LITEON®

NB-IoT Module
WNB301H

Compact-sized Multi-band
NB-IoT Module
With Ultra-low Power Consumption

- NB-IoT Support
- B1, B3, B5, B8, B20, B28
- AT Commands
- Extended Temperature Range: -40°C to +85°C
- Ultra-Low Power Consumption

Advanced Solutions

WNB301H is high performance NB-IoT module with extremely low power consumption for long battery life up to 10 years. The ultra-low power design is applied at system level, in the different 3GPP modes of operation.

WNB301H supports various interfaces such as UART, I2C, SPI* and so on. The module provides customer high flexibility for different kind of applications.

Due to the compact form factor, ultra-low power consumption and good performance, WNB301H is the best choice to be embedded to the design or solution for SmartX applications, ex. smart cities, smart metering and grid, security and asset tracking, environmental monitoring and control, health care monitoring, etc.

1.1. General Description

WNB301H is equipped with 42-pin 1.25mm pitch Stamp Pad of LCC package for PCB SMT mounting. The following chapters provide detailed descriptions of these pins:

- Power supply
- Reset interface
- UART interfaces
- USIM interface
- ADC interface
- I2C interface*
- Network status indication*
- RF interface
- GPIO / SPI Interface*

1.2. Pin Assignment

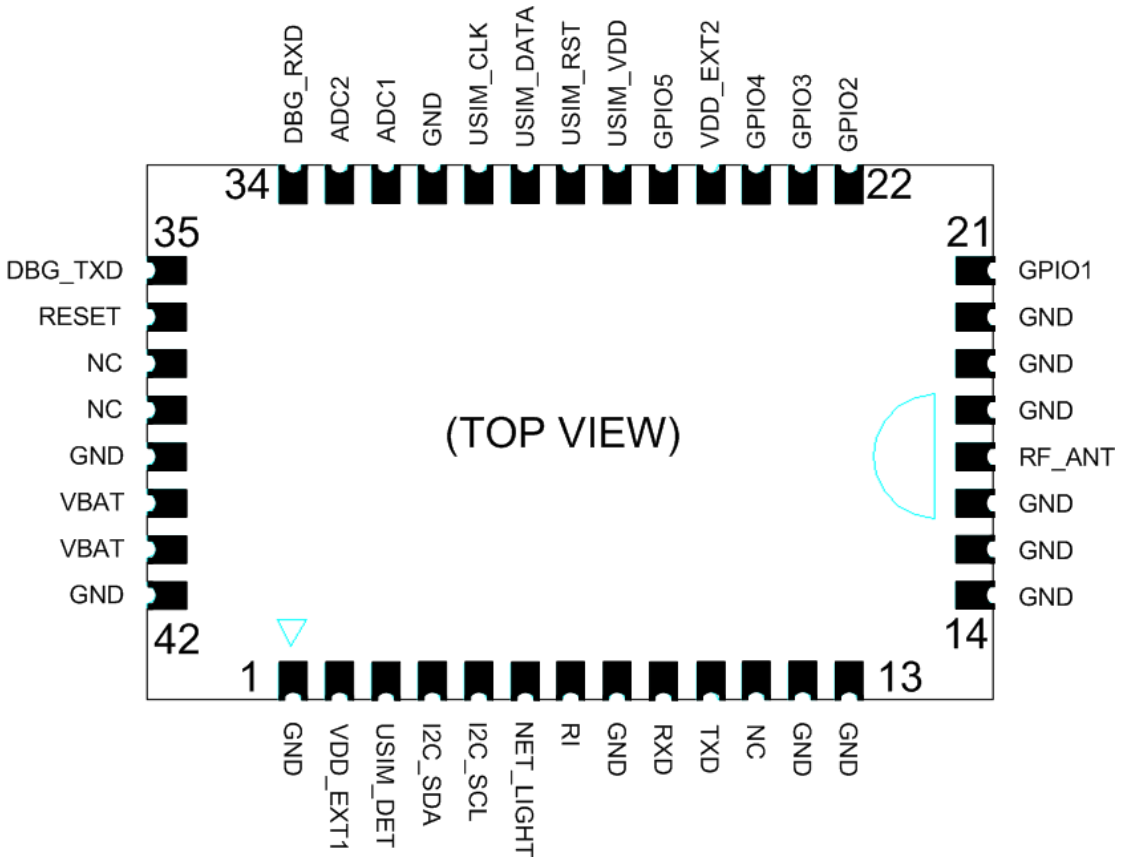


Figure.1 Pin Assignment

1.3. Pin Description

The following tables show the pin definition and description of WNB301H.

Table 1: I/O Parameters Definition

Type	Description
IO	Bidirectional
DI	Digital Input
DO	Digital Output
PI	Power Input
PO	Power Output
AI	Analog Input
AIO	Analog Input / Output
GND	Ground

Table 2: Reference Power domain of digital Pins

Pin Name	Pin No.	Power Domain
RESET	36	VDD_EXT1
RXD	9	
TXD	10	
RI*	7	
DBG_RXD	34	
DBG_TXD	35	
I2C_SDA	4	
I2C_SCL	5	
NET_LIGHT	6	
GPIO1	21	VDD_EXT2
GPIO2 / SPI_CS*	22	
GPIO3 / SPI_MOSI*	23	
GPIO4 / SPI_CLK*	24	
GPIO5 / SPI_MISO*	26	

