

---

**DRF4431F13**  
**13dBm ISM RF Transceiver Module**

**V1.10**

---

**Features:**

- Frequency Range: 433/868MHz
- Modulation: FSK/GFSK/OOK
- SPI Data Interface
- Sensitivity: -121dBm
- Output Power: +13dBm
- Data Rate: -0.123~256 kbps
- Digital RSSI
- Wake-up Timer
- 64 bytes TX/RX FIFOs
- Integrated Voltage Regulator
- Frequency Hopping Capability
- Temperature sensor and 8-bit ADC
- Working Temperature: -20°C ~+60°C
- Standby current:  $\leq 1\mu\text{A}$
- Supply voltage: 1.8~3.6V



**Applications**

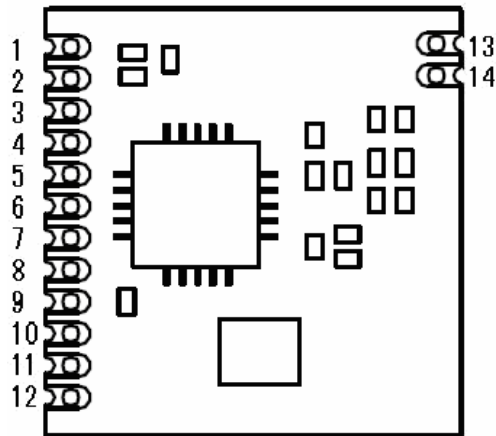
- Remote Control
- Remote AMR
- Home Automation
- Personal data logger
- Wireless sensor network
- Remote Keyless entry
- Wireless PC peripherals

**DESCRIPTION**

DRF4431F13 is a type of low cost RF front-end transceiver module based on SI4431 from Silicon labs. It keeps all the advantages of RFIC SI4431 but simplifies the circuit design. The high sensitivity (-121dBm) and 13dBm output power make the module suitable for most short range applications.

DRF4431F13 module consists of RFIC Si4431, thin SMD crystal and antenna matching circuit. The antenna port is well matched to standard 50 Ohm impedance. Users don't need to spend time in RF circuit design and choose suitable antennas for different applications. DORJI also provides SMA connector and high gain antenna for longer communication distance. DRF4431D13 operates at 1.8~3.6V with extra low standby current which makes it suitable for battery powered-up applications. DORJI also provides high power module DRF4431F13 with 500mW output power, which provides users high flexible in designing products for different distances.

**PIN FUNCTIONS**



**Figure 1: DRF4431F13 Pin Layout**

| PIN | Name  | Function     | Description  |
|-----|-------|--------------|--|
| 1   | GND   | Ground       | Ground (0V)  |
| 2   | GPIO0 | Input/Output | General Purpose Digital I/O which can be functioned as: Microcontroller Clock Output, FIFO status, POR, Wake-Up timer, Low Battery Detect, TRSW, Ant Diversity control |
| 3   | GPIO1 | Input/Output |  |
| 4   | GPIO2 | Input/Output |  |
| 5   | VCC   | Power        | +3.3V  |
| 6   | SDO   | Output       | SPI data output pin  |
| 7   | SDI   | Input        | SPI data input pin   |
| 8   | SCLK  | Input        | SPI data clock pin   |
| 9   | nSEL  | Input        | SPI select pin   |
| 10  | nIRQ  | Onput        | Interrupt status output pin  |
| 11  | SDN   | Input        | Shutdown Input pin   |
| 12  | GND   | Ground       | Ground (0V)  |
| 13  | Ant   | Output       | 50 Ohm Impedance   |
| 14  | GND   | Ground       | Ground (0V)  |

**Table 1: DRF4431F13 Pin Functions**

**ELECTRICAL SPECIFICATIONS**

| Symbol                | Parameter (condition)                         | Min.             | Typ.         | Max.         | Units |
|-----------------------|---|------------------|--------------|--------------|-------|
| VCC                   | Supply Voltage                                | 1.8              | 3.3          | 3.6          | V     |
| Temp                  | Operating temperature range                   | -20              | 25           | 60           | °C    |
| Freq                  | Frequency range                               | 428<br>863       | 433<br>868   | 438<br>873   | MHz   |
| F <sub>DEV</sub>      | Modulation deviation @433MHz<br>@868MHz       | ±0.625<br>±0.625 | ---<br>---   | ±160<br>±320 | KHz   |
| RES <sub>RSSI</sub>   | RSSI resolution                               |                  | ±0.5         |              | dB    |
| I <sub>DD_R</sub>     | Current in receive mode @ 433Mhz<br>@868Mhz   |                  | 18.5<br>18.5 |              | mA    |
| I <sub>DD_T</sub> (1) | Current in transmit mode @ 433Mhz<br>@ 868Mhz |                  | 36<br>36     |              | mA    |
| I <sub>DD_S</sub>     | Current in sleep mode.                        |                  |              | 1            | uA    |
| P <sub>out</sub>      | Max. output power @ 433Mhz<br>@ 868Mhz        |                  | 12<br>12     | 13<br>13     | dBm   |
| Sen. (2)              | Receiver sensitivity @ 433Mhz<br>@ 868Mhz     | -121<br>-121     | -117<br>-117 |              | dBm   |
| DR <sub>FSK</sub>     | FSK data rate                                 | 0.123            |              | 256          | Kbps  |
| CH <sub>BW</sub>      | Receiver channel spacing                      | 2.6              | ---          | 620          | kHz   |
| Z <sub>ANT</sub>      | Antenna Impedance                             |                  | 50           |              | Ohm   |

