NRFLRCC68 LoRaWAN Module

LoRa@ Wireless Module-Powered by Semtech

Datasheet

V1.0

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1 Introduction

The NRFLRCC68 is a wireless communication module designed for low-power, long-range IoT applications. It integrates the Semtech LLCC68 and Nordic nRF52840, featuring Semtech's LoRa® technology and Nordic's low-power Bluetooth technology. This module supports long-range wireless communication via LoRa and Bluetooth communication.

The LLCC68 employs an advanced LoRa modulation technique, which significantly outperforms traditional FSK and GFSK modulation methods in terms of interference resistance and communication range. In LoRa mode, the module supports data transmission rates ranging from 1.76 kbps to 62.5 kbps, while in FSK mode, it can achieve a maximum data rate of up to 300 kbps. Additionally, it supports spreading factors SF5 to SF11.

1.1 Feature

- LoRaWAN 1.0.3 specification compliant
- Supported bands: 868/915MHz LoRa®/(G)FSK
- LoRaWAN Activation by OTAA/ABP
- LoRa Point-to-Point (P2P) communication
- Easy-to-use AT Command set via UART interface
- TCXO crystal for LoRa chip

- IO ports: UART, I2C, GPIO, USB
- Temperature range: -40℃ to +85℃
- Supply voltage: 2.0 ~ 3.6 V
- Low-Power Wireless Systems with 7.8 kHz to 500 kHz bandwidth
- Support spread spectrum factors SF5, SF6, SF7, SF8, SF9, SF10, SF11
- Ultra-Low Power Consumption 5 uA in sleep mode
- LoRa PA Boost mode with 22 dBm@Sub-Ghz output power
- Serial Wire Debug (SWD) interface
- Module size: 20 mm x 20 mm x 3.5mm
- CE,FCC Certified

2 Description

The NRFLRCC68 is a low-power, long-range transceiver module featuring the Nordic nRF52840 MCU, which supports Bluetooth 5.0 (Bluetooth Low Energy, BLE) and the latest Semtech LLCC68 LoRa transceiver. The module complies with LoRaWAN 1.0.3 Class A, B, and C specifications and supports LoRa point-to-point (P2P) communication mode, enabling rapid deployment of custom LoRa networks.

With dual-radio communication capabilities (LoRa + BLE), the NRFLRCC68 is highly suitable for a wide range of IoT applications, including home automation, sensor networks, building automation, and various IoT network scenarios.

