

LoRa wireless star network data transmission module

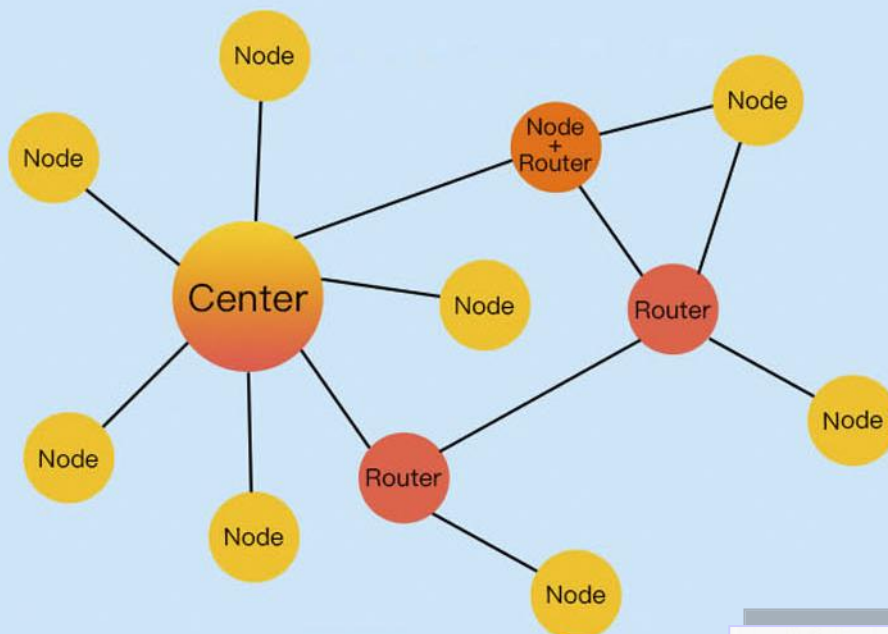
Support TTL/232/485

Star network + automatic routing

AES128 wireless encryption

Listen Before Talk

## Product Specification



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## Note: Document Revision History

Historical version number	release time	Modify content
V1.0	2019-10	First release

### 1. Product description

VOLTEC is an advanced IoT node powered by LoRa wireless data transmission module that works under star Mesh network following the shortest path. Each module can be pre-set to

act as center, router or node depending on its role / functionality in network. It supports an automatic MESH function to communicate with server without any blind zone or distance limitation. The module has a high-level communication security using AES128 wireless data encryption and provides additional feature such as LBT (listen before talk) to support more applications.

The VOLTEC module is based on Semtech's SX127X chip and uses advanced LoRa™ spread spectrum modulation frequency hopping technology to achieve high sensitivity. The penetrating power and communication distance are far superior to the current FSK and GFSK products, and have stronger anti-interference.

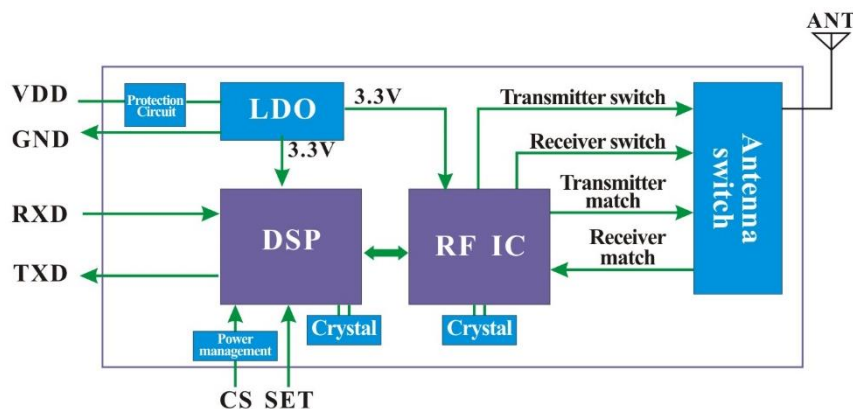
## 2. Features

- LoRa Star – Mesh Modulation network routing, no blind zone, no distance limit
- Center / node / router / node + router
- Long Range 2.5-15 Km (direct P2P)
- LBT (Listen Before Talk) (Selective)
- Built-in software watchdog
- Built-in hardware reset protection
- Multiple transmit power options (20mW-5W)
- Diversified serial port parameters
- Operating frequency band: 433/470/868/915 MHz optional
- TTL/232/485 level
- Sensitivity up to -139 dBm
- ESD protection
- Operating temperature: - 40 ~ +85
- AES128 data encryption - optional

