NRFLR1110 LoRaWAN Module

LoRa@ Wireless Module-Powered by Semtech

Datasheet

V1.0

Content

1 Introduction

The NRFLR1110 is a fusion of Semtech LR1110 and Nordic nRF52840 low-power, remote iot module. LoRa® technology with Semtech is used for long-range wireless communications, GNSS, Wi-Fi and Bluetooth location tracking service.

1.1 Feature

- LoRaWAN 1.0.3 specification compliant
- Multi-Purpose Radio Front-End Targeting Geolocation Purposes: GNSS (GPS/ BeiDou)、Wi-Fi、Bluetooth, suitable for indoor and outdoor positioning
- Supported bands: EU868,US915
- 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
- Ultra-Low Power Consumption 6 uA in sleep mode
- LoRa PA Boost mode with 22 dBm output power

- Serial Wire Debug (SWD) interface
- Module size: 20 mm x 20 mm x 3.5mm
- CE,FCC Certified

2 Description

The NRFLR1110 module integrates the high-performance Semtech LR1110 and Nordic nRF52840, offering developers low-power, long-range LoRaWAN® communication with global frequency band coverage. This makes it highly versatile for a wide range of low-power wide-area IoT applications, such as smart agriculture, wireless meter reading, and smart city programs.

Additionally, the NRFLR1110 module can leverage GNSS (Global Navigation Satellite System) for outdoor tracking applications. Moreover, Wi-Fi passive scanning and Bluetooth mesh serve as suitable IPS (Indoor Positioning System) solutions, providing comprehensive location coverage while reducing complexity and cost. It is an ideal development platform for applications such as asset tracking, inventory management, loss prevention, and anti-theft.

