



NXP5169 Module Specifications Datasheet

Module supports:



Module Part Number:

Module #	Module Name	HT Part Number	remark
#1	Zigbee NXP 5169 Module	HTMD-005	

Role	Name:	Appointment:	Signature:
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Checked by	Nick Qiao	PM – R&D	
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Date:	Classification	Version:	Status:
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Revision History:

Version	Date (dd/mm/yyyy)	Author	Status	Modifications
V0.1	31/07/2018	Li Dan	Draft	Doc creation

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1 Introduction

1.1 Scope

Module #	Module Name	HT P/N	SOC	Standard Supported	Bluetooth Standard Supported	RF Frequency Band	Interface to Host	Module Size
#2	Zigbee NXP5169 Module	HTMD-005	JN5169	Zigbee 3.0		♦ 2.4G (2.4 ~ 2.5 GHz)	UART	25mm (L) x 16mm(W) x 3mm(H)

1.2 Product Features

The JN5169 module provides designers with a ready-made component that provides a fully integrated solution for applications, using the IEEE802.15.4 standard in the 2.4 GHz - 2.5 GHz ISM frequency band, including ZigBee 3.0 and ZigBee PRO stack with Home Automation, Light Link and Smart Energy profiles.

The modules integrate all of the RF components required, removing the need to perform expensive RF design and test. Products can be designed by simply connecting sensors and switches to the module IO pins. The modules use NXP's single chip IEEE802.15.4 wireless microcontroller, allowing designers to make use of the extensive chip development support material. Hence, this range of modules allows designers to bring wireless applications to market in the minimum time with significantly reduced development effort and cost.

The JN5169 module is a range of ultra-low power, high performance surface mount modules targeted at IEEE 802.15.4, ZigBee 3.0 and ZigBee Home Automation, Light Link and Smart Energy networking applications, enabling users to realize products with minimum time to market and at the lowest cost. They remove the need for expensive and lengthy development of custom RF board designs and test suites. The modules use NXP's JN5169 wireless microcontroller to provide a comprehensive solution with large memory, high CPU and radio performance and all RF components included. All that is required to develop and manufacture wireless control or sensing products is to connect a power supply and peripherals such as switches, actuators and sensors, considerably simplifying product development.



Features: modules

2.4 GHz IEEE 802.15.4, ZigBee 3.0 and ZigBee PRO stack with Home Automation, Light Link and Smart Energy compatible

Integrated printed antenna

TX power 14.92dBm

Receiver sensitivity -98 dBm

TX current 27.2 mA at 10 dBm

TX current 23.6 mA at 8.5 dBm

RX current 17.8 mA at maximum input level 10 dBm

RX current 16.2 mA at maximum input level 0 dBm

Features: microcontroller

32-bit RISC CPU; 1 MHz to 32 MHz clock speed

Variable instruction width for high coding efficiency

Multi-stage instruction pipeline

512 kB Flash

32 kB RAM

4 kB EEPROM

Data EEPROM with guaranteed 100 k write operations

2-wire I²C-bus compatible serial interface; can operate as either master or slave

5 PWM (4 timers, 1 timer/counter)

2 low-power sleep counters

2 UARTs

SPI-bus Master and Slave port, 3 selects

Supply voltage monitor with 8 programmable thresholds

6-input 10-bit ADC, comparator

Battery and temperature sensors

Watchdog and Supply Voltage Monitor (SVM)

Up to 20 Digital IO (DIO) pins

Ambient Conditions:

- Operation Temperature: -10°C ~ +120°C
- Storage Temperature: -40°C ~ +85°C
- Operation Humidity: 10 ~ 90% RH
- Storage Humidity: 5 ~ 95% RH

Environmental compliance:

- RoHS compliant
- REACH compliant

Approbation:

- EU/ Russia:
- LATAM:



