Specifications Datasheet

Module supports:

Module Part Number:

Module #	Module Name	HT Part Number	remark
#1	NXP5169LIGHT MODULE	HTMD-004B	

Role	Name:	Appointment:	Signature:
Author	Li Dan	Design Engineer	
Checked by	Nick Qiao	PM – R&D	
Approved by	Yin Zhi Lin	CTO	
Date:	**Classification**	**Version:**	**Status:**
<31 July 2018>	Confidential	<V0.1>	<Draft>

Revision History:

Version	Date (dd/mm/yyyy)	Author	Status	Modifications
V0.1	31/07/2018	Li Dan	Draft	Doc creation
V0.2	22/08/2018	Li Dan	Draft	Add 5169 module
V0.3	7/9/2018	Li Dan	Draft	Add parameter

1 Introduction

1.1 Scope

Module #	Module Name	HT P/N	SOC	Standard Supported	RF Frequency Band	Interface to Host	Module Size
#1	NXP5169LIGHT MODULE	HTMD-004B	JN5169	Zigbee 3.0	◆ 2.4G (2.4 ~ 2.5 GHz)	UART	22mm x 15mm(W) x 3mm(H) (L)

1.2 Product Features

1) Embedded 32-bit high performance MCU with clock up to 48MHz.
2) Program memory: internal 512KB Flash.
3) Data memory: 32KB on-chip SRAM.
4) 32MHz Crystal
5) A rich set of I/Os:
   - ✧ Up to 36/21 GPIOs depending on package option;
   - ✧ DMIC (Digital Mic);
   - ✧ AMIC (Analog Mic);
   - ✧ Mono-channel Audio output;
   - ✧ SPI;
   - ✧ I2C;
   - ✧ UART with hardware flow control;
   - ✧ USB;
   - ✧ Debug Interface.
6) Up to 6 channels of PWM, 2-channel IR.
7) Sensor:
   - ✧ 14bit ADC with PGA;
   - ✧ Temperature sensor.

8) One quadrature decoder.

9) Embedded hardware AES.

10) Operating temperature:

- ✧ ET versions: -40℃~+85℃ temperature range;
- ✧ AT versions: -40℃~+125℃ temperature range.

RF features include:

1) Rx Sensitivity: -97dBm@ IEEE802.15.4 250Kbps,
2) TX output power:11dBm
3) Single-pin antenna interface
4) RSSI monitoring.

Features of power management module include:

1) Embedded LDO.
2) Battery monitor: Supports low battery detection.
3) Power supply: 1.9V~3.6V.
4) Multiple stage power management to minimize power consumption.
5) Low power consumption:

- ✧ Receiver mode current: 12mA
- ✧ Transmitter mode current: 15mA @0dBm power, 22mA @max power
- ✧ Suspend mode current: 10uA (IO wakeup), 12uA (Timer wakeup)
- ✧ Deep sleep mode current: 1.7uA

Zigbee RF4CE features include:

1) Based on IEEE 802.15.4 Standard, certified RF4CE platform, with ZRC1.1/ZRC2.0 and MSO profile support;
2) Various transmission options including broadcast;
3) Provides a secured key generation mechanism;
4) Supports a simple pairing mechanism for devices with full application confirmation;
5) Only authorized devices are able to communicate;

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6) Various power saving modes are supported for all device classes;
7) Supports AES-128bit encryption;
8) Extensible to vendor specific profiles;
9) Telink extended profile with audio support for voice command based searches;
10) Over the air (OTA) firmware upgrade with hardware support.

Ambient Conditions:

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

Environmental compliance:

- RoHS compliant
- REACH compliant

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 ℃ ~ +85℃.
Storage Humidity conditions	5% to 95% (RH)
ESD (HBM)	1000V

2.2 Recommended Operation Conditions

Parameters	Operation Conditions
Operating Temperature Conditions	(–10 ℃ ~ +120℃) - 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
2.3.1	Input power	Test board	2.8V	3.3V	3.6V	V
2.3.2	Power consumption	standby				mA
2.3.3		Active				mA
2.3.4	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

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		-97		dBm

2.4.2.2		2440 nominal for 1 % PER, as per 802.15.4		-97		dBm
2.4.2.3		2480 nominal for 1 % PER, as per 802.15.4		-97		dBm
2.4.2.4	Power	2405		10.70		dBm
2.4.2.5		2440		10.03		dBm
2.4.2.6		2480		-7.62		dBm

2.5 Quality, Environmental and Reliability

S/N	Electrical Test Requirement	TEST CONDITION	Requirement
2.5.1	Dry heat Test	Temp. : +70℃ Test time : 96 hrs	4 days
2.5.2	Low Temperature storage	Temp. : -25℃ Test time : 96 hrs	4 days
2.5.3	Temperature Shock	Temp. : -20℃ ~ +85℃, 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℃±5℃, 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℃	1 day
2.5.7	Damp heat cyclic	Humidity 93%RH, 6h:temp from 25 ℃ to 40 ℃, 6hrs temp 40 ℃ to 25 ℃, 6hrs at 25 ℃, operational last hour only for 21 days.	21 days
2.5.8	Temperature step stress test	Operational up to a temperature of 60 ℃ for 16 days	16 days

2.5.9	Operation Life(MTBF)	Temp. : 60℃, 90% RH, MTBF 50,000 hrs	10 days

2.6 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

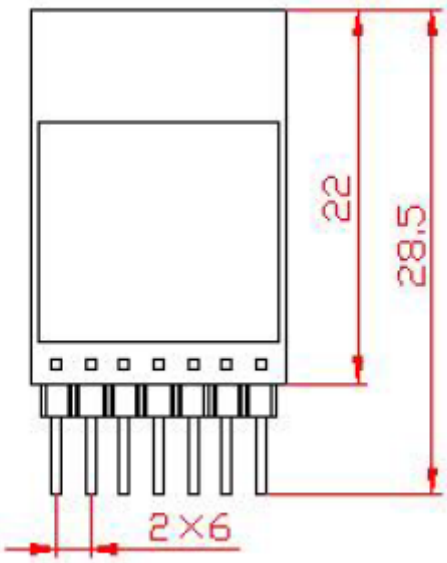
2.7 Environment Compliance

- RoHS compliant
- REACH compliant

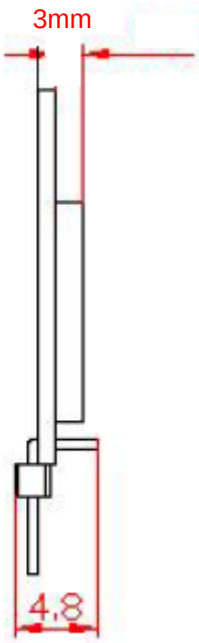
3 Mechanical Drawing

3.1 Mechanical Outline and dimensions

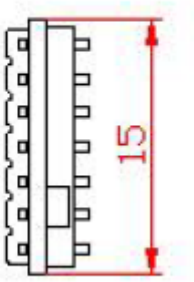
Dimension (TOP View)



Dimension (Side View)



Dimension (Bottom View)



3.2 Actual Module image

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-HTMD004B or Contains FCC ID: PUW-HTMD004B " , Any similar wording that expresses the same meaning may be used.