2.1 System Diagrm

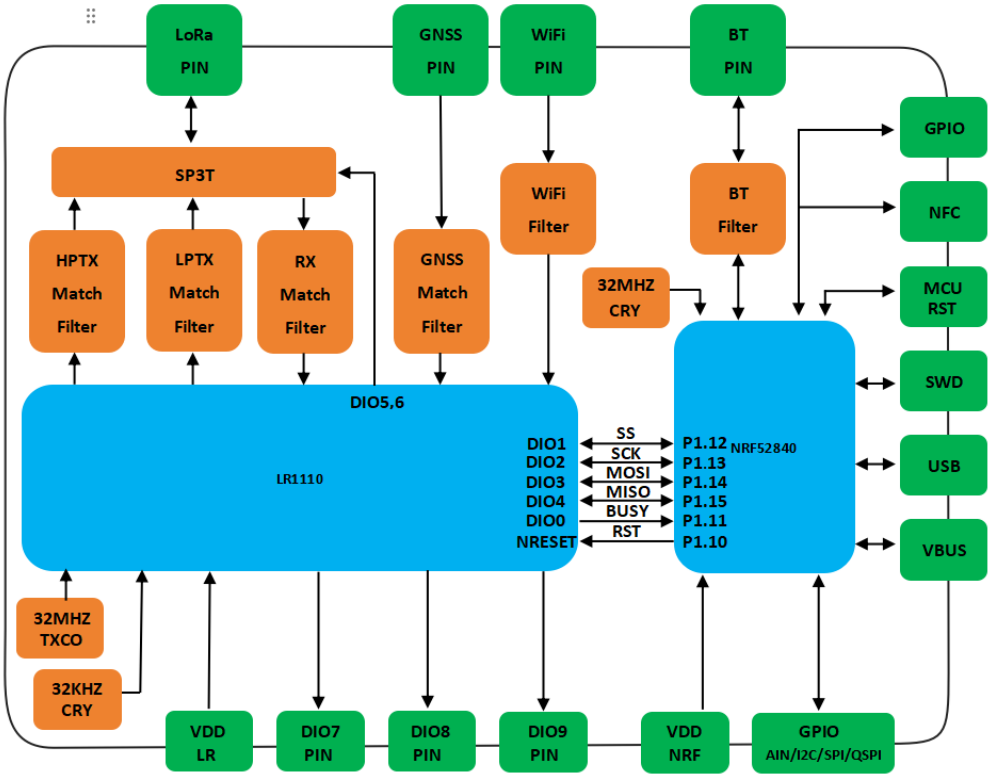

Figure 1:NRFLR1110 Schematic diagram

2.2 Pin Definition

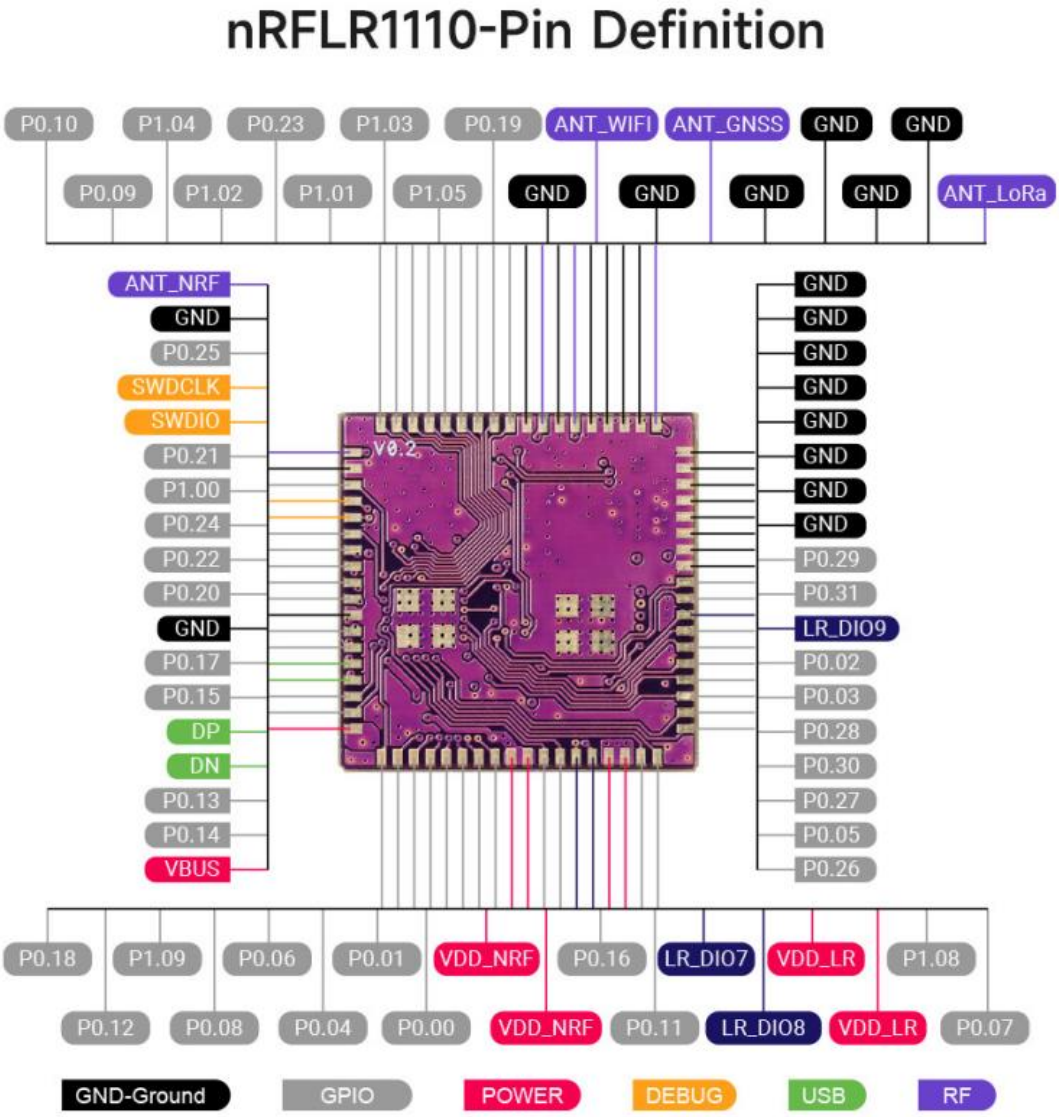

Figure 2:NRFLR1110 Pin Definition

2.3 Pinout

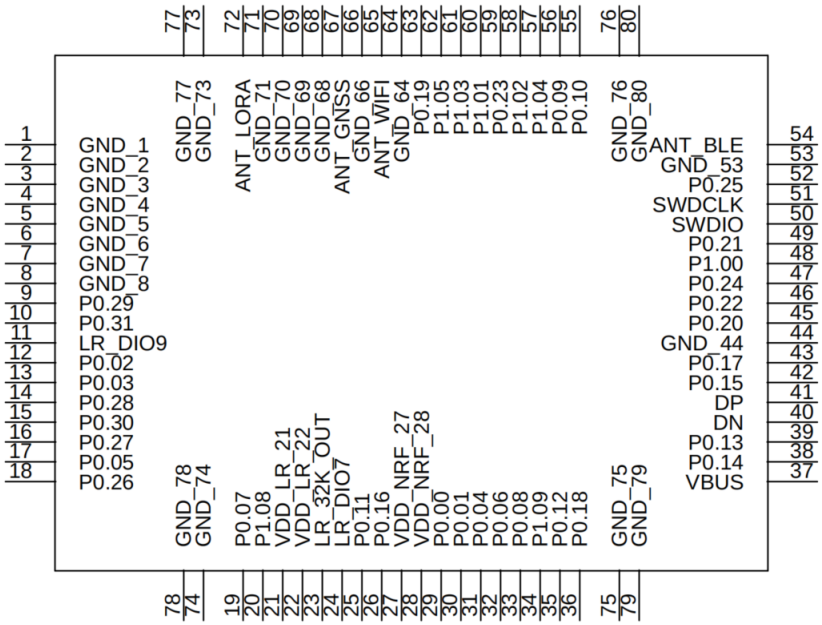

Figure 3:NRFLR1110 Pin arrangement

Table 1:NRFLR1110 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	LR_DIO9	O	LR1110 DOUT
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	LR_DIO8	O	LR1110 DOUT
24	LR_DIO7	O	LR1110 DOUT
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	ANT_WIFI	RFIO	WIFI SCAN Antenna
66	GND	-	Ground
67	ANT_GNSS	RFIO	GNSS Antenna
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:NRFLR1110 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	6uA	uA
	Operation current (Transmitter+MCU)	126mA @ LoRa® TX 22dBm	mA
	Operation current (Receiver+MCU)	18mA @ LoRa® SF12 125 kHz	mA
		8mA @ Bluetooth Scan	
		8mA @ Wi-Fi Scan	

<table>
<tr><td rowspan="6"></td><td rowspan="2">Output power</td><td colspan="4">20dBm max @LoRa®</td><td>dBm</td></tr>
<tr><td colspan="4">6dBm max @ Bluetooth</td><td>dBm</td></tr>
<tr><td rowspan="4">Sensitivity</td><td colspan="4">SF</td><td rowspan="4">dBm</td></tr>
<tr><td></td><td>min</td><td>type</td><td>max</td></tr>
<tr><td>SF7</td><td>-</td><td>-125</td><td>-</td></tr>
<tr><td>SF12</td><td>-</td><td>-141</td><td>-</td></tr>
<tr><td rowspan="5">Peripheral Interface</td><td colspan="6">Full-speed 12 Mbps USB</td></tr>
<tr><td colspan="6">QSPI/SPI/TWI/I²S/PDM/QDEC</td></tr>
<tr><td colspan="6">High speed 32 MHz SPI</td></tr>
<tr><td colspan="6">Quad SPI interface 32 MHz</td></tr>
<tr><td colspan="6">Manual reset pin input</td></tr>
</table>

