Product Specification

Product Name:LoRa cloud module

Model Name: DSM-060

Revision History

Specification		Sect.	Update Description	By
Rev	Date			
1.0	2022-11-10		New version release	Alpha

杭州市大关路 189 号万通中心 A 幢 8 楼,310004 Floor 8, building A, Wantong center,
Tel:86-571-86769027/8 8810480 Hangzhou 310004, china
Website: www.dusuniot.com www.dusunremotes.com www.dusunlock.com

1. Introduction 3
1.1. Description 3
1.2. Features 3
1.3. Application 3
2. Pin Definition 4
2.1. Pinout 4
2.2. Module size 5
3. Electricity performance 6
3.1. Absolute electrical parameters 6
3.2. Typical electrical parameters 6
4. RF performance 8
4.1. TX features 8
4.2. RX feature 8
5. Firmware 9
5.1. Connectivity support 9
6. Uart communication protocol 10
7. Production guide 11
7.1. Processing method 11
7.2. Storage method 11
7.3. Indicates card description 11
7.4. Baking parameters 11
7.5. Recommended furnace temperature curve 12
7.6. Storage condition 13
8. Package information and MOQ 14

1. Introduction

1.1. Description

DSM-060 is an ultra-low-power LoRa module developed by Roombanker Technology based on SoC-ASR6501. The ASR6501 uses Semtech's advanced low-power LoRa Transceiver SX1262 and integrates a Cypress32-bit Cortex-M0+ low-power MCU with 128kB Flash and 16kB SRAM. The LoRaWAN protocol stack is integrated, supports LinkWAN and AliOS, can easily connect to the Alibaba Cloud platform, and is very simple for porting private protocols.

1.2. Features

Built-in low-power 32-bit MCU, which can be used as an application processor

The clock frequency supports 40MHz

Working Voltage: 3.0V-3.6V

Peripherals: 13×GPIOs, 1×UART, 1×ADC

Sub-G Connectivity

- 434MHz
- Transmission Rate 50kbps, FSK Modulation
- Tx Power +14dBm/+20dBm
- IPEX Antenna

Working Temperature: -40℃ to 105℃

CE, FCC, SRRC certification

1.3. Application

Smart building

Smart home

Smart plug/lighting

Industrial wireless control

Baby Monitor

IP camera

2. Pin Definition

2.1. Pinout

The pins start at the 1-pin position and increase counterclockwise.

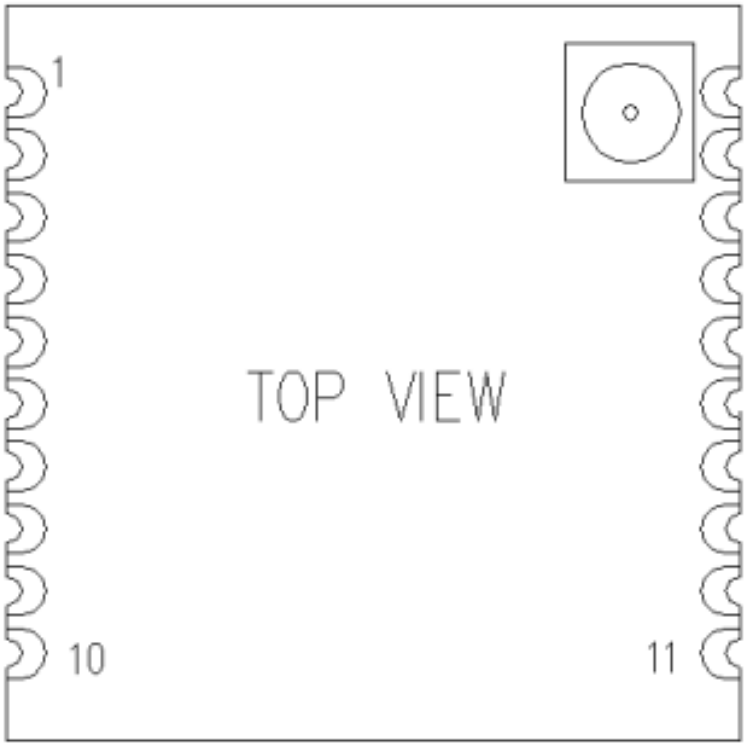


figure 2.1 DSM-060 Pinout

The following table provides a general description of the pin connections and pin functions of the package. For details on the features supported by each GPIO pin, see the table 2.1 Device Pin definition .

