Product Brief

Model: TLM922S-P01A

Ver.1.4

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1. Overview

TLM922S-P01A is developed on the basis of LoRa technology and got LoRaWAN Certified. It's not only slim, ultra-low power but also includes AES encryption. TLM922S-P01A module integrates a 32bit MCU, Cypress S6E1C32, and a single-chip radio transmitter, Semtech SX1272, designed for high performance at very low-power and low-voltage operation in cost-effective wireless systems. All filters are integrated, thus removing the need for costly external SAW and IF filters. The device is mainly intended for the ISM (**I**ndustrial, **S**cientific, and **M**edical) frequency bands at 862-932 MHz. The module integrated many RF functions and PA to make the maximum output power up to +20dBm and signal coverage can reach up 10km.

TLM922S-P01A is an open source wireless communication module. In this module, it builds in a 32bits MCU, Cypress S6E1C32, which equips with 128Kbytes flash and 16Kbytes SRAM. Customer can use it conveniently and reduce development time.

2. Product Features

1. LoRa Modem

2. LoRaWAN or proprietary protocol

3. AES encryption 128

4. Frequency bands :862~932MHz

5. Programmable output power up to +20dBm for all supported frequencies, the communication distance is above 10km.

6. Sensitivity: down to -137dBm

7. Transmit mode at +20dBm output power <140mA

8. Low current consumption at power down state <3uA

9. Small dimension: 23.5mm×23.2mm×3.1 mm

10. Certification: LoRaWAN, TELEC, VCCI, NCC, FCC, NBTC

3. Application

1. Automation and safety alarm in the community.

2. Various automated smart meters, such as water meter, gas meter and electricity meter.

3. Long range communication data collection and integration.

4. Outdoor information monitoring and collection, such as temperature, humidity and air quality information.

5. Electricity facilities measurement and management, such as smart street lighting.

6. Agriculture and animal husbandry monitoring and management.

4. Product Specifications

Transceiver	SX1272
MCU	Cypress S6E1C32
Operating supply voltage	DC 2.2～3.6V
Frequency	862~932MHz
Frequency accuracy	±10KHz
Modulation	LoRa
Transmit power	-2～+20dBm
TX current consumption	<140mA
Sleep State current consumption	<3uA
Data rate	292bps～21.875 Kbps
Antenna impedance	50ohm
Operating temperature	-40～+85 °C
Storage temperature range	-40°C ~ +90°C

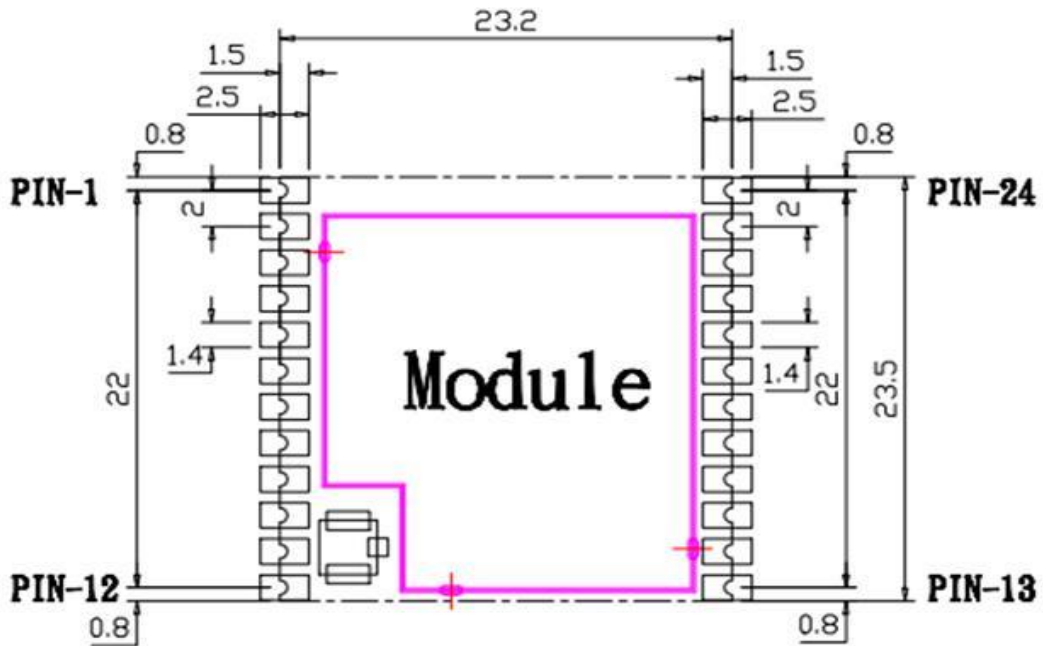| Dimension	23.5mm×23.2mm×3.1 mm
Certificate of Compliance	LoRaWAN EU868/AS923, TELEC, FCC, NCC, NBTC, VCCI TELEC ID: 201-170057 NCC ID: CCAK17LP0980T1 FCC ID: 2AKIBTLM922S

