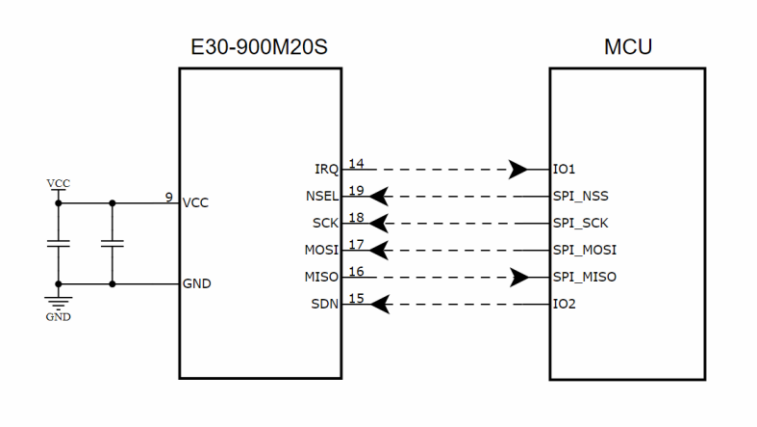
Pin No.	Item	Direction	Description
1	GND	-	Ground wire, connected to the power reference ground
2	GND	-	Ground wire, connected to the power reference ground
3	GND	-	Ground wire, connected to the power reference ground
4	GND	-	Ground wire, connected to the power reference ground
5	GND	-	Ground wire, connected to the power reference ground
6	GPIO_2	Output	Configurable universal GPIO port (see SI4463manual for details),GPIO2: Enable the internal LNA connection.
7	GPIO_3	Output	Configurable universal GPIO port (see SI4463manual for details),GPIO3: Enable the internal PA connection.
8	GPIO_ 1	Output	Configurable universal GPIO port (see SI4463manual for details)
9	VCC	-	Power supply, 1.8~3.6V, 3.3V is recommended (It is also recommended to add external ceramic filter capacitor)
10	GND	-	Ground wire, connected to the power reference ground
11	GND	-	Ground wire, connected to the power reference ground
12	GND	-	Ground wire, connected to the power reference ground
13	GPIO_0	Output	Configurable universal GPIO port (see SI4463manual for details)
14	IRQ	Output	SPI interrupt request
15	SDN	-	Shutdown Input Pin. It is low level when working (See SI4463 manual for more details)

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16	MISO	Output	SPI master output slave input
17	MOSI	Input	SPI master input slave output
18	SCK	Input	Serial Clock Input
19	nSEL	Input	SPI Chip select for starting SPI communication
20	GND	-	Ground wire, connected to the power reference ground
21	ANT	Input/ Output	Antena
22	GND	-	Ground wire, connected to the power reference ground

4 Recommended circuit diagram



5 Hardware design

- It is recommended to use a DC stabilized power supply. The power supply ripple factor is as small as possible and the module needs to be reliably grounded;
- Please pay attention to the correct connection of the positive and negative poles of the power supply, reverse connection may cause permanent damage to the module;
- Please check the power supply to ensure that between the recommended supply voltage, if exceeding the maximum, the module will be permanently damaged;
- Please check the stability of the power supply. Voltage can not fluctuate greatly and frequently;
- When designing the power supply circuit for the module, it is often recommended to reserve more than 30% of the margin, so the whole machine is beneficial for long-term stable operation;
- The module should be as far away as possible from the power supply, transformers, high-frequency wiring and other parts with large electromagnetic interference;
- Bottom Layer High-frequency digital routing, high-frequency analog routing, and power routing must be avoided under the module. If it is necessary to pass through the module, assume that the module is soldered to the Top Layer, and

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the copper is spread on the Top Layer of the module contact part(well grounded), it must be close to the digital part of the module and routed in the Bottom Layer;

