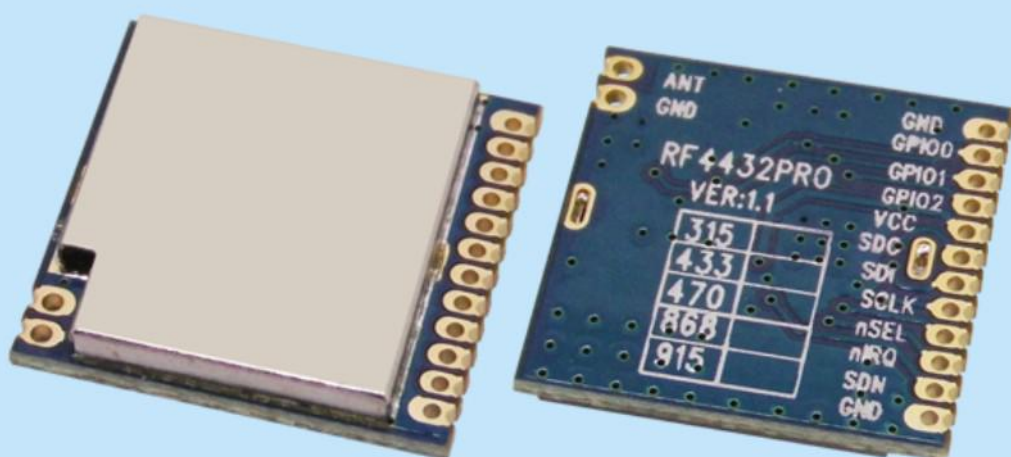


100mW

Small Size Wireless Transceiver Module

Product Specification



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Note: Revision History

Revision	Date	Comment
V1.0	2013-10-16	First release
V2.0	2016-8-5	Typesetting updated
V2.1	2017-06	Logo updated

1. Description

RF4432PRO adopts Silicon Lab Si4432 RF chip, which is a highly integrated wireless ISM band transceiver. The features of high sensitivity (-121 dBm), +20 dBm output power, 10PPM crystal, and good RF matching circuit make this module work well in hot/cold environment with reliable communication and long distance.

2. Features

- Frequency Range: 433/868
(Customizable 240-930MHZ)
- Sensitivity up to -121dBm
- Max Output power: 20dBm
- 30mA@+13dBm (Tx)
- Data transfer rate: 0.123-256kbps
- FSK, GFSK and OOK Modulation mode
- 1.8-3.6 V Power supply
- Ultra-low consumption shutdown mode
- Digital received signal strength indicator (RSSI)
- Time wake-up function
- Excellent antenna match circuit and bi-direction communication
- Configurable packet structure
- Preamble detection
- 64-byte transmit and receive data FiFo
- Low battery detection
- Temperature sensor and 8-bit analog-to-digital converters
- 10PPM crystal
- Operating temperature Range:-40 ~ +85°C
- Integrated voltage regulator
- Frequency hopping
- Power-on reset function
- Built-in crystal adjustment function
- Weight:1.2g

