

## Ultra Low Power sub 1GHz Multichannels Radio Transceiver

The **RC-S2LP-XXX** module is based on STMicroelectronics S2-LP transceiver. This device is a high performance ultra low power RF transceiver designed for RF wireless application in the sub 1GHz band.

The module is designed for maximum performance in a minimal space, with 4 programmable I/O pins. Programmable from external microcontroller via SPI interface. Ready for use SMD mounting (15x 22mm) - Metal shield.

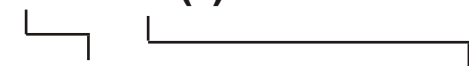
For more information and details, please refer to the S2-LP datasheet ([www.st.com](http://www.st.com)).



868MHz version with Helical Antenna

Module Information :

### RC-S2LP - XXX - XX(\*)



*Frequency*

**434=434MHz**

**868=868MHz**

**915=915MHz**

*Antenna Type*

**HA = Helical Antenna**

**NA = No Antenna**

(\*) UFL connector default version

Sub-1GHz technology is becoming one of the chief driving forces behind the **Internet of Things (IoT)**, in particular this type of module is ideal for this applications basically for the following reasons :

**Ultra low power consumption**, the consumption of this device is 7mA when receiving and 20mA when transmitting at +14dBm (11mA at +10dBm) in sleep mode the consumption is 0.7µA.

**Long range operations**, the sensitivity parameter is -109dBm at data rates of 38.4 kbps and down to -128dBm when the data rate is 0.3kbps.

Interference from other wireless communications can be overcome with 90dB of blocking.

The RF output power levels can reach up to +16dBm.

All this ensure a robust signaling for long range communications.

### Applications :

- Low-Power Wireless Systems
- Home and Building Automation
- Smart Grid and Automatic Meter Reading
- Wireless Sensor Network
- 6LoWPAN systems

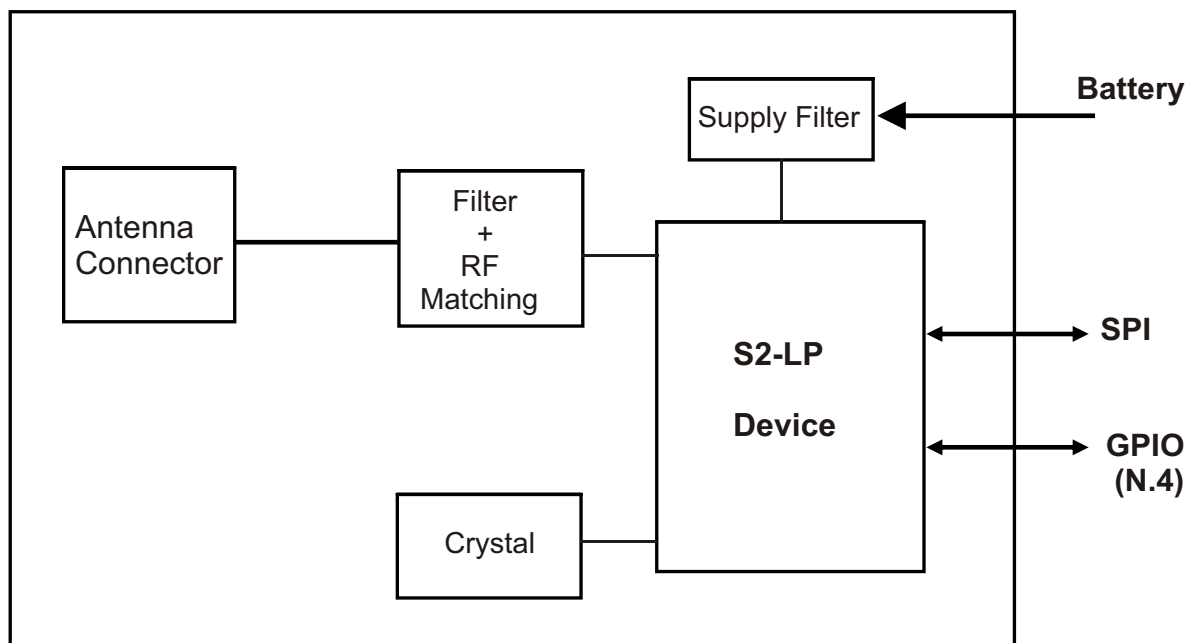
### Features

- Ultra Low consumption technology
- Easy to Use
- Small Dimension SMD mounting
- CE CERTIFIED

