RAK811 Lora Module

Datasheet V1.1

Content

1. General Description

RAK811 Low-Power Long Range LoRa Technology Transceiver module, provides an easy to use, small size, low-power solution for long range wireless data transmission.

First, The RAK811 module complies with the latest LoRaWAN Class A & C protocol specifications, it is simple to access LWPA IOT platforms, such Actility etc. Second, it also support Lora Point to Point communications, this function can help customers implement their own private long range Lora network fast.

Module integrates semtech SX1276 and stm32L, offer user an serials At commands with UART Interface .It is easy to accomplish their applications, such as simple long range sensor data applications with external host MCU, low-power feature is suitable for battery applications.

This compact module is a total solution which developing of LORA-wan protocol techniques. The module’ s applications as following:

1. Automated Meters Reading
2. Home and Building Automation
3. Wireless Alarm and Security Systems
4. Industrial Monitoring and Control
5. Long Range Irrigation Systems

2. Features

- Long Range LoraWAN operating in the 868 MHz or 915 MHz frequency bands
- Lora Point to Point communication in the 860MHz-1020MHz frequency
- Small size and low power
- High Receiver Sensitivity: down to -146 dBm
- TX Power: adjustable up to +14 dBm high efficiency PA, max PA boost up to 20dbm
- FSK, GFSK, and LoRa Technology modulation
- IIP3 = -11 dBm
- Up to 15 km coverage at suburban and up to 5 km coverage at urban area

3. System Block Diagram

The block diagram of module is depicted in the figure below.

