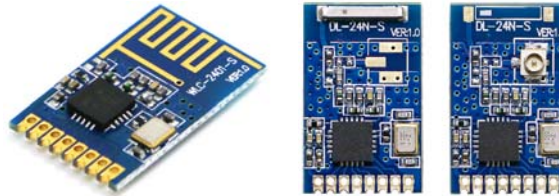


## 2.4G High Performance Wireless Transceiver Module

# SPECIFICATION

Model No.: DL-24N Serial

Version: V1.1



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 DL-24N module is integrated with all RF related devices and has PCB onboard antenna, while other DL-24N series modules defaulted to using an external antenna, you can choose wire antenna or standard UHF antenna, according to the using condition. If there is metal case of the final product, please make sure install the antenna on 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.

## 1. Module introduction

### 1.1 Brief introduction

Designed base on Nordic's NRF24L01 wireless transceiver chip, DL-24N Serial RF modules are 2.4g wireless modules with small size, excellent performance and long distance, which are widely used in intelligent home, toys, model airplane, and the field of close digital transmission control. The sensitivity can reach -82dbm@2m, the highest transmission rate can reach 2Mbps, and the output power can be configured in four levels from -20dbm to 0dbm through registers.

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

The module adopts stamp edge and half hole interface design, which can not only meet customers' SMT application, but also realize transverse and longitudinal welding through needle arrangement. The module adopts high precision, high temperature stability crystal, with compact size, is convenient for portable products, and has a very high cost performance, suitable for mass applications

### 1.2 Features

- Transmission distance: 120m in an open field (250KHz)
- Operating frequency: 2400-2483mhz
- Operating voltage: 1.9V-3.6V
- Programmable carrier detection, digital RSSI output
- Excellent selectivity and out-of-band isolation
- Gold plate PCB-ANT, high cost performance
- 10ppm precision chip crystal, excellent performance

### 1.3 Typical application

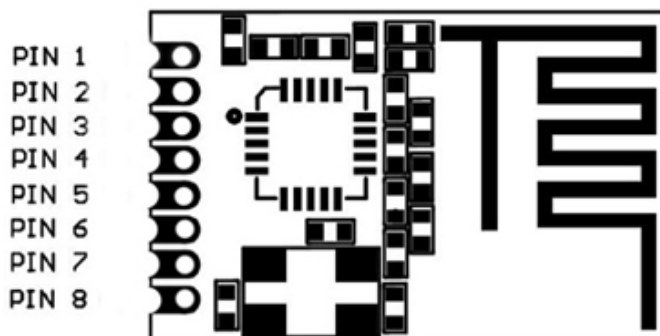
- Wireless game controller, toys
- Wireless keyboard and mouse
- Consumer electronics and toy model airplanes
- Wireless voice audio
- Data monitoring transmission
- Smart home control
- Remote control that supports radio frequency (RF) technology

## 2. Model Selection Guide

Model	Specification	Feature	Chip
DL-24N	A: PCB On-board antenna	On-board antenna has lower cost	Nordic
DL-24N-S	S: SMD Ceramic antenna	Small size antenna, but high performance	Nordic
DL-24N-I	I: IPEX connector base	It can be connected with various kinds of 2.4g antennas	Nordic
DL-24NPA	PA: RF power amplifier chip	High output power up to 20dBm	Nordic

## 3. Pin Definitions

DL-24N series modules are compatible in pins, which are specifically defined in the following table



Pin	Definition	Function
1	VDD	Supply voltage, DC 1.9-3.6V
2	CE	Working mode selection, TX or RX mode selection
3	CSN	CSN = 0 valid, SPI chip selection enabled
4	SCLK	SPI Clock
5	MOSI	SPI data input, MOSI
6	MISO	SPI data output, MISO
7	IRQ	Interrupt request port
8	GND	Grounding, common ground with the system
Antenna	PCB	The original standard package, PCB onboard antenna

