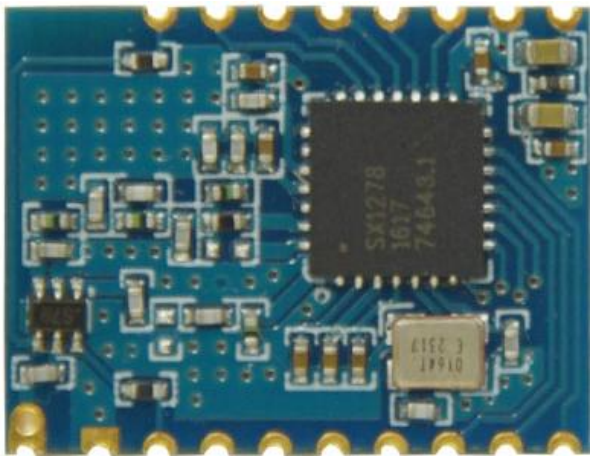
VT-SX1278-433M Wireless Module

User Guide



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General Description

VT-SX1278-433M is based on RF Transceiver SX1278 of SEMTECH，it's a small size and ultra low power UHF wireless module. SX1278 is a low cost true single chip UHF transmitter designed for very low power wireless applications. The circuit is mainly intended for the ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency bands at 315 and 433 MHz, The MAX RF output power can be set as high as +20dBm, with data rate as high as 300Kbps. The module integrated many RF functions thus you can use it conveniently and reducing your development time.

Features

- Central frequency is 433MHz, Frequency bands :410~525MHz
- Programmable output power up to +20dBm for all supported frequencies，the communication distance is above 3000m in sight .
- High receiver sensitivity down to -148dBm(at LORA mode)
- Programmable baseband modulator with FSK/OOK/LORA
- Programmable data rate up to 300Kbps
- 256-byte TX data FIFO
- Digital RSSI output.
- Low current consumption with receive mode <14mA, transmit mode at +10dBm output power <140mA
- Low current consumption at power down state <1uA
- Integrated analog temperature sensor
- Efficient SPI interface, All registers can be programmed with one "burst" transfer
- Small dimension：20.5×15.5×2.0mm
- Operating supply voltage：1.8～3.7V DC

Applications

- Logistics Tracking System, Warehouse patrol, Electronic label.
- Replace RS232 and RS485 in data transmission
- Industrial monitoring and control in data acquisition
- AMR – Automatic Meter Reading
- Home and building automation
- Consumer Electronics products of wireless control
- Wireless alarm and security systems
- Wireless sensor networks

General Characteristics

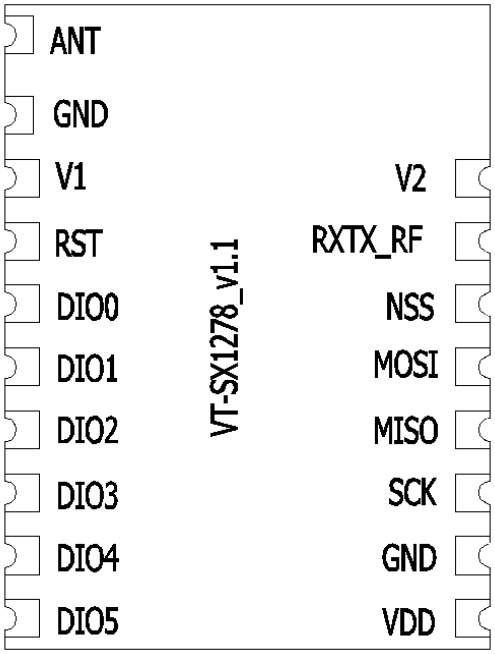
Test operating conditions：Ta=25℃，VCC=3.3V if nothing else stated.

Parameter	Type	Condition/Note
Operating supply voltage	DC 1.8～3.7V	
Central frequency	433MHz	Can be programmable to other frequency in bands 410~525MHz
Frequency accuracy	±10KHz	
Modulation format	FSK/OOK/LORA	Programmable
Transmit power	-2～+20dBm	Programmable
TX current consumption	<140mA	Po=20dBm
Receiver sensitivity	-110dBm	@LoRa，SF=12，BW=7.8kHz
RX current consumption	<14mA	
Sleep State current consumption	<1uA	Refer to IC operation states
Data rate	0.018kbps~300kbps	Programmable
Spurious emissions and harmonics	< -30dBm	TX power +20dBm.
Communication distance	>3000m	0.8kBaud data rata, +20dBm output power.
Antenna impedance	50ohm	
Operating temperature	-20～+85 ℃	
Storage temperature range	-50～+125 ℃	
Dimension	20.5×15.5×2.0mm	See more in PCB description

Note：

1. The module transmission data rate will affect Transmission distance ,the higher the data rate , the closer the distance, and the lower the receiving sensitivity.
2. The supply voltage to the module will affect TX power, in the operating supply voltage range, the lower the voltage, the lower the TX power.
3. The module central frequency will change as the operating temperature change, use it under suggest temperature, the module can work well.
4. The antenna will strongly affect the communication distance, please select matched antenna and connect it correctly.
5. The module mount will affect the communication distance.

