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2.4GHz RF Transceiver Module

Features

- Frequency range — 2400~2525 MHz
- Number of channels — 126 channels
- Channel space — 1 or 2 MHz
- Modulation — GFSK
- Data Rate — 1 or 2 Mbit
- Digital interface (SPI) speed — 0~8 Mbps
- RF output power — 0/-6/-12/-18 dBm programmable
- RF receiver sensitivity — -82 dBm (2Mbps) / -85 dBm (1Mbps)
- Auto ACK and retransmit (up to 16 times)
- Address and CRC computation
- Power supply — 1.9~3.6 V
- Power supply for RF transmit — 11.3 mA
- Power supply for RF receive — 12.3 mA
- Power supply at power down mode — 400 nA
- Power supply at standby-I mode — 32 μA
- Low wakeup time — 130 μs
- Input pads — 5 V tolerant

Applications

- Telemetry
- Remote control
- Wireless mouse, keyboard, joystick
- Wireless data modem
- Wireless security systems
- Car alarms
- Remote keyless entry (RKE)
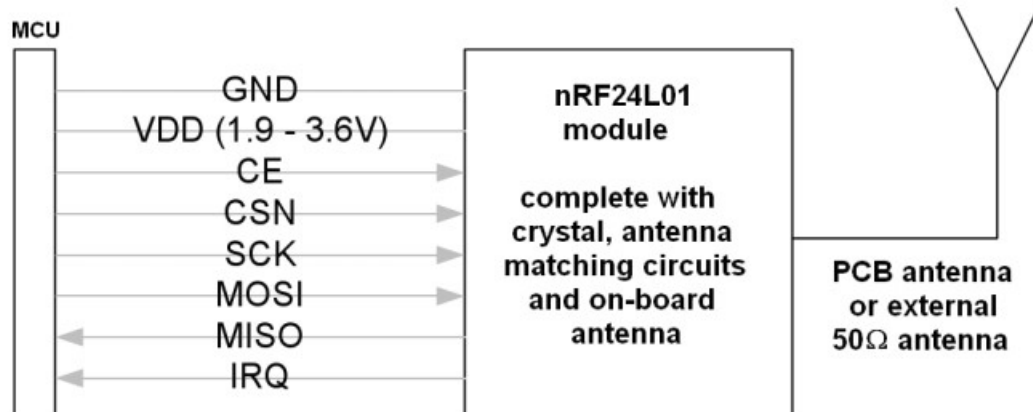- Toys

Module Size

- Type R: 26.0 x 18.5 x 4.1mm
- Type M: 26.0 x 18.5 x 4.1mm
- RoHS compliance

General Description

The CS1W2401 is a very compact RF module for the 2.4~2.5 GHz ISM band using Nordic nRF24L01 transceiver. Comprised of a complete, agency-certified radio and sophisticated OSI link layer, CS1W2401 simplifies the OEM's design effort and assures successful field operation.

The modules come in two versions: the type R module with a HC49 crystal, and an inverted F on-board antenna; and the type M module with a SMD crystal, and an external antenna connection. The range can be up to 5~10 meters. The CS1W2401 is made to be a drop-in module for seamless integration, easy operation and fast time-to-market. A MCU can be connected to the module to configure, control and operate the module. As each transceiver includes complete OSI link layer in hardware, it manages protocol over-the-air to assure successful transmissions. The 3-level of 32 bytes FIFO can store up to 3 packets before MCU must read out the data. The process is transparent to the OEM.

Application Circuit

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Selection Guide

The transceiver module comes with different sizes that can be selected at user's request. The selection can be made with designating the part number as shown below.

Part number   CS1W2401—R $\longrightarrow$ A 2.4GHz transceiver with nRF24L01 core in RoHS compatible regular module size
                                    1

Designator	Description	Symbol	Values
1	Modula Type	R	Regular module with on-board inverted F antenna
2		M	Miniature module without on-board antenna

Pin Descriptions

Type R Module

Pin Number	Pin Name	Description
1	VSS	Ground (0V)
2	VDD	Power supply (+3V DC)
3	CE	Chip enable activates RX and TX mode
4	CSN	SPI chip select
5	SCK	SPI clock
6	MOSI	SPI slave data input
7	MISO	SPI slave data output, with tri-state option
8	IRQ	Maskable interrupt pin
9	VSS	Ground (0V)

Type M Module

Pin Number	Pin Name	Description
1	VSS	Ground (0V)
2	VDD	Power supply (+3V DC)
3	CE	Chip enable activates RX and TX mode
4	CSN	SPI chip select
5	SCK	SPI clock
6	MOSI	SPI slave data input
7	MISO	SPI slave data output, with tri-state option
8	IRQ	Maskable interrupt pin
9	VSS	Ground (0V)
10	VSS	Ground (0V)
11	VSS	Ground (0V)
12	ANT	Antenna connection (refer to antenna selection)
13	VSS	Ground (0V)
14	VSS	Ground (0V)

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Absolute Maximum Ratings

Characteristic	Symbol	Min	Max	Unit
Power Supply Voltage	V_{DD}	-0.3	6	V
Ground	V_{SS}	0	0	V
Output Voltage	V_o	VSS	VDD	V
Storage Temperature Range	T_{STG}	-40	125	°C
Operating Junction Temperature Range	T_{OPR}	-40	85	°C

NOTE 1 : Maximum ratings are for design aid only, not subject to production testing. Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{DD}	1.9	3.0	3.6	V
Supply current in transmit mode				11.3	mA
Supply current in receive mode				12.3	mA
High level input voltage	V_{IH}	$0.7 \times V_{DD}$		5.25	V
Low level input voltage	V_{IL}	V_{SS}		$0.3 \times V_{DD}$	V
Low level output voltage	V_{OL}	V_{SS}		0.3	V
Operating frequency		2400		2525	MHz
Output power		-1	0	+1	dBm
Second Harmonic		-46	-45	-44	dBm
Sensitivity				-85	dBm

Operations

Detail specification and operations, please refer to the datasheet of Nordic nRF24L01.

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