**Table 2: DRF4431F13 Electrical Specifications**

**Notes:**

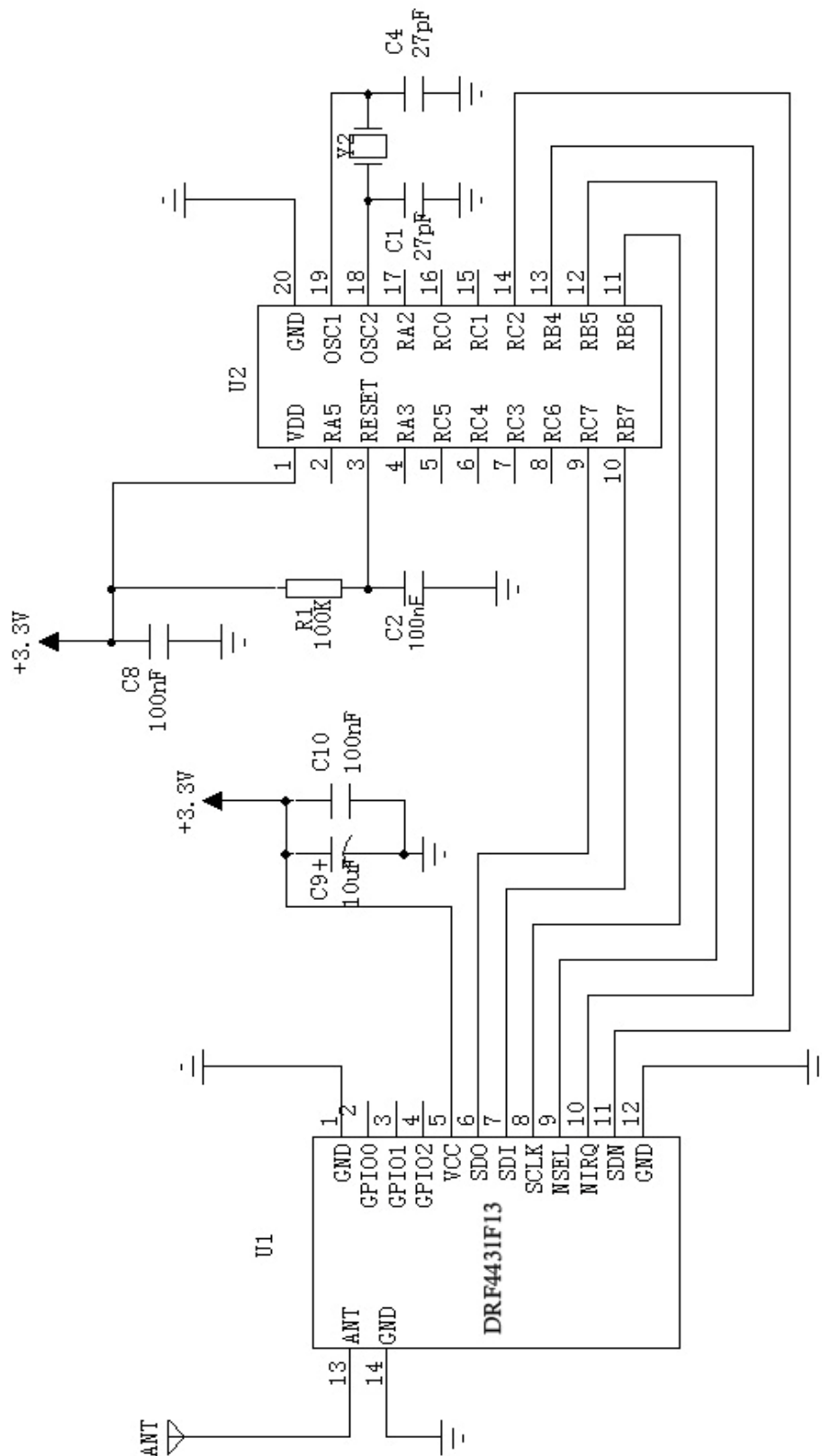
- (1) Transmit current is tested at the Max. output power.
- (2) Sensitivity is measured at DR<sub>FSK</sub> = 1.2k bps and F<sub>DEV</sub> = 30 kHz

