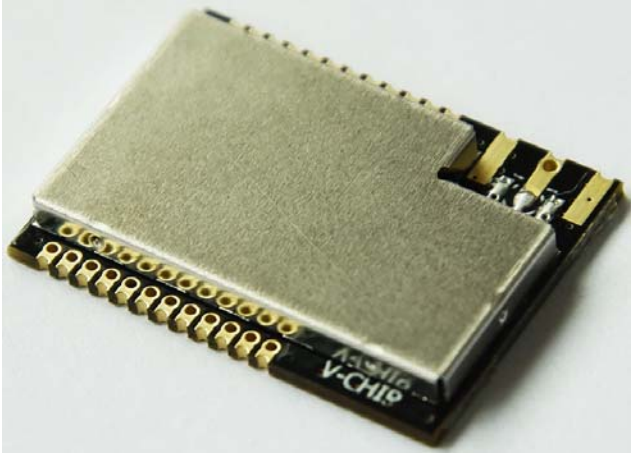
VT-S02C-915 Ultra-Low Power Long Range RF Module

Industry

1 Advantage

- Ultra-Low Power
  - Voltage Range: 1.8~3.8V
  - Standby: 0.7uA
  - Active-Mode RX: 5.4mA
  - Active-Mode TX: 13.4mA @+10dBm
- Long Range
  - 2000m @+10dBm, 2.4kbps
  - 3000m @+15dBm, 2.4kbps
- TI-RTOS and Contiki System Support
- External Watchdog
- Small Size, Compatible with VT-SA02x



The picture is for reference, please in kind prevail

2 Descriptions

VT-S02C-915 RF Module is base on the SoC chip CC1310 of Texas Instruments design. It integrated with a high performance RF core, an ARM®Cortex®-M3 controller.

It operates at 904~920MHz, max output power up to 10dBm.

Thanks to its ultra low power feature, the module is extremely suitable for the battery power systems. And thanks to its small size, the module can be easily installed in existing systems without any external circuits.

3 Device Information

Part Number	Frequency MHz	Power dBm	Range km	Voltage V	Temperature ℃	Discreption
VT-S02C- 915	904-920	10	3	1.8~3.8	-40~85	

4 Features

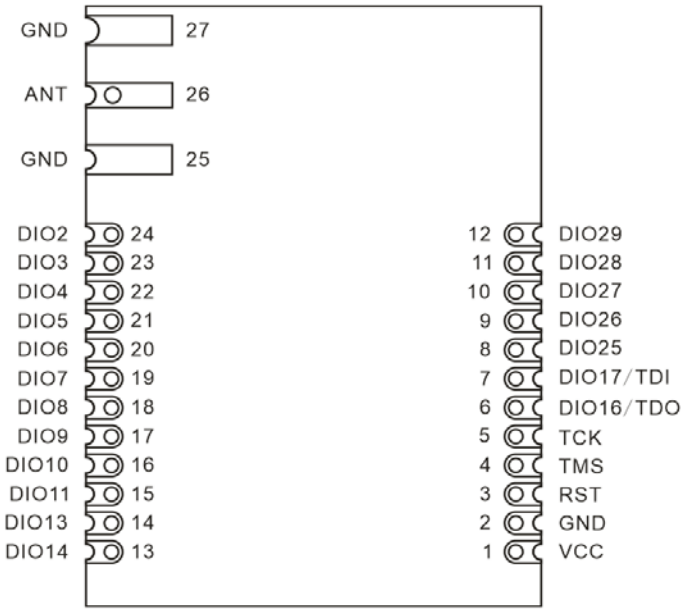
- Radio
  - Operate Frequency 904~920MHz
  - Modulation: MSK、FSK、GFSK、OOK、ASK、2-GFSK、4GFSK、CPM
  - Sensitivity: -124dBm @Long-Range Mode
  - Data Rate from 0.625Kbps to 4Mbps
  - Hardware support FEC, Data Whitening, CRC
  - Support 8.2.15.4g
  - Support LBT and CCA
  - Support Digital RSSI
- Microcontroller
  - Powerful ARM® Cortex®-M3
  - Up to 48MHz Clock Speed
  - 128KB Flash
  - 20KB SRAM
  - 2-Pin cJTAG and JTAG Debugging
  - Support OTA
- Peripherals
  - 19 GPIO
  - 4 Timers (8x16-Bit or 4x32-Bit)，Support PWM Each
  - 12-Bit ADC, 8-Channel
  - UART、SSI、I^2C、I2S
  - Real-Time Clock (RTC)
  - AES-128 Security Module
  - Support 8 Capacitive Sensing Buttons
  - Integrated Temperature Sensor
- Electric Specification
  - Voltage Range from 1.8 to 3.8V
  - Standby: 0.7uA
  - Active-Mode RX: 5.4mA
  - Active-Mode TX: 13.4mA @ +15dBm
- Package
  - SMD + DIP
  - Antenna Interface: SMD + DIP + IPEX Connector

