

2.4G High Power RF Transceiver Module

Model No.: DL-24PA-C / DL-24PA

SPECIFICATION

Version: V1.1



DL-24PA-C



DL-24PA

Before using this module, please pay attention to the following important matters:

This module is an electrostatic sensitive product. Please operate it on an anti-static workbench during installation and testing.

This module defaults to using an external antenna, you can choose wire antenna or standard UHF antenna, according to the using condition, if there is metal case/shell, please make sure install the antenna out of the metal shell, otherwise it will lead to serious attenuation of radio frequency signals, which will affect the effective use of distance.

Metal objects and wires should be kept away from the antenna as much as possible.

When installing the module, nearby objects should be kept at a sufficient safety distance from the module to prevent short circuit damage.

This module should be used in a dry environment. Please do not make any liquid substance come into this module.

Please use an independent voltage regulator circuit to supply power to this module, and avoid sharing with other circuits. The tolerance of the power supply should not be less than 5%.

Limitations:

This module is intended to be embedded in the customer's terminal product application, and does not provide a casing itself. It is not recommended that the customer directly resell this module as a final product without permission.

This series of modules are in accordance with commonly used international standards. If there is any special certification needed, we can adjust certain indicators according to your needs.

This module cannot be applied to life rescue, life-support systems, or any occasion where personal injury or life threatening may cause by equipment failure. Any organization or individual carrying out the above-mentioned applications shall bear all risks at their own.

| Date | Version | Formulation / Revision of Contents | Approved by |
|-----------|---------|---|-------------|
| 2016-8-15 | V1.0 | DL-24PA Binding Version (CC2500 Wafer) Standard RF Module | Fagan Xu |
| 2021-7-10 | V1.1 | Add DL-24PA-C Chip Version (CC2500RGPR) RF Module | Fagan Xu |

1. Brief Introduction of the Module

Designed base on TI-Chicon' s CC2500 wireless transceiver chip, DL-24PA/DL-24PA-C is a compact, cost-effective, remote wireless transceiver module. This 2.4G module is widely used in the fields of smart home, toys, model airplane and near range digital transmission control. Sensitivity up to -104dbm, maximum transfer rate up to 500Kbps, output power through register configuration range -30dbm to 20dbm.

The module has integrated all radiofrequency related functions, and users can easily develop wireless products with stable performance and high reliability directly, which will extremely shorten the development cycle without in-depth understanding of RF circuit design.

SMD and DIP interface modes are adopted. Since it is a compact module, so it can be used easily in portable smart products, and compatible with our DL-24D 2.4G module without PA

Importance notice:

DL-24PA: manual welding is required, due to different thermal expansion coefficient of the black glue and the binding wire inside, as it is binding version base on **CC2500 wafer**.

DL-24PA-C: it can be SMT directly in mass production, since it was **CC2500RGPR** chip-based design.

2. Typical application of the Module

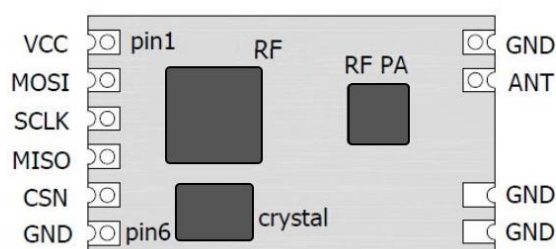
- * Wireless Toy Controller
- * Wireless keyboard, Mouse
- * Consumer Electronics and Toy Aerial Models
- * Meteorological monitoring, data collection
- * Data monitoring transmission
- * Intelligent Home Control
- * Remote Controls Supporting Radio Frequency (RF) Technology

3. Features

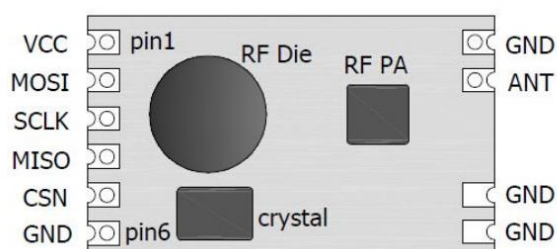
- 600m transmission distance in open field (250Kbps)
- Operating frequency 2400-2483mhz