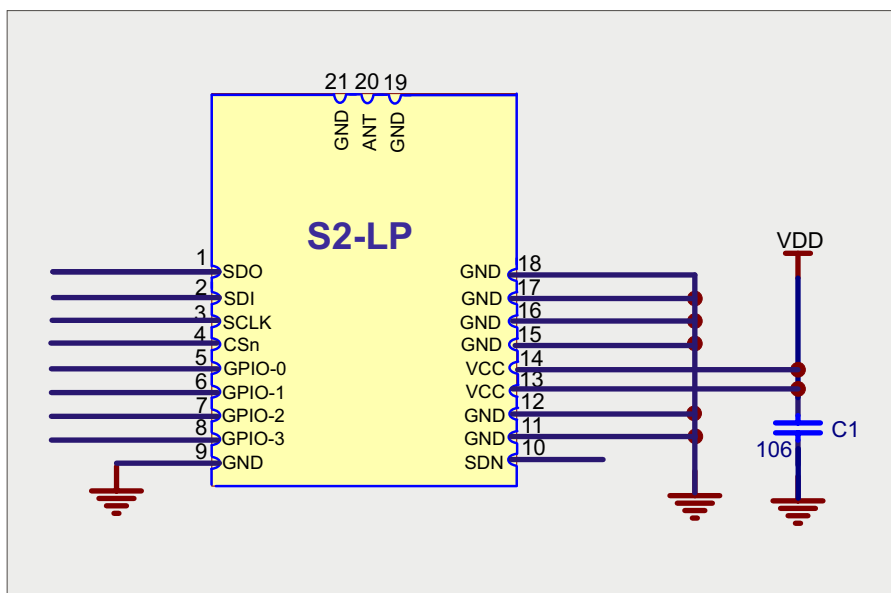
## Technical Characteristics

Characteristics	MIN	TYP	MAX	UNIT
Supply Voltage	1.8	3	3.6	VDC
Supply Current RX mode		7.2		mA
Supply Current TX mode ---> +10dBm		11		mA
Supply Current TX mode ---> +14dBm		20		mA
Supply Current Standby Mode		0.5		µA
Supply Current Shut Down Mode		2.5		nA
Operative Frequency		434/868/915		MHz
RF Power Output 50ohm (*)	-30		+16	dBm
RF Sensitivity 38.4 Kbps 2-GFSK		- 109		dBm
RF Sensitivity 0.3 Kbps 2-GFSK		- 128		dBm
Operative Temperature	-30		+75	°C

