

RAK11300 WisDuo LPWAN Module Datasheet

Overview

Description

RAK11300 Low-Power Range transceiver module this is based on RP2040 MCU and SX1262 LoRa chip. It provides an easy to use, small size, low-power solution for long range wireless data applications.

The module complies with LoRaWAN 1.0.3 protocols, it also supports LoRa point to point communication. It can easily connect to different LoRaWAN server platforms like TheThingsNetwork (TTN), Chirpstack, Actility, etc.

Features

- Based on RP2040 MCU and SX1262 LoRa chip.
- LoRaWAN 1.0.3 Specification compliant
- Supports bands: EU433, CN470, IN865, EU868, AU915, US915, KR920, RU864 and AS923
- LoRaWAN Activation by OTAA/ABP
- LoRa Point to Point (P2P) communication
- Ultra-Low Power Consumption
- Supply Voltage: 2.0 V ~ 3.6 V
- Temperature Range: -40° C ~ 85° C

Specifications

Overview

Block Diagram

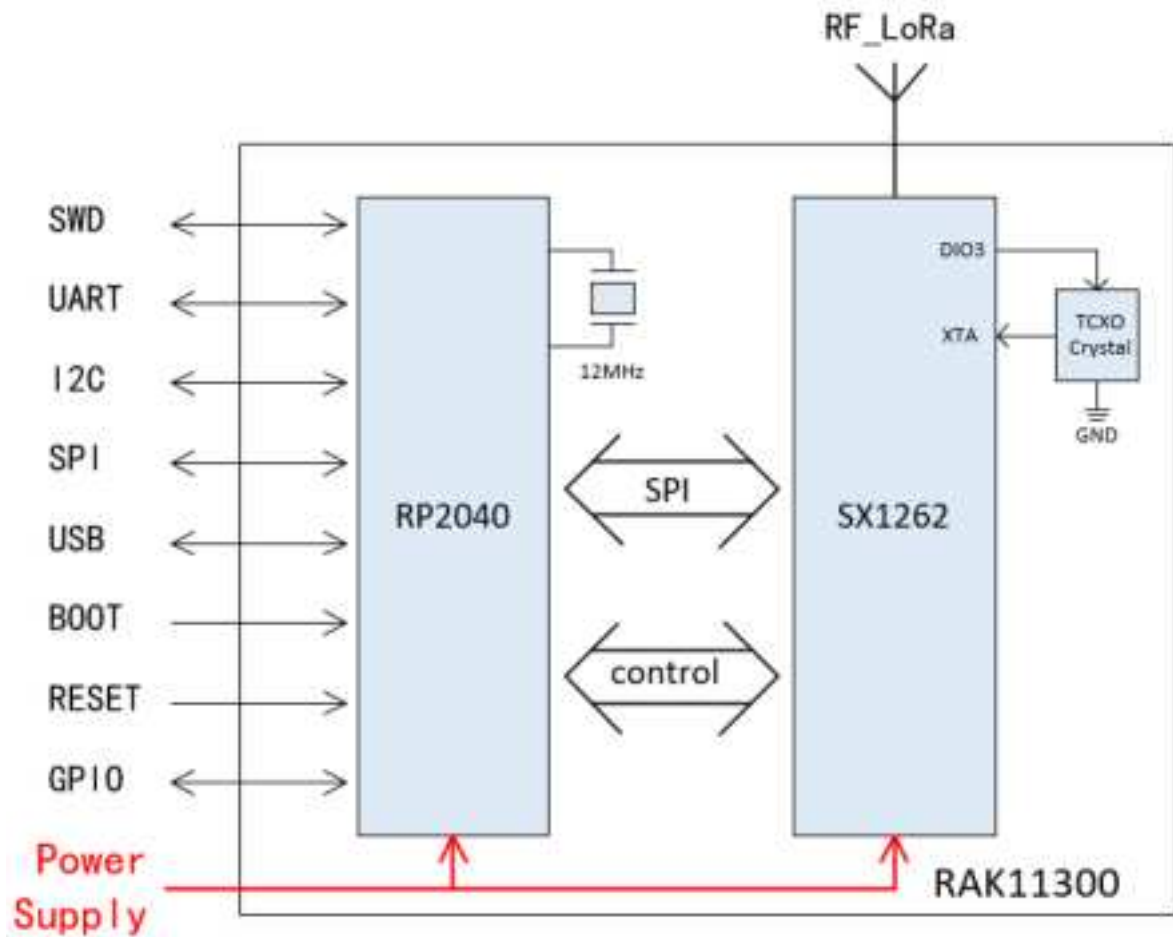


Figure 1: RAK113010 System Block Diagram

Support LoRaWAN Bands

The Table 1 shows support LoRaWAN Bands of RAK11300 module.

