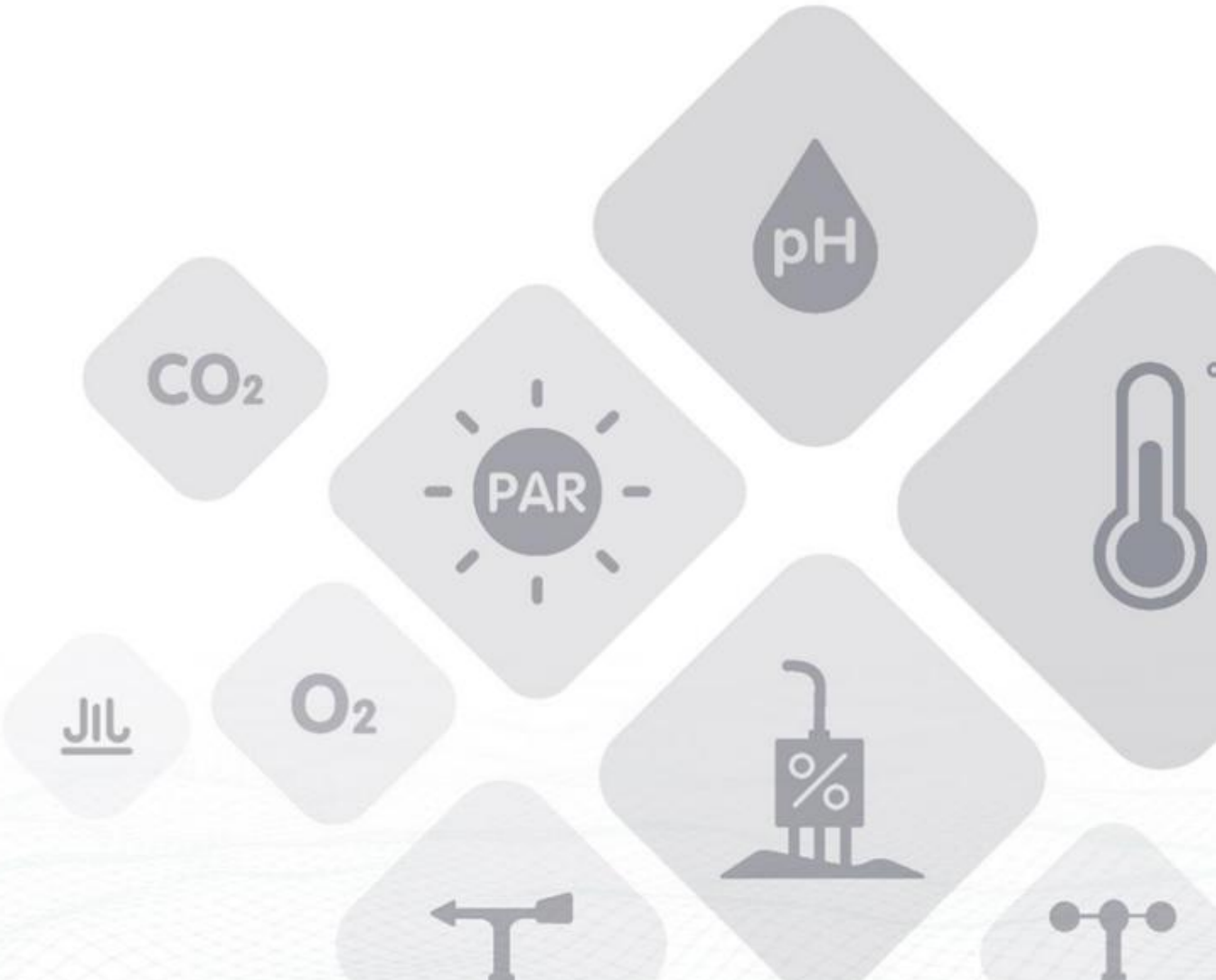
SENSECAP

Wio-SX1262-LF Wireless Module Datasheet (V1)

Version: V1.1

Dates: 2026-3-13



Content

1 Introduction

Wio-SX1262-LF is a low-cost, ultra-low power, ultra-small size LoRa Pure RF module. The module is embedded with Semtech's ultra-high performance LoRa wireless communication IC SX1262.