5 Applications

- 915MHz ISM and SRD Systems
- Energy Harvesting Application
- Electronic Shelf Label
- Long-Range Sensor Application
- SmartGrid and Automatic Meter Reading
- Wireless Healthcare Application
- Industrial Monitoring and Control
- Home and Building Automation
- Heat Cost Allocators
- Wireless Alarm and Security Systems
- Wireless Sensor Networks
- Active RFID

6 Terminal Configuration and Functions

6.1 Pin Diagram



VT-S02C (27.0 × 20.0 mm) Pin out，1.27mm Pitch

6.2 Signal Description

Pin		Type	Description
NO.	Name		
1	VCC	Power	Voltage Range from 2.4V to 3.8V DC
2	GND	Power	Ground
3	RST	Digital Input	Reset, active low. No internal pull-up
4	TMS	Digital I/O	JTAG TMSC, High drive capability
5	TCK	Digital I/O	JTAG TCKC
6	DIO16/TDO	Digital I/O	GPIO, JTAG TDO, High drive capability
7	DIO17/TDI	Digital I/O	GPIO, JTAG TDI, High drive capability
8	DIO25	Digital/ Analog I/O	GPIO, Sensor Controller, Analog
9	DIO26	Digital/ Analog I/O	GPIO, Sensor Controller, Analog
10	DIO27	Digital/ Analog I/O	GPIO, Sensor Controller, Analog
11	DIO28	Digital/ Analog I/O	GPIO, Sensor Controller, Analog
12	DIO29	Digital/ Analog I/O	GPIO, Sensor Controller, Analog
13	DIO14	Digital I/O	GPIO
14	DIO13	Digital I/O	GPIO

15	DIO11	Digital I/O	GPIO
16	DIO10	Digital I/O	GPIO
17	DIO9	Digital I/O	GPIO
18	DIO8	Digital I/O	GPIO
19	DIO7	Digital I/O	GPIO, Sensor Controller, High drive capability
20	DIO6	Digital I/O	GPIO, Sensor Controller, High drive capability
21	DIO5	Digital I/O	GPIO, Sensor Controller, High drive capability
22	DIO4	Digital I/O	GPIO, Sensor Controller
23	DIO3	Digital I/O	GPIO, Sensor Controller
24	DIO2	Digital I/O	GPIO, Sensor Controller
25	GND	Power	Ground
26	ANT	Analog	Antenna, 50ohm
27	GND	Power	Ground

6.3 External Watchdog Connection

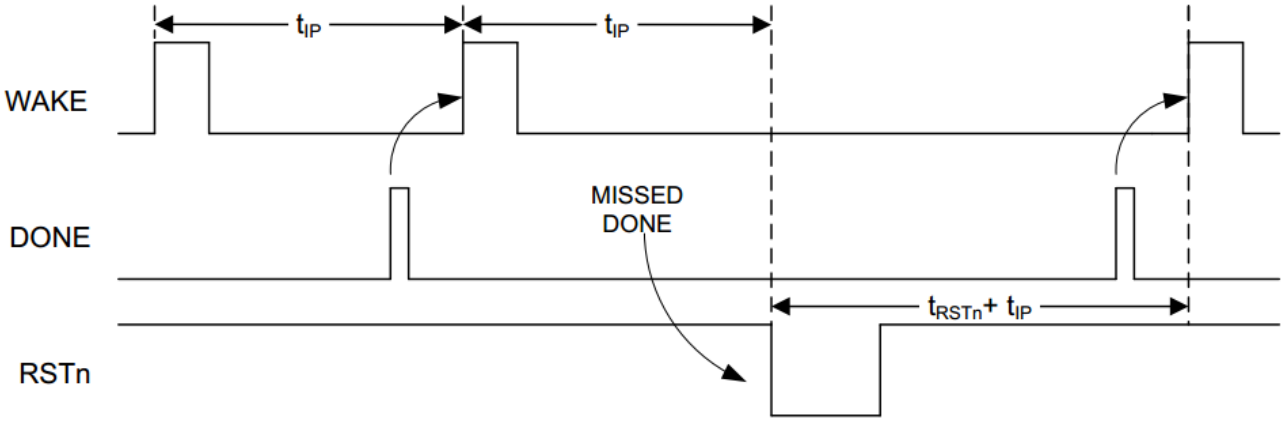
6.3.1 Pin Connection

Pin		Type	Description
Name	Function		
DIO19	WAKE	Input	Connect to Watchdog WAKE pin, issue a periodic WAKE pulse.
DIO18	DONE	Output	Connect to Watchdog DONE pin, must issue a DONE signal to at least 20ms before the rising edge of the next WAKE pulse.

Note:

- Watchdog may not include in some type of the module.
- The Watchdog is programmed to 1 minute periodic, please contact with us for other periodic.
- Make sure to deal with WAKE pulse during debugging.

