1.0 Introduction

LW313 is a compact RF module for the 2.4~2.5 GHz ISM band using Nordic nRF24L01 transceiver IC. Consisting of a complete, agency-certified radio and sophisticated OSI link layer, LW313 simplifies the OEM's design and assures successful field operation.

Two versions of module are provided: the type R module has a HC49 crystal, and an inverted F on-board antenna; the type M module has a SMD crystal and an external antenna connection. The communication range can be up to 5 ~ 10 meters. LW313 is made to be a drop-in module for seamless integration, fast time-to-market and easy operation. A MCU can be connected to the module to control, configure and operate the module. Having a complete OSI link layer in hardware, it manages protocol over-the-air to assure successful transmissions. 3 levels of 32 bytes FIFO can store up to 3 packets before MCU must read out the data. The control process is transparent to the OEM.

2.0 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 Interace (SPI) speed 0 ~ 8 Mbps
- RF receiver sensitivity -82 dBm (2Mbps)
  -85 dBm (1Mbps)
- RF output power 0/-6/-12/-18 dBm
  programmable
- Auto ACK and Retransmit (up to 16 times)
- Address and CRC computation
- Power Supply 1.9 ~ 3.6V
- 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 μ A

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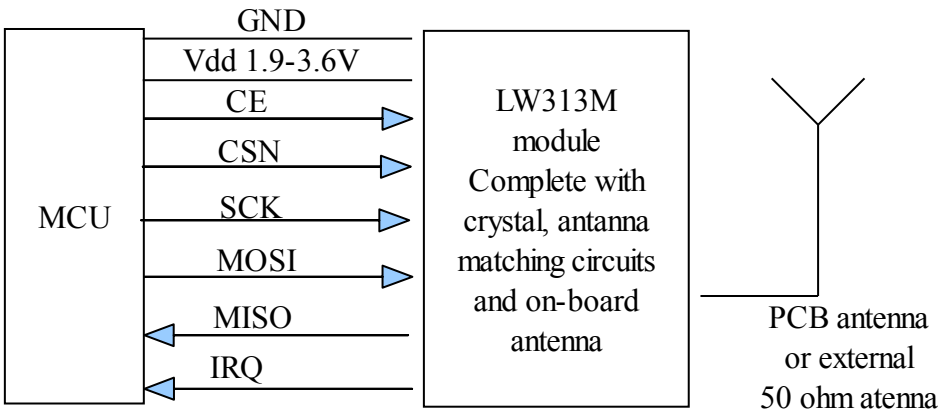
- Low wakeup time 130 μ s
- Operating temperature -40 ° C ~ +85 ° C

3.0 Applications

- Remote control
- Toys
- Telemetry
- Wireless mouse, keyboard, joystick
- Wireless data modem
- Surveillance