1.3 Acronyms and abbreviations

BR	Basic Rate
EDR	Enhanced Data Rate
EVM	Error Vector Magnitude
CCK	complementary code keying (CCK),
CE	Conformité Européenne (European Conformity)
DSSS	<i>Direct Sequence Spread Spectrum</i>
EMC	Electromagnetic Compatibility
EMF	Electromagnetic Fields, the acronym used for the issue of exposure of humans to EM-fields and the associated possible adverse health effects
EIRP	Effective Isotropically Radiated Power
ERP	Effective Radiated Power
ETSI	European Telecommunications Standards Institute
HCI	Host Controller Interface
HT	Huitong
HT20	High Throughput 20 MHz bandwidth (802.11n/ac)
HT40	High Throughput 40 MHz bandwidth (802.11n/ac)
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol (IP)
Iperf	Iperf is a commonly used network testing tool that can create Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) data streams and measure the throughput of a network that is carrying them, that was developed by the Distributed Applications Support Team (DAST) at the National Laboratory for Applied Network Research (NLNR)
ISM	Industrial, Scientific, and Medical
VHT80	Very High High Throughput 80 MHz bandwidth (802.11ac)
VHT160	Very High Throughput 160 MHz bandwidth (802.11ac)
LE	Low Energy
MAC	Media Access Control
MCS	Modulation and Coding Scheme
PID	Product ID
VID	Vendor ID
TX	Transmission
RX	Receiver
RSSI	Received Signal Strength Indicator
TSSI	Transmit Signal Strength Indicator
MIMO	Multiple-Input Multiple-Output
WoWLAN	Wake on WLAN
WoBLE	Wake up on BLE
QoS	Quality-of-Service (QoS)
EIRP	Equivalent Isotropically Radiated Power
TCP	Transmission Control Protocol (TCP)
TCP/IP	Internet Protocol Suite: TCP and Internet Protocol (IP)
TPC	Transmit Power Control
ISM	Industrial, Scientific and Medical (2.412GHz~2.484GHz,)
U-NII	Unlicensed National Information Infrastructure
UDP	User Datagram Protocol (UDP) is the set of network protocols used for the



Internet.
VSWR Voltage Standing Wave Ratio
WiFi Wireless Fidelity

1.4 REFERENCES

1. NXP5169_Data_sheetV1.01.pdf



2 Technical Specifications

2.1 Absolute Maximum Ratings:

Stresses beyond these conditions listed below may cause permanent damage to the module.

Parameters	Maximum Rating
Power Supply Voltage at +3V3	(-0.3 ~3.63)V
Input voltage to IO pins	(-0.3 ~3.63)V
Storage Temperature Conditions	-40 °C ~ +85°C.
Storage Humidity conditions	5% to 95% (RH)
ESD (HBM)	1000V

2.2 Recommended Operation Conditions

Parameters	Operation Conditions
Operating Temperature Conditions	(-10 °C ~ +120°C) - No performance reduction up 80°C ambient Temperature - No component failure up to 120°C ambient Temperature.
Operating Humidity conditions	10% to 90% (RH)



2.3 Electrical Specifications

Pre-test conditions:

- 1 Operation Temperature = room temperature 25°C, unless otherwise noted.
- 2 CTQ parameters are marked with *.

Item No.	Parameters	Test Conditions	Specifications/Requirement			
			Min	Typ	Max	Units
3.3.1	Input power	Test board	2.8V	3.3V	3.6V	V
3.3.2	Power	standby				mA
3.3.3	consumption	Active				mA
3.3.4	ESD	EN61000-3-2/3-3: ESD - IEC61000/4/2 : 8kV air - ANATEL 442 : 8kV air discharge Module is mounted into Final product casing at the designed location.	No functional failures and no parts should suffer damage			

2.4 RF Performance

Pre-test conditions:

- 1) TX power is at typical level, measured at antenna feed point.
- 2) Front End Insertion loss (including Balun, impedance mis-match+diplexer):
- 3) Operation Temperature = room temperature 25°C, unless otherwise noted.
- 4) CTQ parameters are marked with *.