The target application of this module is wireless sensor networks and other internet of things devices, especially battery-powered low power consumption and long-distance occasions.

This specification mainly describes the hardware information, hardware performance and application information of the module.

Wio-SX1262-LF LoRa pure RF module is mainly suitable for long-distance, ultra-low-power applications such as wireless meter reading, sensor networks, and other low-power wide-area IoT scenarios.

1.1 Feature

- Low power consumption:as low as 1.62uA sleep current
- Low cost
- Small size:11.6mm X 11mm * 2.95mm @12 pins SMT
  RF interface:IPEX port
- High performance
  - ✓ TXOP=10dBm@434MHz
  - ✓ TXOP=22dBm@470-510MHz
  - ✓ -136.5dBm sensitivity for SF12 with 125KHz BW,included line loss
- Interface
  - ✓ SPI

2 Description

Wio-SX1262-LF module is embedded with ultra-high performance LoRa wireless communication IC SX1262,which is very suitable for the design of various IoT nodes.

Wio-SX1262-LF module supports (G) FSK and LoRa® modulations, 7.8 - 500kHz bandwidth can be used in LoRa® mode. Wio-SX1262-LF module provides SPI communication interface to communicate with external MCU.

SX1262 chip power distribution scheme supports two hardware designs:DC-DC or linear regulator LDOThe hardware of Wio-SX1262-LF module used DC-DC distribution design. The internal RF reference frequency of the Wio-SX1262-LF module uses an high-precision active TCXO and DIO3 is used as TCXO voltage power supply.

Schematic diagram:

