



## RC-LLCC68-868

LoRa Smart Home module (based on Semtech LLCC68)

LoRa Smart Home (LLCC68) is a sub-GHz LoRa® RF Transceiver for medium range indoor and indoor to outdoor wireless applications. SPI interface. Designed for long battery life with just 4.2 mA of active receive current consumption. The LLCC68 can transmit up to +22 dBm 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 for consumer use. The device provides LoRa modulation compatible with Semtech transceivers used by the LoRaWAN® specification released by the LoRa Alliance®.

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 +21 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.

## Features

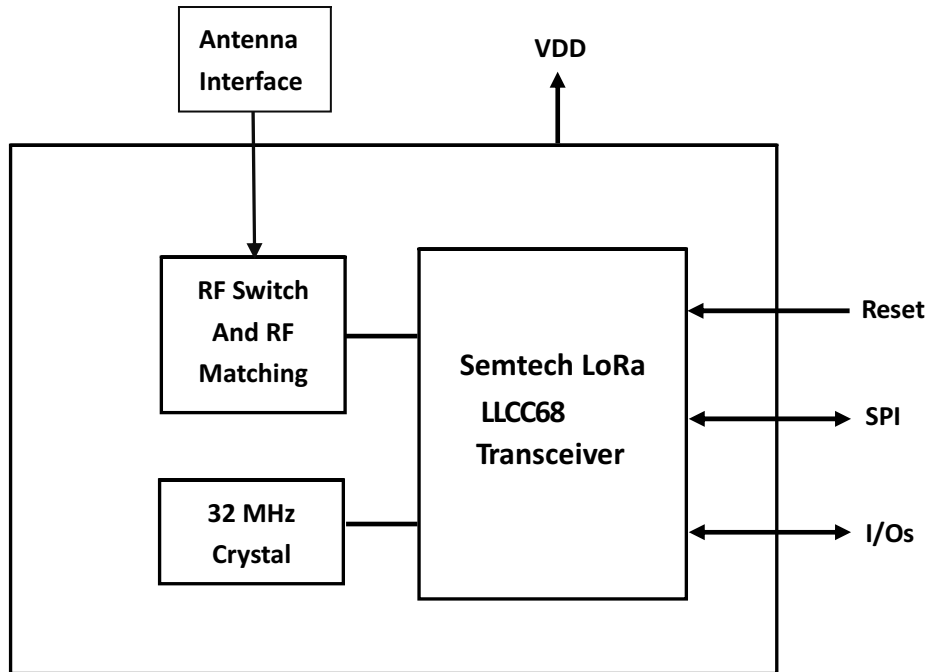
- LoRa and FSK Modem.
- 151 dB maximum link budget.
- +22 dBm or +15dBm high efficiency PA .
- +14 dBm high efficiency PA .
- Low RX current of 4.6mA .
- Integrated DC-DC converter and LDO.
- Programmable bit rate from 1.76kbps to 62.5 kbps LoRa and 300 kbps FSK.
- High sensitivity : down to -129dBm .
- 88 dB clocking immunity at 1MHz offset.
- Co-channel rejection of 19dB in LoRa mode.
- FSK, GFSK, MSK, GMSK, and LoRa modulation.
- Built-in bit synchronizer for clock recovery .
- Automatic Channel Activity Detection (CAD) with ultra-fast AFC.
- 13mm x 19mm stamp package for easy assembly and low-cost pcb design.

