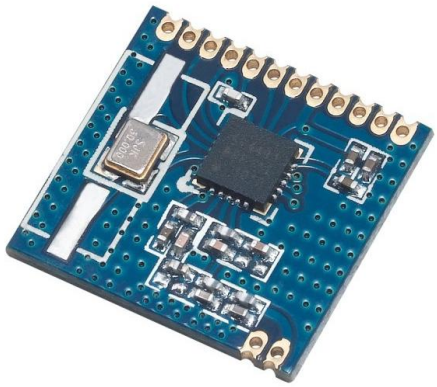
# RF4431 wireless transceiver module

## 1. Description

RF4431 adopts Silicon Lab Si4431 RF chip, which is a highly integrated wireless ISM band transceiver. The features of high sensitivity (-121 dBm), +13 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: 315/433/868/915 （Customizable 240-930 MHZ）
- Sensitivity up to -121 dBm
- Data transfer rate：0.123-256 kbps
- FSK and GFSK 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 with operating Temperature Range：-40 ~ + 85 ℃
- Integrated voltage regulator
- Frequency hopping
- Power-on reset function
- Built-in crystal adjustment function

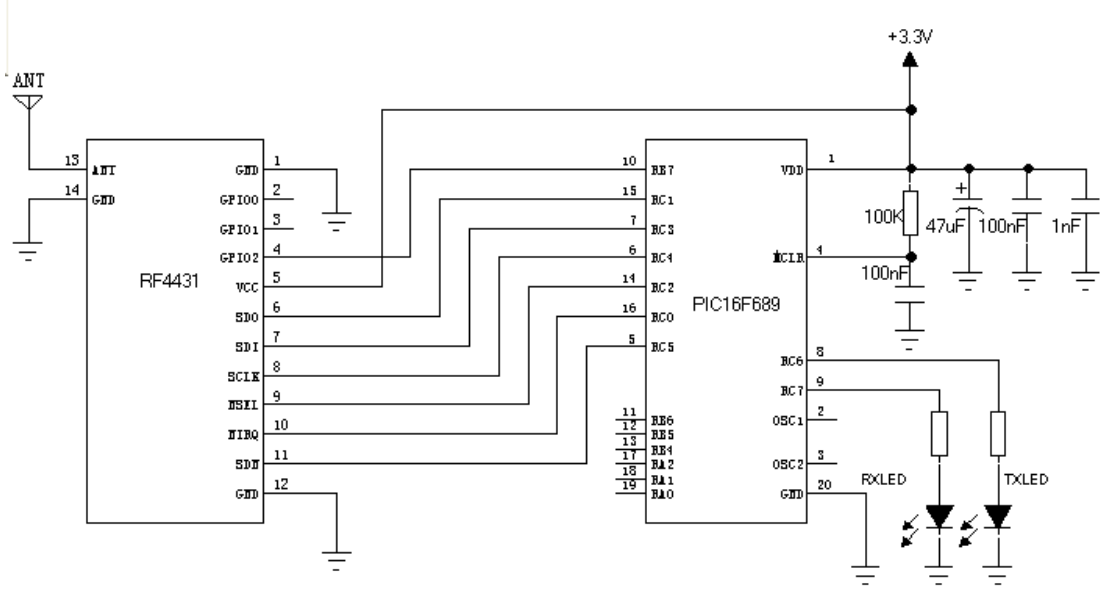
## 3. Application

- 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

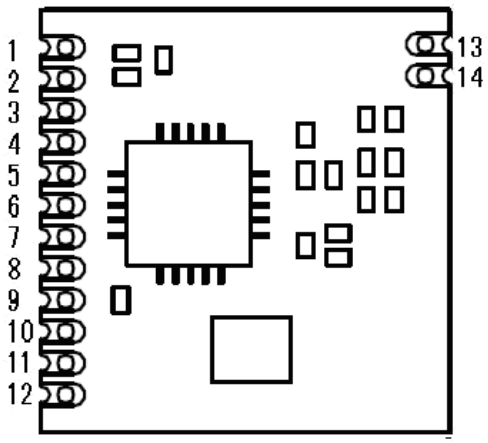
## 4. Electrical Specifications

| Parameter | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|
| Operation conditions | | | | | |
| Supply Voltage | 1.8 | 3.3 | 3.6 | V | |
| Operating Temperature | -40 | 25 | 85 | ℃ | |