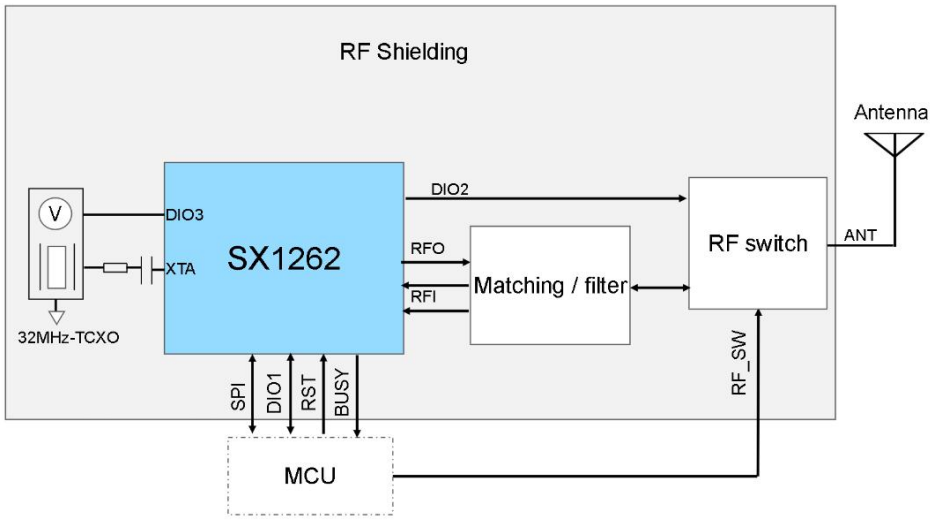


Figure 1 Wio-SX1262-LF Schematic diagram

2.1 Pin define

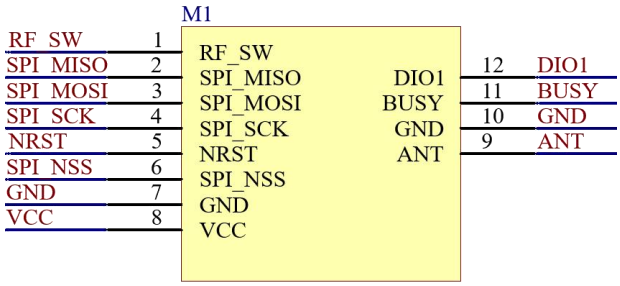


Figure 2 Wio-SX1262-LF Pin arrangement

Table 1 Wio-SX1262-LF pinout

Number	Name	Type	Description
1	RF_SW	I	External IO control internal gate RF switch Logic high=Enable Receiver mode, other time =low level
2	MISO	I/O	SPI_MISO
3	MOSI	I/O	SPI_MOSI
4	SCK	I/O	SPI_SCK
5	NRST	I	Reset signal, active low
6	NSS	I/O	SPI_NSS
7	GND	-	Ground
8	VCC	I	Supply voltage for the module
9	ANT	I/O	RF input/output, (only Wio-SX1262-N)*
10	GND	-	Ground
11	BUSY	O	Busy indicator of IC SX1262
12	DIO1	I/O	Multi-purpose digital IO, DIO1 of IC SX1262

3 Electrical characteristics

3.1 Absolute Maximum Ratings

Item	Description	min	max	unit
VCCmr	Supply voltage	-0.5	+3.9	V
Tmr	Working temperature	-40	+85	℃
Tstore	Storage temperature	-40	+105	℃
Pmr	RF input level	-	+10	dBm

3.2 Operating Range

Item	Description	min	max	unit
VCCop	Supply voltage	+1.8	+3.6	V
Top	Working temperature	-40	+85	℃
Pop	RF input power	-	0	dBm

3.3 Module specifications

Items	Parameter	Specifications	Unit
Structure	Size	11.6(W) X 11(L) X 2.95(H)	mm
	Package	12 pins, SMT	
Electrical Characteristics	Supply voltage	3.3V typical	V
	Sleep current	1.62uA	uA
	SX1262 power distribution mode	DC-DC Mode	
	TCXO supply mode	By SX1262 DIO3	
	TCXO supply voltage	1.7-3.3V	V
	Frequency range	LF@434	MHz
		LF@470-510	
	Maximum operation current (Transmitter)	55mA @10dBm in 434MHz typical	mA
		106mA @22dBm in 470-510MHz typical	

	Maximum operation current (Receiver)	6.3mA @BW125kHz, 434MHz typical				
		6.3mA @BW125kHz, 470-510MHz typical				
	Output power	10dBm max @434MHz				dBm
		22dBm max @470-510MHz				
	Receiver Sensitivity included line loss	@SF12, BW125kHz				dBm
		Fr(MHz)	min	typical	max	
		434	-	-135	-136	
		470-510	-	-136.5	-136.5	
	Harmonics	≤-43dBm below 1GHz ≤-31dBm above 1GHz				dBm
Interface	ANT	RF port of IPEX or SMT pin,default IPEX@50 ohm impedance				
	DIO1	Multi-purpose digital IO				
	Busy	Busy signal indicator				
	SPI	1 group of SPI, include 4 pins				
Other	DIO2	Multi-purpose digital IO,Internally connected to RF switch Logic high=Enable Transmitter mode, other mode =low level				
	DIO3	DIO3 is used as TCXO voltage power supply configure through software,TCXO voltage should always be 200 mV less than the VCC to ensure proper operation				