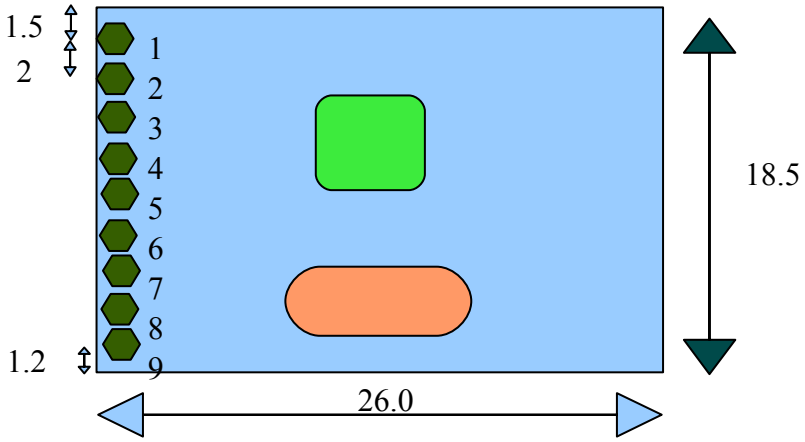
4.0 Pin Description

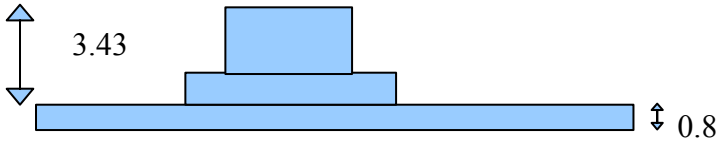
Application Circuit



Type R Module

Top View



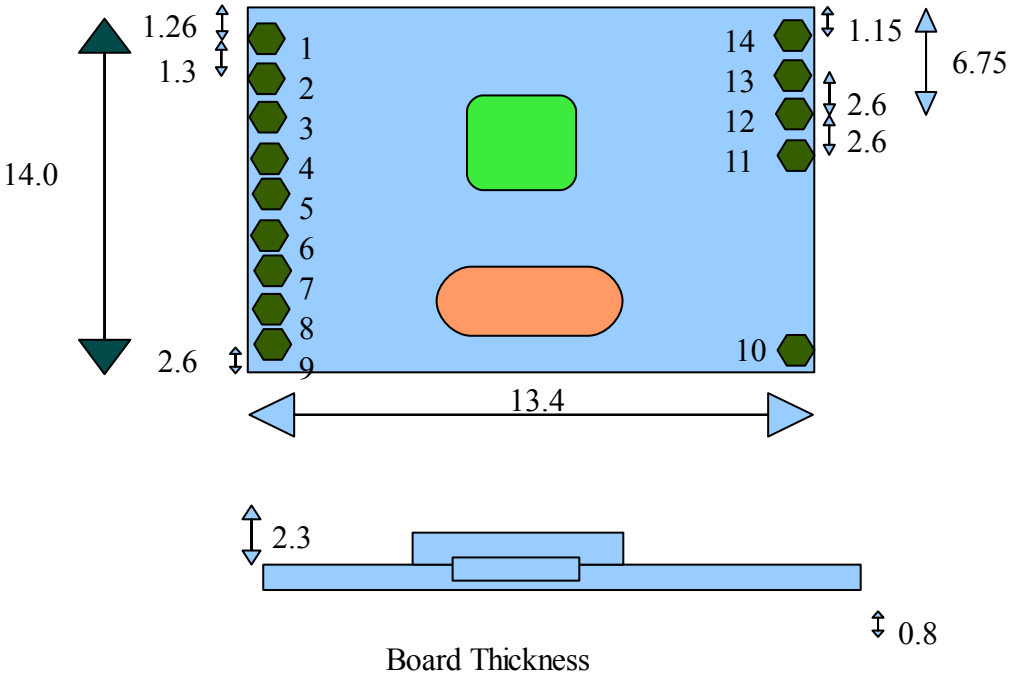


Board Thickness

Pin no.	Symbol	Description
1	VSS	Ground (0V)
2	VDD	Power Supply (+3V DC)
3	CE	Chip Enable Activates RX or 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

Top View



Board Thickness

Pin no.	Symbol	Description
1	VSS	GROUND (0V)
2	VDD	POWER SUPPLY (+3V DC)
3	CE	Chip Enable Activates RX or 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)

5.0 Electrical Characteristics

5.1 Absolute Maximum Ratings

Rating	*Symbol*	*Min*	*Max*	*Unit*
Ground	VSS	0	0	V
Power Supply Voltage	VDD	-0.3	3.6	V
Operating Junction Temperature Range	TOPR	-40	85	°C
Storage Temperature Range	TSTG	-40	125	°C
Output Voltage	Vo	VSS	VDD	V

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.

5.2 Electrical Characteristic

Characteristics	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	1.9	3.0	3.6	V
Operating Frequency		2400		2525	MHz
Supply Current in Receive mode				12.3	mA
Supply Current in Transmit mode				11.3	mA
High level input voltage	V_{IH}	0.7 V_{DD}		5.25	V
Low level input voltage	V_{IL}	V_{SS}		0.3 V_{DD}	V
High level output voltage	V_{OH}	V_{DD} - 0.3		V_{DD}	V
Low level output voltage	V_{OL}	V_{SS}		0.3	V
Second Harmonic		-46	-45	-44	dBm
Output Power		-1	0	+1	dBm
Sensitivity				-85	dBm

5.3 Operations

For detail specification and operations, please refer to the data sheet of Nordic nRF24L01

6.0 IMPORTANT NOTICE

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