LR68NA-C Module Datasheet V2.0

Beijing Jia An Electronics Technology Co., Ltd.

Contents

History

Date	Version	Description	Draft	Approval
2020-10-16	V2.0	Release	ZYX	Amy

Module Name Information

LR68 - NA - C - 868

Chip Type:	Antenna Type:	PCB Version	Frequency:
Semtech LoRa	NA: No Antenna		434MHz 470MHz 868MHz 915MHz

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	911.1	25	916.1
01	911.3	26	916.3
02	911.5	27	916.5
03	911.7	28	916.7
04	911.9	29	916.9
05	912.1	30	917.1
06	912.3	31	917.3
07	912.5	32	917.5
08	912.7	33	917.7
09	912.9	34	917.9
10	913.1	35	918.1
11	913.3	36	918.3
12	913.5	37	918.5
13	913.7	38	918.7
14	913.9	39	918.9
15	914.1	40	919.1
16	914.3	41	919.3
17	914.5	42	919.5
18	914.7	43	919.7
19	914.9	44	919.9
20	915.1	45	920.1
21	915.3	46	920.3
22	915.5	47	920.5
23	915.7	48	920.7
24	915.9	49	920.9

Features

- LoRa and FSK Modem
- 170 dB maximum link budget
- Wide-Supply Voltage: VBAT:1.8 to 3.7V
-
- Programmable bit rate
- Integrated DC-DC converter and LDO
- High sensitivity: down to -148 dBm
- 80 dB blocking immunity at 1 MHz offset
- Co-channel rejection of 19 dB in LoRa mode
- Fully integrated synthesizer with a resolution of 122 Hz
- FSK, GFSK, MSK, GMSK and LoRa modulation
- Built-in bit synchronizer for clock recovery
- Automatic Channel Activity Detection (CAD) with ultra-fast AFC
- Preamble detection
- Package and Operating Conditions: 3.4 mm Pitch, 17 mm×19mm Stamp Package for Easy Assembly and Low-Cost PCB Design
- Operating Temperature Range: -40℃ to +85℃

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

Description

The LR68NA-C module is sub-GHz radio transceivers are ideal for long range wireless applications.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™.

The radio is suitable for systems targeting compliance with radio regulations including but not limited to ETSI EN 300 220, FCC CFR 47 Part 15, China regulatory requirements and the Japanese ARIB T-108. Continuous frequency coverage from 150 MHz to 960 MHz allows the support of all major sub-GHz ISM bands around the world..

Architecture

The LR68NA-C is a half-duplex transceiver capable of low power operation in the 150-960 MHz ISM frequency band. The radio comprises four main blocks:

1.Analog Front End: the transmit and receive chains, as well as the data converter interface to ensuing digital blocks. The LR68NA-C transceiver is capable of delivering up to +14 dBm under the battery supply.

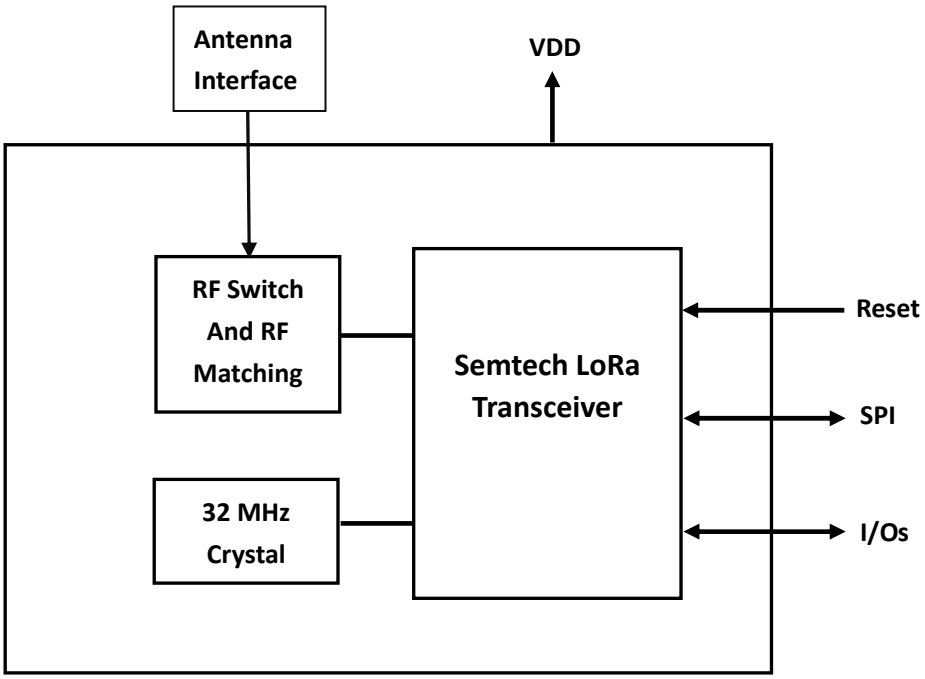
2.Digital Modem Bank: a range of modulation options is available in the LR68NA-C:

- LoRa® Rx/Tx, BW = 125 -250 - 500 kHz
- LoRa® SF = 5 - 6 - 7 - 8 - 9 for BW = 125 kHz
- LoRa® SF = 5 - 6 - 7 - 8 - 9 - 10 for BW = 250 kHz
- LoRa® SF = 5 - 6 - 7 - 8 - 9 - 10 - 11 for BW = 500 kHz

3.Digital Interface and Control: this comprises all payload data and protocol processing as well as access to configuration of the radio via the SPI interface.

4.Power Distribution: two forms of voltage regulation, DC-DC or linear regulator LDO, are available depending upon the design priorities of the application.

Block Diagram

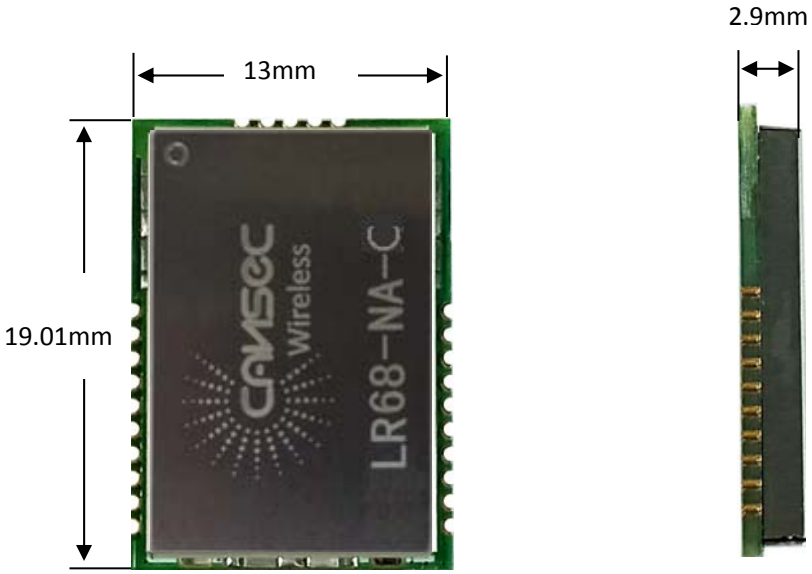


Specifications

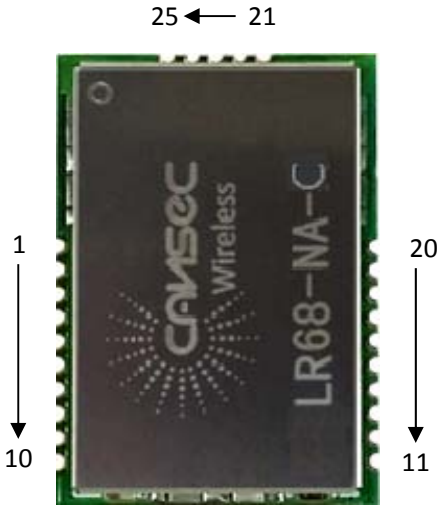
Parameter		Min	Typ	Max	Unit
Operating Voltage		1.8	-	3.7	V
Operating Temperature		-40	-	+85	℃
Current Consumption	Sleep Mode	-	0.5	1.5	uA
	Receive mode(@DCDC mode)	-	4.9	-	mA
	Transmit Mode	-	120	-	mA
TX Power (For Carrier)		-	14	-	dBm
RX Sensitivity (For Lora Modulation)		-	-	-148	dBm
Distance		4.8K			m