4 Typical RF performance test

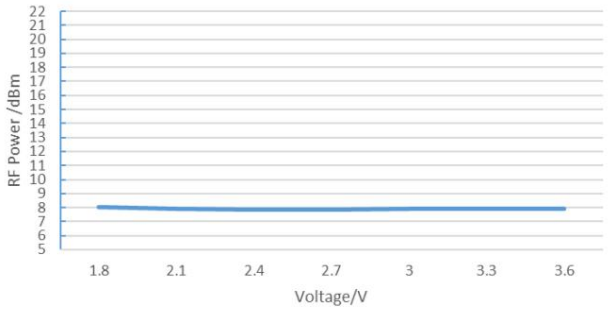


Figure 3 Max RF Power vs Voltage（434MHz）

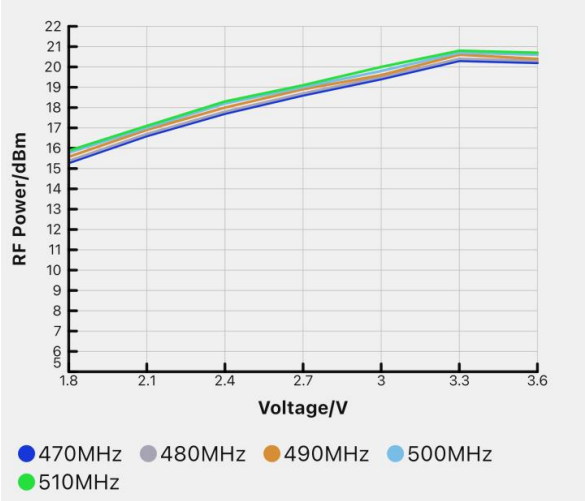


Figure 4 Max RF Power vs Voltage（470~510MHz）

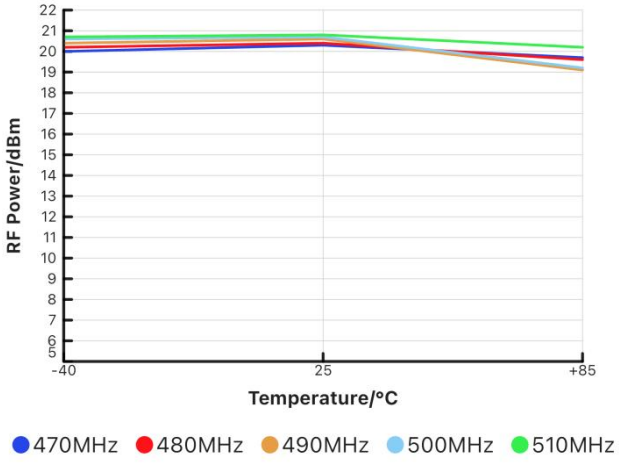


Figure 5 Max RF Power VS Temperature（470~510MHz）

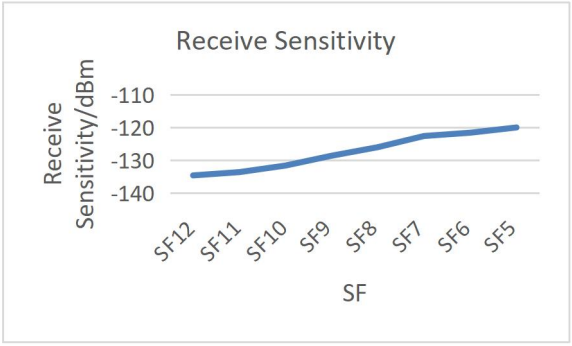


Figure 6 RF Receiver Sensitivity vs Spreading factor（434MHz@BW125KHz）

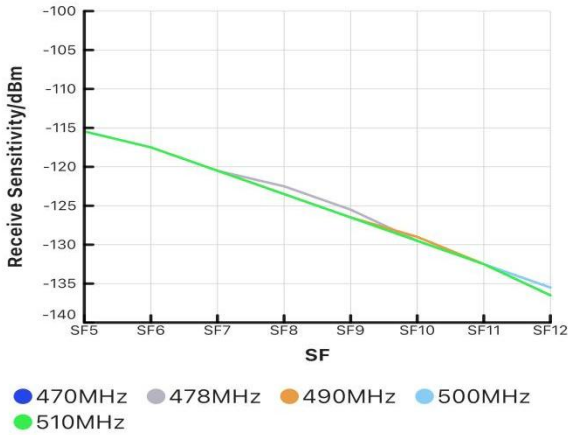


Figure 7 RF Receiver Sensitivity vs Spreading factor（470~510MHz@BW125KHz）

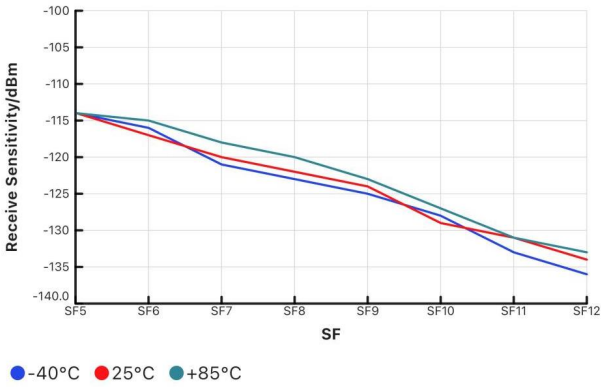


Figure 8 RF Receiver Sensitivity VS Temperature（470MHz@BW125KHz）

5 Application information

5.1 Package information