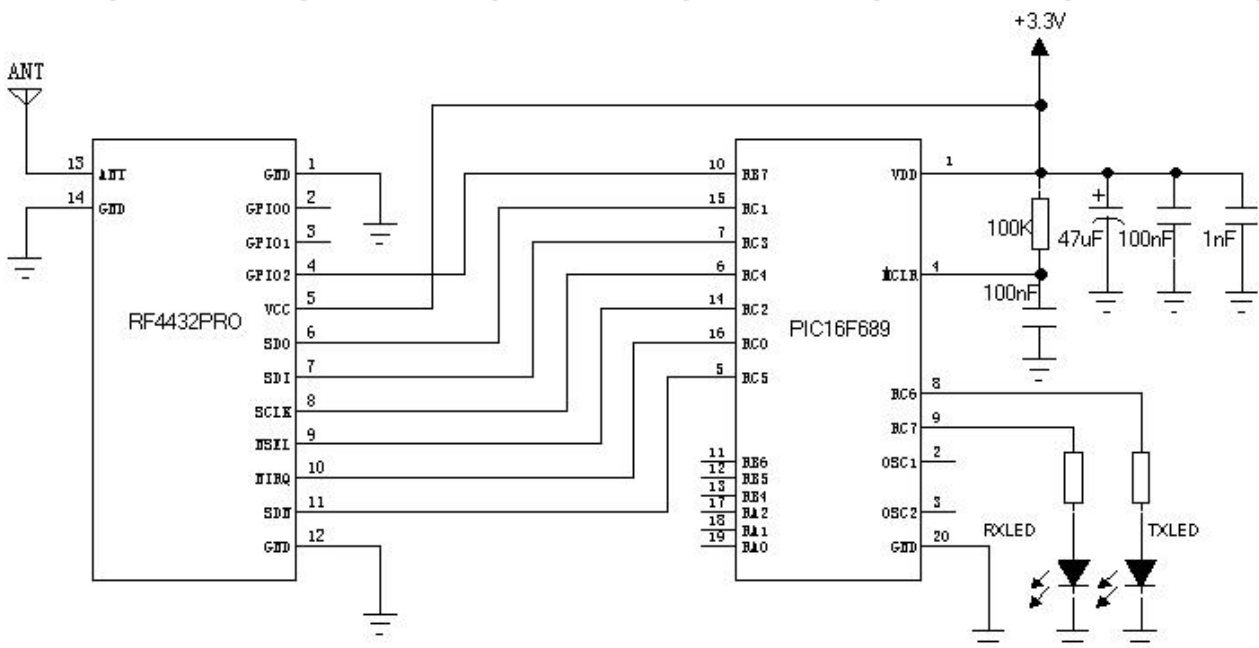
3. Application

- Remote control
- Remote meter reading
- Home security alarm and remote keyless entry
- Sensor networks
- Industrial control
- Tire Pressure Monitoring
- Home automation telemetry
- Health Monitoring
- Personal data records
- Wireless PC peripherals
- Toy control
- Tag reader

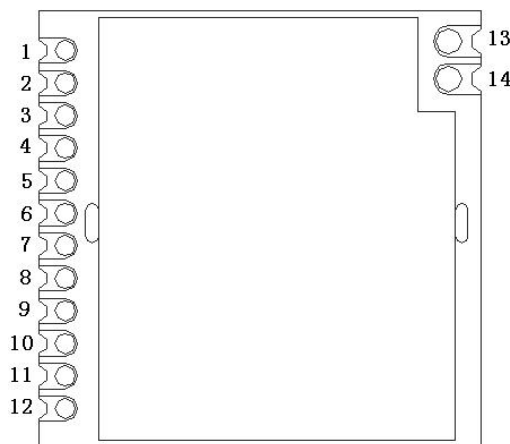
4. Electrical Specifications

Parameter	Min	Typ.	Max	Unit	Conditions
Working Condition					
Working Voltage Range	1.8	3.3	3.6	V	
Temperature Range	-40		85	°C	
Current Consumption					
Receiving Current		18.5		mA	
Transmitting Current		85		mA	@20dBm
Sleep Current		<1		uA	
RF Parameter					
Frequency Range	403	433	463	MHZ	@433MHZ
	838	868	898	MHZ	@868MHZ
Modulation Rate	0.123		256	Kbps	FSK
Tx output power	1		20	dBm	
Receiving Sensitivity		-121		dBm	@data=1.2kbps