2.1 System Diagrm

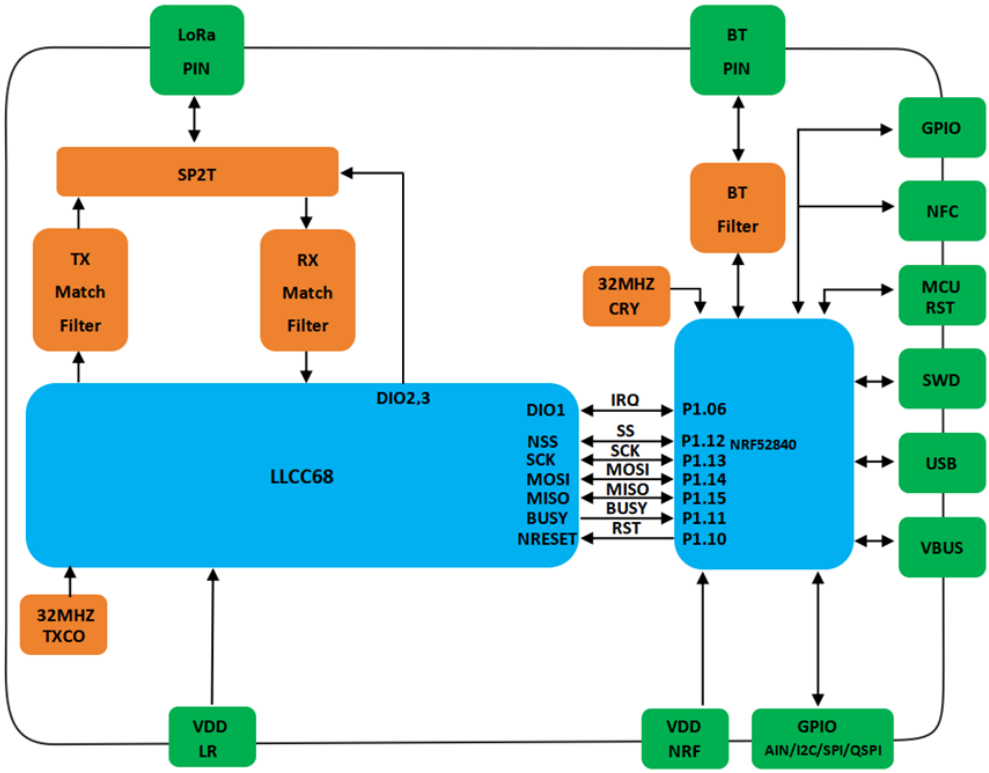

Figure 1:NRFLRCC68 Schematic diagram

2.2 Pin Definition

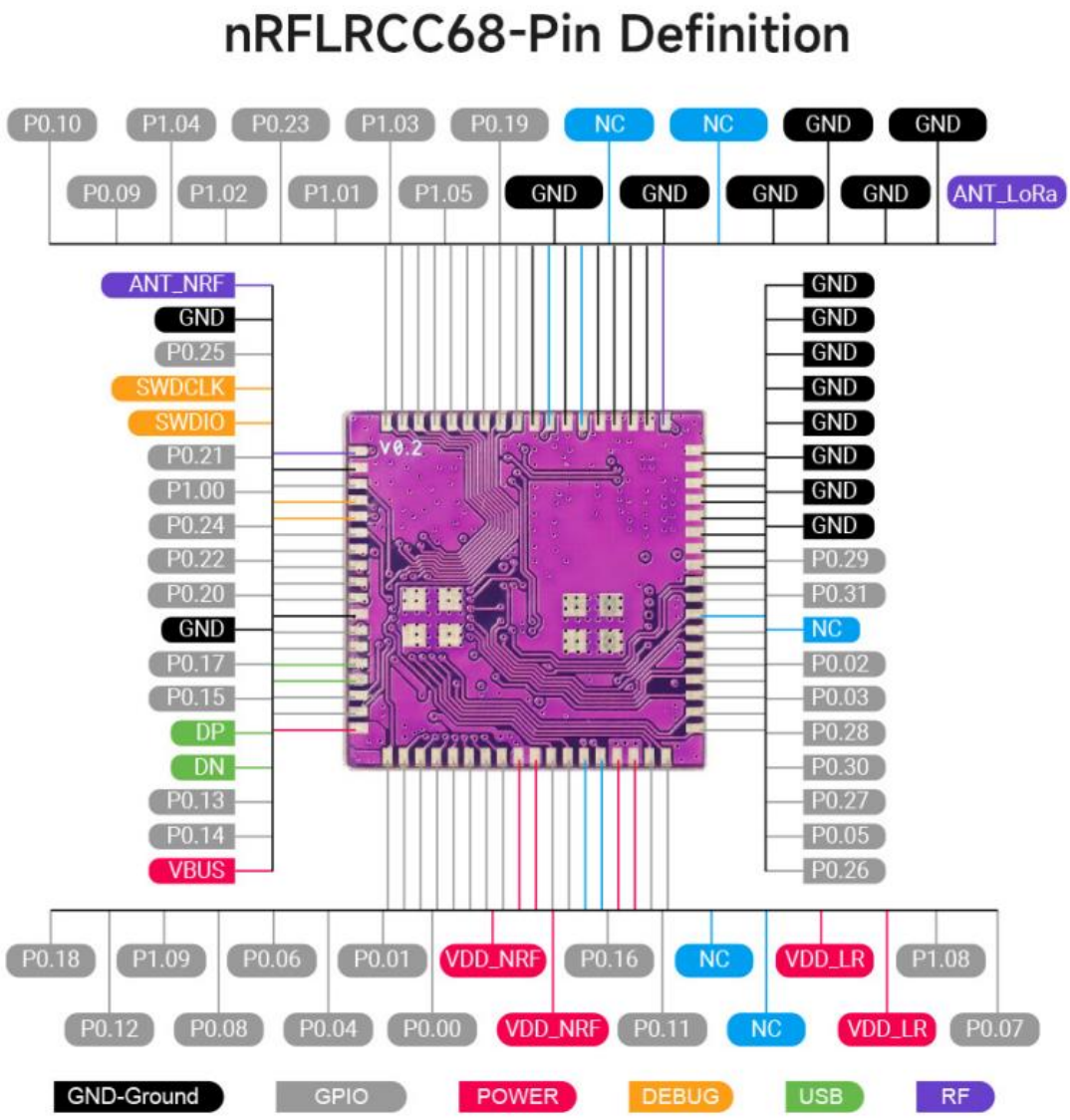

Figure 2:NRFLRCC68 Pin Definition

2.3 Pinout

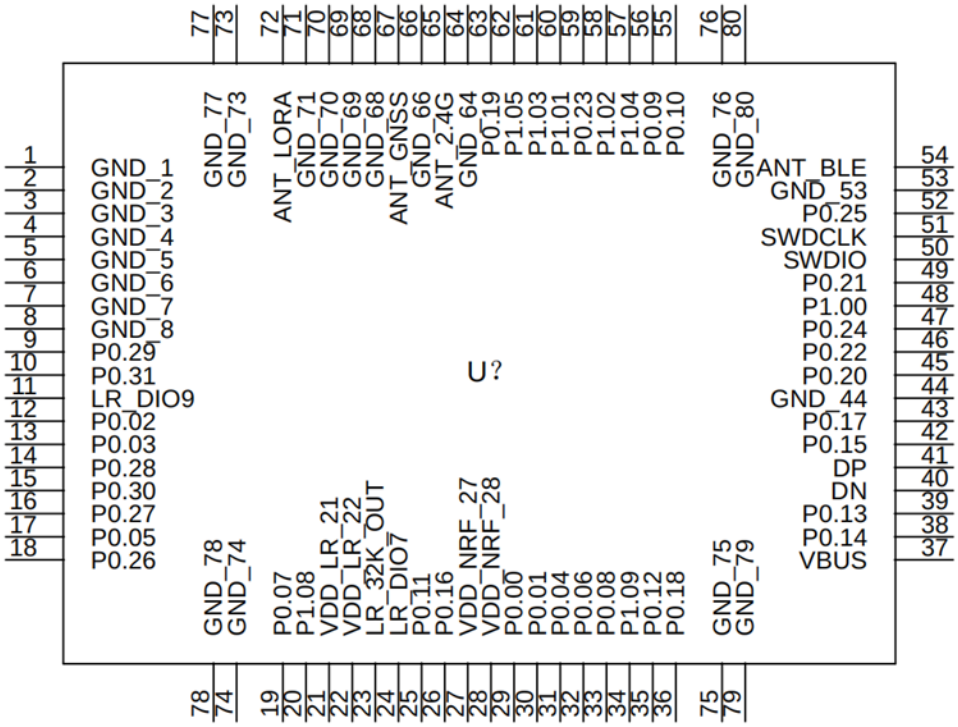

Figure 3:NRFLRCC68 Pin arrangement

Table 1:NRFLRCC68 Pinout

Number	Name	Type	Description
1	GND	-	Ground
2	GND	-	Ground
3	GND	-	Ground
4	GND	-	Ground
5	GND	-	Ground
6	GND	-	Ground
7	GND	-	Ground
8	GND	-	Ground
9	P0.29	I/O	MCU GPIO P0.29
10	P0.31	I/O	MCU GPIO P0.31
11	NC	-	NC
12	P0.02	I/O	MCU GPIO P0.02