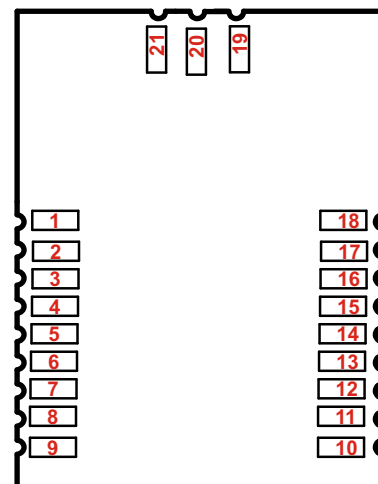
## Block Diagram



## Reference Schematics



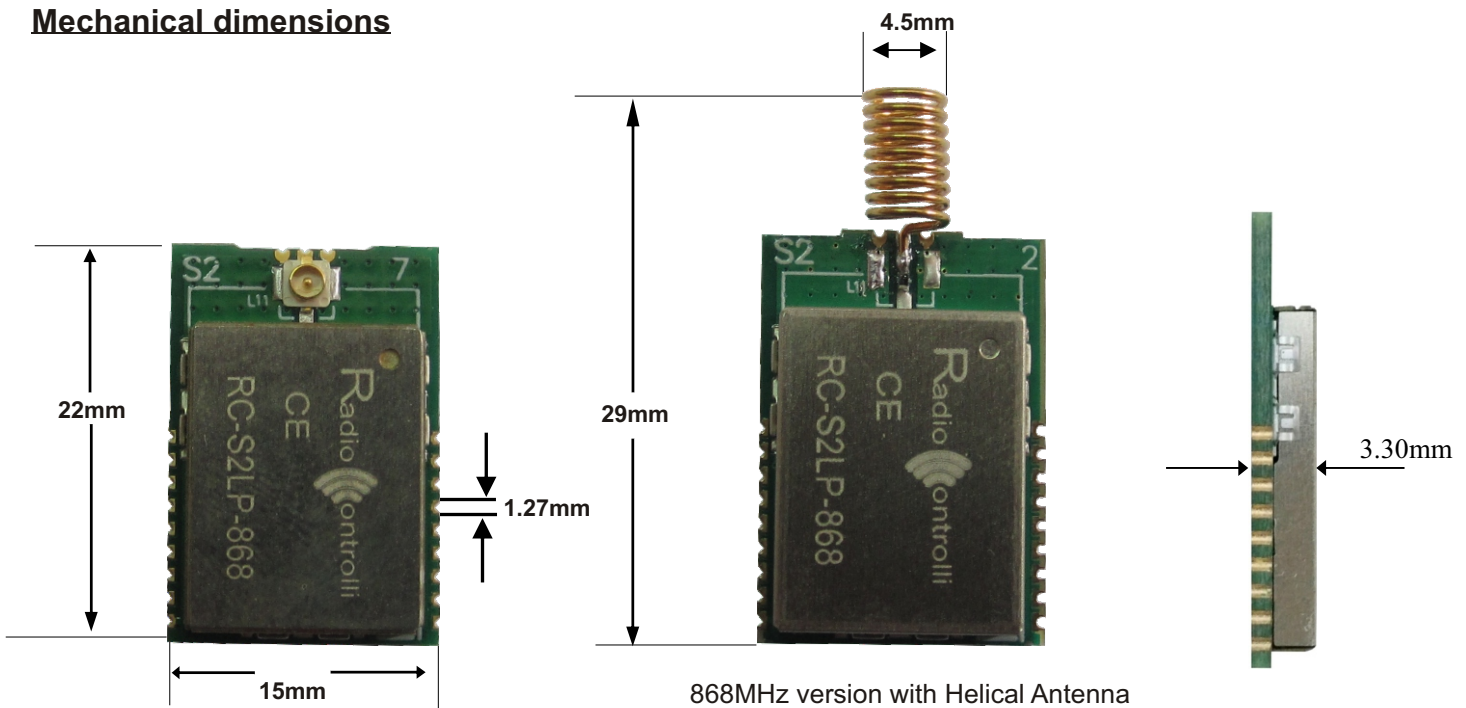
## Pin out device



## Terminal description RC-S2LP-XXX

Pads	Name	Description	Pin Type
1	SDO	SPI slave data output	Digital out
2	SDI	SPI slave data input	Digital in
3	SCLK	SPI slave clock input	Digital in
4	CSn	SPI chip select	Digital in
5	GPIO-0	General purpose I/O that may be configured through the SPI registers to perform various function.	Digital I/O
6	GPIO-1	General purpose I/O that may be configured through the SPI registers to perform various function.	Digital I/O
7	GPIO-2	General purpose I/O that may be configured through the SPI registers to perform various function.	Digital I/O
8	GPIO-3	General purpose I/O that may be configured through the SPI registers to perform various function.	Digital I/O
9	GND	Connect to GND	Ground pin
10	SDN	Shutdown input pin. SDN should be = '0' in all modes, except shutdown mode.	Digital in
11	GND	Connect to GND	Ground pin
12	GND	Connect to GND	Ground pin
13	VCC	1.8Volt to 3.6 Volt power	Power Supply
14	VCC	1.8Volt to 3.6 Volt power	Power Supply
15	GND	Connect to GND	Ground pin
16	GND	Connect to GND	Ground pin
17	GND	Connect to GND	Ground pin
18	GND	Connect to GND	Ground pin
19	GND	Connect to GND	Ground pin
20	ANT	Connect to an external Antenna	Antenna
21	GND	Connect to GND	Ground pin