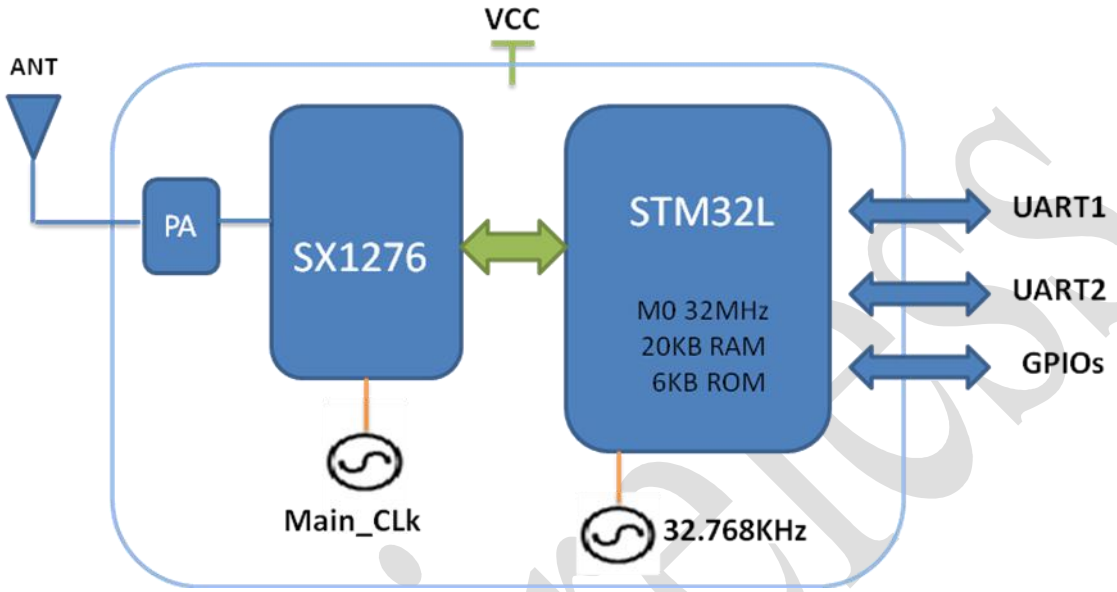

Figure 3-1 System Diagram

4. Hardware Description

4.1 Pin Outline

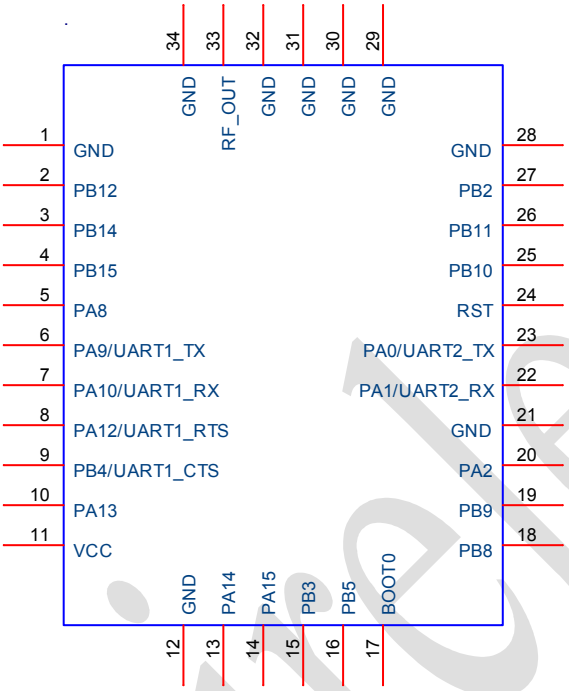

Figure 4-1 Module Pin outline

4.2 Pin definition

Table 4-1: Pin Definition

NO	Name	Type	Description
1	GND	—	Ground connections
2	PB12	I/O	B part for GPIO port
3	PB14	I/O	B part for GPIO port
4	PB15	I/O	B part for GPIO port
5	PA8	I/O	A part for GPIO port
6	PA9/UART1_TX	O	UART1 Interface
7	PA10/UART1_RX	I	UART1 Interface
8	PA12/UART1_RTS	O	UART1 Interface
9	PB4/UART1_CTS	I	UART1 Interface
10	PA13	I/O	A part for GPIO port
11	VCC	P	Main power voltage source input
12	GND	—	Ground connections

13	PA14	I/O	A part for GPIO port
14	PA15	I/O	A part for GPIO port
15	PB3	I/O	B part for GPIO port
16	PB5	I/O	B part for GPIO port
17	BOOT0	I	Boot mode GPIO enable pin
18	PB8	I/O	B part for GPIO port
19	PB9	I/O	B part for GPIO port
20	PA2	I/O	A part for GPIO port
21	GND	—	Ground connections
22	PA1/UART2_RX	I	UART2 Interface
23	PA0/UART2_TX	O	UART2 Interface
24	RST	I	Reset trigger input
25	PB10	I/O	B part for GPIO port
26	PB11	I/O	B part for GPIO port
27	PB2	I/O	B part for GPIO port
28	GND	—	Ground connections
29	GND	—	Ground connections
30	GND	—	Ground connections
31	GND	—	Ground connections
32	GND	—	Ground connections
33	RF_OUT	I/O	RF I/O port
34	GND	—	Ground connections

4.3 Physical Dimensions

(Unit: mm)