4 Application Information

4.1 Package Information

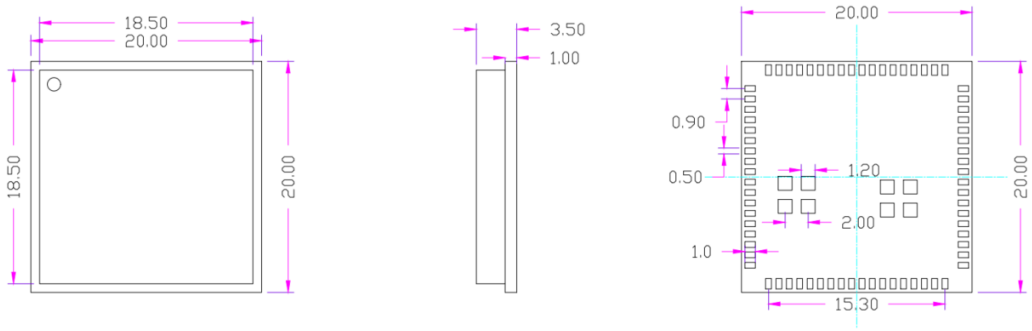

Figure 4:Package Outline Drawing (Unit:mm)

4.2 Land Pattern

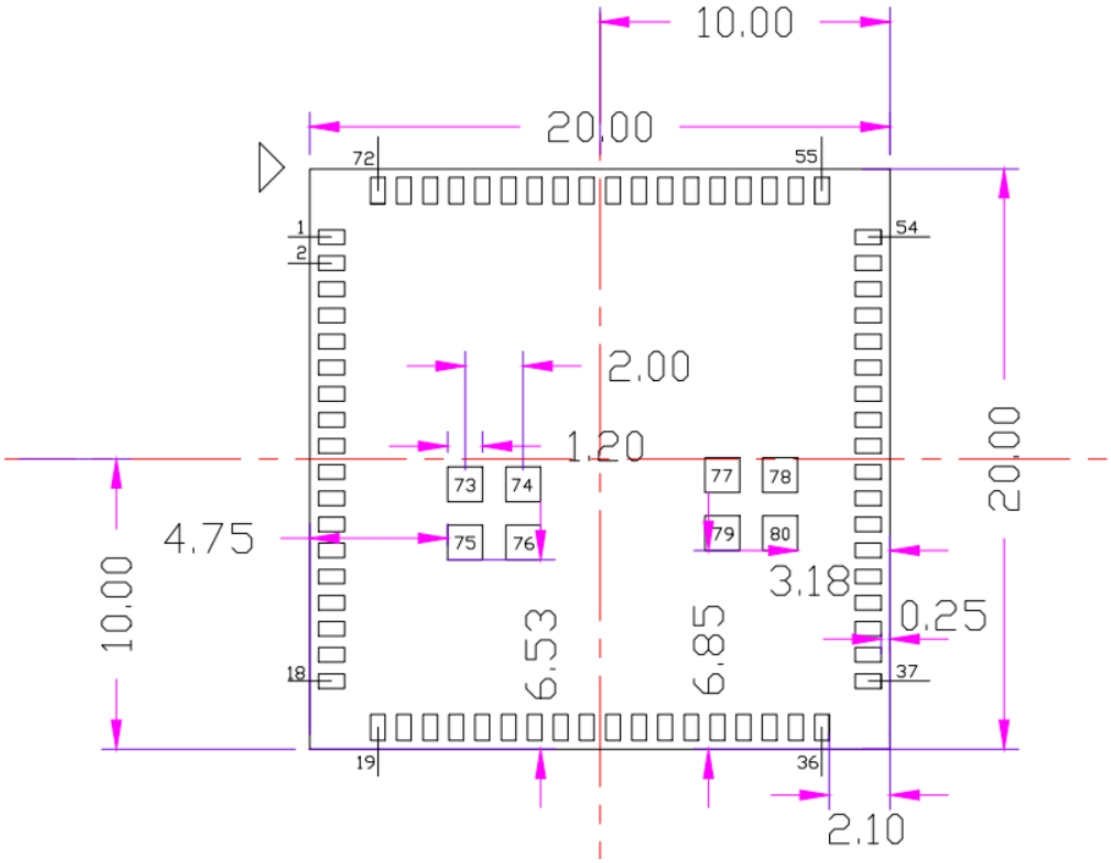

Figure 5:PCB Layout (Unit:mm)

4.3 Label