13	P0.03	I/O	MCU GPIO P0.03
14	P0.28	I/O	MCU GPIO P0.28
15	P0.30	I/O	MCU GPIO P0.30
16	P0.27	I/O	MCU GPIO P0.27
17	P0.05	I/O	MCU GPIO P0.05
18	P0.26	I/O	MCU GPIO P0.26
19	P0.07	I/O	MCU GPIO P0.07
20	P1.08	I/O	MCU GPIO P1.08
21	VDD_LR	-	Supply voltage for LoRa®
22	VDD_LR	-	Supply voltage for LoRa®
23	NC	-	NC
24	NC	-	NC
25	P0.11	I/O	MCU GPIO P0.11
26	P0.16	I/O	MCU GPIO P0.16
27	VDD_NRF	-	Supply voltage for Bluetooth
28	VDD_NRF	-	Supply voltage for Bluetooth
29	P0.00	I/O	MCU GPIO P0.00
30	P0.01	I/O	MCU GPIO P0.01
31	P0.04	I/O	MCU GPIO P0.04
32	P0.06	I/O	MCU GPIO P0.06
33	P0.08	I/O	MCU GPIO P0.08
34	P1.09	I/O	MCU GPIO P1.09
35	P0.12	I/O	MCU GPIO P0.12
36	P0.18	I/O	MCU GPIO P0.18
37	VBUS	I/O	MCU GPIO VBUS
38	P0.14	I/O	MCU GPIO P0.14
39	P0.13	I/O	MCU GPIO P0.13
40	DN	I/O	MCU USB DN
41	DP	I/O	MCU USB DP
42	P0.15	I/O	MCU GPIO P0.15

43	P0.17	I/O	MCU GPIO P0.17
44	GND	-	Ground
45	P0.20	I/O	MCU GPIO P0.20
46	P0.22	I/O	MCU GPIO P0.22
47	P0.24	I/O	MCU GPIO P0.24
48	P1.00	I/O	MCU GPIO P1.00
49	P0.21	I/O	MCU GPIO P0.21
50	SWDIO	I/O	MCU SWDIO
51	SWDCLK	I	MCU SWDCLK
52	P0.25	I/O	MCU GPIO P0.25
53	GND	-	Ground
54	ANT_NRF	RFIO	Bluetooth Antenna
55	P0.10	I/O	MCU GPIO P0.10
56	P0.09	I/O	MCU GPIO P0.09
57	P1.04	I/O	MCU GPIO P1.04
58	P1.02	I/O	MCU GPIO P1.02
59	P0.23	I/O	MCU GPIO P0.23
60	P1.01	I/O	MCU GPIO P1.01
61	P1.03	I/O	MCU GPIO P1.03
62	P1.05	I/O	MCU GPIO P1.05
63	P0.19	I/O	MCU GPIO P0.19
64	GND	-	Ground
65	NC	-	NC
66	GND	-	Ground
67	NC	-	NC
68	GND	-	Ground
69	GND	-	Ground
70	GND	-	Ground
71	GND	-	Ground
72	ANT_LoRa®	RFIO	LoRa® Antenna

73	GND	-	Ground
74	GND	-	Ground
75	GND	-	Ground
76	GND	-	Ground
77	GND	-	Ground
78	GND	-	Ground
79	GND	-	Ground
80	GND	-	Ground

3 Electrical Characteristics

3.1 Maximum Ratings

Table 2:Absolute Maximum Ratings

Item	Description	Min	Max	Unit
VDD_LR	LoRa® supply voltage	-0.5	+3.9	V
VDD_NRF	MCU supply voltage	-0.3	+3.9	V
VBUS	MCU USB VBUS	-0.3	+5.8	V

3.2 Normal Working Conditions

Table 3:Recommended Operating Conditions

Item	Description	Min	Max	Unit
VDD_LR	LoRa® supply voltage	+1.8	+3.7	V
VDD_NRF	MCU supply voltage	+1.7	+3.6	V
VBUS	MCU USB VBUS	+4.35	+5.5	V
TA	Ambient temperature	-40	+85	℃