## Applications

- Smart Home.
- Smart Community
- Smart Meter.
- Home and Building



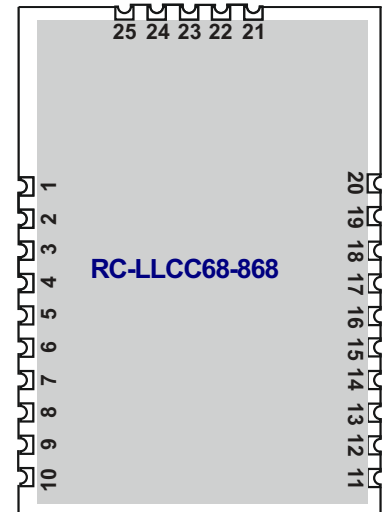
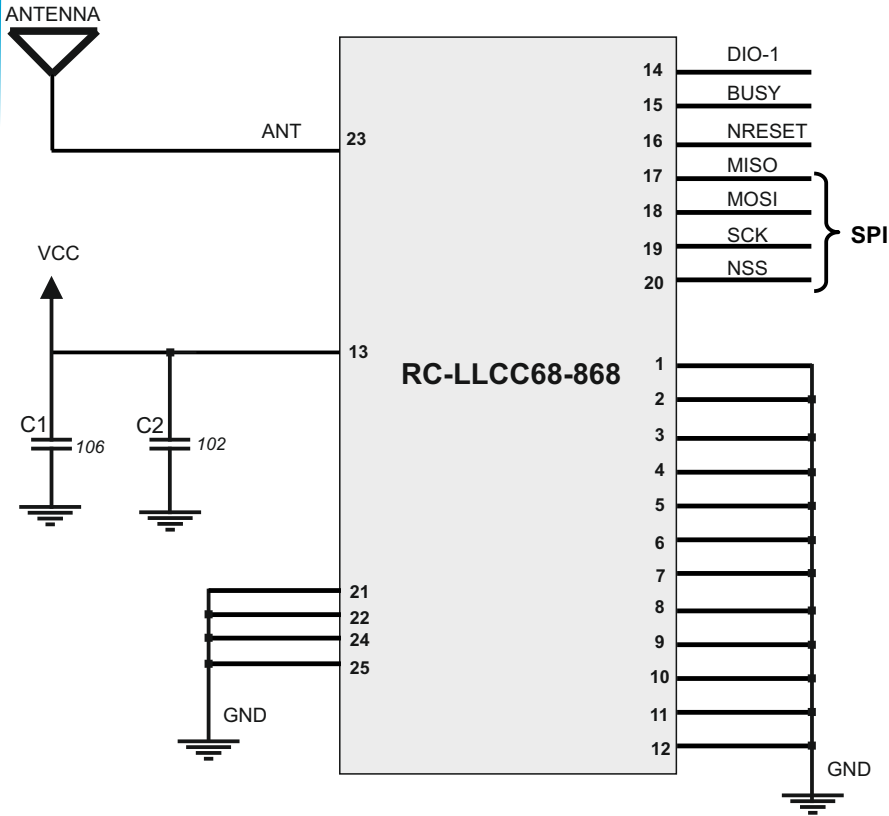
## 1.0 Block Diagram



## 2.0 Technical Specifications

Characteristics	MIN	TYP	MAX	UNIT
Supply Voltage	1.8		3.7	VDC
Supply Current RX mode (@DCDC mode)		4.90		mA
Supply Current Sleep Mode		0.5	1.5	µA
Supply Current Transmit Mode		120		mA
RF Power Output (for Carrier)		+20.5	+21	dBm
RF Sensitivity (for LORA Modulation)		- 148		dBm
Operative Frequency Band		868		MHz
Operative Temperature	-20		+70	°C