## 3. Application field

- Remote control
- Remote meter reading
- Industrial data collection
- Home automation telemetry
- Wireless data communication
- Access control system

## 4. Internal block diagram



## 5. Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition
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Working condition					
Voltage range	3.3	5.0	6.5	V	<b>*2</b>
Operating Temperature	-40	25	+85	°C	
Current consumption					
Rx current		< 15		mA	TTL level
Tx current		< 130		mA	
Sleep current	<b>*1</b>	< 200		µA	
RF parameter					
Frequency Range Different specifications	414.92	433.92	453.92	MHz	@433MHz
	470.92	490.92	509.92	MHz	@470MHz
	849.92	868.92	888.92	MHz	@868MHz
	895.92	914.92	934.92	MHz	@915MHz
Data rate	91	656	17353	bps	@LoRaTM
Output power	4	20	+20	dBm	7 adjustable levels by software
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**\*1** We can change the sleep current to 5uA version upon request.

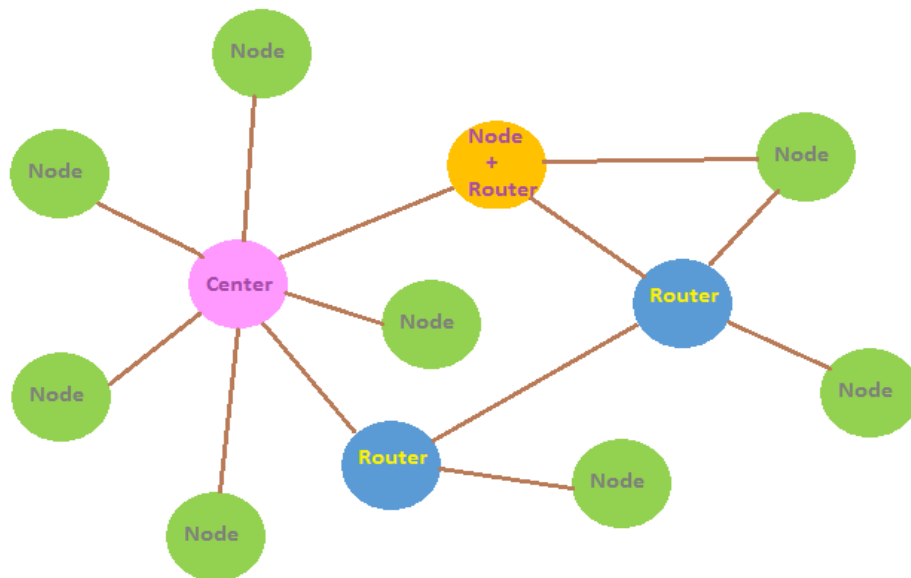
## 6. Operation

### 1) Network description

A star network need a center and some nodes. The center can broadcast to all nodes or send to one node, and the node can upload data to the center. Communication between nodes is not allow. The module has four working modes which are as follows:

Working mode	Received data from the Center	Data sent by the Center to other Nodes	Received data sent by other Node
Center	/	/	Serial output
Node	Serial output	No operation	No operation
Router	No operation	Wireless forwarding	Wireless forwarding
Node & Router	Serial output	Wireless forwarding	Wireless forwarding

**The nodes can be set to different modes to form a STAR + MESH network without blind zone and distance limitation. There is no limit to the jumps of routes in the entire network.**



### 2) AES128 data encryption transmission mode

In the wireless communication process, the module can superimpose and enable AES128 encryption in addition to its own data encryption function. The user can freely read or change the module's AES128 key through the PC software. After the AES128 encryption mode is enabled, the wireless transmission delay will be slightly longer, but the protection of the air data is the best. The AES128 encryption function of the module can be enabled in the application where the transmission data encryption is required. .