Unless specified dimension tolerance, the dimension below will be with tolerance ±0.2mm, all the dimension unit is mm.

Wio-SX1262-LF has a 12-pins SMD package:

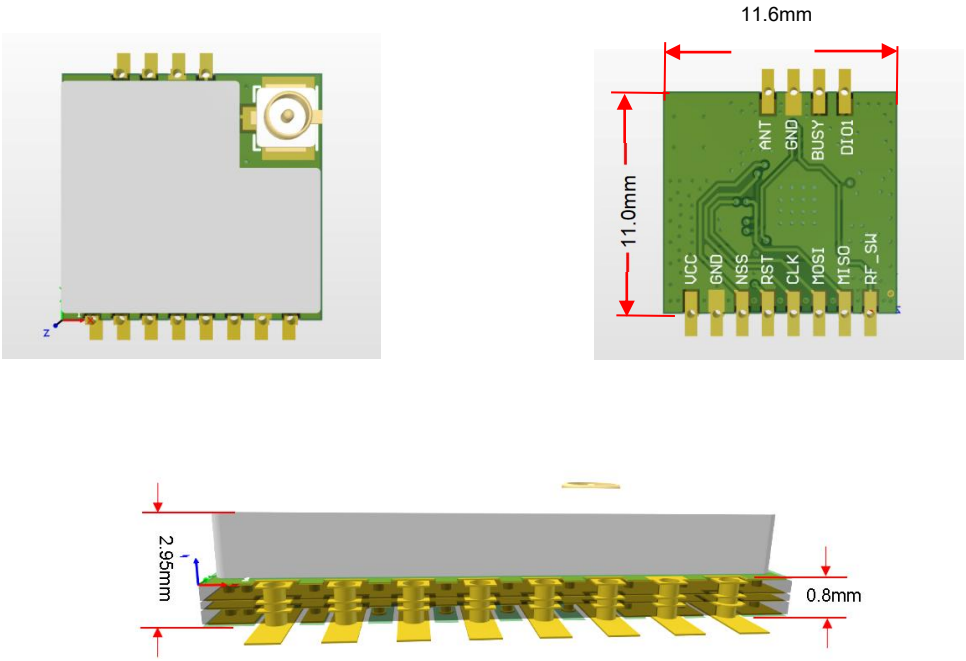


Figure 9 Wio-SX1262-LF Module appearance

The following figure shows the recommended Layout package dimensions.

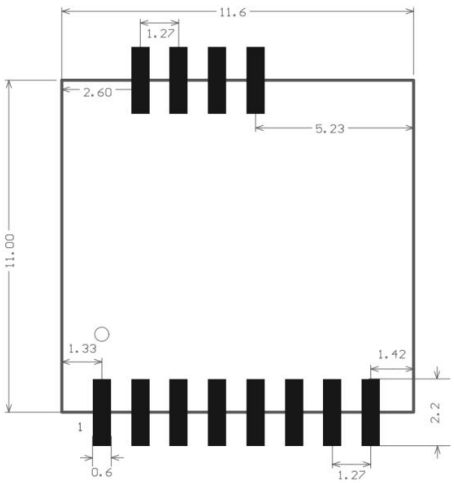


Figure 10 PCB footprint

5.2 External interface of the module

- A set of SPI used for internal RF transceiver control
- DIO1 is the generic IRQ line
- A External GPIO used for control internal gate RF switch
- Busy is used as a busy signal indicating that the module is ready for new command only if this signal is low.
- The output impedance of the RF is 50 Ω and compatible with IPEX and SMT-Pin.