Mechanical Drawing

LR68NA-C-XXX:

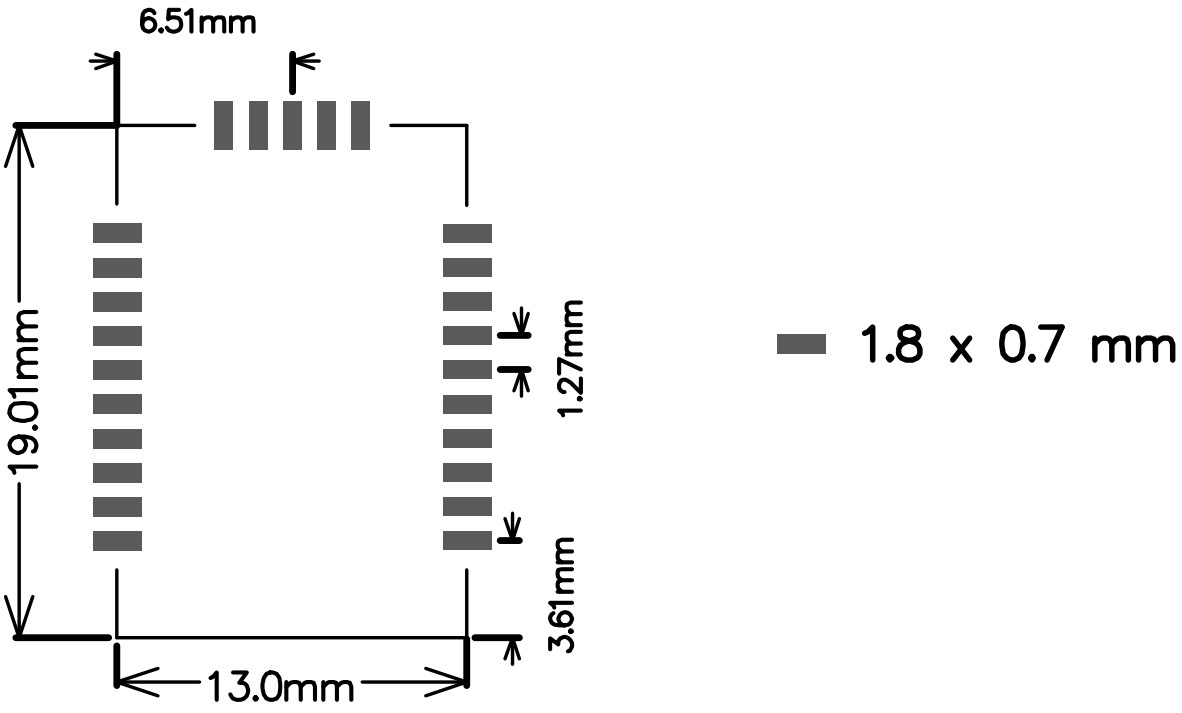


Terminal Description

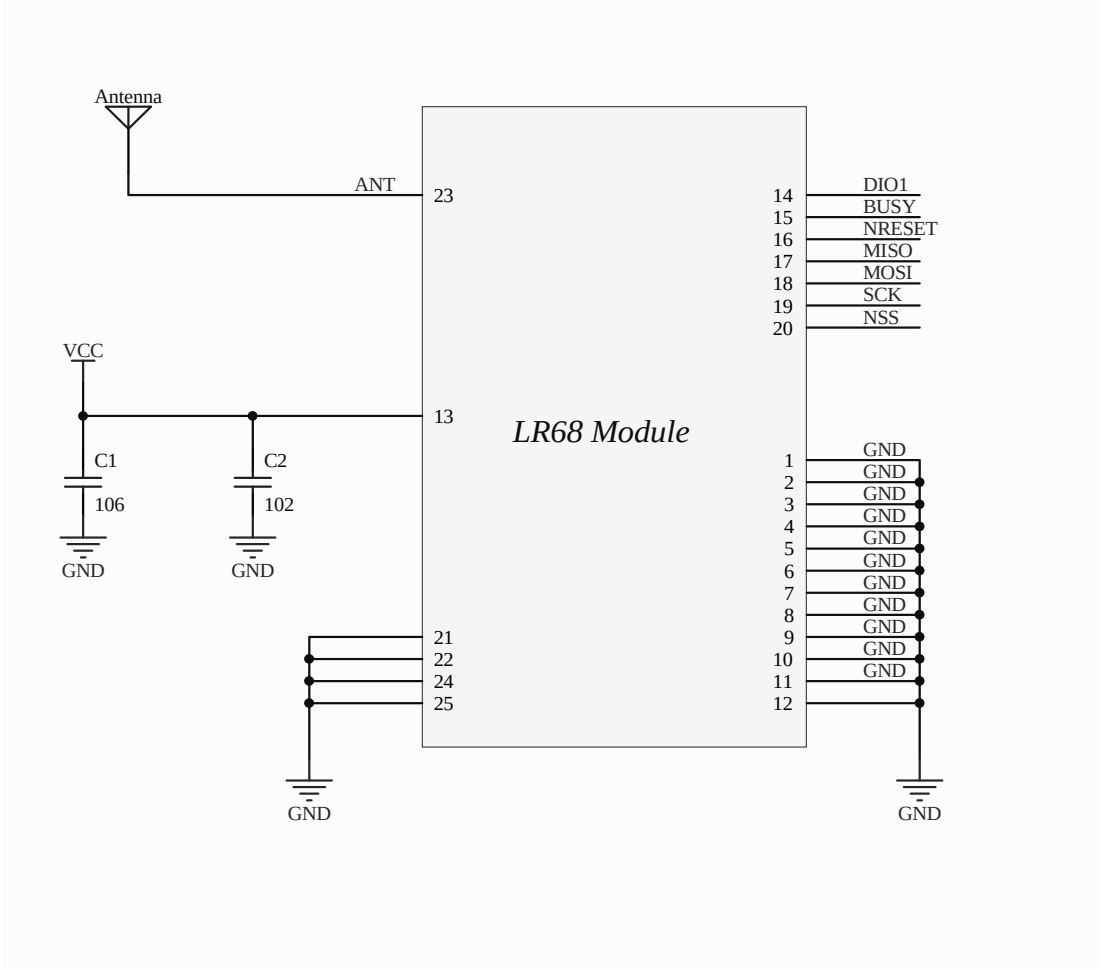


Pad Number	Name	Pin Type	Description
1-12	GND	Ground Pin	Connect to GND
13	VDD	POWER	1.8V to 3.7V main chip supply
14	DIO1	I/O	Multi-purpose digital IO
15	BUSY	O	Busy indicator
16	NRESET	I	Reset trigger input
17	MISO	O	SPI slave output
18	MOSI	I	SPI slave input
19	SCK	I	SPI clock
20	NSS	I	SPI Slave Select
21	GND	Ground Pin	Connect to GND
22	GND	Ground Pin	Connect to GND
23	RF_OUT	O	RF transmitter output
24	GND	Ground Pin	Connect to GND
25	GND	Ground Pin	Connect to GND

