



UGM1301



1. Product Overview

Thank you for choosing Ursalink UGM1301. This user guide will present in detail all the functions and features of the product. UGM1301 is a module designed for LoRaWAN gateway based on SX1301. It operates in the license free frequency band. Users can operate the module by SPI interface to realize multi packets processing at the same time with half-duplex.

1.1 Features

UGM1301 can process 8 packet (which maybe different SF or different bandwidth or different frequency) at the same time. The feature of multi packet processing supply more possible realization in IOT application. With UGM1301, users can realize the LoRaWAN gateway.

- Radio Frequency: 902.3~903.7 MHz(UGM1301-915)
- Transmission Power: 89.18dBμV/m
- Receiving Sensitivity: -134dBm@977bps
- Working Humidity: 10%~90% (no condensation)
- Storage temerature: -45℃~85℃
- Working Temperature: -45℃~85℃
- The power Supply: 5V

1.2 Main Applications

- Smart Metering
- Security Sensors Network
- Internet of Things (IoT)
- Agricultural Monitoring

2. Module interfaces

2.1 Size Package

UGM1301 has one row of pins and the spacing between each two pins is 2mm. UGM1301 size: 51.5*34*3.2mm, UGM1301 size is shown in figure1.

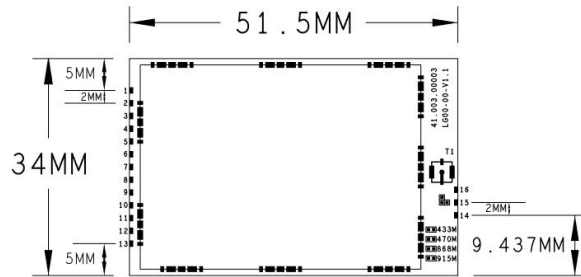


Figure 1

2.2 Pin Definition

UGM1301 module has 17 pins, as shown in figure 2. Specific definitions as the following table2.1.

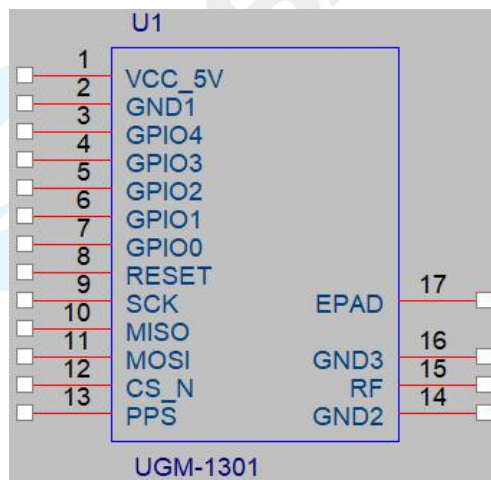


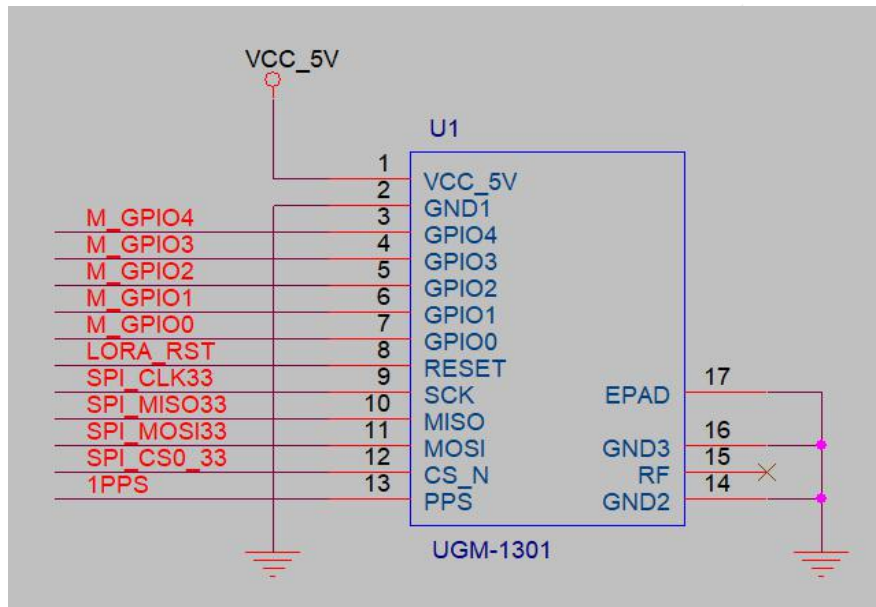
Figure 2

1	5V		Power supply for the module
2	GND		GND of the module
3	GPIO4	Input/output	Refer the datasheet of SX1301
4	GPIO3	Input/output	Refer the datasheet of SX1301
5	GPIO2	Input/output	Refer the datasheet of SX1301
6	GPIO1	Input/output	Refer the datasheet of SX1301
7	GPIO0	Input/output	Refer the datasheet of SX1301
8	RESET	Input	Active high for SX1301 reset

9	SCK	Input	SPI clock
10	MISO	Output	Master In Slave Output SPI Output
11	MOSI	Input	Master Out Slave Input SPI Input
12	CSN	Input	SPI chip select
13	PPS	Input	GPS 1pps input
14	GND		GND of the module
15	RF1		SMT antenna pin(RESEVER)
16	GND		GND of the module
17	EPAD		Exposed Pad

Table2.1

2.3 Typical Application Schematic



3. Electrical Parameters

3.1 Absolute electrical parameters

Parameters	Description	Minumum value	Maximum value	Unit
Ts	Storage temperature	-45	85	°C
VCC	Supply voltage	4.9	5.1	V
ESD	HBM	-	2	KV
	CDM		0.3	KV