5.3 Reference design based on Wio-SX1262-LF module

The following is a typical reference design using the Wio-SX1262-LF module,Just connect the module to the host MCU according to the reference design and send AT commands.

Antenna design considerations:The antenna interface is designed with a 50 Ω impedance, an

it is recommended that users reserve a π-type matching network for the antenna.

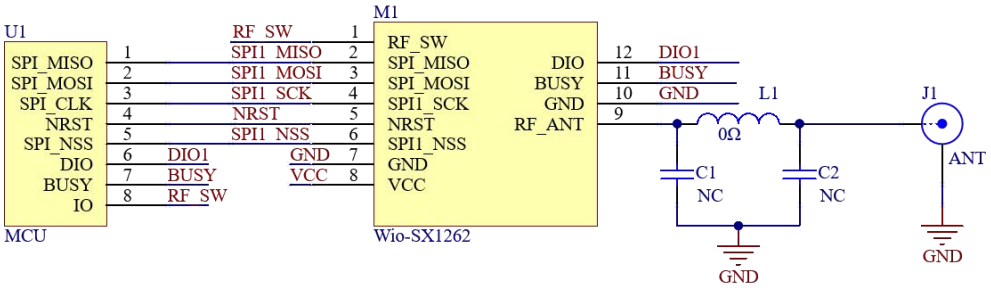


Figure 11 Reference design based on Wio-SX1262

6 LoRaWAN® application information

6.1 LoRaWAN®application

The topology of the LoRaWAN® network is a star network, and the gateway acts as a relay between nodes and network servers. The gateway is connected to the network server through a standard IP link, and the node device uses LoRa® or FSK to communicate with one or more gateways. Communication is bidirectional, although it is mainly upstream communication from the node to the network server.

The communication between the node and the gateway uses different frequencies and rates. The choice of rate is a compromise between power consumption and distance, and different rates do not interfere with each other. According to different spreading factors and bandwidths, the rate of LoRa® can be from 300bps to 50Kbps. In order to maximize battery life and network capacity, the network server manages the node's rate and output power through rate adaptation (ADR).

The node device may transmit on a random channel at any time and at any rate, as long as the following conditions are met:

1) The channel currently used by the node is pseudo-random. This makes the system more resistant to interference.

2) The maximum transmission time (dwell time of the channel) and duty cycle of the node depends on the frequency band used and local regulations.

Wio-SX1262-LF module is embedded with Semtech's ultra-high performance and ultra-low power LoRa wireless communication IC SX1262,The current is only 1.62uA in sleep mode, this module is very suitable for various applications of LoRaWAN®.

6.2 Design LoRaWAN® wireless sensor based on Wio-SX1262

Wio-SX1262-LF pure RF module only a simple MCU is needed as the main controller to control Wio-SX1262-LF through SPI interface, thereby easily implementing the LoRaWAN® protocol.This helps customers quickly bring sensor products to the LoRaWAN® market.

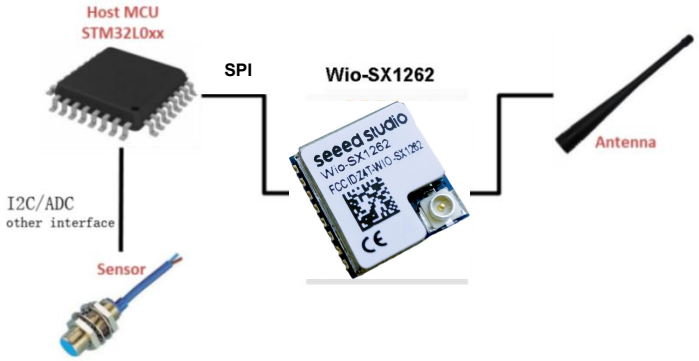


Figure 12 Design of LoRaWAN® wireless sensor based on Wio-SX1262-LF module

7 Reflow soldering parameters

The design of the Wio-SX1262-LF module makes it very convenient for production, including soldering it to PCB boards using reflow soldering technology. A basic element is that users need to choose the appropriate solder paste and ensure that the solder paste meets the temperature requirements during the furnace passing process. Wio-SX1262-LF complies with the requirements of J-STD-020D1 standard for reflow soldering temperature.