< TOP VIEW >

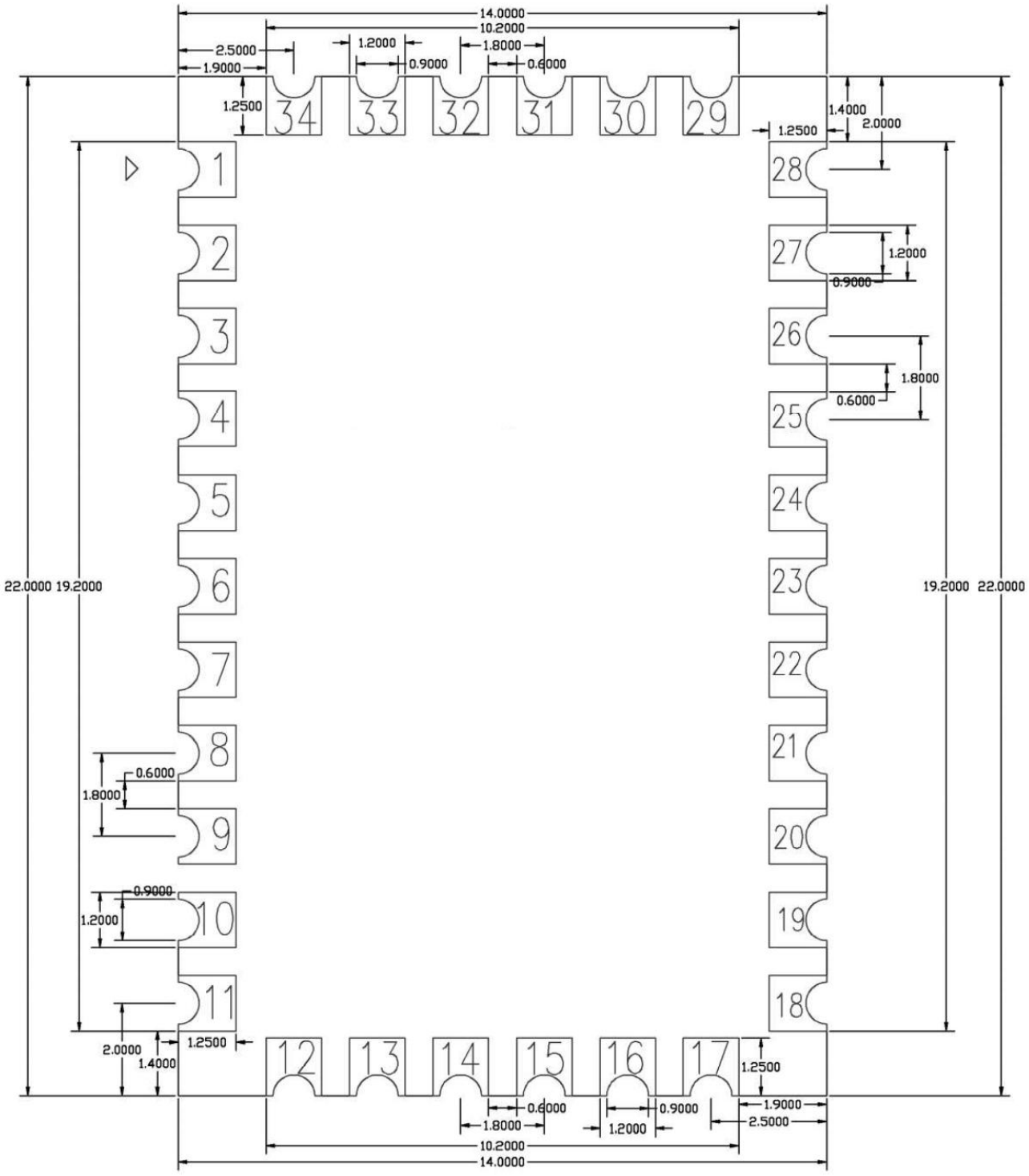

Figure 4-2 Module dimensions

5. General Specification

5.1 General specification

Model Name	RAK811
Dimension	L x W x H: 22 x 14 x 1.7 mm
Interface	UART1, UART2, GPIOs
Operating temperature	-40°C to 85°C
Storage temperature	-40°C to 85°C

5.2 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-40	25	85	deg.C
VCC	3.15	3.3	3.45	V

5.3 Specification

Feature	**Description**				
General Specification					
Frequency Band	868/915 MHz				
Host Interface	UART				
Characteristics	**Condition**	**Min**	**TYP**	**MAX**	**UNIT**
Transmit	TX Power		14	20	dBm
RX Sensitivity	RSSI	-130	-		dBm
	SNR	-15			dB
Current Consumption	TX mode	30 (14dBm)			mA
	RX mode	5.5			mA
	Sleep mode	7.2			uA

6. Layout Recommendation

(Unit: mm)