Note：

- The module transmission data rate will affect Transmission distance, the higher the data rate , the closer the distance, and the lower the receiving sensitivity.
- The supply voltage to the module will affect TX power, in the operating supply voltage range, the lower the voltage to get the lower the TX power.
- The antenna will strongly affect the communication distance, please select matched antenna and connect it correctly.
- The module mount will affect the communication distance.

5. PIN Definition

Pin	Name		Pin	Name
1	MD0		24	RST_M0
2	GPIO_ADC0		23	GPIO_INT0
3	SPI_MISO		22	UART_TX
4	SPI_MOSI		21	UART_RX
5	SPI_SCK		20	GPIO_INT3
6	SPI_CS		19	SWDIO
7	I2C_SCL		18	SWCLK
8	I2C_SDL		17	GPIO_INT2
9	GPIO_ADC1		16	+3.3V
10	GND		15	+3.3V
11	ANT		14	GND
12	GND		13	GND

6. PCB Dimension

7. Pin Configuration

PIN	1. PIN NAME	2. Description
1	3. MD0	4. During normal operation, input MD0="L". 5. During serial programming to Flash memory, input MD0="H".
2	6. GPIO_ADC0	7. A/D converter analog input pin and general-purpose I/O
3	8. SPI_MISO	9. SPI interface
4	10. SPI_MOSI	11. SPI interface
5	12. SPI_SCK	13. SPI interface
6	14. SPI_CS	15. SPI interface

7	16. I2C_SDA	17. I2C interface
8	18. I2C_SCL	19. I2C interface
9	20. GPIO_ADC1	21. A/D converter analog input pin and general-purpose I/O
10	22. GND	23. RF ground
11	24. ANT	25. RF output signal
12	26. GND	27. RF ground
13	28. GND	29. System ground
14	30. GND	31. System ground
15	32. +3.3V	33. Power source
16	34. +3.3V	35. Power source
17	36. GPIO_INT2	37. External interrupt request and general-purpose I/O
18	38. SWCLK	39. Serial wire debug interface clock input pin
19	40. SWDIO	41. Serial wire debug interface data input output pin
20	42. GPIO_INT3	43. External interrupt request and general-purpose I/O
21	44. UART_RX	45. UART interface
22	46. UART_TX	47. UART interface
23	48. GPIO_INT0	49. External interrupt request and general-purpose I/O
24	50. RST_M0	51. External Reset Input pin.

Note:

- The module power supply voltage range is DC 3.0 ~ 3.6V, above DC 3.6V, the module will damage. It is recommended work at DC 3.3 V.
- The module interface use half circle pad to soldering on the system PCB board, the GND must soldering to the system digital GND reliably, or use connector to connect main-board .
- The antenna must the get to the module's ANT pin as close as possible.
- The module's pin GPIO_ADC and GPIO_INT are general digital I/O ports, they also can be programmable to A/D converter analog input pin and external interrupt pin.

8. Distance Measurement in City