| Current consumption | | | | | |
| RX Current | | 18.5 | | mA | |
| TX Current | | 35 | | mA | @13dBm |
| Sleep Current | | <1 | | uA | |
| RF parameters | | | | | |
| Frequency | 403 | 433 | 463 | MHZ | @433MHZ |
| | 838 | 868 | 898 | MHZ | @868MHZ |
| Air data rate | 0.123 | | 256 | Kbps | FSK |
| Output power | -8 | | 13 | dBm | |
| Sensitivity | | -118 | | dBm | @data=1.2kbps,Fdev=30kHZ |

## 5. Schematic



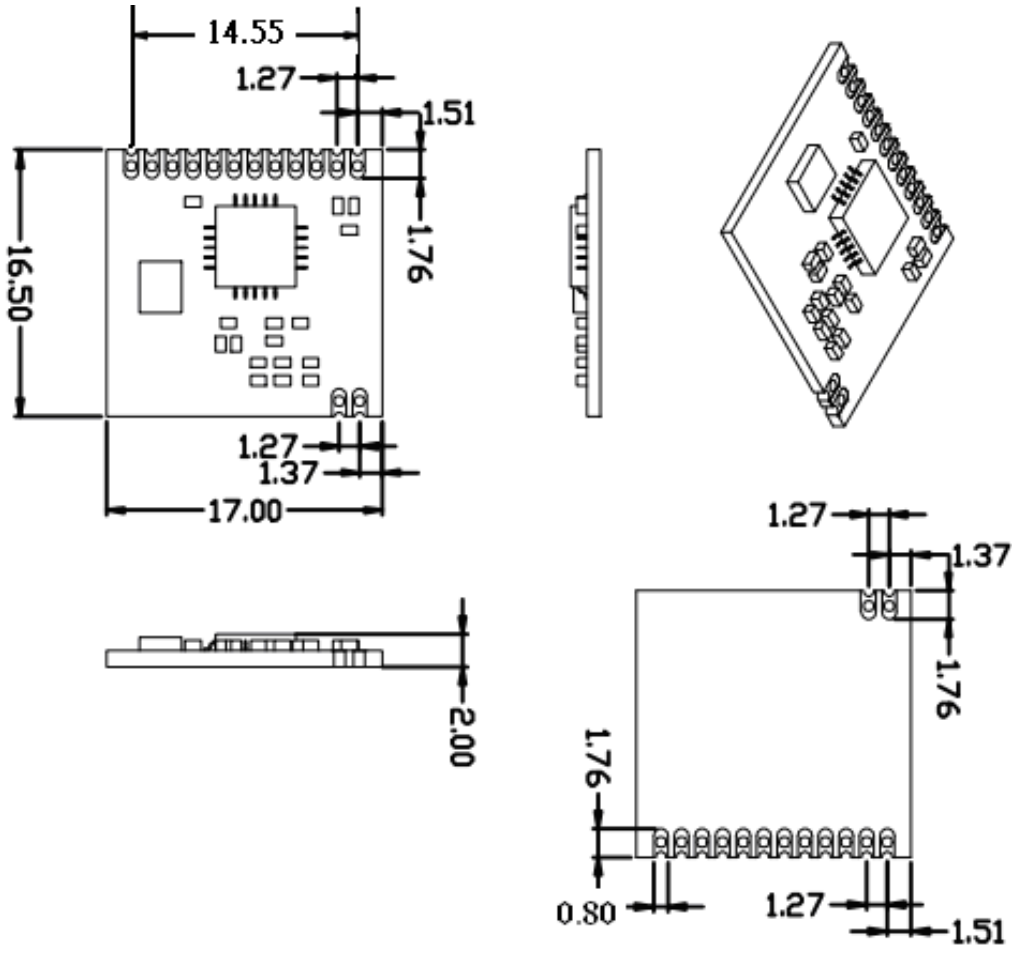

## 6. Pin Configuration




| Pin Number | Pin Definitions | Description |
|---|---|---|
| 1 | GND | Connected to power ground |
| 2 | GPIO0 | GPIO 0 of Si4431 |
| 3 | GPIO1 | GPIO 1 of Si4431 |
| 4 | GPIO2 | GPIO 2 of Si4431 |
| 5 | VCC | Positive supply 1.8--3.6V |
| 6 | SDO | Serial data out for SPI interface |
| 7 | SDI | Serial data in 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.<br>SDN = 1, power down<br>SDN = 0, normal working. |
| 12 | GND | Connected to power ground |
| 13 | ANT | From 50 ohm coaxial antenna |
| 14 | GND | Connected to power ground |