Table 2.1 DSM-060 Pin definition

Pin NO.	Pin name	I/O Type	Description
1	GND	P	Ground
2	VDD	P	Power Supply
3	D1	I/O	GPIO 5
4	GND	P	Ground
5	D2	I/O	GPIO 2
6	D3	I/O	GPIO (transmit done notification)
7	UART_RX	I	UART Data In
8	UART_TX	O	UART Data Out
9	SWD_DATA	I	Debug Data
10	SWD_CLK	I	Debug Clock
11	D4	I/O	GPIO (receive done notification)

12	D5	I/O	Sleep status indicate
Pin NO.	Pin name	I/O Type	Description
13	D5	I/O	GPIO 1（sleep control）
14	D6	I/O	GPIO 3
15	D7	I/O	GPIO 4
16	D8	I/O	Ground
17	GND	P	An external reset signal ,requires a 3.3V pullup
18	RESET	I	Ground
19	GND	P	F8L10A-N version is RF input and output
20	GND/RF_OUT	I/O	Ground

Note ：

1. The signal input/output is relative to the module, GPIO 1 - GPIO 5 in the table description column is IO1 - IO5 in the IO application of the configuration tool, the standard version now only IO5 supports analog input function (ADC).

The sleep control pin wakes up high and sleeps low;

The Sleep status indicates that the pin wakes up high and sleeps low;

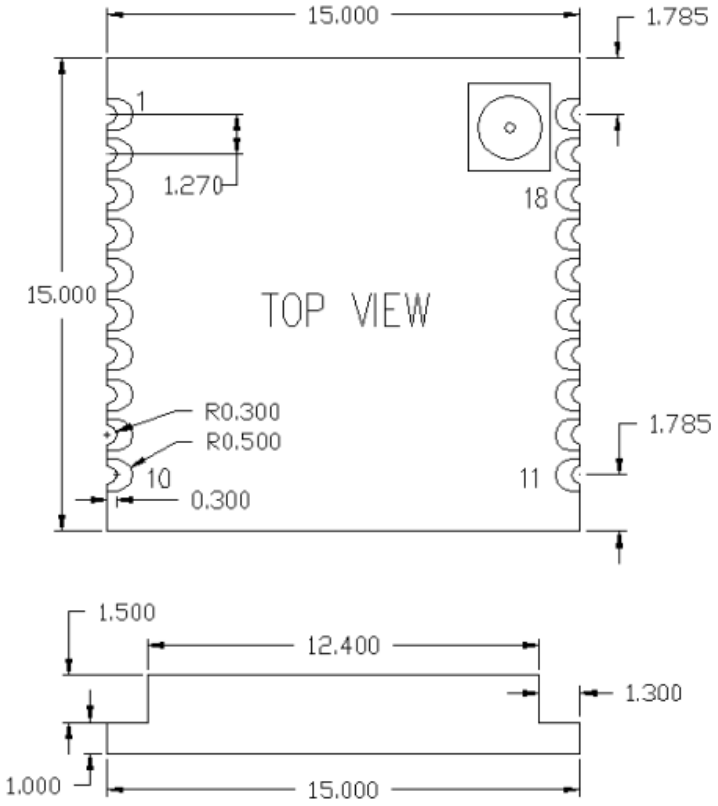
The transmit done notification pin is usually low, and it is pulled up 10ms when transmit done;

The receive done notification pin is always low, and it is pulled up 10ms when receive done (10ms is default value, AT command configurable);

2. When without IPEX header, pin 20 is the RF input and output pin, and it is ground pin for the other versions .

2.2. Module size

unit(mm)



3. Electricity performance

3.1. Absolute electrical parameters

Exceeding the limit parameter limit may cause permanent damage to the equipment, and prolonged exposure to maximum rated conditions may affect the reliability of the equipment.