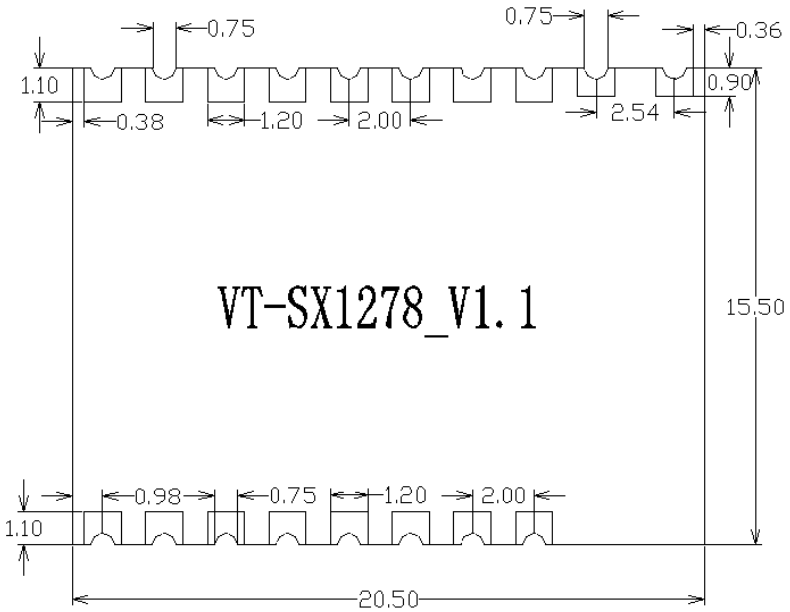
PCB Description



Pin Configuration

Pin name	Pin type	Description
VCC	Power(Analog)	1.8 V - 3.7 V analog power supply connection.
GND	Ground	Connect to the system ground.
RST	Digital Input	Reset, active low
MOSI	Digital Input	Serial configuration interface, data input.
SCK	Digital Input	Serial configuration interface, clock input.
MISO	Digital Output	Serial configuration interface, data output. Optional general output pin when CSN is high.
NSS	Digital Input	Serial configuration interface, chip select, active low.
DIOx	Input/output	GPIO
ANT	RF I/O	RF output signal from PA, connect to the Antenna.

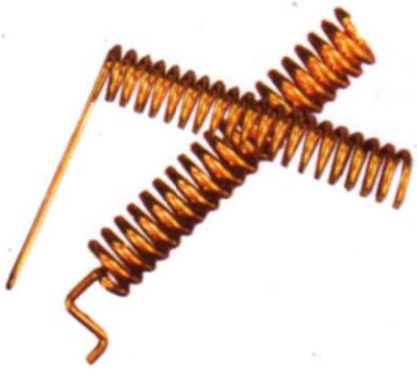
Dimension



Antenna

We can provide antenna match to the module. And if there is some special requirements to satisfy, we can coordinate with you to select antenna, match antenna to the module in order to make the product work well.

Some recommend antennas as the table below.

Spring antenna（Standard） Characteristic: small size, low cost, embedded conveniently.	
SMA rubber antenna（Optional） Characteristic: medium-scale, low cost, high gain	
Magnetic Mount Antenna（Optional） Characteristic: high gain, Magnetic Mount，suitable for mount on iron box.	

Note: Standard is for free, optional need another payment and the cost refer to the antenna price.

Questions and Answers

Description	Reason and Solution
Can't communication	1. The power supply connect not well, check the module VCC whether it is out of maximum rating. 2. The signal line connect not well, check the module SPI interface. 3. The settings of the transmitter module and receiver module are not the same. Check these modules' register configuration. 4. Signal block. If the transmitter work with a high TX power, and the receiver was put at a short distance(<0.5m), maybe there is a signal block to make no communication.
Communication distance is too short	1. The application environment is too bad or the antenna is shield. Put the antenna to a better place outside or higher throw a coaxial line , replace it with a higher gain antenna. 2. The work space contains a same frequency interference source, or a strong magnetic field interference, power source disturbance. Try to change the carrier frequency or get far away from the source of the disturbance. 3. The power supply is not strong. Check the voltage and the current whether it is enough.
High data error	1. The power supply ripple is too big, Change the power supply. 2. Check the module register configuration, it is recommended to set as the CC1101-datasheet. 3. There is a carrier frequency interference, change the channel. 4. The antenna unmatched to the module RF interface, change another matched antenna.

Development Package:

1. SX1278 datasheet（SX1278.pdf）
2. SX1278 register configuration tool.
3. SX1278 demo code (SX1278 Demo Code.rar）

Note：

1. **You can get the development package above from the salesman when you order the module.**
2. **As version update，please refer to our latest development materials.**

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