

Catalogue

1. Descriptions	- 3 -
2. Features	- 3 -
3. Application	- 3 -
4. Block Diagram	- 4 -
5. Electrical Characteristics	- 4 -
6. Typical Schematic Circuit:	- 5 -
7. Voltage and Power Comparison ChartVoice transmission	- 5 -
8. Pin Assignment	- 6 -
9. Mechanism Dimension(Unit:mm)	- 7 -
Appendix: SMD Reflow Chart	- 8 -

Note: Revision History

Revision	Date	Comment
V1.0	2024-4	First release

1. Descriptions

The LoRa-STM32WLE5 wireless module utilizes the STM32WLE5 chip from STMicroelectronics, specifically designed for ultra-long-range and ultra-low-power wireless solutions. This module employs LoRa® modulation and is based on the high-performance Arm® Cortex®-M4 32-bit RISC core, with an operating frequency of up to 48 MHz. The core includes a complete set of DSP instructions and an independent Memory Protection Unit (MPU), enhancing the security of applications. This module is extensively applicable in various sectors such as security systems, smart agriculture, industrial manufacturing, and smart homes.

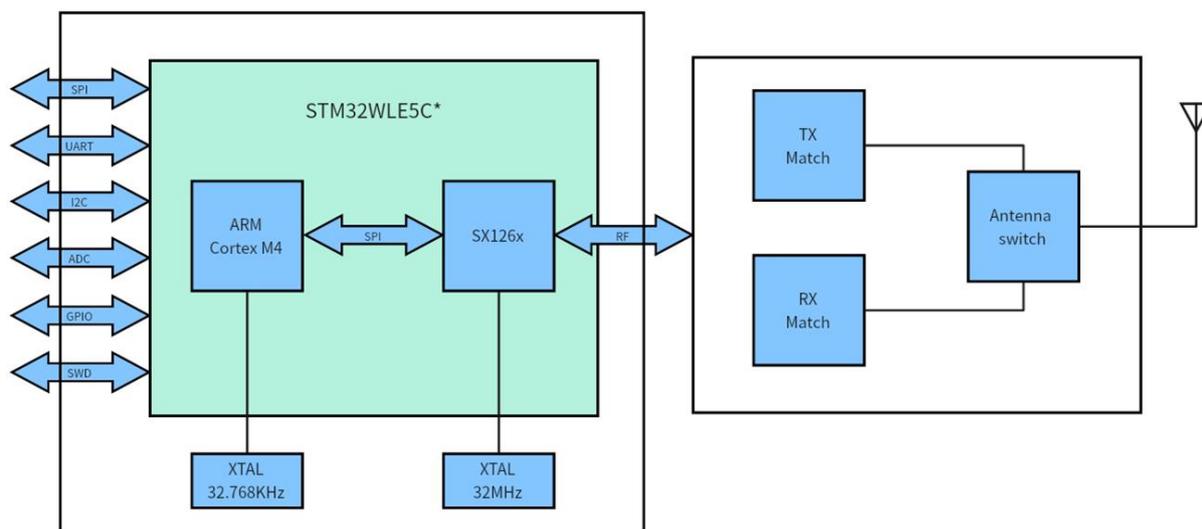
2. Features

- UHF band frequency:433/470MHz, 868/915MHz
- Customizable frequency range from 150 to 960 MHz
- Open area transmission distance of over 5000 meters
- High receiver sensitivity up to -141dBm @ BW=125KHz, SF=12
- Adjustable transmit power, up to 22dBm
- Diverse interfaces: UART, SPI, I2C, GPIO, ADC
- Sleep current: < 1uA
- Receive current:< 8mA
- Core processor: 32-bit Arm® Cortex®-M4 CPU
- Security features: Supports 256-bit hardware encryption and PCROP read-write protection
- Compact size with stamp hole design, facilitating secondary development by customers