5. Typical application circuit:



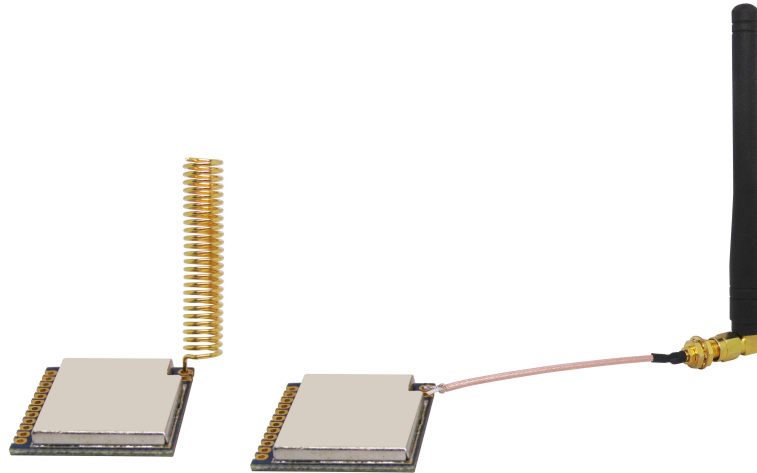
6. Pin configuration



Pin Number	Pin Definitions	Description
1	GND	Connected to power ground
2	GPIO0	Connected to the antenna switch on the module. Control antenna in Tx, Rx and standby mode together with GPIO1
3	GPIO1	Connected to the antenna switch on the module. Control antenna in Tx, Rx and standby mode together with GPIO0
4	GPIO2	GPIO2 of Si4432
5	VCC	Positive supply 3.3V
6	SDO	Serial data out for SPI interface
7	SDI	Serial data out for SPI interface
8	SCLK	Serial data clock for SPI interface
9	nSEL	Serial data selection for SPI interfaces.
10	nIRQ	Interrupt output
11	SDN	Power down control. SDN = 1, power down SDN = 0, normal working.
12	GND	Connected to power ground
13	ANT	From 50 ohm coaxial antenna
14	GND	Connected to power ground

7. Accessories

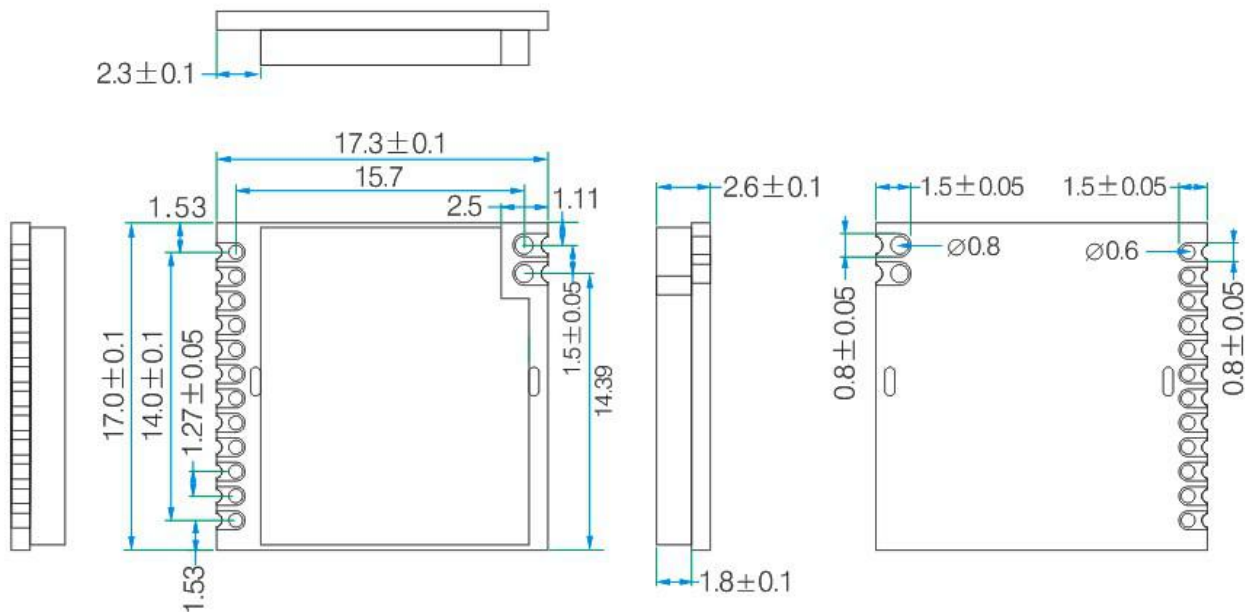
The antenna is very important for RF communication, its performance will affect the communication directly. Module needs antenna in 50ohm. Common antenna has rubber straight/ elbow/ foldable rod and sucker antenna and etc. Users can order accordingly. To ensure module in the best performance, we suggest to use the our antennas.



★To ensure modules get the best performance, user must obey the following principles when using the antennas:

- Put the antenna away from the ground and obstacle as possible as you could;
- If you choose the sucker antenna, pull straight the lead wire as possible as it can be, the sucker under arches should be attached on the metal object

8. Mechanism dimensions(Unit: mm)



9. Order Information

RF4432PRO-433

Module Model

Frequency

For example: If the customer needs the patch module small crystal 433MHZ band module that order Model: RF4432PRO-433.