Region	Frequency(MHz)	Part Number
Europe	EU433	RAK11300L
China	CN470	RAK11300L
Europe	EU868	RAK11300
America	US915	RAK11300
Australia	AU915	RAK11300
Korea	KR920	RAK11300
Asia	AS923	RAK11300
India	IN865	RAK11300
Russia	RU864	RAK11300

Table 1: Operating Frequencies

Pin Assignment

The Figure 2 shows the RAK11300 stamp module pin assignment.

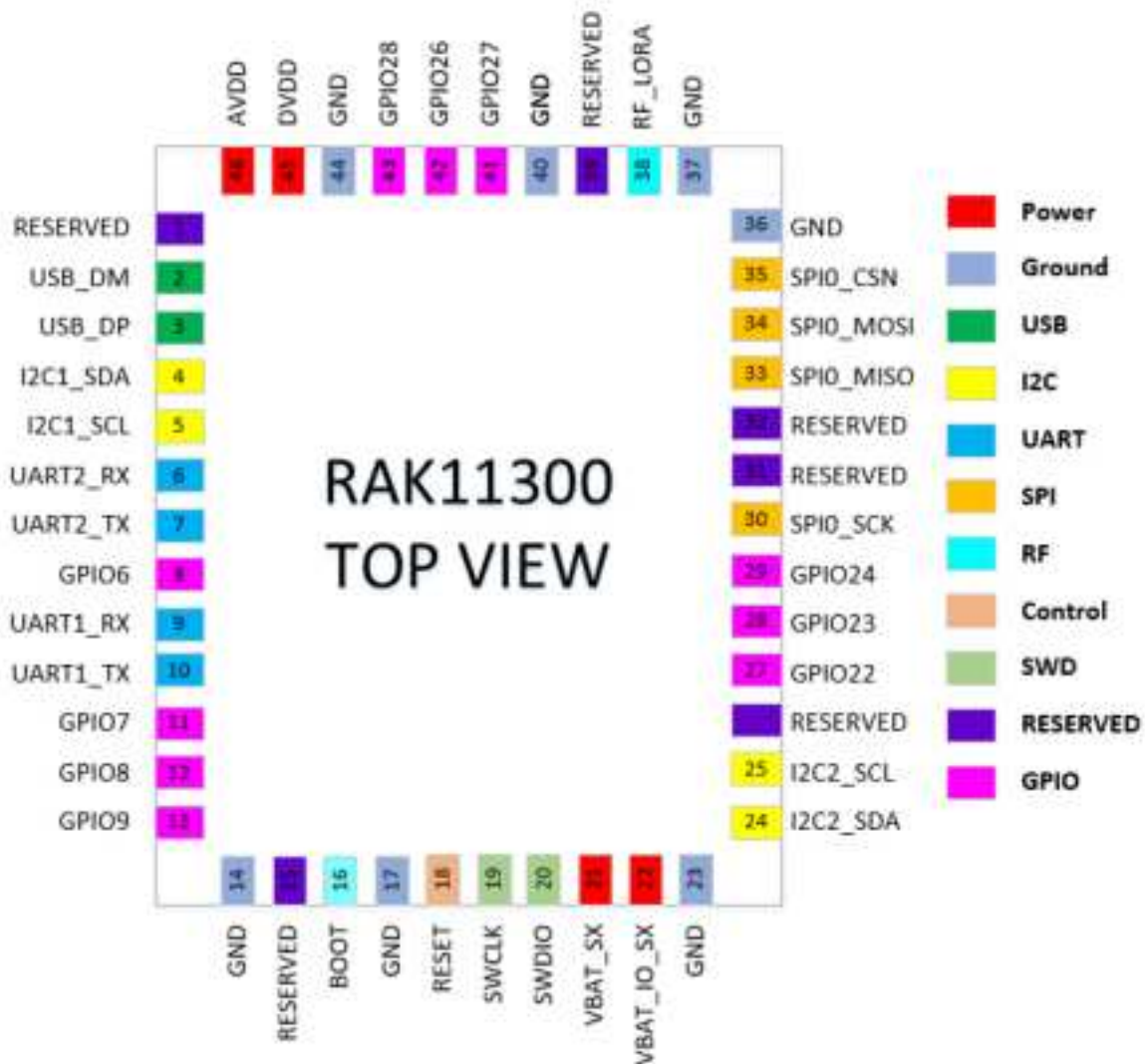


Figure 2: RAK11310 Mounting Sketch

Pin Description

The Table 2 shows the pin definition and description of RAK11300.