3. Application

- Smart Agriculture
- Industrial Manufacturing
- Smart Home
- Remote Irrigation

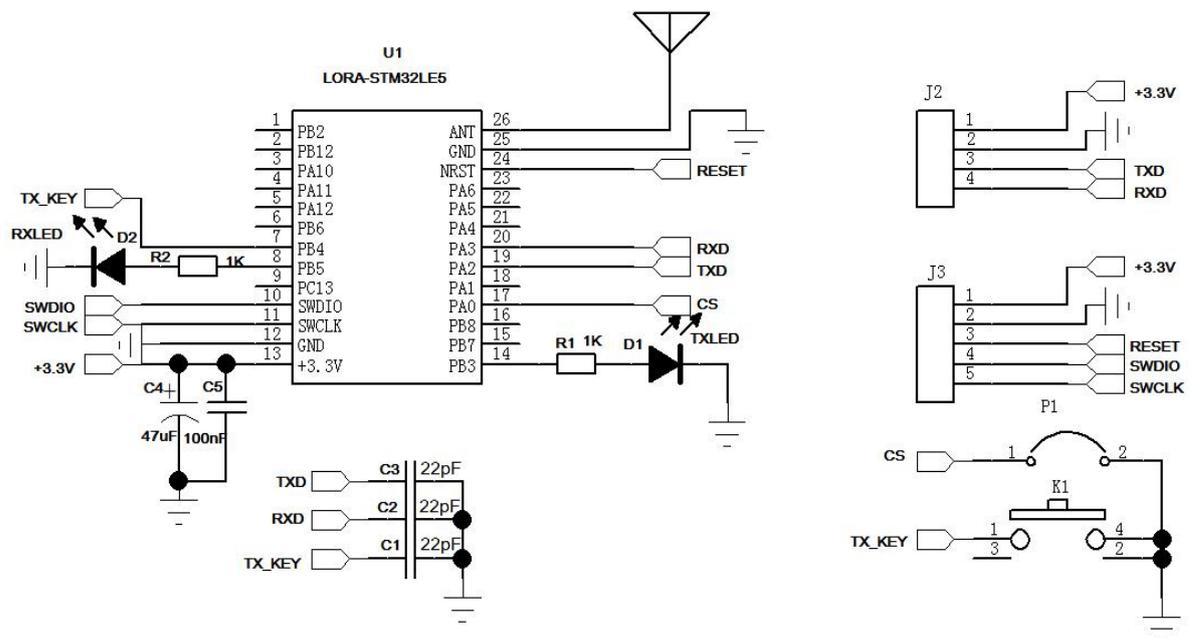
4. Block Diagram



5. Electrical Characteristics

Parameters	Test condition	Min.	Typ.	Max	Unit
Voltage range		1.8	3.3	3.6	V
Operating Temperature		-40	25	85	°C
Maximum Input Signal			10		dBm
Current Consumption					
Transmit Current	@3.3v		<120		mA
Receive Current			<8		mA
Sleep Current			<1		uA
RF Parameters					
Frequency Range	@433MHz	400		460	MHz
	@470MHz	470		510	MHz
	@868MHz	850		890	MHz
	@915MHz	900		940	MHz
Transmit Power		20	21	22	dBm
Receive Sensitivity	@BW=125KHz,SF=12		-141		dBm
Frequency Error			10		ppm
Modulation Rate	@LoRa	0.018		62.5	kpbs
	@FSK	0.6		300	kpbs

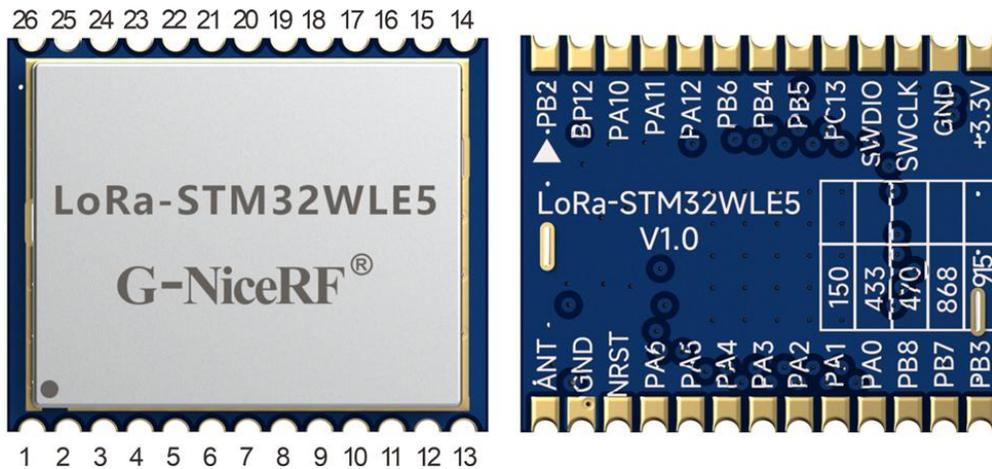
6. Typical Schematic Circuit:



7. Voltage and Power Comparison Chart

V _{DDPA} supply (V)	Transmit output power (dBm)
3.3	+ 22
2.7	+ 20
2.4	+ 19
1.8	+ 16