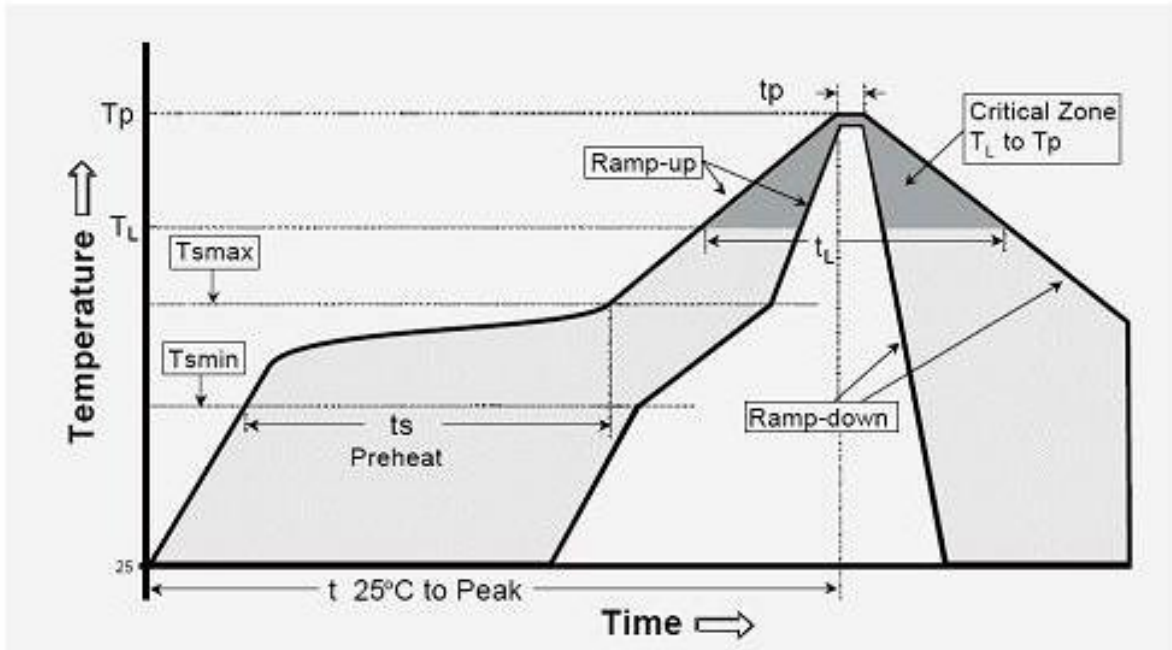
Product Name	Description
RF4432PRO-433	The center frequency is 433MHz
RF4432PRO-490	The center frequency is 490MHZ
RF4432PRO-868	The center frequency is 868MHZ
RF4432PRO-915	The center frequency is 915MHZ

10. FAQ

- a) Why modules can't communicate?
- 1) Check if power supply is connected correctly
 - 2) Check if the frequency ,channel, NET ID and air rate of each module are the same
 - 3) Check if module is damaged
- b) Why communication distance is not so far as expected?
- 1) Check if the Power supply is stable;
 - 2) Check if the antenna well matched and install properly;
 - 3) Check if the surrounding environment is good;
 - 4) Check if strong same frequency interference existed.

Appendix 1: SMD Reflow Chart

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

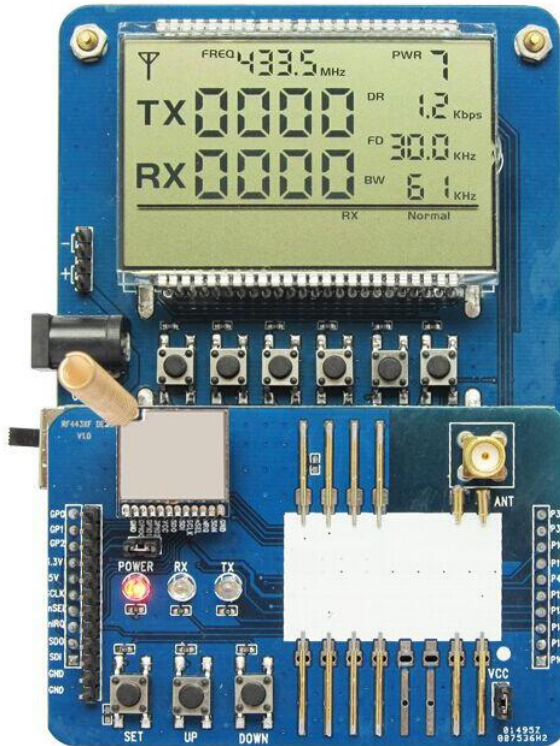


IPC/JEDEC J-STD-020B the condition for lead-free reflow soldering	big size components (thickness $\geq 2.5\text{mm}$)
The ramp-up rate (T _l to T _p)	3°C/s (max.)
preheat temperature	
- Temperature minimum (T _{min})	150°C
- Temperature maximum (T _{max})	200°C
- preheat time (t _s)	60~180s
Average ramp-up rate(T _{max} to T _p)	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