Type	Description
PI	Power Input
PO	Power Outpt
DI	Digital Input
DO	Digital Output
IO	Bidirectional
AI	Analog Input
AO	Analog Output

Table 2: Definition of I/O Parameters

Power Supply

Pin Name	Pin No.	Type	Description
VBAT_SX	21	PI	Supply for the LoRa IC
VBAT_SX_IO	22	PI	Supply for the Digital I/O interface pins
DVDD	45	PI	Supply for the MCU
AVDD	46	PI	ADC Reference Voltage
GND	14, 17, 23, 37, 40, 44	Ground	Ground

I2C Interface

Pin Name	Pin No.	Type	Description
I2C1_SDA	4	IO	I2C serial data
I2C1_SCL	5	DO	I2C serial clock
I2C2_SDA	24	IO	I2C serial data
I2C2_SCL	25	DO	I2C serial clock

USB Interface

Pin Name	Pin No.	Type	Description
USB_DM	2	IO	USB differential data(-)
USB_DP	3	IO	USB differential data(+)

UART Interface

Pin Name	Pin No.	Type	Description
UART1_RX	9	DI	UART1 receive
UART1_TX	10	DO	UART1 transmit
UART2_RX	6	DI	UART1 receive
UART2_TX	7	DO	UART1 transmit

SPI Interface

Pin Name	Pin No.	Type	Description
SPI0_SCK	30	DO	SPI clock
SPI0_MISO	33	DI	SPI master input, slave output
SPI0_MOSI	34	DO	SPI master output. slave input
SPI0_CSN	35	DO	SPI chip select

SWD Interface

Pin Name	Pin No.	Type	Description
SWCLK	19	Debug	SWD clock input for debug and programming
SWDIO	20	Debug	SWD I/O for debug and programming

RESET

Pin Name	Pin No.	Type	Description
RESET	18	DI	Reset the module, Active Low

Antenna Interface

Pin Name	Pin No.	Type	Description	Comment
RF_LoRa	38	IO	Lora antenna interface	50Ω Impedance If unused, keep this pin open.

ADC and GPIO

Pin Name	Pin No.	Type	Description	Comment
GPIO7	11	IO	General-purpose input/output	
GPIO8	12	IO	General-purpose input/output	
GPIO9	13	IO	General-purpose input/output	
GPIO22	27	IO	General-purpose input/output	
GPIO23	28	IO	General-purpose input/output	
GPIO24	29	IO	General-purpose input/output	
GPIO27	41	IO	General-purpose input/output	
GPIO26 ADC1	43	IO AI	General-purpose input/output General-purpose ADC interface	
GPIO28 ADC0	44	IO AI	General-purpose input/output General-purpose ADC interface	

Electrical Characteristics

Power Consumption

Note: The power consumption will wait the hardware test result.

Item	Power Consumption	Condition
Tx mode LoRa @20dBm	TBD	LoRa @ PA_BOOST
Tx mode LoRa @17dBm	TBD	LoRa @ PA_BOOST
Rx mode LoRa @37.5Kbps	TBD	LoRa @ Receive mode
Sleep mode current	TBD	LoRa sleep

Absolute Maximum Ratings

Symbol	Description	Min.	Nom.	Max.	Unit
VBAT_SX	LoRa chip supply voltage	-0.5	-	3.9	V
VBAT_SX_IO	LoRa chip supply for I/O pins	-0.5	-	3.9	V
DVDD	Supply for the MCU	-0.5	-	3.6	
AVDD	ADC Reference Voltage	-0.5	-	3.6	
ESD HBM	Human Body Model	-	-	2000	V
ESD CDM	Charged Device Model	-	-	500	V

Recommended Operating Conditions

Symbol	Description	Min.	Nom.	Max.	Unit
VBAT_SX	SX1262 supply voltage	2.0	3.3	3.7	V
VBAT_SX_IO	SX1262 supply for I/O pins	2.0	3.3	3.7	V
DVDD	power supply of MCU	2.0	3.3	3.6	V
AVDD	ADC Reference Voltage	-	3.3	-	V

Mechanical Characteristics

Board Dimensions

The Figure 3 shows the mechanical dimension of the RAK11300 module.