Table 1: Pin Definitions Of DL-24N

4. Product Size:

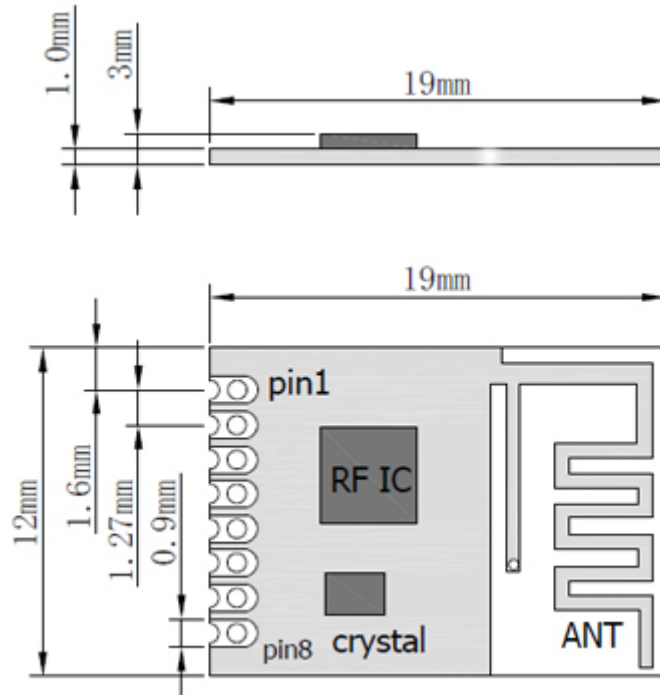


Figure 1: DL-24N

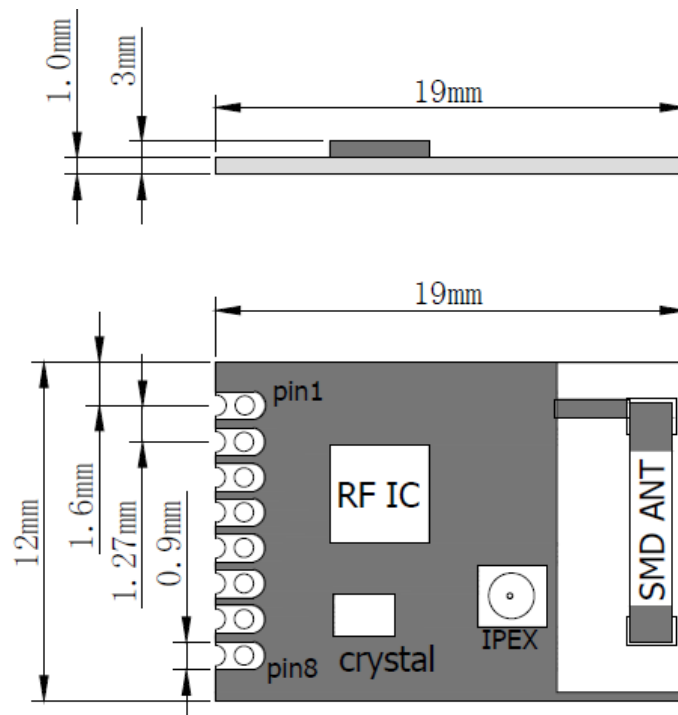


Figure 2: DL-24N-S

## 5. Technical Parameters:

## DC Features:

Description	Min.	Max.	Unit
Power supply voltage	1.9	3.6	V
Working current	11.3mA@0dbm	13.5mA@2Mbps	mA
Stand-by current	26uA@Standby Mode	0.9uA@Powerdown	mA
Working temperature	-40	85	°C
Voltage of IO Port	Vss-0.3	Vdd+0.3	V
Rate range	0.5	50	Kbps

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 (4 levels)	-18	-12	-6	dBm
4	Reception sensitivity		-82		dBm
5	Modulation mode		GFSK		
6	transmission speed	1.2		2000	Kbps
7	Harmonic power	-48	---	-45	dBm
8	Communication Distance	80		120	M
9	Sensitivity at 2.4K		-95		dBm
10	Standby Power Consumption			0.9	uA
11	Crystal Precision *3225/16MHz		10		PPM

Table 3: High Frequency Characteristic of the module

## 6. Module connection diagram (SPI interface):

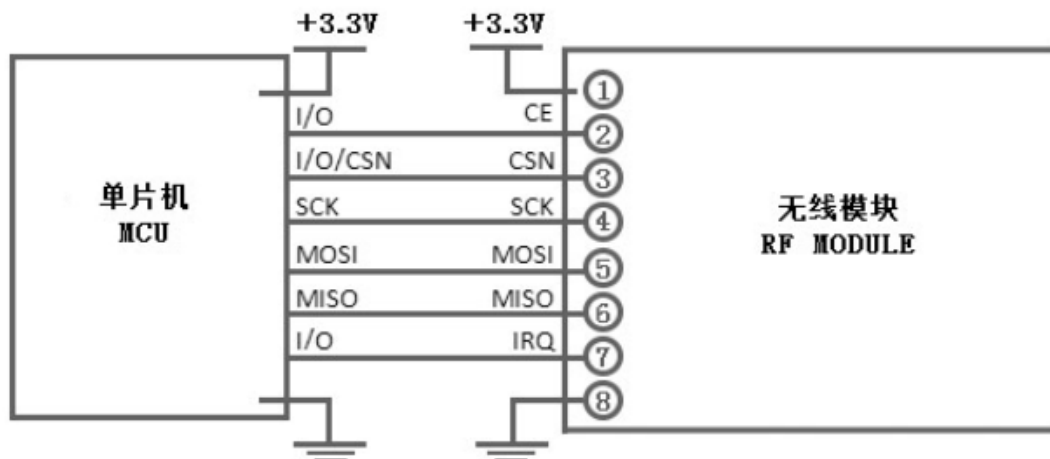


Figure 3: Module connection diagram

## 7. Notice in Module Application

Module application system is generally divided into two categories: remote control and fixed transmitter station. Two factors need to consider in different systems: power type, product internal space.

1. The power supply types of the remote control CR2032 (3V), AAA (1.5V\*2), 27A (12V) need to be considered when applying. 12V batteries need to increase LDO for voltage conversion. However, in the selection of LDO, attention should be paid to the "sudden wave" problem of LDO in the voltage conversion process. When the voltage spike exceeds 7.5V, there is a risk of damage to IC. Also, attention should be paid to the protection of ESD.

2. Ultra-thin remote control needs to consider the module thickness, usually using PCB board antenna. A standard remote control also needs to consider the placement of the antenna and the radiation capability of the antenna.

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...

## 8. Contact us

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