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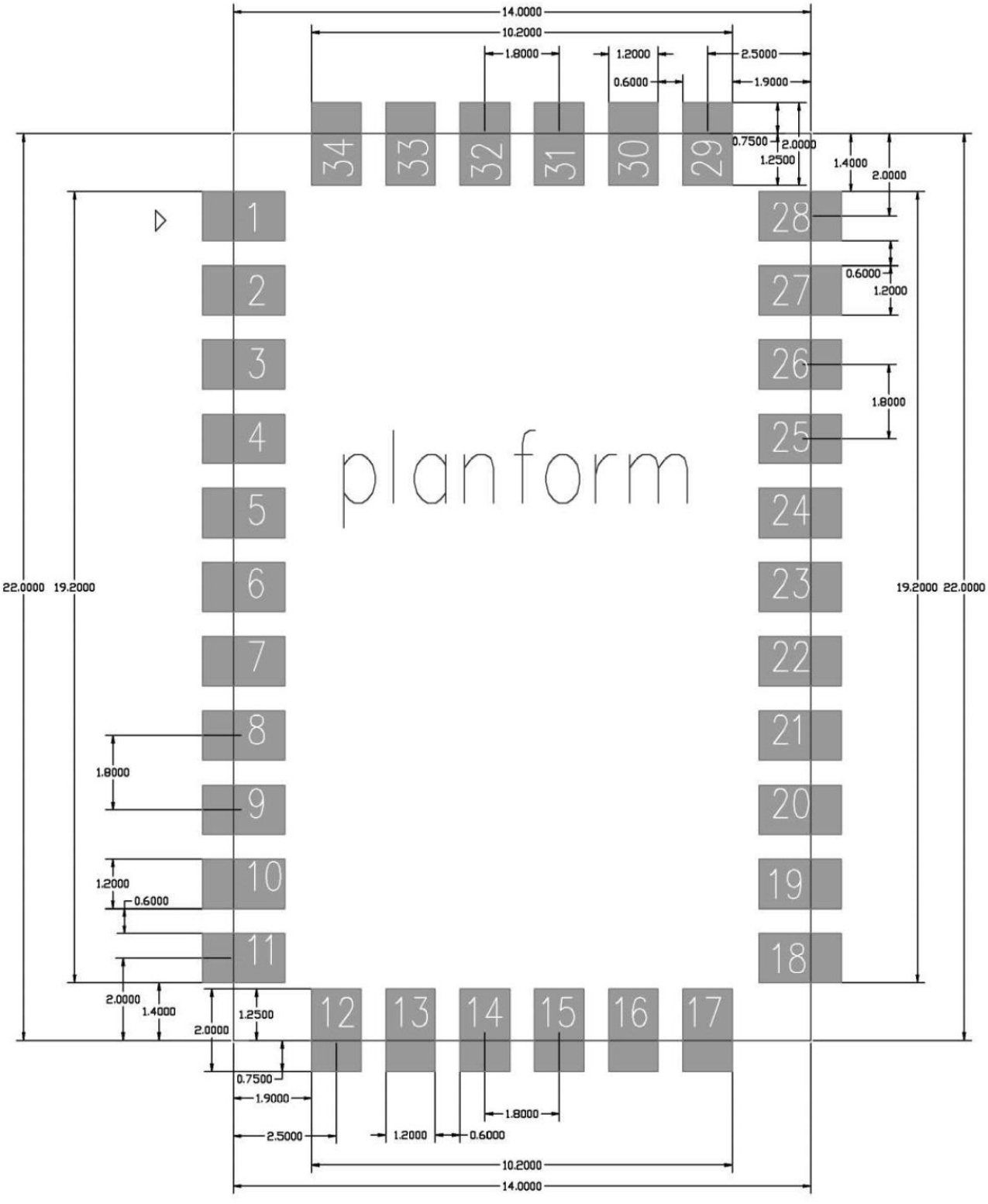
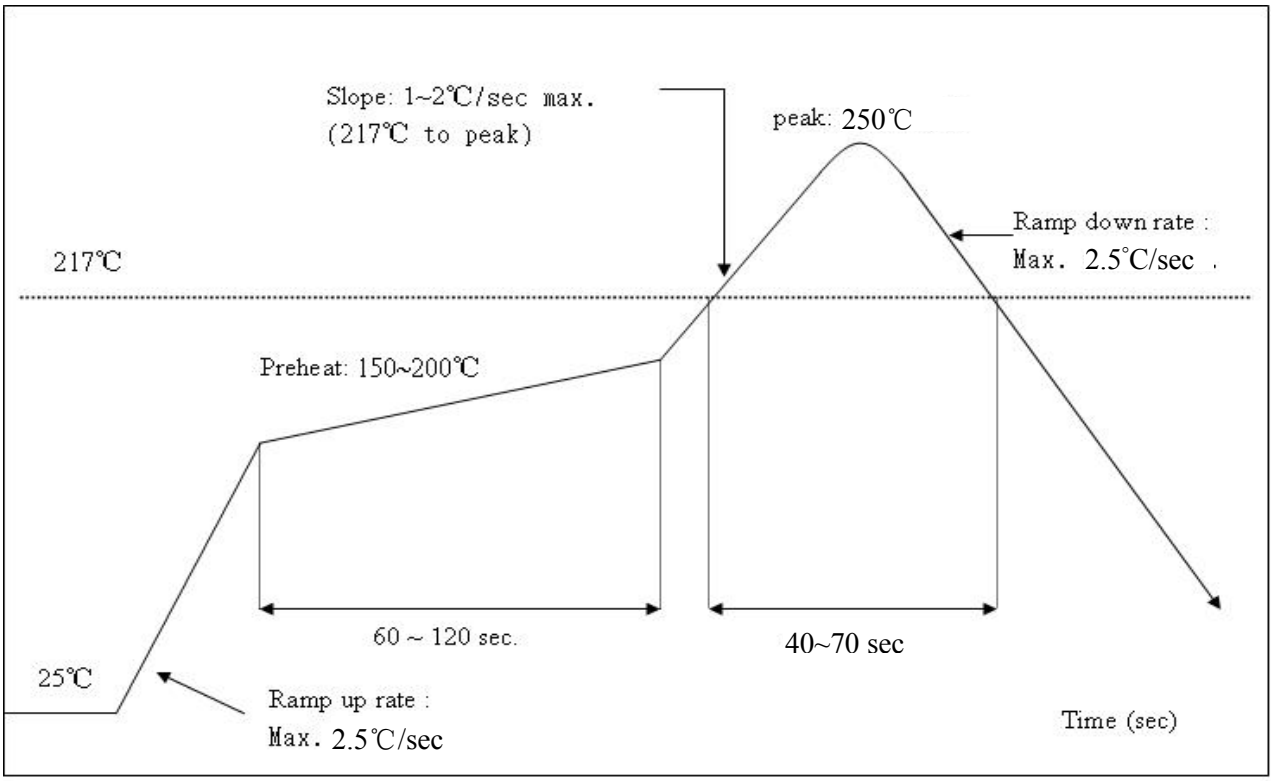


7. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250° C

Number of Times : ≤2 times



8. Order Information

Order Information		
Model Name	Operation Frequency	Output Power
RAK811HF-868	868MHz	5-20dBm
RAK811HF-915	915MHz	5-20dBm

9. Contact information

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10. Change Note

Version	Date	Change
V1.0	2016-06-11	Draft
V1.1	2016-11-15	Add LoraP2P mode