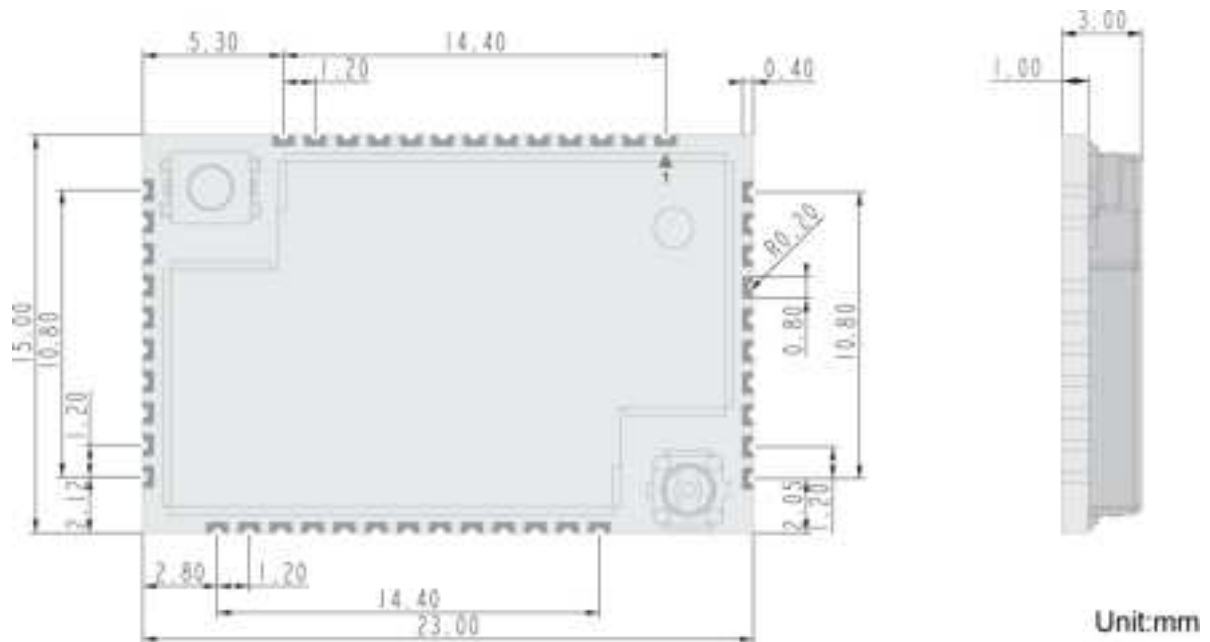


Figure 3: Mechanical Demensions

Recommended Footprint

The Figure 4 shows the recommended footprint of the RAK11300 module.

