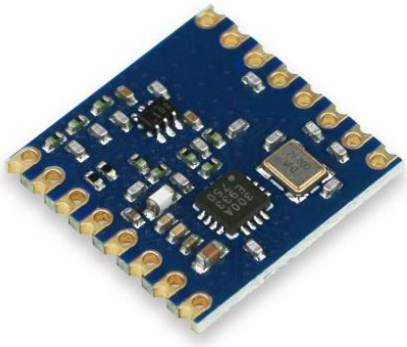
High-performance FSK Wireless Transceiver Module

SPECIFICATION

Model No.: DL-RTM300&300H

Version: V1.2

Model：DL-RTM300
433MHz/868MHz/915MHz



Model：DL-RTM300H
433MHz/868MHz/915MHz

Before using this module, please read this document carefully, and pay attention to the following important matters:

This module is an electrostatic sensitive product. Please operate it on an anti-static workbench during installation and testing.

The module uses an external antenna by default. The antenna can be a wire antenna or a standard UHF antenna. You can choose a specific antenna according to the actual situation. If the terminal product uses a metal shell, be sure to install the antenna outside the metal shell. Otherwise, the RF signal will be seriously attenuated, which will affect the effective distance.

Metal objects and wires should be kept away from the antenna as much as possible.

When installing the module, nearby objects should be kept at a sufficient safety distance from the module to prevent short circuit damage.

This module should be used in a dry environment. Please do not make any liquid substance come into this module.

Please use an independent voltage regulator circuit to supply power to this module, and avoid sharing with other circuits. The tolerance of the power supply should not be less than 5%.

Disclaimer:

This specification is just for your information, all the charts and pictures used in this specification are for reference only. The actual test shall prevail for details. We do not assume any responsibility for personal injury or property loss caused by user's improper operation.

This specification is subject to change due to the continuous improvement and upgrading of the product version, and the latest version specification shall prevail. DREAMLNK reserves the right of final interpretation and modification of all contents in this specification.

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1. Brief Introduction

DL-RTM300&300H was designed base on a high-performance wireless transceiver chip. It is a compact, low-power, long-distance wireless transceiver module. It is mainly set to 433MHz, 868MHz, 915MHz and other special frequency bands of the national networks. The sensitivity can reach -120dbm, the maximum transmission rate can reach 300Kbps, while max. output power is +20dbm. This Wireless Module integrates all RF-related functions, which can be used directly to develop wireless products with stable performance and high reliability. With this RF module, you do not need to have a deep understanding of RF circuit design, can greatly shorten the product development cycle.

2. Applications

- ISM band data communication
- Smart home Security
- Wireless remote control
- Wireless sensor network
- RKE（Remote Keyless Entry）
- Smart buildings
- AMR
- Building automation
- Energy control and management
- Thermal energy collection, meter reading

3. Features

- Compact size, adopt SMD stamp side half hole package mode
- Working frequency: 433Mhz, 868Mhz, 915 MHz;
- Transmission distance: 1.8KM in open ground;
- Support FSK, GFSK, OOK modulation, can be controlled programmatically
- Baud Rate: 1.2Kbps～300Kbps, can be configured programmatically
- Max. output power: 20dBm,
- Receiving sensitivities: -120dBm @ 1.2Kbps
- Low power consumption: receiving current < 7mA;
- Supplying Voltage: 1.9～3.6V DC
- Size: 16*16*1.8mm

4. Technical parameters

Maximum

Parameter	Minimum	Maximum	Unit
Positive Power Supply	-0.3	+3.6	V
Voltage On Digital Control Inputs	-0.3	VDD+0.3	V
Voltage On Analog Inputs	-0.3	VDD+0.3	V
RX Input Power	-	+10	dBm
Storage Temperature	-55	+125	℃
Soldering Temperature (10s)	-	+255	℃
ESD Rating (Human Boy Model)	-2	2	KV

Recommended working range

Parameter	Minimum	Maximum	Unit
Positive Power Supply	+1.8	+3.6	V
Working Temperature	-20	+70	℃
Supply Voltage Slew Rate	1	-	mV/us

DC characteristic

Parameter	Conditions	Minimum	Typical	Maximum	Unit
RTM300H TX Working Current	433MHz band, P.out=+20dBm 868MHz band, P.out=+20dBm 915MHz band, P.out=+20dBm	- - -	75 80 85	95 90 95	mA
RTM300 TX Working Current	433MHz band, P.out=+20dBm 868MHz band. Pout=+20dBm 915MHz band. Pout=+20dBm	-	75 80 85	95 90 95	mA
RTM300H/RTM300 RX Working Current	433MHz band, 868MHz band, 915MHz band,	- - -	7 7.5 7.5	10 10.5 10.5	mA
RTM300H/RTM300 Sleep Current	All band	-	-	1	uA