- Assuming the module is soldered or placed over the Top Layer, it is wrong to randomly route over the Bottom Layer or other layers, which will affect the module's spurs and receiving sensitivity to varying degrees;
- It is assumed that there are devices with large electromagnetic interference around the module that will greatly affect the performance. It is recommended to keep them away from the module according to the strength of the interference. If necessary, appropriate isolation and shielding can be done;
- Assume that there are traces with large electromagnetic interference (high-frequency digital, high-frequency analog, power traces) around the module that will greatly affect the performance of the module. It is recommended to stay away from the module according to the strength of the interference. If necessary, appropriate isolation and shielding can be done;
- If the communication line uses a 5V level, a 1k-5. 1k resistor must be connected in series (not recommended, there is still a risk of damage);
- Try to stay away from the TTL protocol which also has a physical layer of 2.4GHz, such as USB3.0;
- The mounting structure of antenna has a great influence on the performance of the module. It is necessary to ensure that the antenna is exposed, preferably vertically upward.
- When the module is mounted inside the case, use a good antenna extension cable to extend the antenna to the outside; When the antenna is installed inside a metal case, it will cause the transmission distance to be greatly weakened.

6 FAQ

6. 1 Communication range is too short

- The communication distance will be affected when obstacle exists;
- Data lose rate will be affected by temperature, humidity and co-channel interference;
- The ground will absorb and reflect wireless radio wave, so the performance will be poor when testing near ground;
- Sea water has great ability in absorbing wireless radio wave, so performance will be poor when testing near the sea;
- The signal will be seriously affected when the antenna is near metal object or put in a metal case;
- Power register was set incorrectly or air data rate is set as too high (the higher the air data rate, the shorter the distance);
- The power supply low voltage under room temperature is lower than our recommendation, the lower the voltage, the lower the transmitting power;
- Due to antenna quality or poor matching between antenna and module.

6.2Module is easy to damage

- Please check the power supply source, ensure it is 1.8V~3.6V, voltage higher than 3.6V will damage the module;
- Please check the stability of power source, the voltage cannot fluctuate too much;
- Please make sure anti-static operation when installing and using, high frequency devices have electrostatic susceptibility;
- Please ensure the humidity is within limited range, some parts are sensitive to humidity;
- Please avoid using modules under too high or too low temperature.

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6.3 BER(Bit Error Rate) is high

- There are co-channel signal interference nearby, please be away from interference sources or modify frequency and channel to avoid interference;
- Poor power supply may cause messy code. Make sure that the power supply is reliable;
- The extension line and feeder quality are poor or too long, so the bit error rate is high.

7 Production guidance

This product is a SMD module. When soldering the module, the soldering personnel must work in accordance with the anti-static operation specification;

This product is an electrostatic sensitive product. If the module is not welded according to the specification, the module may be permanently damaged.

8 E30 series

Model No.	IC	Frequency Hz	Tx power dBm	Distance km	Air data rate bps	Package	Size mm	Antenna
E30-170T20D	SI4463	170M	20	2.0	1k~25k	DIP	21 * 36	SMA-K
E30-170T27D	SI4463	170M	27	5.0	1k~25k	DIP	24 * 43	SMA-K
E30-433T20S3	SI4438	433M	20	2.5	1k~25k	SMD	16 * 26	IPEX/ STAMP
E30-433T20S	SI4438	433M	20	2.5	1k~25k	SMD	17 * 30	IPEX/ STAMP
E30-433T20D	SI4438	433M	20	2.5	1k~25k	DIP	21 * 36	SMA-K
E30-490T20S	SI4438	490M	20	2.5	1k~25k	SMD	17 * 30	IPEX/ STAMP
E30-490T20D	SI4438	490M	20	2.5	1k~25k	DIP	21 * 36	SMA-K
E30-780T20S	SI4463	780M	20	2.5	1k~25k	SMD	17 * 30	IPEX/ STAMP
E30-868T20D	SI4463	868M	20	2.5	1k~25k	DIP	21 * 36	SMA-K
E30-868T20S	SI4463	868M	20	2.5	1k~25k	SMD	17 * 30	IPEX/ STAMP
E30-915T20D	SI4463	915M	20	2.5	1k~25k	DIP	21 * 36	SMA-K
E30-915T20S	SI4463	915M	20	2.5	1k~25k	SMD	17 * 30	IPEX/ STAMP