2.4.1 Zigbee RF Specifications

Item No.	Parameters	Test Conditions	Specifications/Requirement			
			Min	Typ	Max	Units
2.4.2.1	receiver sensitivity	2405 nominal for 1 % PER, as per 802.15.4		-96		dBm
2.4.2.2		2440 nominal for 1 % PER, as per 802.15.4		-96		dBm
2.4.2.3		2480 nominal for 1 % PER, as per 802.15.4		-96		dBm



2.4.2.4	Power	2405		14.76		dBm
2.4.2.5		2440		14.92		dBm
2.4.2.6		2480		-2.31		dBm

2.5 Quality, Environmental and Reliability

S/N	Electrical Test Requirement	TEST CONDITION	Requirement
2.5.1	Dry heat Test	Temp. : +70°C Test time : 96 hrs	4 days
2.5.2	Low Temperature storage	Temp. : -25°C Test time : 96 hrs	4 days
2.5.3	Temperature Shock	Temp. : -20°C ~ +85°C, Duration : 30 min Ramp-up & Ramp-down for 5 min, Cycle : 1,000cycle.	35 days
2.5.4	Humidity Load Test	Leave samples in 40°C±5°C, 90 ~ 95% RH for 21days, and in standard test condition for 30 minutes	21 days
2.5.5	Vibration test	10-55-10Hz / amplitude 0.35mm / sweep rate 1 octave per min.	1 day
2.5.6	Cold Test	Operational/start up after min 4hrs at -10°C	1 day
2.5.7	Damp heat cyclic	Humidity 93%RH, 6h:temp from 25 °C to 40 °C, 6hrs temp 40 °C to 25 °C, 6hrs at 25 °C, operational last hour only for 21 days.	21 days
2.5.8	Temperature step stress test	Operational up to a temperature of 60 °C for 16 days	16 days
2.5.9	Operation Life(MTBF)	Temp. : 60°C, 90% RH, MTBF 50,000 hrs	10 days

3.6 EMC Compliance and Certifications



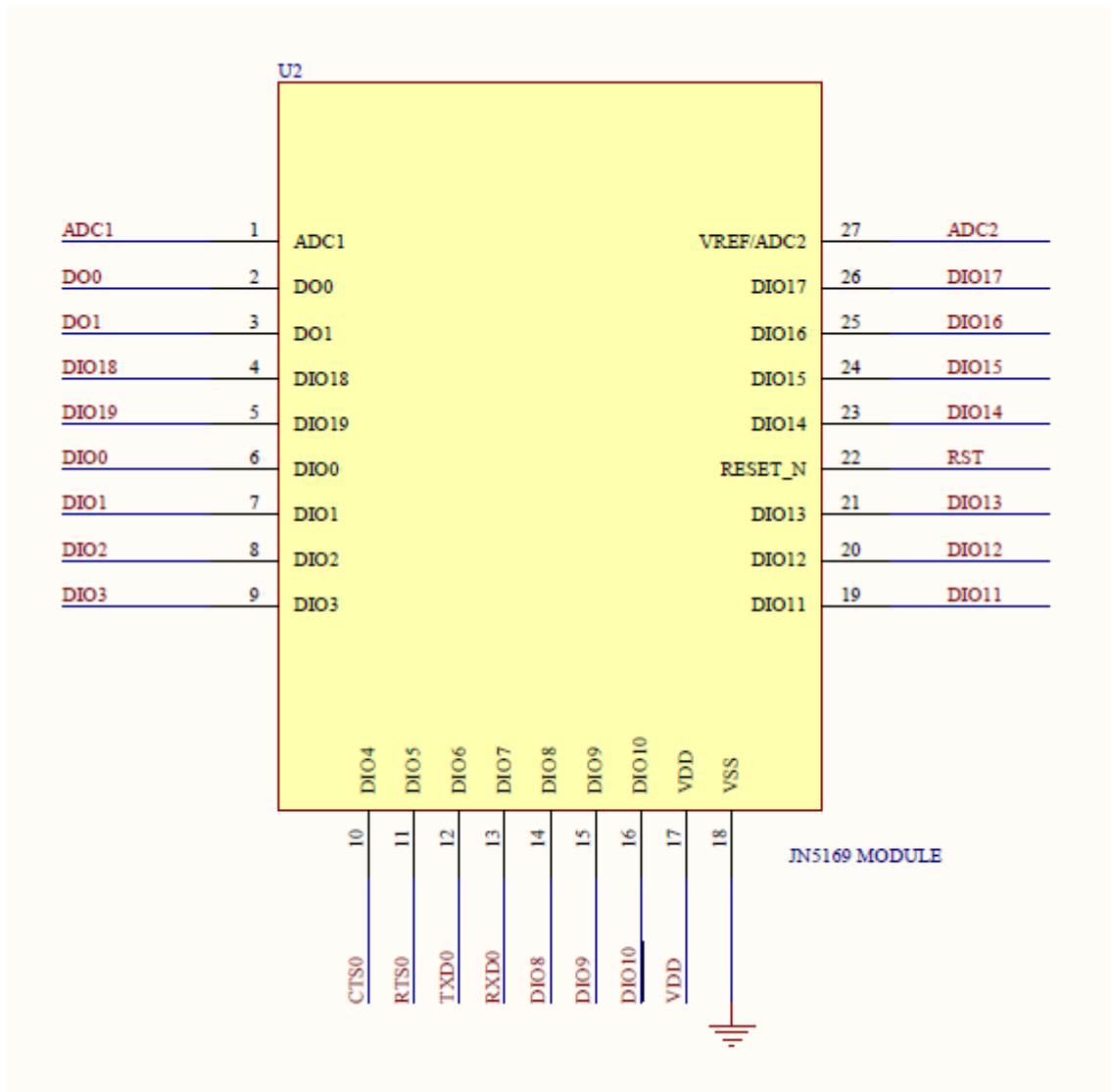
Region	Regulation Standards	Requirement
EU/RU		Fulfill CE with official test report at module level to meet the latest EMC requirement
LATAM:		Fulfill approbation requirements, with official test report at Module level