## 7. Machanism dimensions




## 8. Products Ordering Information

RF4431 - 433

Module Model  Frequency

For example：

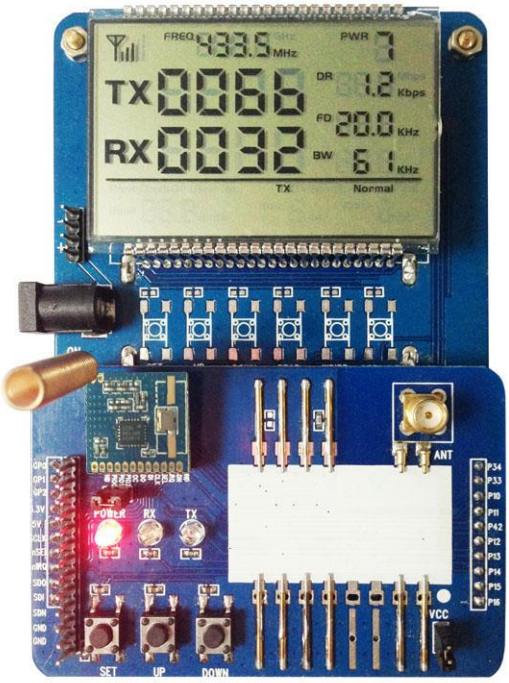
If the customer needs the patch module small crystal 433MHZ band module that order Model：RF4431 - 433

RF4431 products following models：

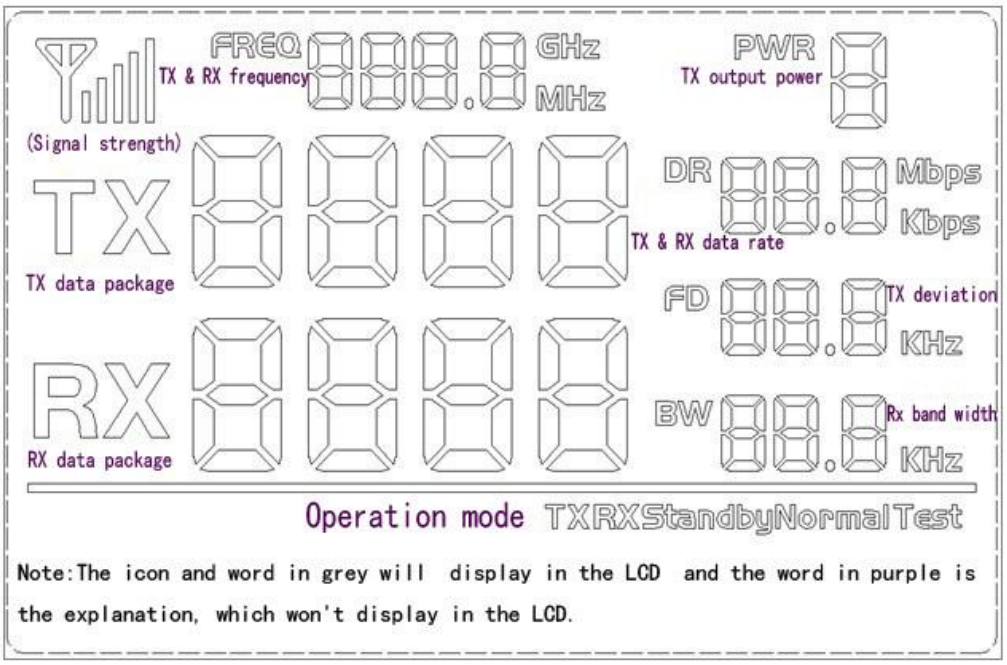
| Part Number | Remark |
|---|---|
| RF4431-315 | 315MHZ， |
| RF4431-433 | 433MHZ， |
| RF4431- 868 | 868MHZ， |
| RF4431- 915 | 915MHZ， |

## Appendix：

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




## 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 receiving 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.