



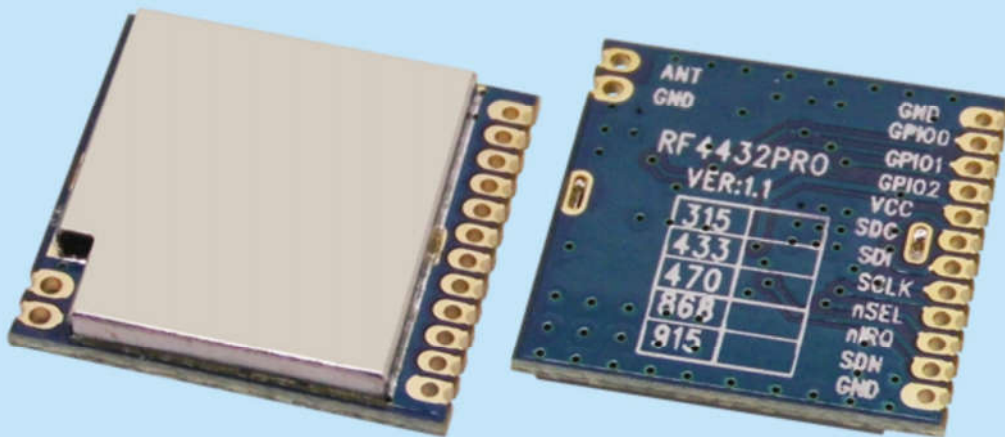
NiceRF Wireless Technology Co., Ltd.

## Product Datasheet v2.0

100mW

Small Size Wireless Transceiver Module

### RF4432PRO



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### Note: Revision History

Revision	Date	Comment
V1.0	2013-10-16	First release
V2.0	2016-8-5	Typesetting 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