9 Antenna recommendation

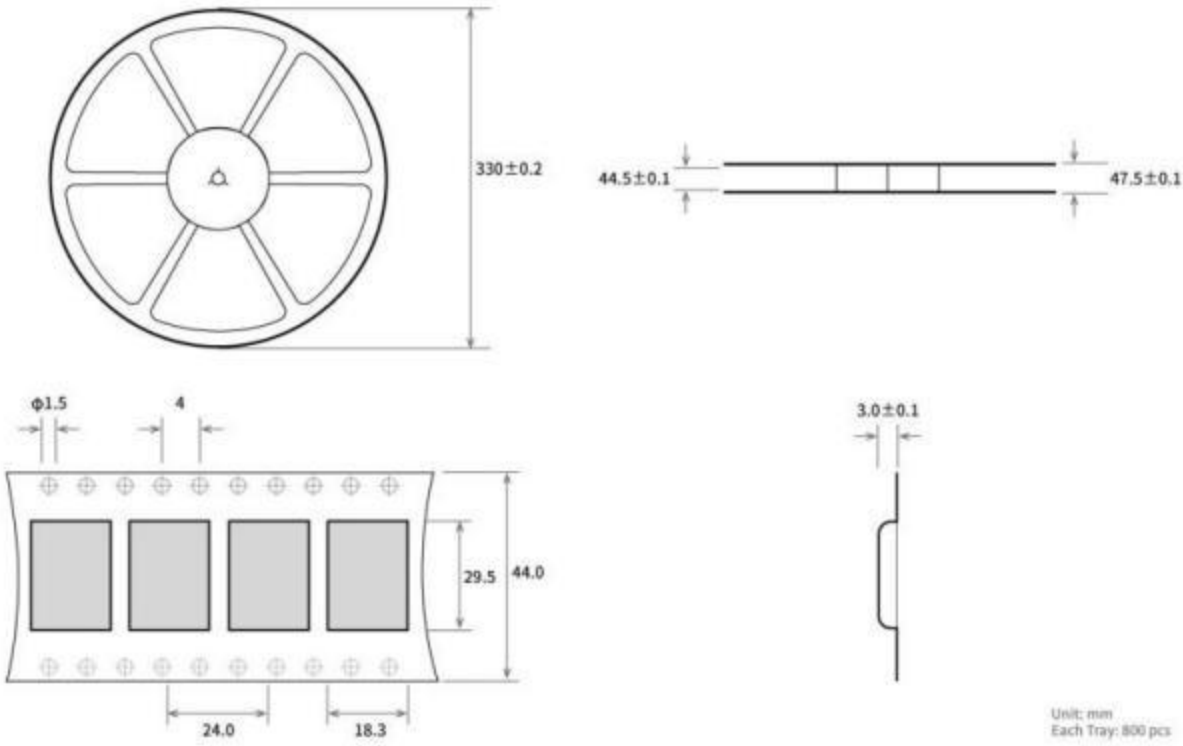
The antenna is an important role in the communication process. A good antenna can largely improve the communication system. Therefore, we recommend some antennas for wireless modules with excellent performance and reasonable price.

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Model No.	Type	Frequeny Hz	Interface	Gain dBi	Hight mm	Cable mm	Function feature
TX868 -JZLW -15	Rubber	868M	IPEX 1	3.0	165	12.5	Glue rod cabinet antenna, omnidirectional antenna
TX915 -JZLW -15	FPC	915M	IPEX 1	3.0	165	12.5	Glue rod cabinet antenna, omnidirectional antenna
TX915 -FPC-4510	Flexible antenna	915M	IPEX 1	2.0	130	10	Flexible antenna

10 Package method for bulk order



Revision history

Version	Date	Description	Issued by
1.0	2021-08-09	Content updated	Linson
1.1	2023-2-20	Content correction	Bin
1.2	2025-9-23	Fix formal specifications	Hao

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