Transmitter AC characteristic

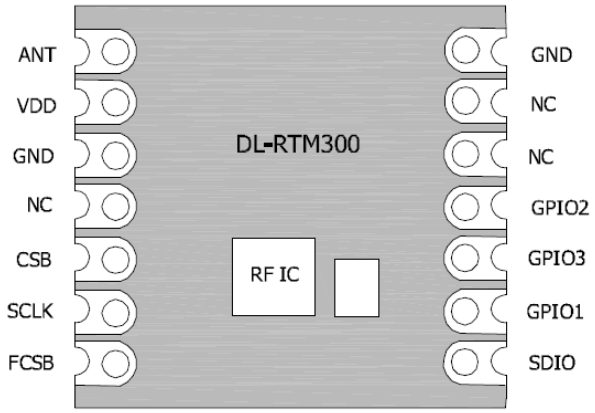
Parameter	Conditions	Minimum	Typical	Maximum	Unit
TX Frequency Range Programmable	433MHz band. 868MHz band. 915MHz band.	413 848 895	- - -	453 888 935	MHz
RTM300H Output Power	433/868/915MHz band	-	+20	-	dBm
RTM300 Output Power	433/868/915MHz band	-	+20	-	dBm
Symbol Rate, FSK Mode	programmable	0.1	-	300	kbps
Symbol Rate, OOK Mode	programmable	0.1	-	40	kbps
Frequency Deviation, FSK	programmable	1	-	200	KHz
Frequency Resolution		-	24.8	-	Hz

Receiver AC characteristic

Parameter	Conditions	Minimum	Typical	Maximum	Unit
PX Frequency Range Programmable	433MHz band. 868MHz band. 915MHz band.	413 848 895	- - -	453 888 935	MHz
RX Sensitivity OOK Mode SR = 1.2kbps,	433MHz 868MHz 915MHz	- - -	-120 -118 -118	- - -	dBm
RX Sensitivity FSK Mode Foev = 19.2kHz, SR = 1.2kbps,	433MHz 868MHz 915MHz	- - -	-118 -116 -116	- - -	dBm
Receiver Bandwidth		50		500	KHz
Blocking Immunity	+/-1MHz offset +/-2MHz offset +/-10MHz offset	- - -	52 74 75	- - -	dB
Image Rejection Ratio	lF=280KHz	-	35	-	dB

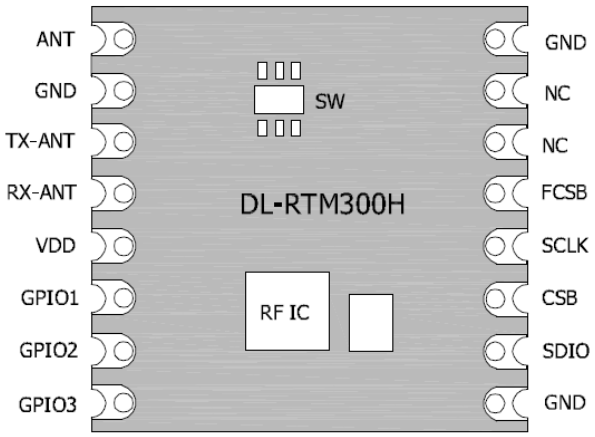
5. Pins Definition:

DL-RTM300 Pins Definition



Number	Definition	Type	Function
1	ANT	AI/AO	RF signal input/output.
2	3.3V(VDD)	PI	Power supply input,1.8-3.6V.
3	GND	G	Ground.
4	NC		No Connect.
5	CSB	I	SPI Chip select input, active low.
6	SCK	I	SPI Clock input.
7	FCSB	I	SPI FIFO select input, active low.
8	SDIO	I/O	SPI Data input and output.
9	GPIO1	I/O	General Purpose Digital I/O that may be configured through the registers to perform various functions
10	GPIO3		
11	GPIO2		
12	NC		No Connect.
13	NC		No Connect.
14	GND	G	Ground.