- Operating voltage: 1.8V-3.6V
- Programmable carrier detection, digital RSSI output
- Excellent selectivity and out-of-band isolation
- Gold plate binding process, high cost performance
- High frequency power amplifier, which adopts European and American brand chip

4. Pins Definition



DL-24PA-C



DL-24PA

| No. | Definition | Function |
|---------------|------------|---|
| 1 | VCC | Supply voltage, DC 1.8-3.6V |
| 2 | MOSI | SPI data input, MOSI |
| 3 | SCLK | SPI CLOCK |
| 4 | MISO | SPI data output, MISO |
| 5 | CSN | CSN=0 Valid |
| 6 | GND | Grounding, common ground with the system |
| 7 | ANT | Antenna interface, standard 50Ω antenna |
| Supplementary | PA control | GPIO0, GPIO2 Controls "Enable (EN) of the PA" |

Table 1 Pin Definition of DL-24PA & DL-24PA-C

Note: GPIO0 and GPIO2 are configured as follows when initializing the configuration

```

halSpiWriteReg(CCxxx0_IOCFG0, 0x1B);    //配置 GPIO0
halSpiWriteReg(CCxxx0_IOCFG2, 0x1C);    //配置 GPIO2

```

5. Product Size:

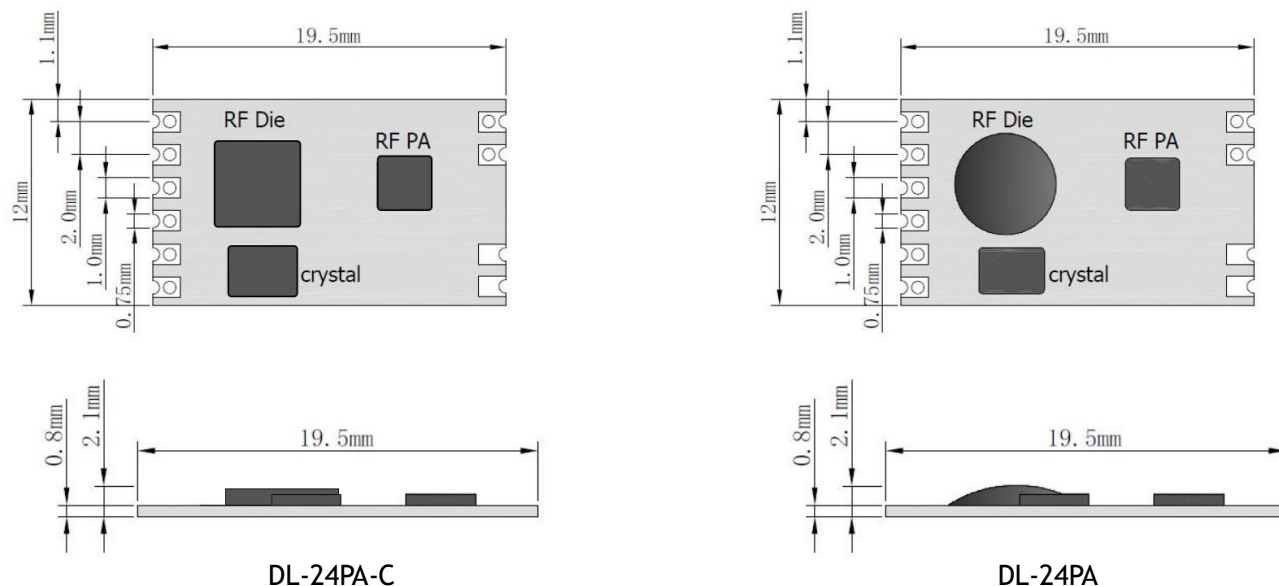


Figure 1: Product Size

6. Technical Parameters of DL-24PA

DC Features:

| Description | Min. | Max. | Unit |
|----------------------|-----------|---------------|------|
| Power supply voltage | 1.8 | 3.6 | V |
| Working current | RX < 18mA | TX=110mA@0dbm | mA |
| Stand-by current | | < 1uA | uA |
| Voltage of IO Port | Vss-0.3 | Vdd+0.3 | V |
| Working temperature | -20 | +85 | °C |