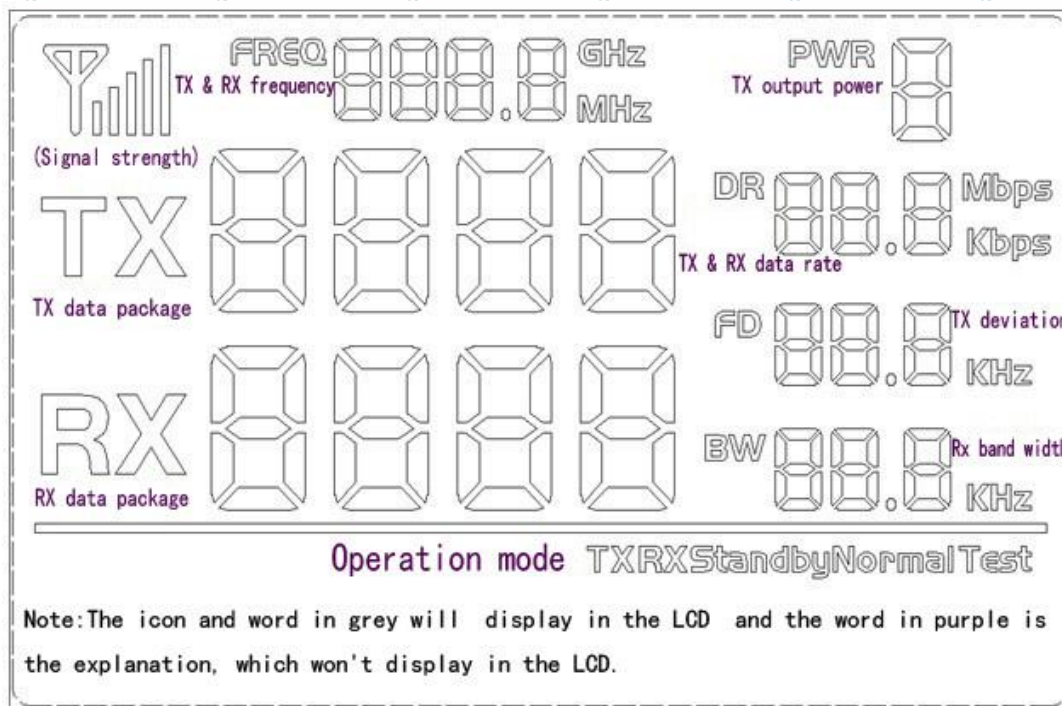
Appendix 2: Demo board

The module is equipped with a standard DEMO board for customer to debug the program and test distance. It shows as below:

Power supply range: 3.3V~6.0V



The LCD Full Segment is as below:



Users can set the parameters of the RF module such as frequency / transmitter power / transmission data rate / working mode through the buttons, and measure the wireless communication distance. Also, all the connection Pins of the module are extended to the demo board, user can use oscilloscope, multi-meter to monitor the operation of the RF module, which is very useful for software programming.

➤ Working Mode

There are 5 working modes in the DEMO. They are: Master mode, Slave mode, Tx Test mode, Rx test mode, Standby mode, accordingly, they are displayed on the LCD as: Tx normal / Rx normal / Tx Test / Rx test / Standby. When one packet is transmitted, the Red LED will blink once, the number of Tx packets will increase; when one packet is received, the Blue LED will blink once, the number of Rx packets will increase.

- 1) Master Mode: Send 1 packet per second, and waiting for the acknowledge;
- 2) Slave Mode: Stay in Rx mode to wait for the data from the master, it will send back the acknowledged signal after received the data from the master.
- 3) Tx Test Mode: RF module continuously transmit signal;
- 4) Rx Test Mode: RF module is always in Rx mode;
- 5) Standby Mode: RF module is always in standby state.

➤ Button Operation

1) [SET] Button

Press the [SET] button to enter setting mode if not in setting mode. In setting mode, press [SET] button to toggle between the set parameters: frequency /output power / data rate / working mode. The related LCD ICON will flash to indicate.

2) [UP] Button

In setting mode, press the [UP] button to increase the value of flash icon.

3) [Down] Button

In setting mode, press the [Down] button to decrease the value of flash icon.

Note: The DEMO board has FLASH memory inside, all the setting parameters will be saved automatically and keep unchanged even power-off.