3.3 Module Specifications

Table 4:NRFLRCC68 features

ITEMs	Parameter	Specifications	Unit
Structure	Size	20(W) X 20(L) X 3.5(H)	mm
	Package	80 pin Module	
Electrical Characteristics	Power supply	3.3V typical	V
	Sleep current	5uA	uA
	Operation current (Transmitter+MCU)	120mA @ LoRa® TX 22dBm	mA
	Operation current (Receiver+MCU)	12mA @ LoRa® SF12 125 kHz	mA
		8mA @ Bluetooth Scan	
	Output power	20dBm max @LoRa®	dBm
		6dBm max @ Bluetooth	dBm
	Sensitivity	SF	dBm

			min	type	max	
		SF7	-	-125	-	
Peripheral Interface	Full-speed 12 Mbps USB					
	QSPI/SPI/TWI/I²S/PDM/QDEC					
	High speed 32 MHz SPI					
	Quad SPI interface 32 MHz					
	Manual reset pin input					

4 Application Information

4.1 Package Information

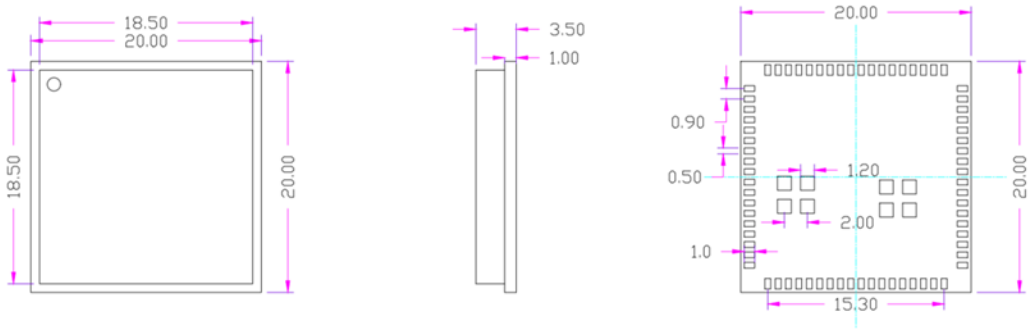

Figure 4:Package Outline Drawing (Unit:mm)