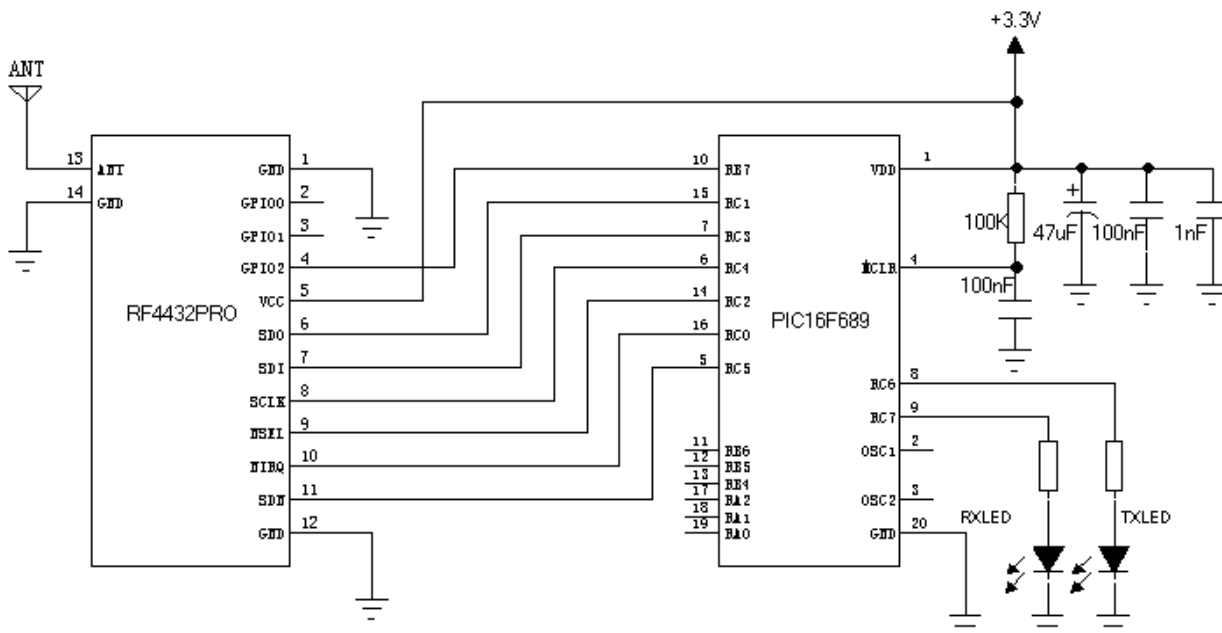
## 3. Application

- 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

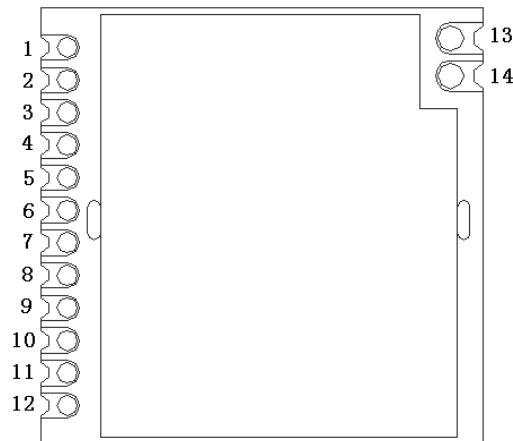
#### 4. Electrical Specifications

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:



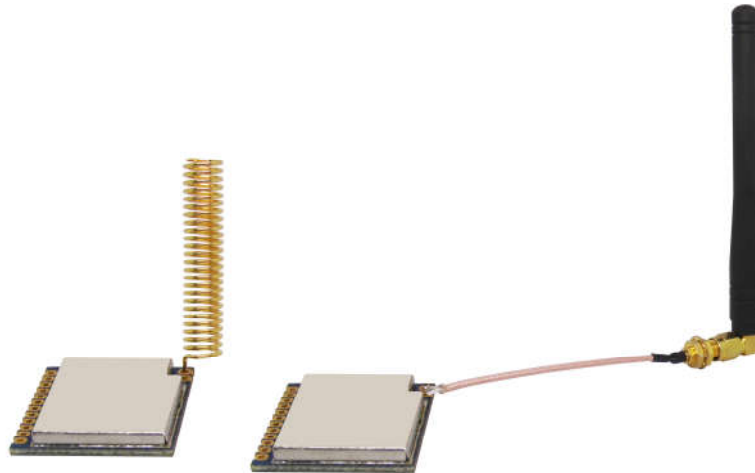
## 6. Pin configuration



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

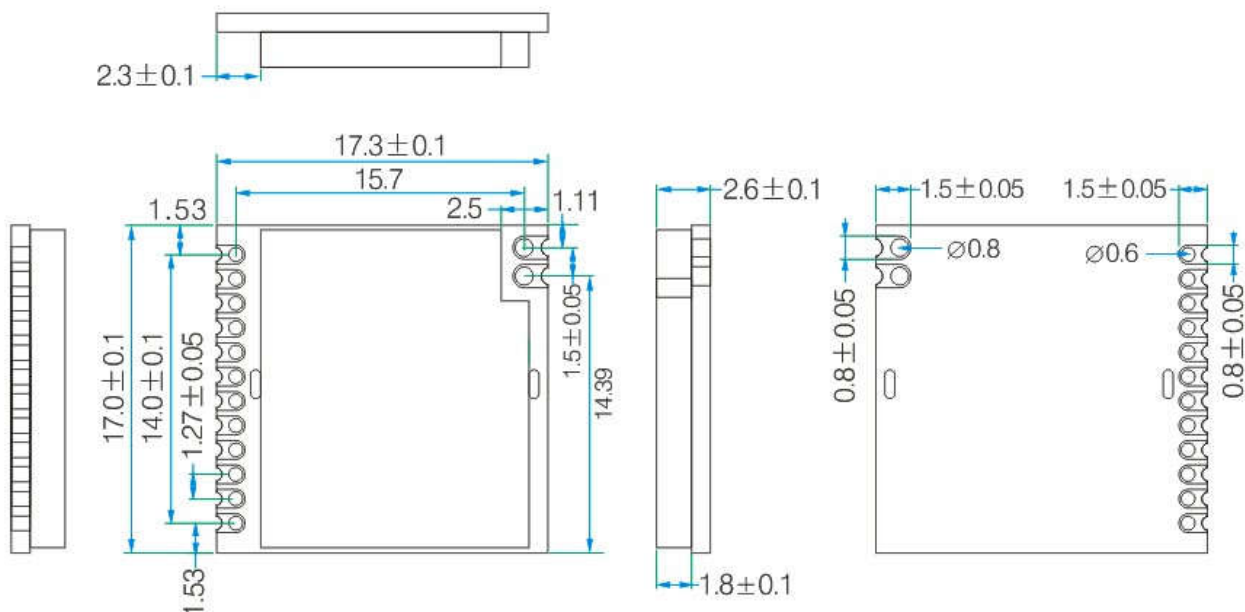
The antenna is very important for RF communication, its performance will affect the communication directly. Module needs antenna in 50ohm. Common antenna has rubber straight/ elbow/ foldable rod and sucker antenna and etc. Users can order accordingly. To ensure module in the best performance, we suggest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