3.2 Operating conditions

Parameters	Description	Min	Typ	Max	Unit
Ta	Operating temperature	-45	-	85	°C
Digital IO VDDIO	Operating voltage	3.0	3.3	3.6	V
VIL	IO low electrical level input	0.4			V
VIH	IO high electrical level input			VDDIO-0.4	V
VOL	IO low electrical level output	VSS		VSS+0.4	
VOH	IO high electrical level output	VDDIO-0.4		VDDIO	

3.3 Power in Operating Mode

Operation Mode	Operating condition TA=25°C	Typ	Peak	Unit
Data Transmission	When the module is with data Transmission	550	600	mA
Data Receives	When the module is with data Receives	300	350	mA

4. RF Characteristics

4.1 Basic RF characteristics

Parameter	Description
Operating frequency	902.3 ~903.7MHz
Data transmitting rate	SF10/125kHz(977bit/s),SF7/125kHz(54690bit/s)...
Antenna type	UGM1301 has one IPEX Connector, connect to omni antenna

4.2 LoRa RX sensitivity

Configuration	Receiving sensitivity	Unit
SF10/125K	-134	dBm
SF9/125K	-131.5	dBm
SF8/125K	-129	dBm
SF7/125K	-126.5	dBm

5. Antenna Information

5.1 Antenna Type

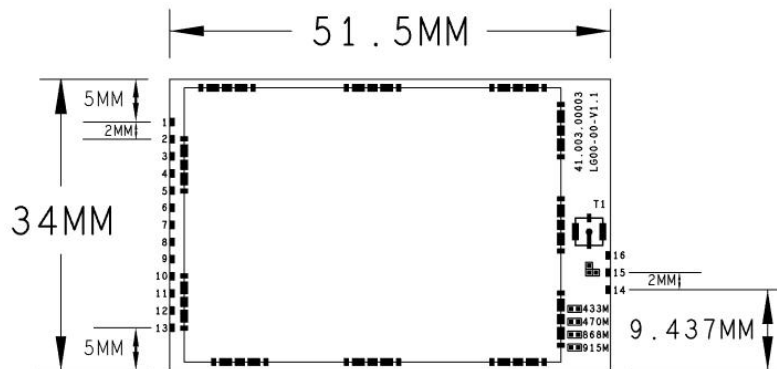
UGM1301 has one replaceable IPEX Connector, using omni antenna .

5.2 Reduction of Antenna Interference

When using antenna with IPEX terminals on the LoRa module, to ensure the best LoRa performance, it is recommended that the distance between the module antenna and other metal part should be at least 10mm.

6. Packaging Information and Manufacturing Instructions

6.1 Mechanical dimensions



6.2 Production guide

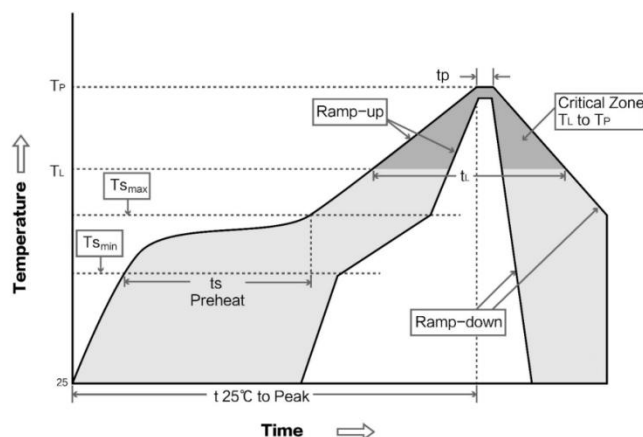
The storage conditions of modules after leaving the factory are show as follows:

1. The moisture barrier bag must be stored in an environment where the temperature is lower than 30°C and the humidity is low than 85%RH.
2. Product in dry package has a guarantee period of 6 month since it is sealed in the package.

Matters needing attention:

1. During the whole production process, each operator must wear an electrostatic ring.
2. When operating, protect the modules from water or contaminants.

6.3 Recommended furnace temperature curve



Profile Feature	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Sn63/Pb37	Sn96.5/Ag3/Cu0.5
Preheat Temperature min (T _{min})	100°C	150°C
Preheat temperature max (T _{max})	150°C	200°C
Preheat Time (T _{min} to T _{max})(t _s)	60-120 sec	60-120 sec
Average ramp-up rate(T _{max} to T _p)	3°C/second max	3°C/second max
Liquidous Temperature (T _L)	183°C	217°C
Time (t _L) Maintained Above (T _L)	60-90 sec	30-90 sec
Peak temperature (T _p)	220-235°C	230-250°C
Average ramp-down rate (T _p to T _{max})	6°C/second max	6°C/second max
Time 25°C to peak temperature	6 minutes max	8 minutes max



Regulatory Module Integration Instructions

2.2 List of applicable FCC rules

This device complies with part 15.249 of the FCC Rules.

2.3 Summarize the specific operational use conditions

This module can be used in household electrical appliances as well as lighting equipment. The input voltages to the module should be nominally 5VDC and the ambient temperature of the module should not exceed 85 °C . UGM1301 has one replaceable IPEX Connector, using omni antenna .

2.4 Limited module procedures

(N/A)

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This module complies with FCC radiation exposure limits set forth for an uncontrolled environment.

2.7 Antennas

UGM1301 has one replaceable IPEX Connector, using omni antenna .

2.8 Label and compliance information

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: “Contains FCC ID: 2AOSV-UGM1301” , Any similar wording that expresses the same meaning may be used.

2.9 Information on test modes and additional testing requirements

The modular transmitter has been tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

2.10 Additional testing, Part 15 subpart B disclaimer

The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369.

FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15.249 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

-End-