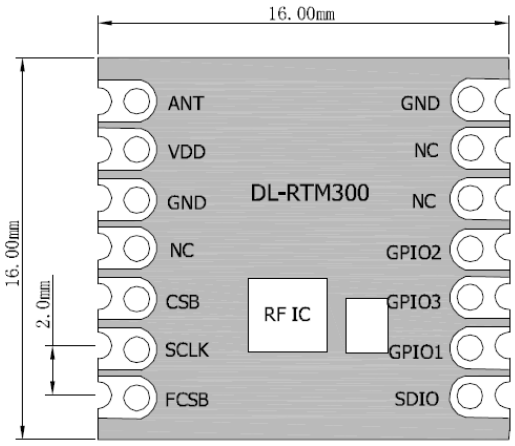
DL-RTM300H Pins Definition



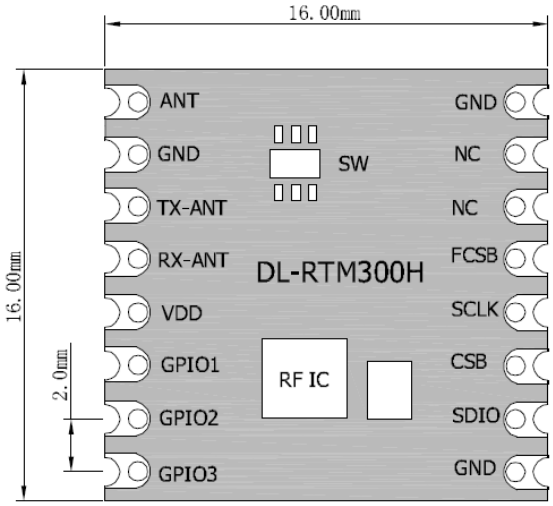
Number	Definition	Type	Function
1	ANT	Al/AO	RF signal input/output
2	GND	G	Ground
3	TX-ANT	l/O	Tx Antenna select input pin, when 300H is TX state, TX_ANT should be = 0, RX_ANT should be = 1
4	RX-ANT	l/O	Rx Antenna select input pin, when 300H is RX state, RX_ANT should be = 0, TX_ANT should be = 1
5	3.3V(VDD)	Pl	Power supply input,1.8-3.6V
6	GPlO1	l/O	General Purpose Digital I/O that may be configured through the registers to perform various functions
7	GPlO2		
8	GPlO3		
9	GND	G	Ground
10	SDlO	l/O	SPI Data input and output
11	CSB	l	SPI Chip select input, active low
12	SCK	l	SPI Clock input
13	FCSB	l	SPI FIFO select input, active low
14	NC		No Connect
15	NC		No Connect
16	GND	G	Ground