## 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

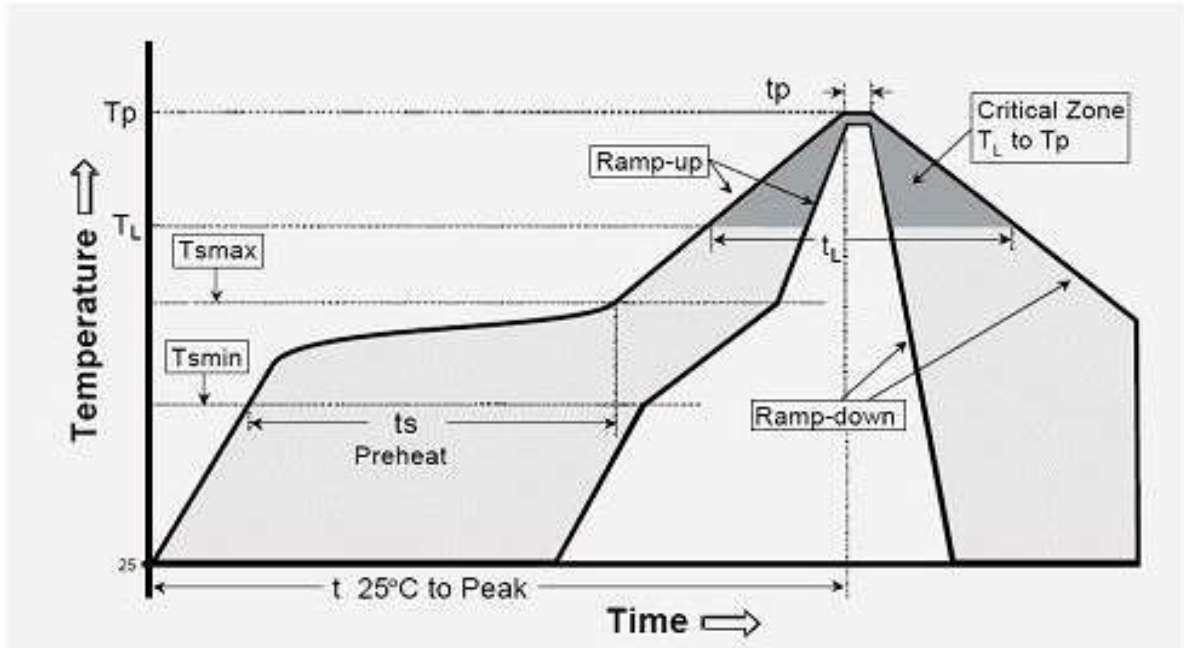
## 10. FAQ

- 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:

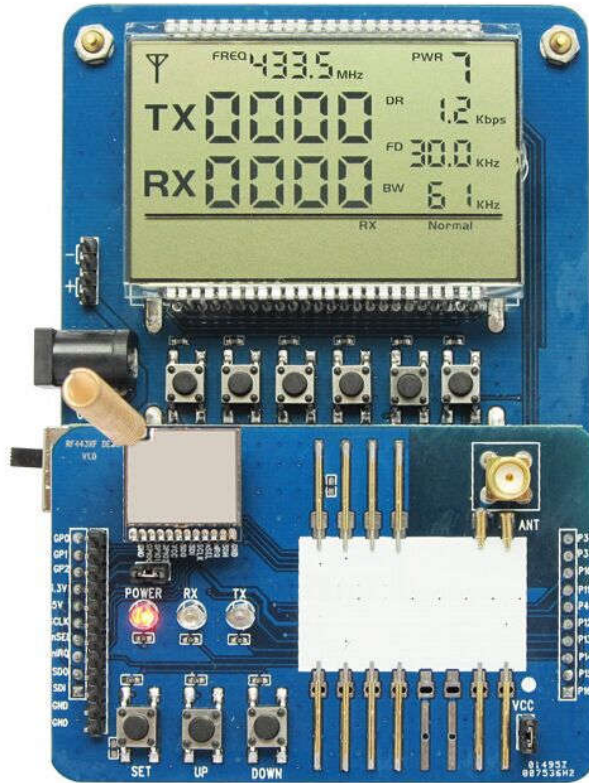


IPC/JEDEC J-STD-020B the condition for lead-free reflow soldering	big size components (thickness $\geq 2.5\text{mm}$ )
The ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3°C/s (max.)
preheat temperature	
- Temperature minimum (T <sub>smin</sub> )	150°C
- Temperature maximum (T <sub>smax</sub> )	200°C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

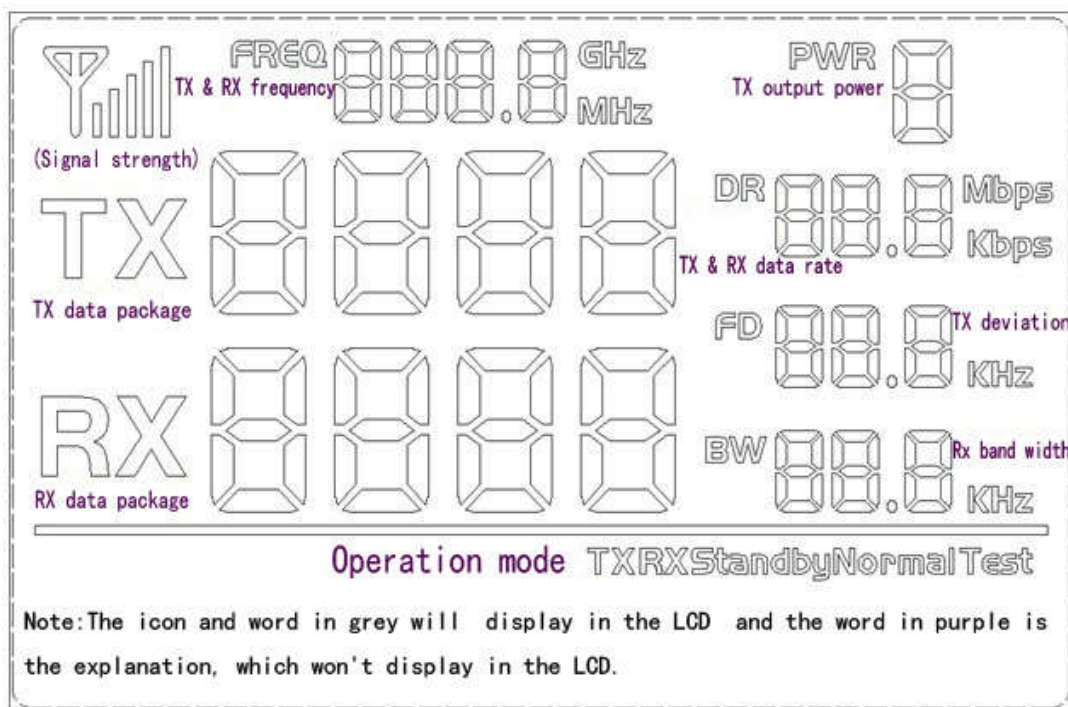
## Appendix 2: Demo board

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:



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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.