Table 2: DC Features of the module

RF Features (unless otherwise stated, Temperature is 25°C, VCC = 3.3V)

| No | Description | Parameter Range | | | Unit |
|----|-----------------------------|-----------------|-------|--------|------|
| | | Min. | Type. | Max. | |
| 1 | Applied Frequency Range | 2400 | | 2483.5 | MHz |
| 2 | Frequency Interval | | 100K | | Hz |
| 3 | Transmit Power | -30 | | 20 | dBm |
| 4 | Receiving sensitivity | | -103 | | dBm |
| 5 | Modulation mode | GFSK | 2-FSK | OOK | MSK |
| 6 | Transmission rate | 1.2 | | 500 | Kbps |
| 7 | Harmonic power | -38 | — | -35 | dBm |
| 8 | Communication Distance | 500 | 600 | 650 | M |
| 9 | Sensitivity at 2.4K | | -105 | | dBm |
| 10 | OOK Modulation mode, Rate | | | 100 | Kbps |
| 11 | Standby Power Consumption | | | 0.9 | uA |
| 12 | Crystal Precision *3225/2*6 | | 10 | | PPM |

Table 3: High Frequency Characteristic of the module

7. Module Connection Diagram (TTL Level):

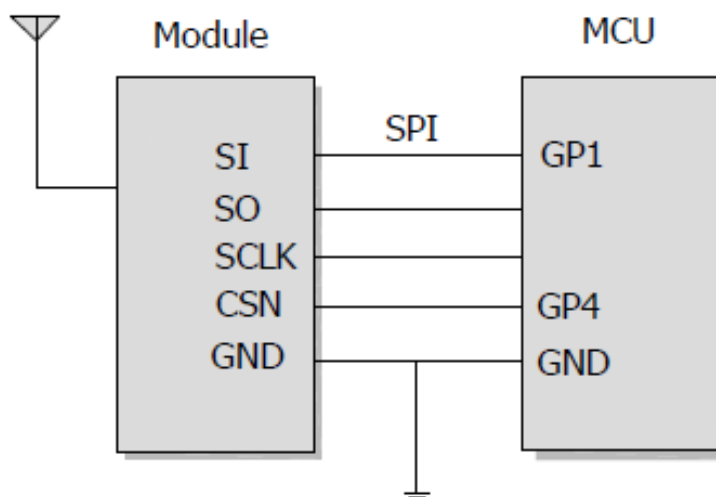


Figure 2: Module connection diagram

8. Notice in Module Application

Considering the complexity of data transmission, radio frequency modulation mode of data and some inherent characteristics of electromagnetic waves, the following aspects should be considered in the application process.

1. The electromagnetic interference of the application environment will affect the actual distance of the remote control. Electromagnetic wave interference can be divided into power transformer, main board power supply interference, TFT screen data layout interference, Flash/DDR/SDRAM data exchange interference, as well as carrier co-frequency interference, noise interference, interference from high-power signal source in the air, and so on.

2. The dimensions of the products, the internal space, the coating of the housing and other factors will cause the attenuation of the wireless signal, which will affect the remote-control distance. Usually, the narrow space inside the product is not conducive to the extension of the antenna. The outer shell should avoid metal or metal coating as much as possible. The antenna should be wounded along the inner wall of the outer shell.

3. Selection of antenna is very important. Antenna is an important part of the communication system; its performance directly affects the indicators of the communication system. Users must pay attention to its performance (antenna type, antenna electrical performance) when choosing the antenna. Therefore, when choosing the antenna, you can contact us for advice or recommendation...

9. Contact us

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★ Data collection, Smart home, Internet of Things applications, Wireless remote control technology, Remote active RFID, Antennas ★

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