2.7 Environment Compliance

- RoHS compliant
- REACH compliant

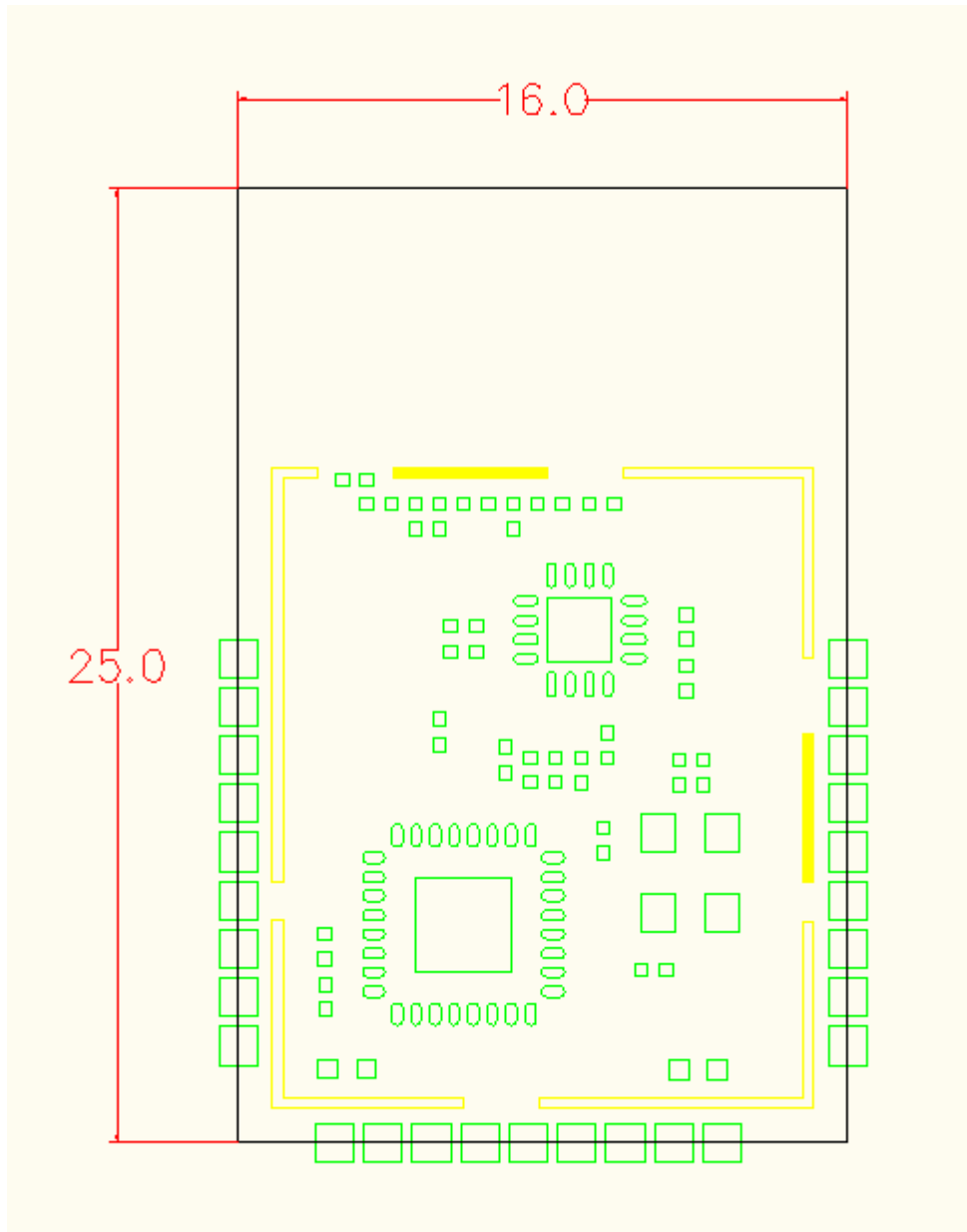
3 Mechanical Drawing

3.1 Pin define

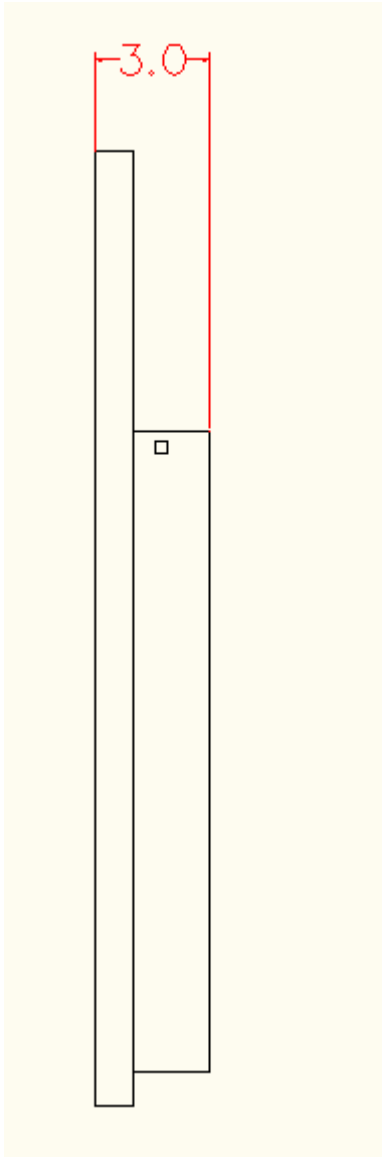


3.2 Mechanical Outline and dimensions

Dimension (TOP View)



Dimension (Side View)



Dimension (Bottom View)

3.3 Actual Module image



4 Software



4.1 MAC Address and Product ID:

Before module is shipped out of Huitong, the following addresses must be flashed into EEPROM and with clear marking on the product:

:
No define for current version

5 Key Components

5.1 SOC Chipset

P/N 151727-20
FREQUENCY BAND : 2405 MHz-2480 MHz
MECHANICAL CONFIGURATION: (see next page)



6 Marking Information

The sticker on the module contents the following info:

- Type and Version number (on Bottom side, tbc)
- Serial number (on Bottom side, tbc)
- Manufacturing date (on Bottom side, tbc)
- WiFi MAC address (on Bottom side, tbc)
- BT MAC address (on Bottom side, tbc)

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 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:

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

equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

FCC Label Instructions:

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 Transmitter Module

FCC ID: PUW-HTMD005A or Contains FCC ID: PUW-HTMD005A " , Any similar wording that expresses the same meaning may be used.