Table 3.1 Absolute electrical parameters

Parameter	Min	Typ	Max	Unit	Test Condition
Working voltage	1.8	3.3	3.9	V	
Storage temperature	-40	-	125	℃	
Electrostatic discharge voltage	-	2	-	KV	TAMB-25℃（Body model）
Electrostatic discharge voltage	-	0.5	-	KV	TAMB-25℃（Machine model）

3.2. Typical electrical parameters

Parameter		Min	Typ	Max	Unit	Test Condition

Working voltage		2.0	3.3	3.6	V	Min200mA
Working temperature		-20	25	105	℃	
IO low level input		-	-	IOVDD*0.3	V	
IO high level input		IOVDD*0.7	-	-	V	
IO low level output		-	-	IOVDD*0.2	V	
IO high level output		IOVDD*0.8	-	-	V	
Receiving data current		-	-	10	mA	
Transmit data current		-	-	108	mA	Pout=+22dBm
		-	-	106	mA	Pout=+21dBm
		-	-	98	mA	Pout=+20dBm
		-	-	90	mA	Pout=+17dBm
		-	-	78	mA	Pout=+14dBm
		-	-	59	mA	Pout=+10dBm
		-	-	47	mA	Pout=+5dBm
Timer wake up current		-	-	3	uA	
Sleep current		-	-	2	uA	

4. RF performance

4.1. TX features

Unless otherwise stated, typical conditions are：T = 25℃， VDD = 3.3V.

Table 4.1 TX features

Parameter	Min	Typ	Max	Unit	Test Condition
Frequency range	150	-	960	MHz	
Tx power	-	22	-	dBm	
Frequency offset	-10	-	10	ppm	

4.2. RX feature

Unless otherwise stated, typical conditions are：T = 25℃， VDD = 3.3V。

Table 4.3 RX features

Parameter	Min	Typ	Max	Unit	Test Condition
Frequency range	150	-	960	MHz	
Receive sensitivity	-	-126	-	dBm	125kHz Bandwidth, SF=7
	-	-135	-	dBm	125kHz Bandwidth, SF=10
	-	-140	-	dBm	125kHz Bandwidth, SF=12

5. Firmware

5.1. Connectivity support

A. API

The module Supports the customization of various IoT products and solutions, including temperature/door/window/PIR/leakage sensors, etc. And we will provide relevant API files and supports for devices which can be paired with gateways (Dusun Gateway or other private gateways) according to customer needs.

APIs include reading sensor data, controlling device's switches, changing device configurations, OTA, etc.

B. MQTT

We can provide the module customization and Dusun gateway overall solution, and can provide MQTT to connect gateway to the customer's platform. Customers can easily deploy the entire system and view status as well as real-time data from PC or mobile devices