**ABSOLUTE MAXIMUM RATINGS**

| Symbol          | Parameter           | Min. | Max.    | Units |
|-----------------|---------------------|------|---------|-------|
| VCC             | Supply Voltage      | -0.3 | 3.6     | V     |
| VI              | Input voltage       | -0.3 | VCC+0.3 | V     |
| VO              | Output voltage      | -0.3 | VCC+0.3 | V     |
| T <sub>ST</sub> | Storage temperature | -55  | 125     | °C    |

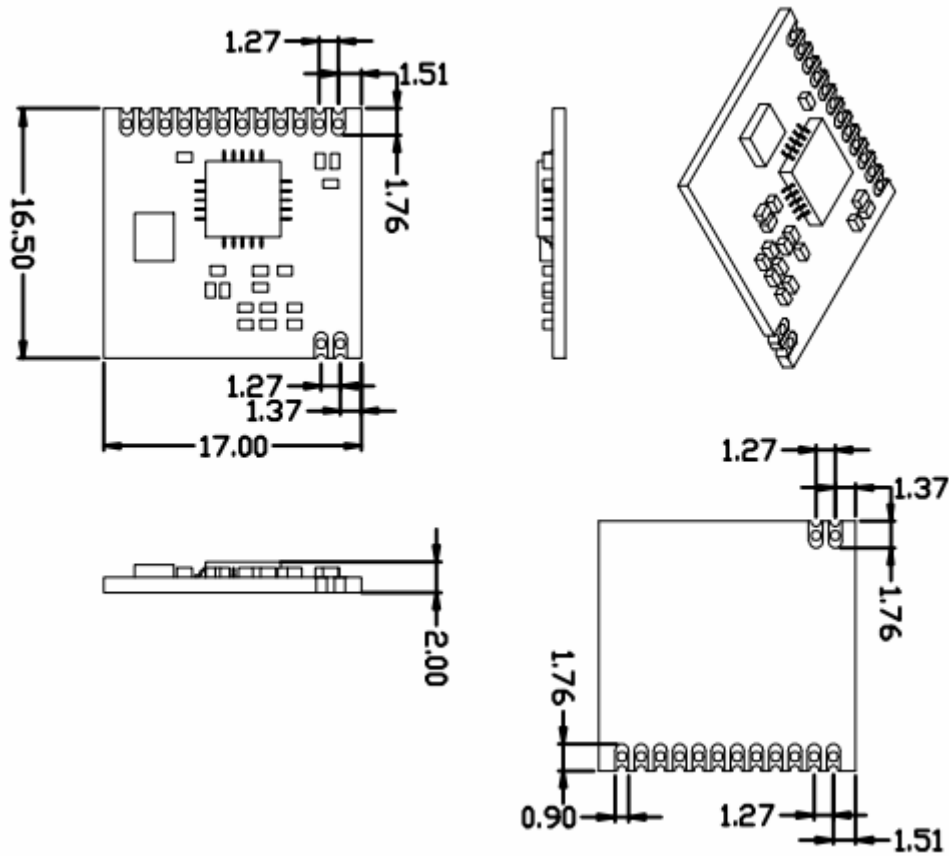
**Table 3: DRF4431F13 Maximum Ratings**

**TYPICAL APPLICATION CIRCUIT**



**Figure 2: Application Circuit**

**MECHANICAL DATA**



**Figure 3: Mechanical Dimension**

**ORDERING INFORMATION**

**DRF 4431 F 13 — 043 S**

- ① ② ③ ④ ⑤ ⑥

| Num | Symbol          | Meaning                        |
|-----|-----------------|--------------------------------|
| ①   | RF module       | RF FSK/GFSK module             |
| ②   | IC Type         | SI4431                         |
| ③   | Module Function | RF front-end module            |
| ④   | Power           | 13dBm output power             |
| ⑤   | Freq. Band      | 043: 433MHz 086:868MHz         |
| ⑥   | Package         | S: SMD package; D: DIP package |

**Table 4: Ordering Information**

|  |   |
|--|---|
| <p>Dorji Applied Technologies<br/>A division of <i>Dorji Industrial Group Co., Ltd</i></p> <p>Add.: Xinchenuayuan 2, Dalangnanlu, Longhua,<br/>Baoan district, Shenzhen, China 518109</p> <p>Tel: 0086-755-28156122<br/>Fax.: 0086-755-28156133<br/>Email: <a href="mailto:sales@dorji.com">sales@dorji.com</a><br/>Web: <a href="http://www.dorji.com">http://www.dorji.com</a></p> | <p>Dorji Industrial Group Co., Ltd reserves the right to make corrections, modifications, improvements and other changes to its products and services at any time and to discontinue any product or service without notice. Customers are expected to visit websites for getting newest product information before placing orders.</p> <p>These products are not designed for use in life support appliances, devices or other products where malfunction of these products might result in personal injury. Customers using these products in such applications do so at their own risk and agree to fully indemnify Dorji Industrial Group for any damages resulting from improper use.</p> |
|--|---|