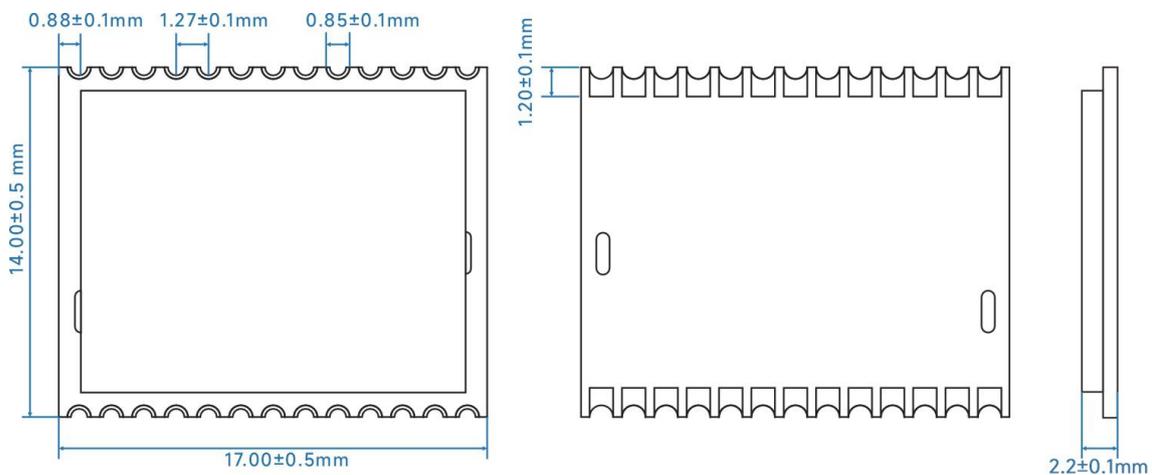
8. Pin Assignment



Pin NO.	Pin name	I/O	Description
1	PB2	I/O	Microcontroller I/O of the embedded chip; refer to the chip specification for functions.
2	PB12	I/O	Microcontroller I/O of the embedded chip; refer to the chip specification for functions.
3	PA10	I/O	Microcontroller I/O of the embedded chip; refer to the chip specification for functions.
4	PA11	I/O	Microcontroller I/O of the embedded chip; refer to the chip specification for functions.
5	PA12	I/O	Microcontroller I/O of the embedded chip; refer to the chip specification for functions.
6	PB6	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
7	PB4	I	Microcontroller I/O of the embedded chip, DEMO program defines the transmit button pin; pressing the button transmits data.
8	PB5	I/O	Microcontroller I/O of the embedded chip, DEMO program defines the receive indicator pin; outputs high when data is received, otherwise low level.
9	PC13	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
10	SWDIO	I/O	Microcontroller I/O of the embedded chip, programming interface.
11	SWCLK	I	Microcontroller I/O of the embedded chip, programming interface.
12	GND	-	Connect to the negative power supply.
13	VCC	-	Connect to the positive power supply.

14	PB3	I/O	Microcontroller I/O of the embedded chip, DEMO program defines the transmit indicator pin; outputs high when transmitting, low when not transmitting.
15	PB7	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
16	PB8	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
17	PA0	I/O	Microcontroller I/O of the embedded chip, DEMO program defines CS.
18	PA1	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
19	PA2	I/O	Microcontroller I/O of the embedded chip, DEMO program defines TXD.
20	PA3	I/O	Microcontroller I/O of the embedded chip, DEMO program defines RXD.
21	PA4	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
22	PA5	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
23	PA6	I/O	Microcontroller I/O of the embedded chip, see chip specification book for specific functions.
24	NRST	I	Microcontroller I/O of the embedded chip, chip reset pin, active low.
25	GND	-	Connect to the negative power supply.
26	ANT		Connect to an external 50-ohm antenna.

9. Mechanism Dimension(Unit:mm)



Appendix: SMD Reflow Chart

We recommend you should obey the IPC related standards in setting the reflow profile:

IPC/JEDEC J-STD-020B the condition for lead-free reflow soldering	big size components (thickness $\geq 2.5\text{mm}$)
The ramp-up rate (Tl to Tp)	3°C/s (max.)
preheat temperature	
- Temperature minimum (T _{min})	150°C
- Temperature maximum (T _{max})	200°C
- preheat time (t _s)	60~180s
Average ramp-up rate(T _{max} to Tp)	3°C/s (Max.)
- Liquidous temperature(T _L)	217°C
- Time at liquidous(t _L)	60~150 second
peak temperature(T _p)	245+/-5°C