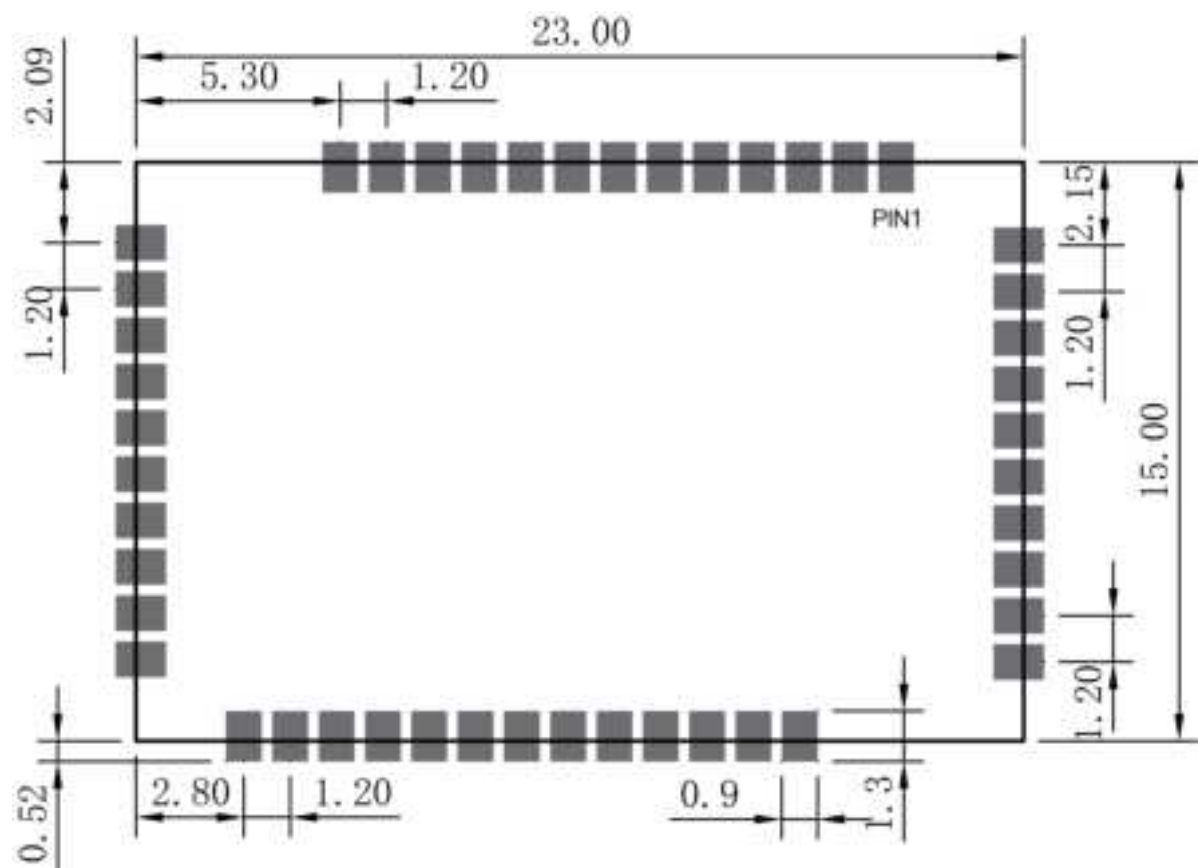


Figure 4: Recommended Footprint

Recommended Reflow Profile

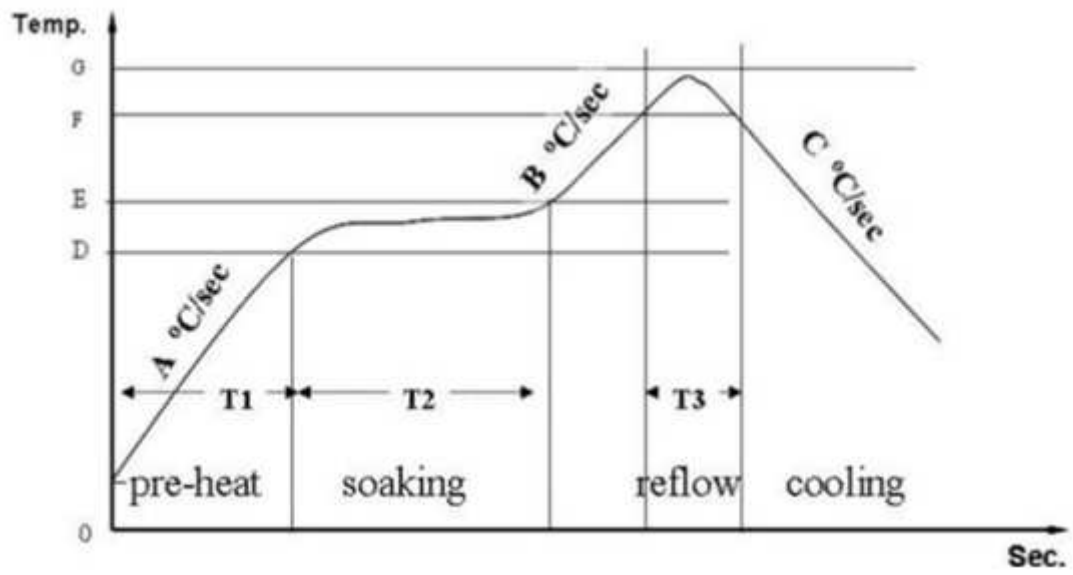


Figure 5: Recommended Reflow Soldering Thermal Profile