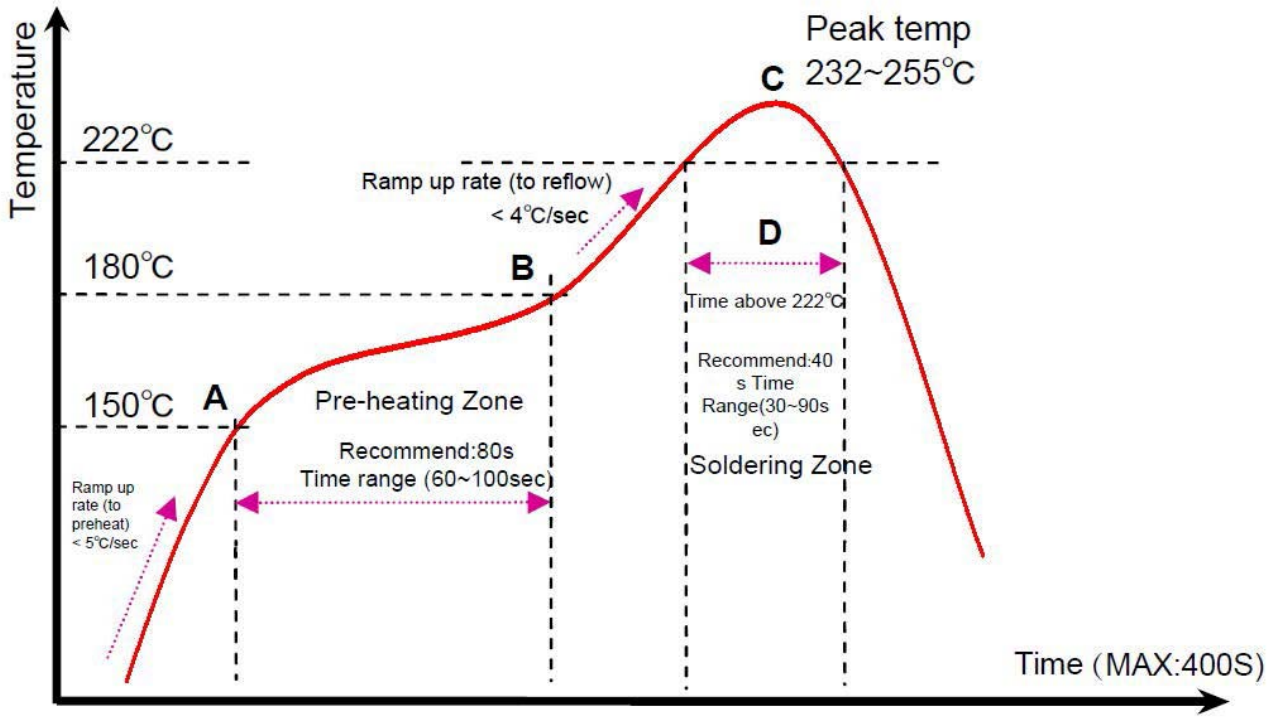
Recommended PCB Layout for Package



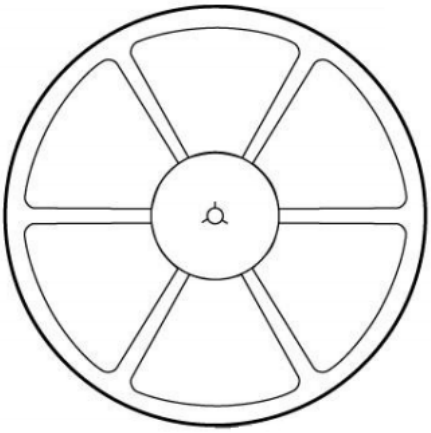
Reference Schematics

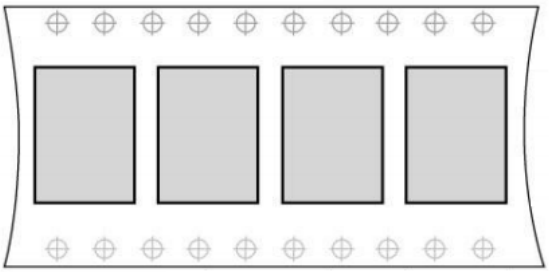


Recommended Reflow Profile for Lead Free Solder



Package





- Tape and Reel
- Helical antenna version Module exception
- Note：For package, we have three package types: Reel, Tray, Simple way for choosing, depend on customer's request or quantity request

Contact Details

CANSEC Catalog

CANSEC Taobao Website

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Website: www.rf-products.com

FCC Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) thi s device may not cause harmful interference, and (2) this device must accept any interference received, incl uding interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user' s authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursua nt to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful inte rference in a residential installation. This equipment generates uses and can radiate radio frequency energy a nd, if not installed and used in accordance with the instructions, may cause harmful interference to radio com munications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turn ing the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help important announcement

Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The final end product must be labeled in a visible area with the following" Contains FCC ID:
VVJ-**LR68-NA-C-**9**15**"

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

2.7 Antennas

This radio transmitter VVJ**-LR68-NA-C-915** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Model	Type	Connector	Peak gain (dBi)				
			900 - 1000 MHz	5150-5250 MHz	5250-5350 MHz	5470-5725 MHz	5725-5850 MHz
911.1-920.9 MHz	Internal antenna	/	-0.7dBi	/	/	/	/

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:VVJ-LR68-NA-C-915".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.