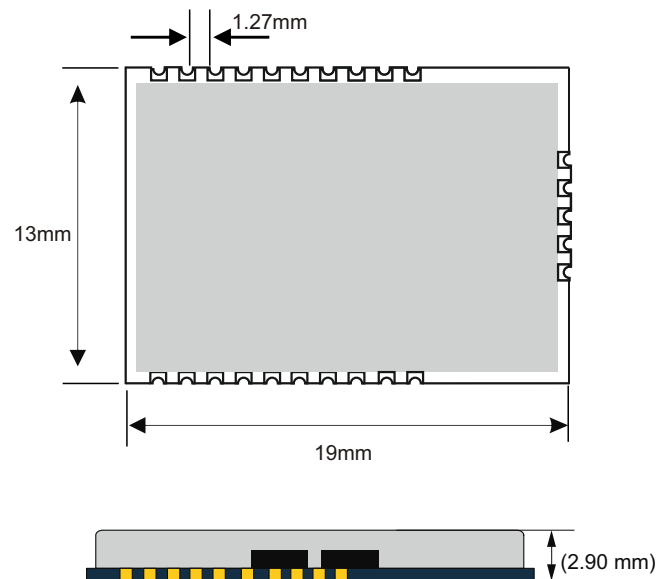
## 3.0 Pin Out and Mechanical Dimension



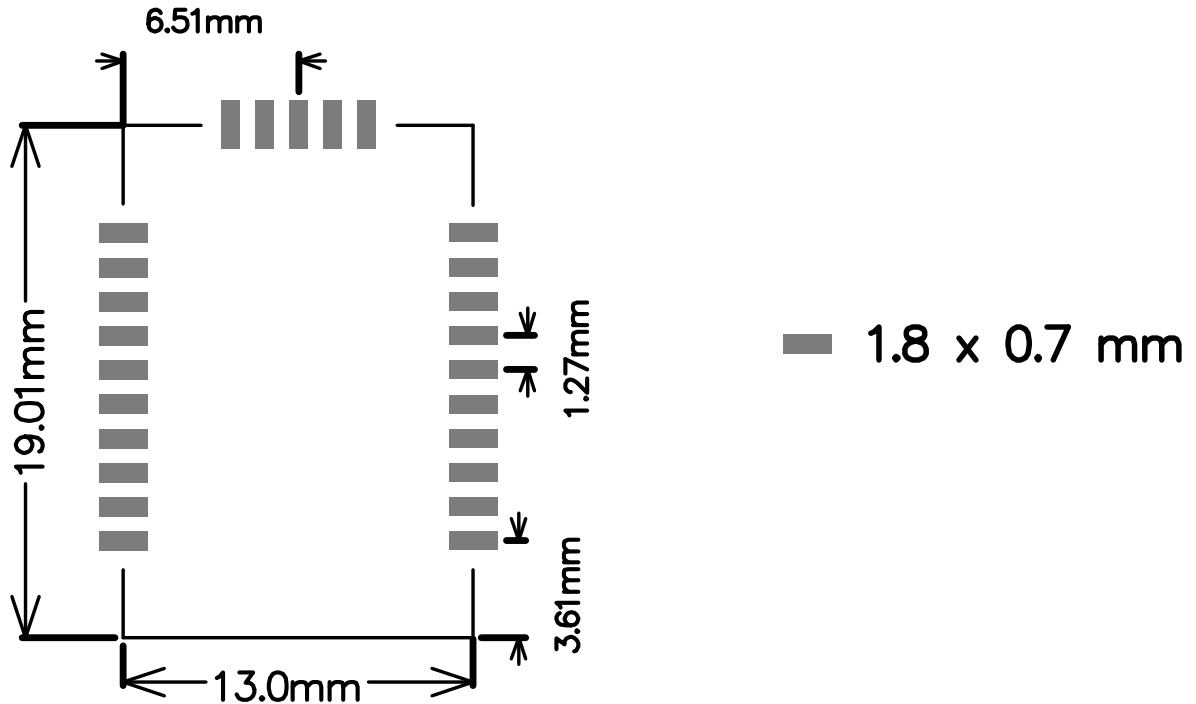
### Pin out device

Pads	Name	Description
1,2,3,4,5,6,7,8,9,10,11,12	GND	Ground
13	VDD	Power 1.8V+3.7V
14	DIO-1	Multi-purpose digital I/O
15	BUSY	Busy indicator
16	NRESET	Reset trigger input
17	MISO	SPI slave output
18	MOSI	SPI slave input
19	SCK	SPI clock
20	NSS	SPI Slave Select
21	GND	Ground
22	GND	Ground
23	RF-OUT	RF transmitter output
24	GND	Ground
25	GND	Ground