## Mechanical dimensions

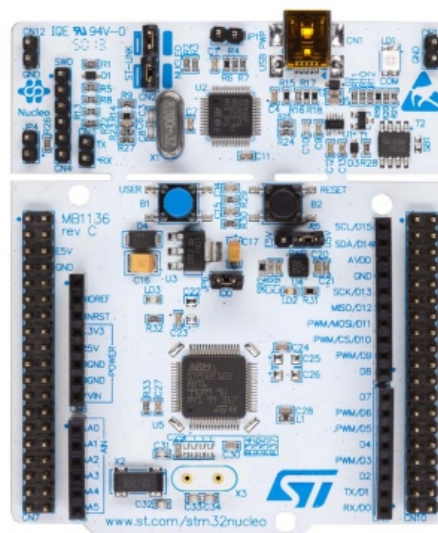


## Sub-1 GHz transceiver development kit based on RC-S2LP-XXX

To make immediate usable this module with STMicroelectronics development system, has been realized the following board adapter (see picture below). The main board to use is the NUCLEO-L152RE development board, equipped with a low power microcontroller STM32L to control the S2-LP and the ST-LINK/V2-1 debugger and programmer for firmware updating. The RC-S2LP-XXX-EK is equipped with Antenna (with SMA connector) and UFL-SMA cable.