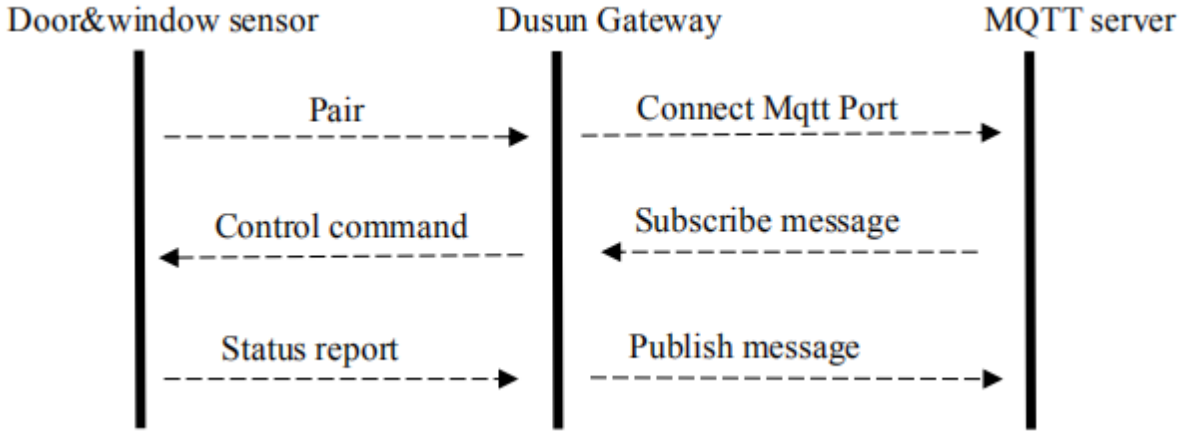


Table 5.1 product list

Product Name	Wireless Devices	Firmware version
DSM-110-1	Temperature &humidity sensor	DSM-110_T&H sensor.bin
DSM-110-2	Door/window sensor	DSM-110_Beacon.bin
DSM-110-3	PIR	DSM-110_ PIR.bin
DSM-110-4	Leakage	DSM-110_Leakage.bin
DSM-110-5	Plug (with metering)	DSM-110-Plug.bin
DSM-110-6	Switch	DSM-110-Switch.bin
DSM-110-7	Smoke	DSM-110-Smoke.bin
DSM-110-8	Emergency button	DSM-110-SOS button.bin
DSM-110-9	RGB lighting	DSM-110-lighting.bin
DSM-110-10	Strip (with metering)	DSM-110-Strip.bin

6. Uart communication protocol

UART communication protocol format，as shown in the figure 6-1.

	Start	D0	D1	D2	D3	D4	D5	D6	D7	Stop

Figure 6-1 UART communication protocol format

1） communication interface：UART

2） baud rate：300、600、1200、2400、4800 、9600 、19200、38400、57600 、115200 bps（默认）

3） start bit：1 bit

4） data bit：8 bit

5） stop bit：1bit，2 bit

6） check ：No checksum/odd check/even check

UART sends and receives data asynchronously, and the sending and receiving can be carried out at the same time to achieve full-duplex mode. Data sending can be initiated by an external device or by the module itself.

As shown in Figure 6-1, each data byte contains a start bit (low), 8 bits of data, and a stop bit (high).

For example：Figure 6-2 shows the data plot of UART transmitting byte 0x1F (decimal number 31) in data mode 8-N-1 (8 data bits, no parity bit, 1 stop bit).

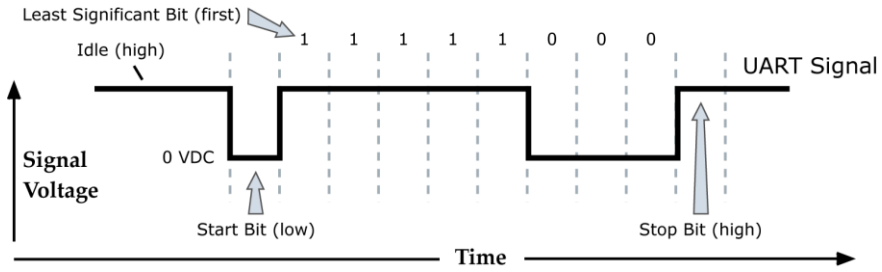


Figure 6-2 Transmit 0x1F data graphs

7. Production guide

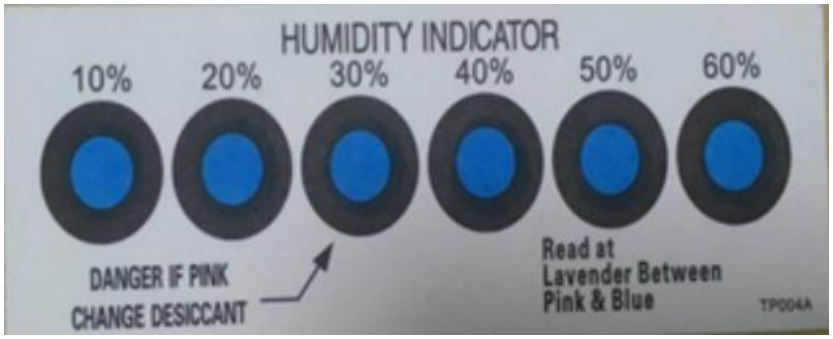
7.1. Processing method

The stamp port packaging module from the soft bank must be SMT machine SMT, and the patch must be completed within 24 hours after unpacking and burning the firmware, otherwise it will be re-vacuumed and packaged, and the module must be baked before the patch.