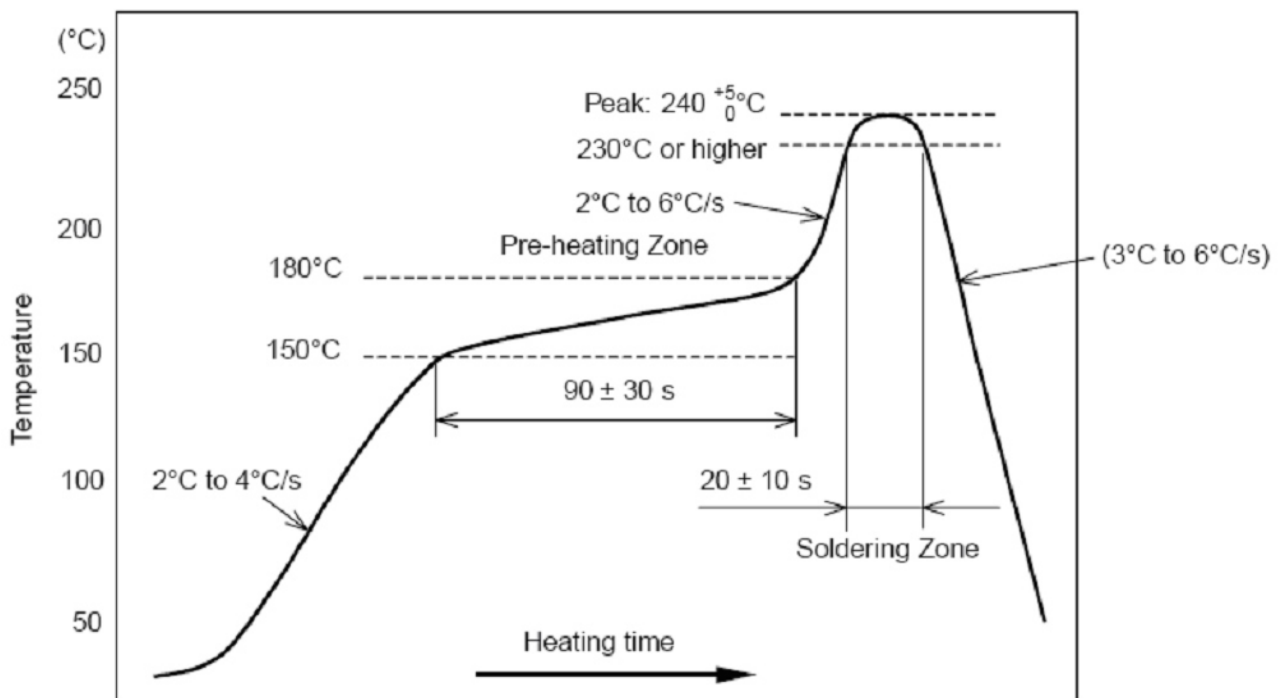
### Mechanical Dimension



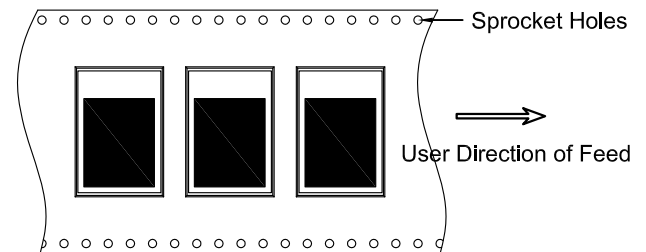
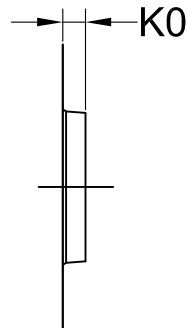
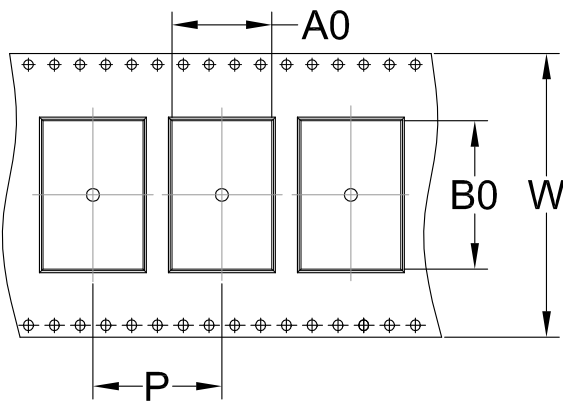
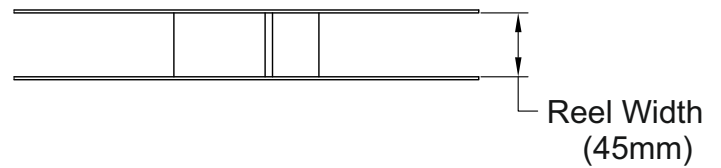
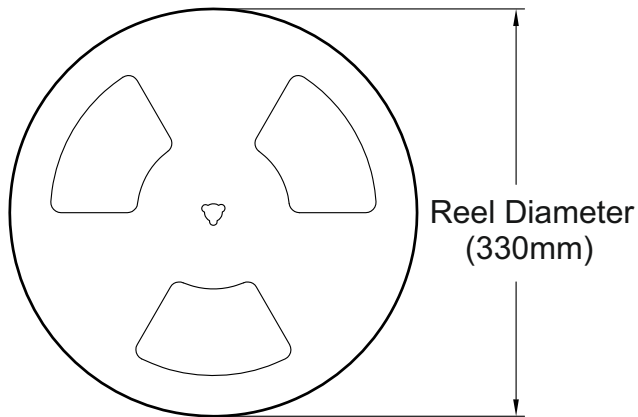
## 4.0 Recommended PCB Layout



## 5.0 Recommended Reflow Profile for Lead Free Solder



## 6.0 Reel and Tape dimensions



A0	Dimension designed to accommodate the component width	15.5mm ± 0.10mm
B0	Dimension designed to accommodate the component length	23.0mm ± 0.10mm
K0	Dimension designed to accommodate the component thickness	3.5mm ± 0.10mm
W	Overall width of the carrier tape	44.0mm ± 0.30mm
P	Pitch between successive cavity centers	20.0mm ± 0.10mm

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