4.4 Reference Schematic Design Based on

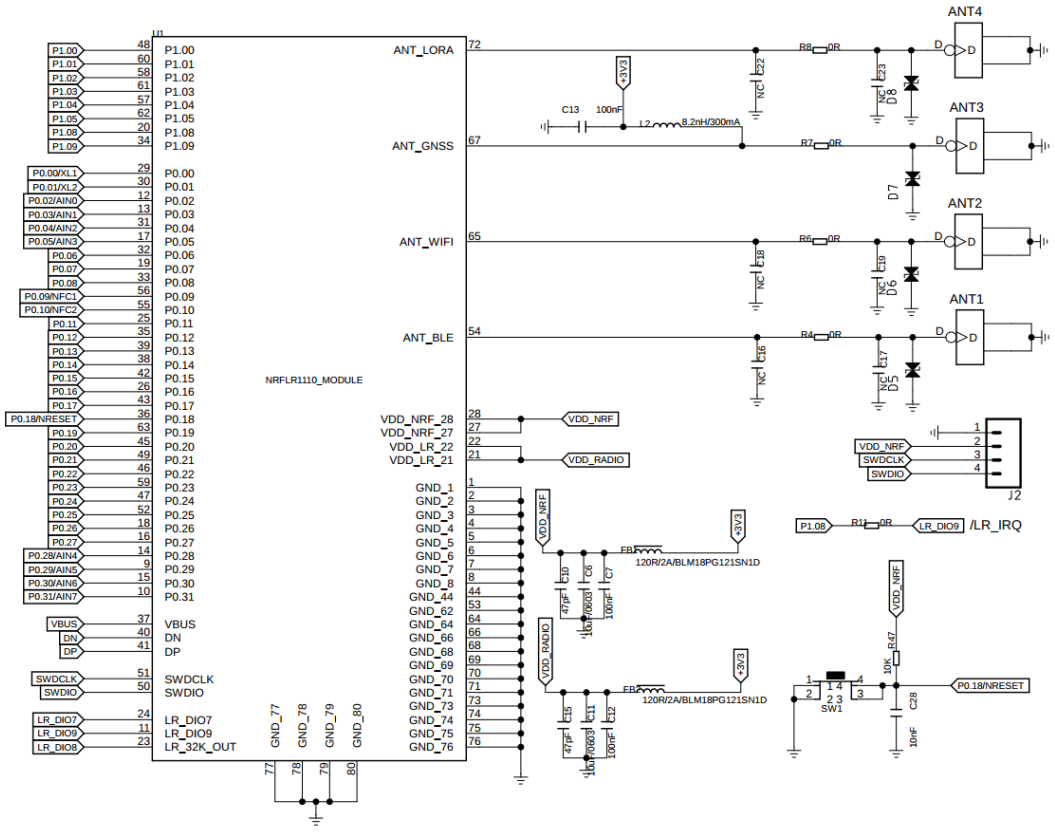

Figure 6:Reference schematic design based on NRFLR1110

5 Contact Info

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6 Version

V1.0 2025-01-17 First release