Note: It is recommended that the module undergoes only one reflow soldering, and the temperature of the module should not exceed 260 ℃ during reflow soldering. The reflux period should not exceed 30 seconds.

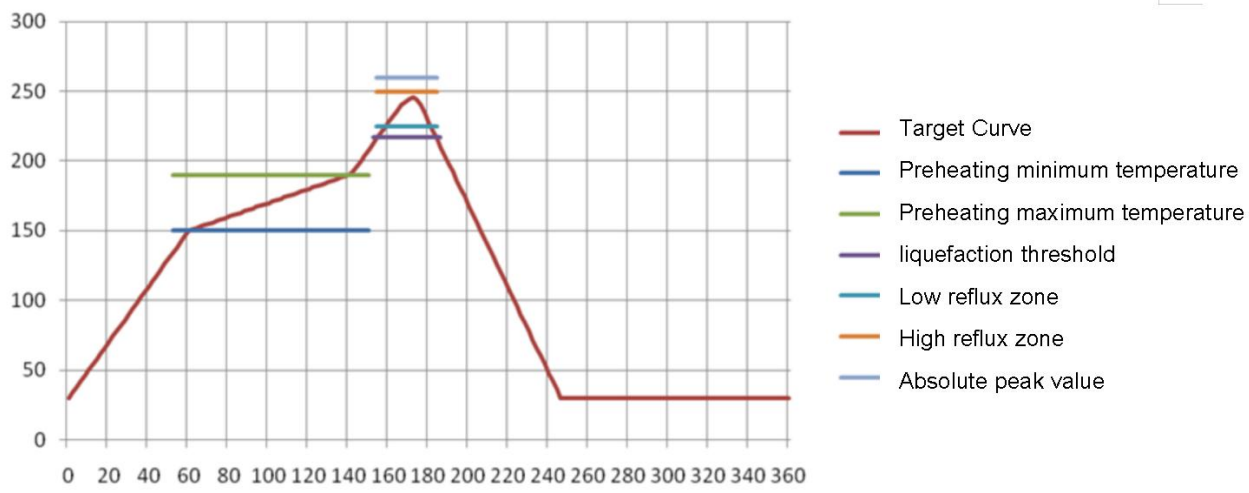


Figure 13 Reflow profile

Item	value	Unit
Heating rate	1~3	℃/Sec
Cooling rate	2~4	℃/Sec
Heating rate of preheating zone	0.5~1	℃/Sec
Preheating zone length MIN	70	Sec
Preheating zone length MAX	120	Sec

Preheating temperature MIN	150	℃
Preheating temperature MAX	190	℃
Residence time of solder paste above the liquefaction temperature MAX	70	Sec
Residence time of solder paste above the liquefaction temperature MIN	50	Sec
Residence time in the reflux zone	30	Sec
Peak temperature residence time MAX	5	Sec
Suggested liquefaction zone threshold	218	℃
Low point temperature of reflux zone	240	℃
High point temperature in the reflux zone	250	℃
Absolute peak temperature	260	℃

Figure 14 Reflow soldering temperature parameters

8 ODM & OEM Services

With decades of ODM & OEM experience, our engineers and product experts are proficient in delivering customization service for popular open-source hardware platforms – NVIDIA® Jetson™, Raspberry Pi®, Beagleboard®, and more. Use the LoRa® module to create industrial-grade sensors or development boards for rapid AIoT implementation. We're dedicated to supporting you and streamlining your idea-to-product journey. We are ready to bring your product concept to the market with Seeed Studio's industrial capabilities from design, manufacturing, testing, certification, global distribution, and marketplace. To design with the LoRa® module, please contact iot@seeed.cc