4.2 Land Pattern

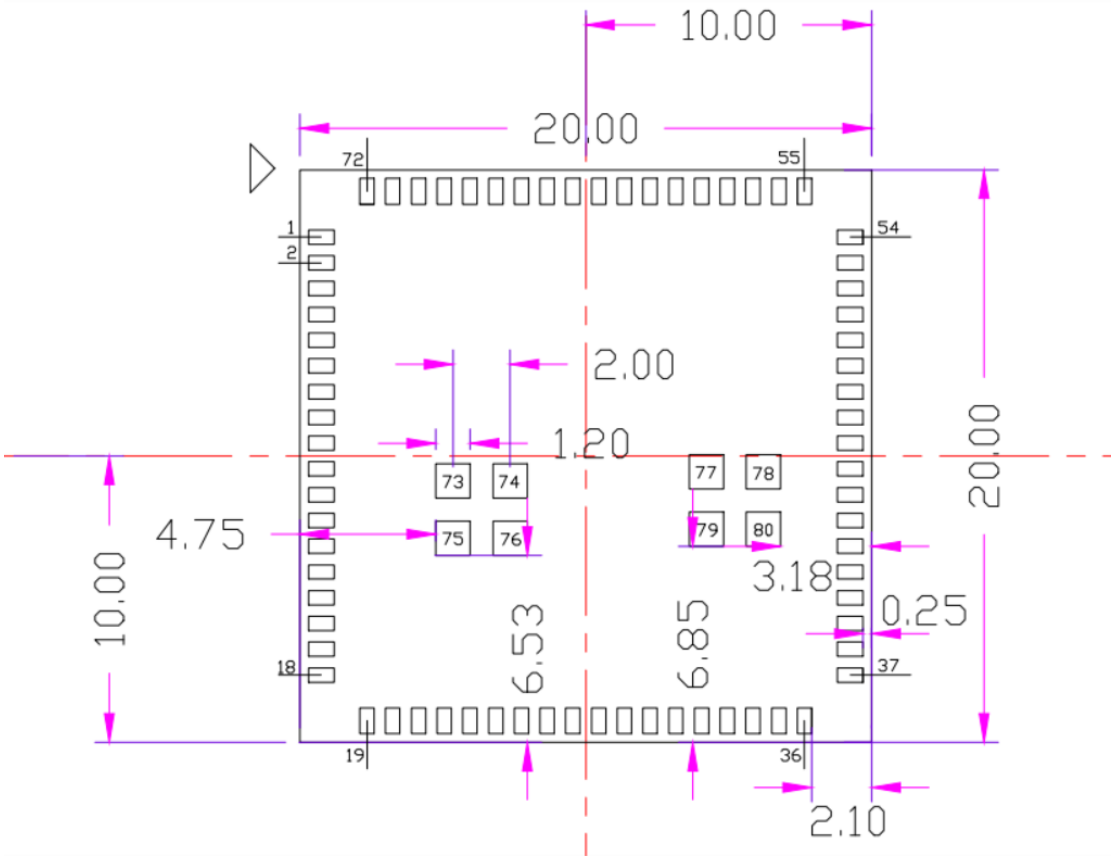

Figure 5:PCB Layout (Unit:mm)

4.3 Label

4.4 Reference Schematic Design Based on NRFLRCC68 Module

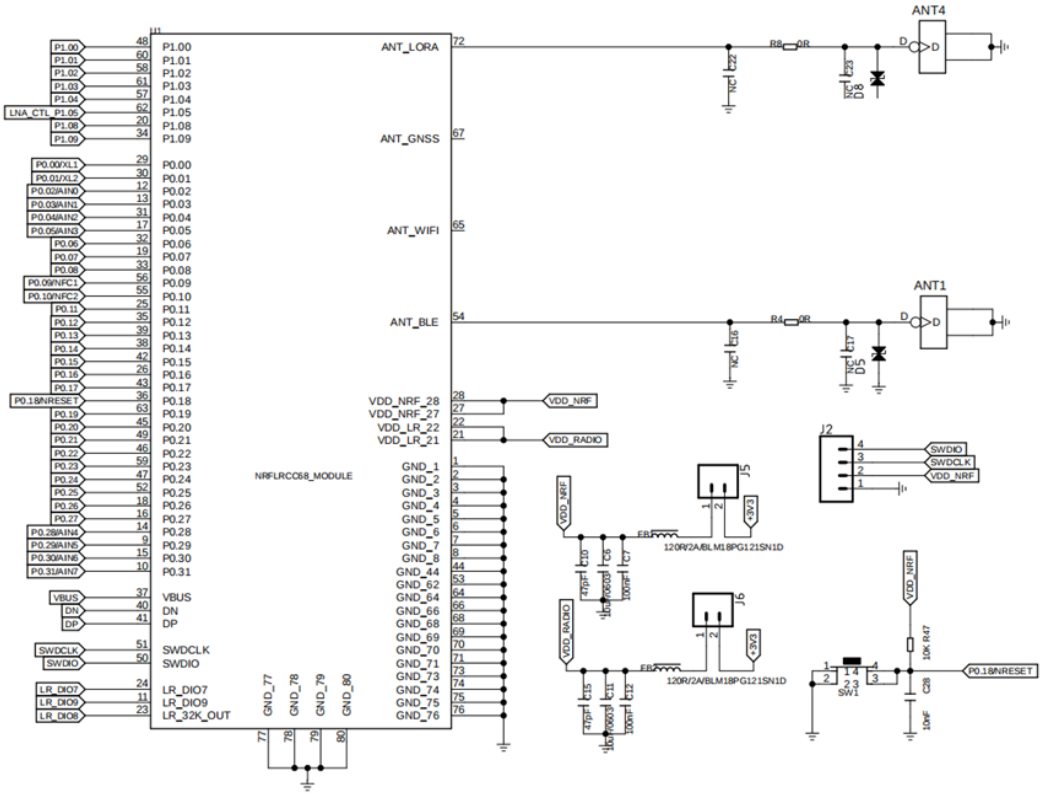

Figure 6:Reference Schematic design based on NRFLRCC68

5 Contact Info

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Sales:info@elecrow.com

6 Version

V1.0 2025-01-20 First release