- Instruments or equipment required for SMT patches:
  - Reflow soldering placement machine
  - AOI detector
  - Caliber 6-8mm nozzle
- Instruments or equipment required for baking
  - Cabinet oven
  - Anti-static high temperature resistant tray
  - Anti-static and high temperature resistant gloves

7.2. Storage method

- The moisture-proof bag must be stored at a temperature < 30° C and a humidity < 70%RH.
- Dry-packed products have a shelf life of 6 months from the date of sealing of the package.
- The sealed package contains a humidity indicator card:



7.3. Indicates card description

- If the humidity indicator card reads 30%, 40%, and 50% when the color ring is blue, the module needs to be baked continuously for 2 hours
- When unpacking, if the humidity indicator card reads 30% The color ring turns pink, the module needs to be baked continuously for 4 hours;
- When unpacking, if the humidity indicator card reads 30% and 40% The color ring turns pink, the module needs to be baked continuously for 6 hours;
- When unpacking, if the humidity indicator card reads 30%, 40%, 50% The color ring turns pink, the module needs to be baked continuously for 12 hours.

7.4. Baking parameters

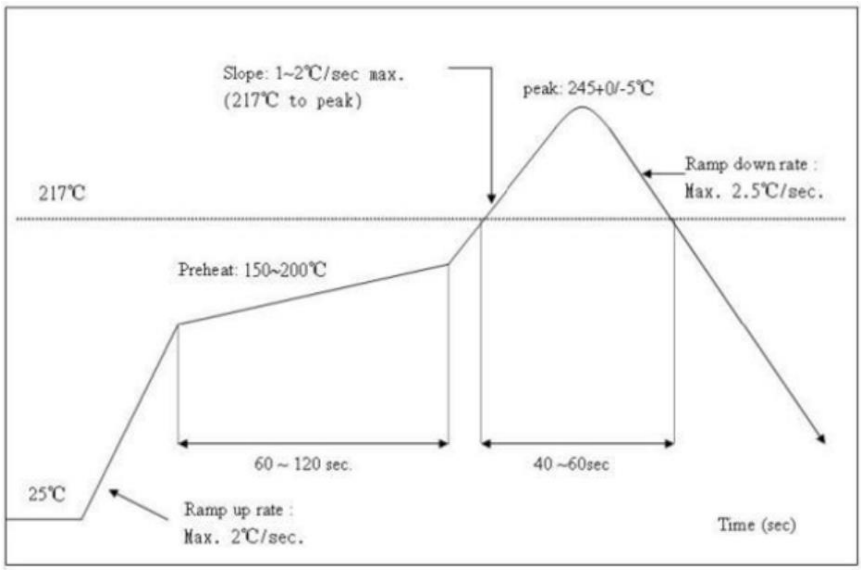
- Bake temperature: 125±5℃
- Alarm temperature setting: 130℃
- After cooling < 36° C under natural conditions, SMT patches can be performed

- Number of drying times: 1 time
- If there is no welding for more than 12 hours after baking, bake again

7.5. Recommended furnace temperature curve

Please perform SMT patch according to the reflow soldering curve diagram, the peak temperature is 245° C, and the reflow soldering temperature curve is shown in the figure below:

Refer to IPC/JEDEC standard; Peak Temperature:<245℃; Number of Times: ≤2 times



7.6. Storage condition



8. Package information and MOQ

Product model	MOQ（pcs）	Shipping packaging method	The number of modules stored per reel	Number of reels per carton
DSM-060	4000	Carrier tape reel	1000	4

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

Dusun:

DSGW-200-2 DSGW-081-3 DSGW-070-2 DSGW-040-12 DSM-055 DSM-04B-1 DSGW-081-6 DSGW-010C DSGW-021-2 DSGW-010-1 DSGW-010-3 DSGW-020-1 DSGW-081-1 DSGW-023-2 DSOM-060N-2 DSGW-021-tuya-A DSM-05D DSOM-060N-1 DSOM-020R-1 DSGW-230-1 DSGW-070-1 DSOM-090M-1 DSGW-210-F-5 DSGW-200-1 DSOM-020R-2 DSGW-081-2 DSOM-010R-2 DSGW-021-tuya-B DSOM-050R DSGW-090-4