### 3) LBT function (Listen Before Talk)

When multiple transmitters are working at the same time, in order to ensure that they will not interfere with each other, the module checks whether other transmitters are transmitting in the

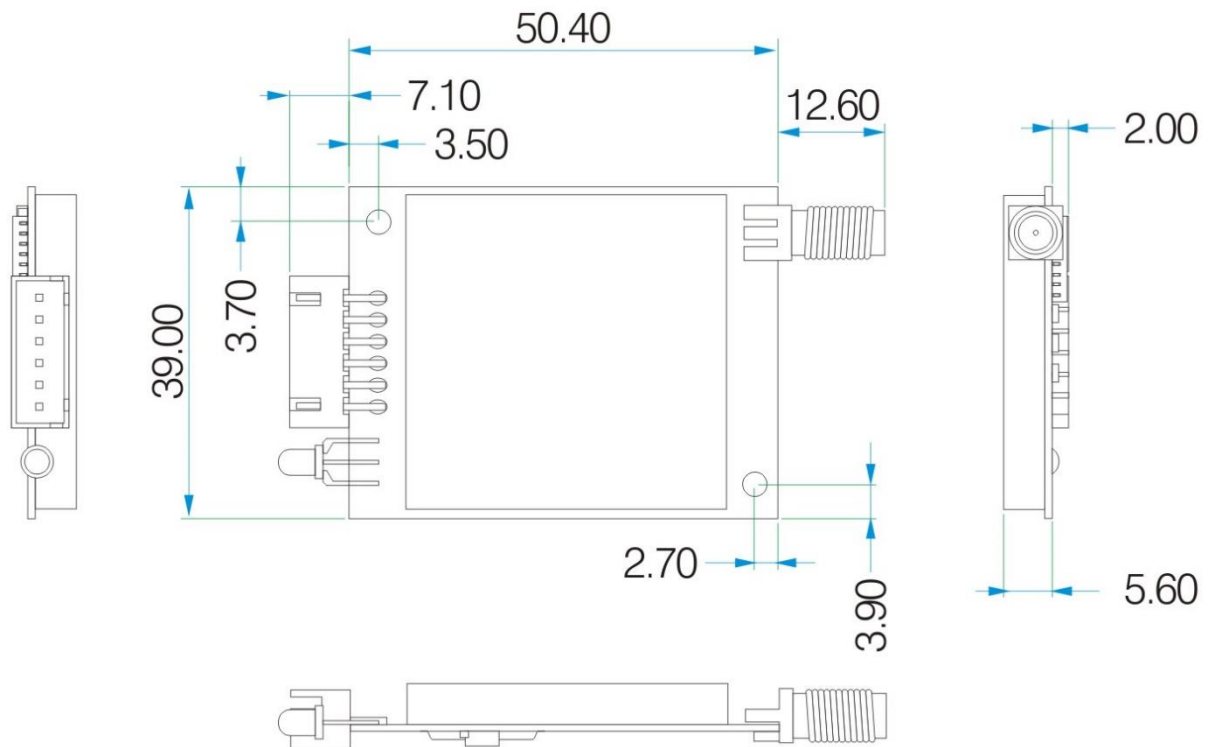
environment before transmitting. If other transmitters are transmitting wireless signals, the actual data will be on hold temporarily until other transmitters stop Emission then it sends the data;

#### 4) Digital Input Port / Sleep mode

The CS pin of the module is by default at “Open” state; the module can be ordered to get either a CS port for sleep state or to be as a Digital Input to trigger and alarm with “Push” functionality. At sleep mode feature, the parameter cannot be set and data transmission is not performed. The module has the lowest power consumption in this state, and the current can reach the uA level.

### 7. Mechanical size (unit: mm)

#### LoRa Module



#### LoRa Module Complete with enclosure

