General Description

RFM90BW sub-GHz radio transceivers are ideal for long range wireless applications. It is designed for long battery life with just 4.5 mA of active receive current consumption. It can transmit up to +22dBm with highly efficient integrated power amplifiers. These devices support LoRa® modulation for LPWAN use cases and (G)FSK modulation for legacy use cases. The devices are highly configurable to meet different application requirements utilizing the global LoRaWAN™ standard or proprietary protocols. The devices are designed to comply with the physical layer requirements of the LoRaWAN™ specification released by the LoRa Alliance™.

Continuous frequency coverage from 150 MHz to 960 MHz allows the support of all major sub-GHz ISM bands around the world.

Figure 1. RFM90BW Appearance

KEY PRODUCT FEATURES

- LoRa™ Modem.
- +22dBm RF output .
- Programmable bit rate up to 300kbps(FSK)/62.5kbps(LORA).
- High sensitivity: down to -137dBm@LoRa BW 125KHz , SF12;
- Excellent blocking immunity.
- Low RX current of 4.5mA.
- Fully integrated synthesizer with step 0.95 Hz.
- (G)FSK, (G)MSK, LoRa™ modulation.
- Built-in bit synchronizer for clock recovery.
- Preamble detection.
- 127dB Dynamic Range instantaneous/Packet RSSI.
- Automatic CAD.
- Module Size: 16*16mm

Applications

The level of integration and the low consumption within RFM90BW enable a new generation of Internet of Things applications.

- Smart meters
- Supply chain and logistics
- Building automation
- Agricultural sensors
- Smart cities
- Retail store sensors
- Asset tracking
- Street lights
- Parking sensors
- Environmental sensors
- Healthcare
- Safety and security sensors
- Remote control applications

Pin Diagram

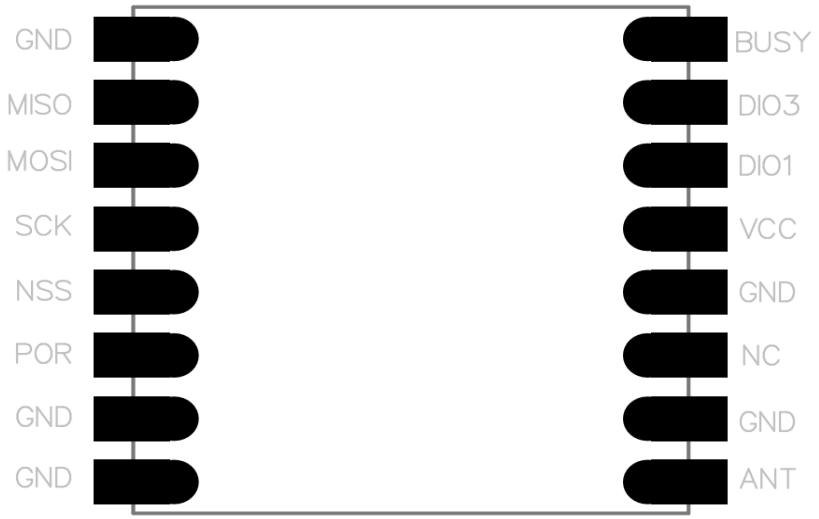

Figure 2: RFM90BW Pin Diagram (Top View)

Pin Description

Table 1. RFM90BW Pin Description

NO.	Name	Description
1	GND	Ground
2	MISO	SPI slave output
3	MOSI	SPI slave input
4	SCK	SPI clock
5	NSS	SPI slave
6	POR	Reset
7	GND	Ground
8	GND	Ground
9	ANT	RF signal output/input
10	GND	Ground
11	NC	NC
12	GND	Ground
13	VCC	Power supply
14	DIO1	Interrupt Signal output
15	DIO3	Interrupt Signal output/External XO power supply
16	BUSY	Busy indicator

Block Diagram

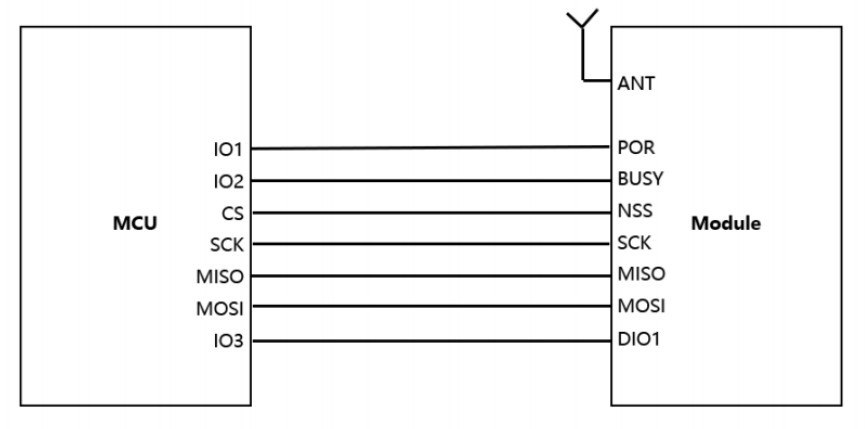

Figure 2. System block diagram

Electrical Characteristics

All electrical parameters in all tables are specified under the following conditions, unless stated otherwise:

- Typical values are based on TA=25 °C and all supplies at 3.3 V

■ Operating Range

Symbol	Description	Min	Max	Unit
VDD	Supply voltage	1.8	3.7	V
Temperature	Operational temperature range	-40	+85	°C
Clop	Load capacitance on digital ports	-	20	pF

■ Absolute Maximum Ratings

Symbol	Description	Min	Max	Unit
VDDmr	Supply Voltage	-0.5	3.9	V
Tmr	Temperature	-55	+125	° C

■ RF Specifications and Power Consumption

Specification	Condition	Min	Typical	Max	Unit
Frequency Range	RFM90BW-433S2 RFM90BW-868S2 RFM90BW-915S2		434 868 915	-	MHz
IDDTX	+22dBm@3.3V	-	120	-	mA
RX Sensitivity	SF=12, BW=125KHz（LORA）	-		-137	dB
IDDRX		-	4.5	-	mA
IDDSL	Sleep mode	-	1	-	uA

Module Dimension (Unit: mm)

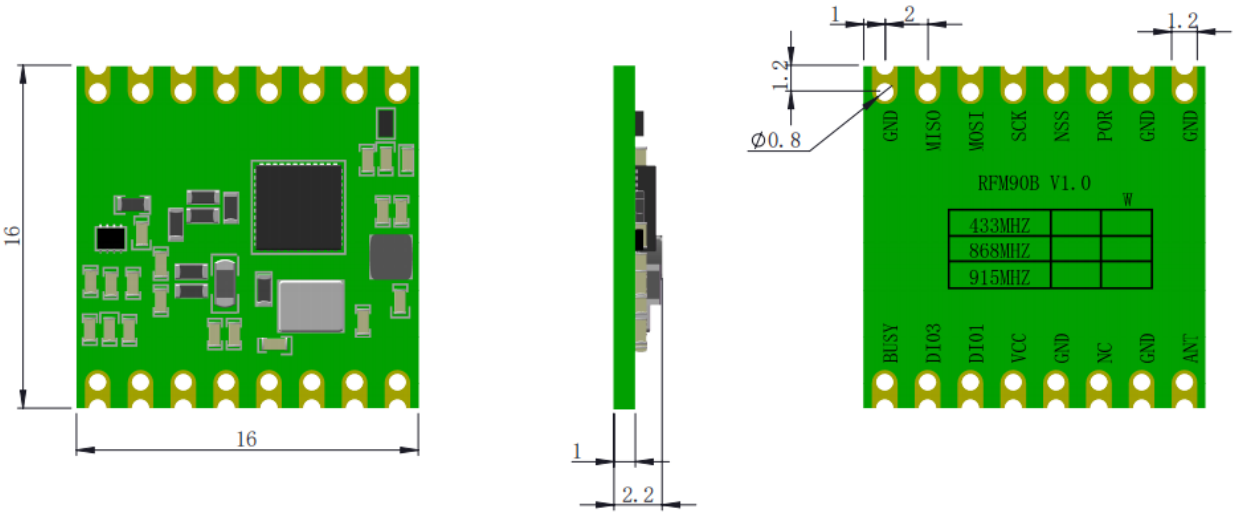

Figure 3. RFM90B Module Dimension

Ordering Information

Module	Frequency
RFM90BW-433S2	434MHz
RFM90BW-868S2	868MHz
RFM90BW-915S2	915MHz

Revision History

Version	Date	Modification
V1.0	2024.7.16	Initial version
V1.1	2024.10.24	Add description for 433MHz and 915MHz modules

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Contact Information

Shenzhen Hope Microelectronics Co., Ltd.
Address: 30th floor of 8th Building, C Zone, Vanke Cloud City, Xili Sub-district, Nanshan, Shenzhen, GD, P.R. China
Tel: +86-755-82973805
Post Code: 518055
Email: sales@hoperf.com
Website: www.hoperf.com