6.3.2 Watchdog Pulse Diagram



7 Specifications

7.1 Electric Spec

	MIN	MAX	UNIT
VCC, Operate Voltage	1.8	3.8	V
Voltage on any digital pin	-0.3	VCC+0.3	V
Voltage on ADC input	-0.3	VCC	V
Input RF level	-	10	dBm

7.2 Environment Spec

	MIN	MAX	UNIT
Operate Temperature	-40	85	℃
Operate Humidity	10%	90%	rh
Storage Temperature	-40	150	℃

7.3 Radio Spec

Condition: Ta=25℃， VCC=3.3V.

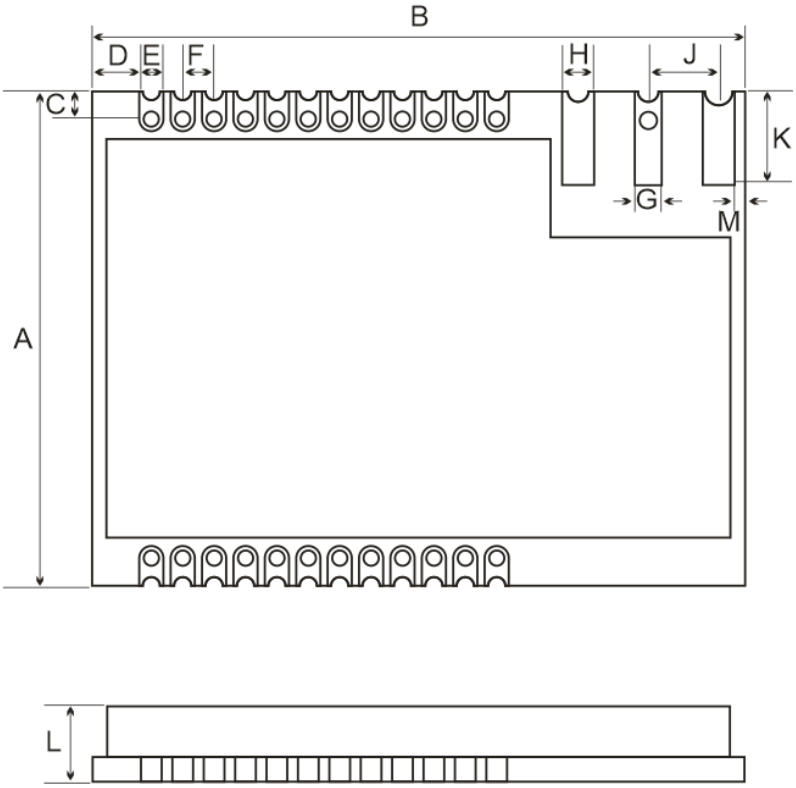
		MIN	MAX	UNIT
915MHz	Operate Frequency	904	920	MHz
	Output Power	-10	+10	dBm
	Sensitivity @Long-Range Mode, 2.4Kbps	-	-124	dBm
	Data Rate	625	4M	bps

	TX Current @ +10dBm	-	24	mA
	RX Current @ MCU Ative	-	6	mA

8 Tools and Development Source

- We provide CC13xx Evaluation Board，fully compact with TI CC13xx LaunchPad.
- CC1310 sheet of TI: http://www.ti.com/product/CC1310
- TI wiki：http://processors.wiki.ti.com/index.php?title=Category:Sub-1GHz
- CC1310 LaunchPad of TI: http://www.ti.com/tool/launchxl-cc1310

9 Size Data



Units: mm

	MIN	MAX
A	20. 00	20. 10
B	27. 00	27. 10
C	1. 00	1. 02
D	2. 00	2. 02
E	0. 90	0. 90
F	1. 27	1. 27
G	1. 15	1. 15
H	1. 35	1. 35
J	2. 90	2. 90
K	3. 82	3. 82
M	0. 43	0. 43
L	3. 00	3. 10

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FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

To assure continued compliance, any changes or modifications not expressly approved by the party.

Responsible for compliance could void the user's authority to operate this equipment. (Example- use only shielded interface cables when connecting to computer or peripheral devices).

This equipment complies with Part 15 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.

FCC Radiation Exposure Statement:

The equipment complies with FCC Radiation exposure limits set forth for uncontrolled enviroment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Modular Approal & Installation:

The Ultra-Low Power Long Range RF Module is designed to comply with the FCC rules, except for power stabilization which shall be provided by the host. Therefore, any host system using this module, requires additional testing and equipment authorization. This radio module must not be installed to co-locate and operating simultaneously with other radios in host system, if so, then additional testing and equipment authorization may be required to operating simultaneously with other radio. Applicable antenna: Helical antenna,FPC antenna;Applicable antenna Gain:-4dBi to +4dBi.

The host system shall have a label indicating: Contains FCC ID: 2APCO-S02C915