6. Product size and Application Diagram

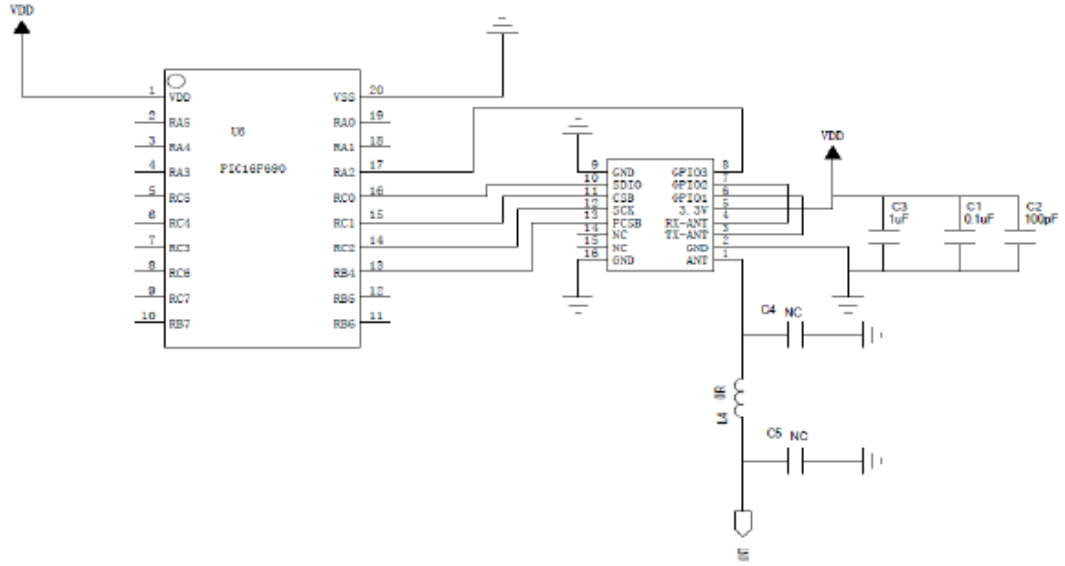
Product size of DL-RTM300



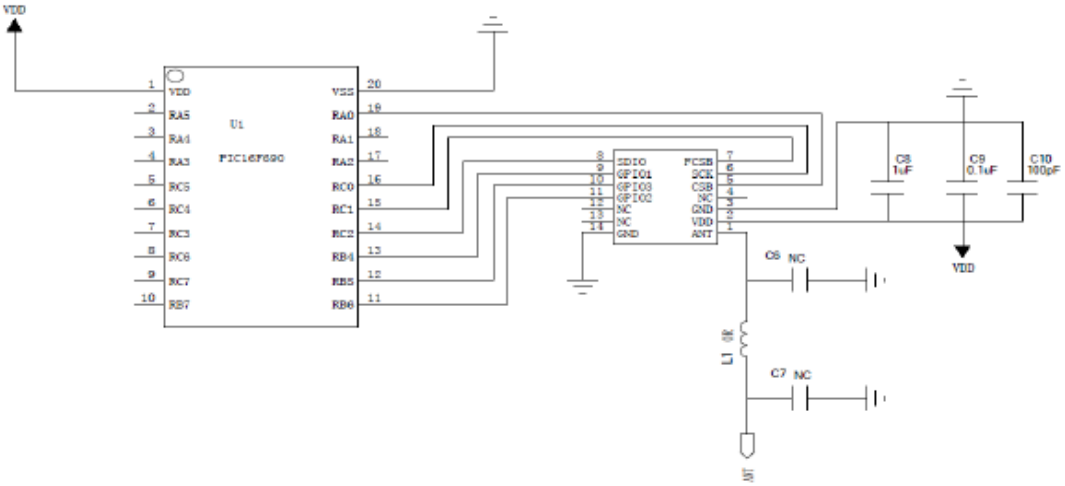
Product size of DL-RTM300H



Application Diagram of DL-RTM300



Application Diagram of DL-RTM300H



This module uses a three-line SPI digital interface:

SCK	SPI Clock
SDIO	SPI Data Input and Output
CSB	SPI Chip Selection (for devices/registers)

FCSB is the chip selection for accessing the FIFO buffer, which must be connected to the MCU

GPIO1, GPIO2, GPIO3 can be used for mapping interrupts as follows (wireless transmitting and receiving, WOR, etc.):

INT1, INT2, DOUT/DIN, DCLK (TX/RX), RF_SWT

GPIO1 GPIO2 can also be used to control TX-ANT and RX-ANT of the module. For DL-RTM300H, it is directly connected with GPIO1 and GPIO2 in PCB Layout. You can change the output logic of GPIO1 and GPIO2 through software programming, and then automatically control the switch of electronic switch, GPIO3 is used to

interrupt the output.

While for the DL-RTM300 RF module, to facilitate programming, we should at least make GPIO1 and GPIO3 pins connected, and the function of the pins can be randomly configured through the software.

This module adopts the original CMT chip (CMT2300). Please follow the CMT2300 chip manual to read and write the register. See the CMT2300 chip manual for detail

7. Circuit Design

7.1 Power Supply Design

● Please pay attention to the power supply voltage of the device, exceeding the recommended voltage range may cause function abnormally and permanently damage;

● Try to use a DC stabilized power supply, and the power ripple coefficient should be as small as possible; the power load when transmitting the maximum power needs to be also considered;

● The module needs to be grounded reliably, and a good grounding can achieve better performance output and reduce the impact of RF on other sensitive devices.

7.2 RF Routing Design

● The module should be far away from RF interference sources, such as high-frequency circuit transformer, and it is forbidden to route the wires directly under the module, otherwise it may affect the receiving sensitivity;

● When using the on-board antenna, the antenna needs to be clear on both sides, and the ground should not be too close to the antenna at the same time, otherwise it will absorb the radiated energy;

● Route 50Ω impedance line, lay the ground and drill more ground holes;

● The PCBA space allows to reserve a π-type matching network, first connect it through a 0R resistor, otherwise the antenna is open.

6.3 Antenna Design

● There are many types of antennas, choose the appropriate antenna according to your needs;

● Choose a suitable placement position, according to the Antenna polarity, and it is recommended to be vertically upward;

● There should be no metal objects in the antenna radiation path, otherwise the transmission distance will be affected (such as a closed metal casing).

8. Model Selection

Model No.	Carrier Frequency (MHz)	Chip	Packaging	Size (mm)	Power (dBm)	Distance (Km)	Antenna
DL-RTM300	433.92/868/915Mhz	CMT2300A	SMT	16*16*1.8	20	1.8	External antenna
DL-RTM300H	433.92/868/915Mhz	CMT2300A	SMT	16*16*1.8	20	1.8	External antenna
☆ The above models can communicate with each other ☆							

9. Contact us

Shenzhen DreamLnk Technology Co., Ltd

★ Data collection, Smart home, Internet of Things applications, Wireless remote control technology, Remote active RFID, Antennas ★

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