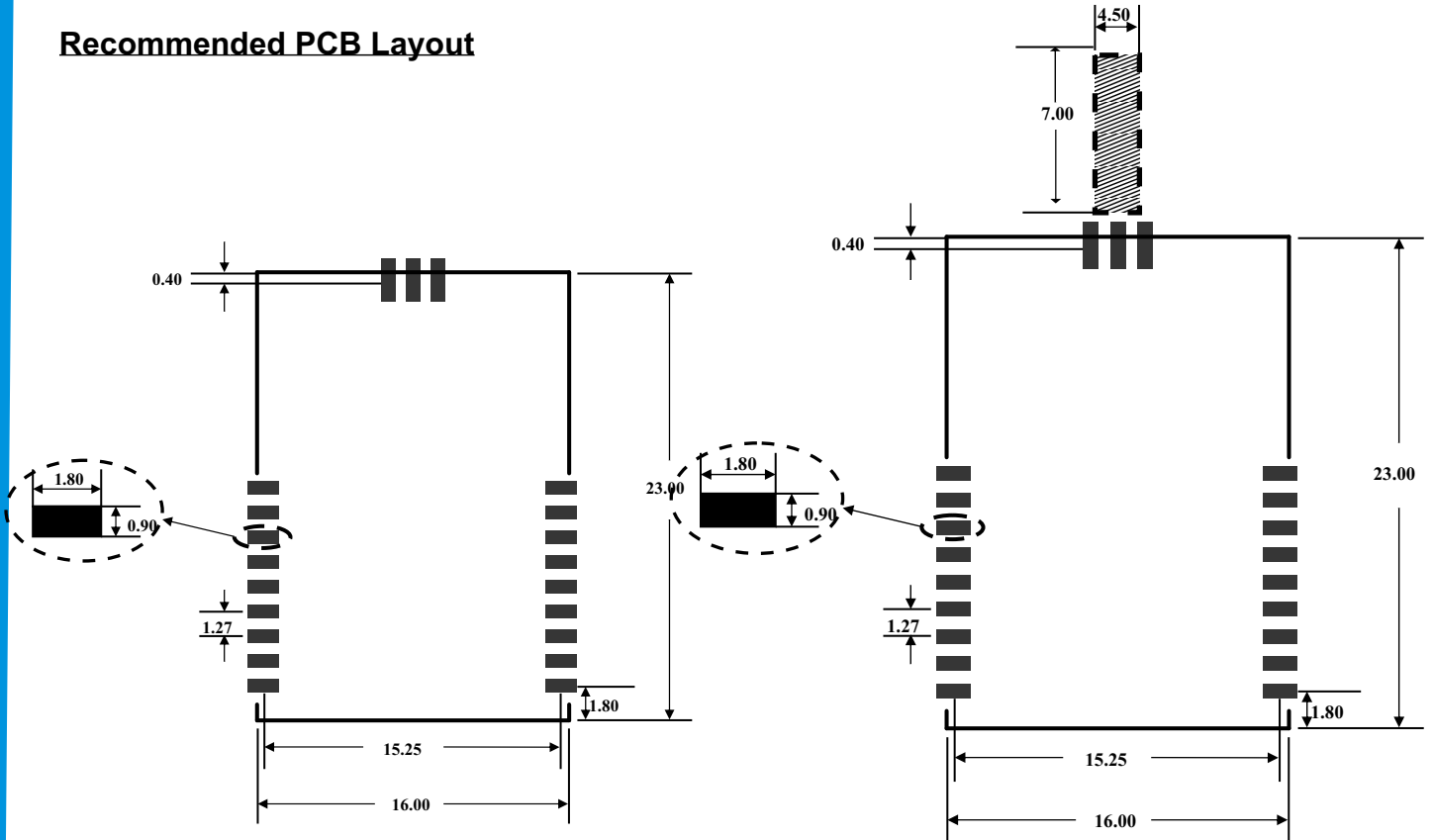
**RC-S2LP - XXX - EK**



**NUCLEO\_L152RE**

- Frequency
- 434=434MHz
  - 868=868MHz
  - 915=915MHz

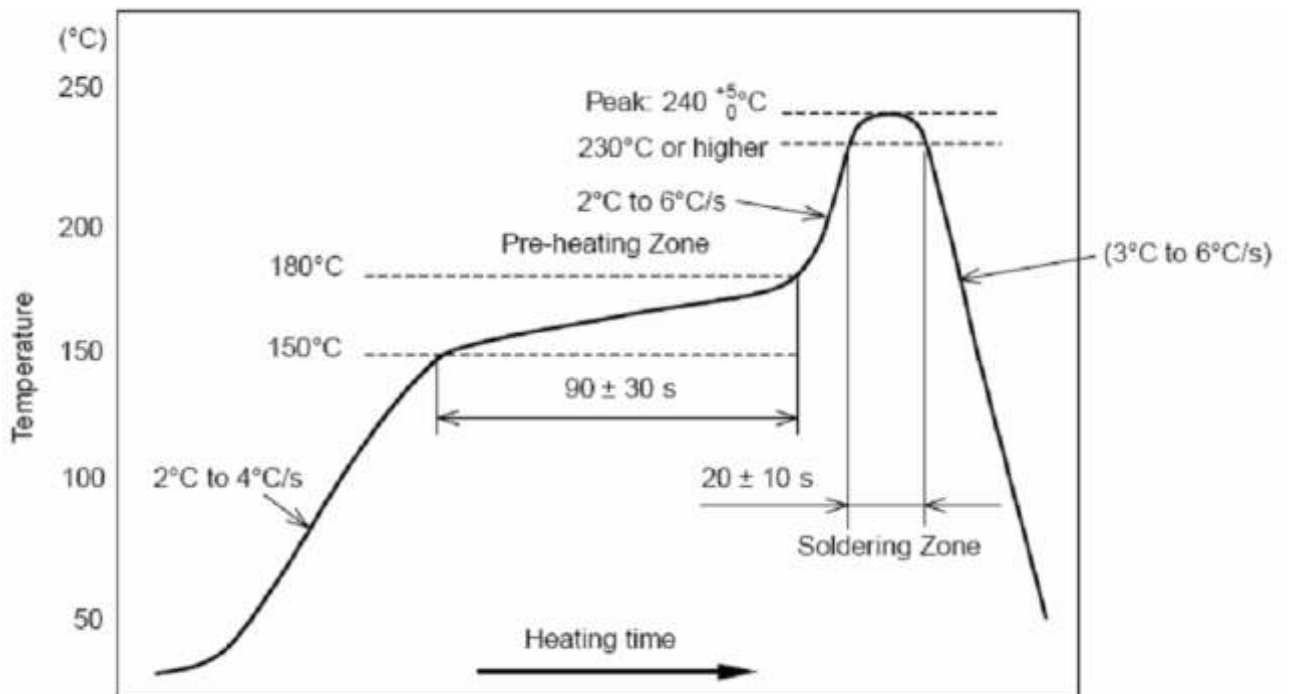
## Recommended PCB Layout



RC-S2LP-868 without Antenna

RC-S2LP-868 with 868MHz Helical Antenna

## Recommended Reflow Profile for Lead Free Solder



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