Table 3: Pin Description

Power Supply				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
VBAT	40, 41	PI	Power supply, Voltage range: 3.1～4.2V Typ.: 3.6V	
VDD_EXT1	2	PO	Reference voltage for external circuit. VDD_EXT1= default 1.8V Io MAX.=10mA	If unused, keep this pin open. Recommend to add a 4.7uF bypass capacitor when using this pin. The VDD would be off as working at PSM mode
VDD_EXT2	25	PO	Reference voltage for external circuit. VDD_EXT2= default 3.0V Io MAX.=3mA	If unused, keep this pin open. Recommend to add a 4.7uF bypass capacitor when using this pin. The VDD would be off as working at PSM mode .
GND	1, 8, 12~16, 18~20, 31, 39, 42	G	Ground	
Reset Interface				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
RESET	36	DI	Reset the module	Recommend to add a 47k ohm Pull-High resistor to VDD_EXT1
UART Interface				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
RXD	9	DI	Receive data	1.8V power domain (Please contact LITE-ON for optional TTL

				voltage domain)
TXD	10	DO	Transmit data	1.8V power domain (Please contact LITE-ON for optional TTL voltage domain)
RI	7	DO	Ring indicator	If unused, keep this pin open
DBG_RXD	34	DI	Receive data	If unused, keep this pin open
DBG_TXD	35	DO	Transmit data	If unused, keep this pin open
(U)SIM Interface				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
USIM_VDD	27	PO	Power output for USIM card. Both 1.8V and 3V SIM Card is support. Output Voltage depends on SIM card types automatically switch.	1. All lines of USIM interface should be protected with ESD component. 2. It's recommended to add 20k ohm resistor between USIM_DATA and USIM_VDD
USIM_RST	28	DO	USIM card reset	
USIM_DATA	29	IO	USIM Card data I/O with Internal pulled up	
USIM_CLK	30	DO	USIM card clock	
USIM_DET*	3	DI	USIM card detecting input	
ADC Interface				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
ADC1	32	AI	ADC input voltage range: 0~4V and ADC input voltage < VBAT	If unused, keep this pin open.
ADC2	33	AI	ADC input voltage range: 0~4V and ADC input voltage < VBAT	If unused, keep this pin open.
Ring Indicator(RI)*				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
RI*	7	DO	Ring Indicator	If unused, keep this pin open.

I2C Interface				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
I2C_SDA	4	IO	I2C data input/output	If unused, keep them open, or else pull them up via resistors to the VDD_EXT1. (Please check with LITE-ON about the sensors support list)
I2C_SCL	5	DO	I2C clock output	
Network status indication*				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
NET_LIGHT*	6	DO	LED control output as network status indication.	If unused, keep this pin open.
RF Interface				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
RF_ANT	17	AIO	RF Antenna PAD	Layout the 50ohm RF trace to Antenna as short as possible.
GPIO / SPI interface*				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
GPIO1	21	DO	Default: GPIO Optional: STATUS	GPIO Default Voltage domain: 3.0V (Please contact LITE-ON for optional TTL voltage domain) If unused, keep these pins open.
GPIO2 / SPI_CS*	22	DO	Default: GPIO Optional: SPI_CS*	
GPIO3 / SPI_MOSI*	23	DO	Default: GPIO Optional: SPI_MOSI*	
GPIO4 / SPI_CLK*	24	DO	Default: GPIO Optional: SPI_CLK*	
GPIO5 / SPI_MISO*	26	DO/DI	Default: GPIO Optional: SPI_MISO*	
NC Pin				
Pin Name	**Pin No.**	**I/O**	**Description**	**Comment**
NC	11		No Connection	Keep them open
NC	37			
NC	38			

"*" means under development.

1.4. Mechanical Information

The following figure shows the package outline drawing of WNB301H.

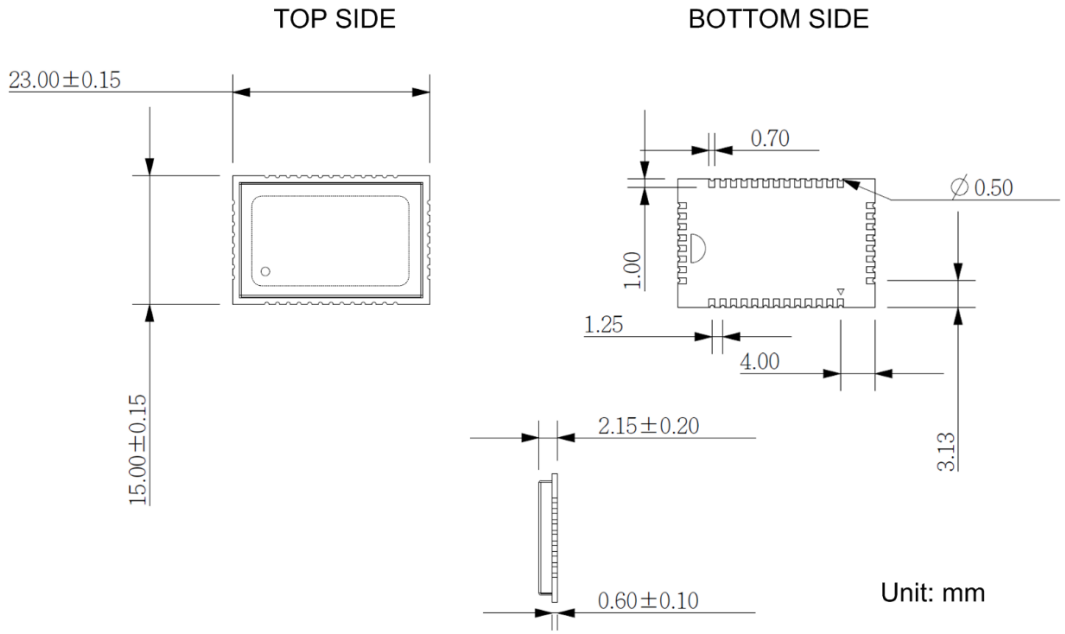
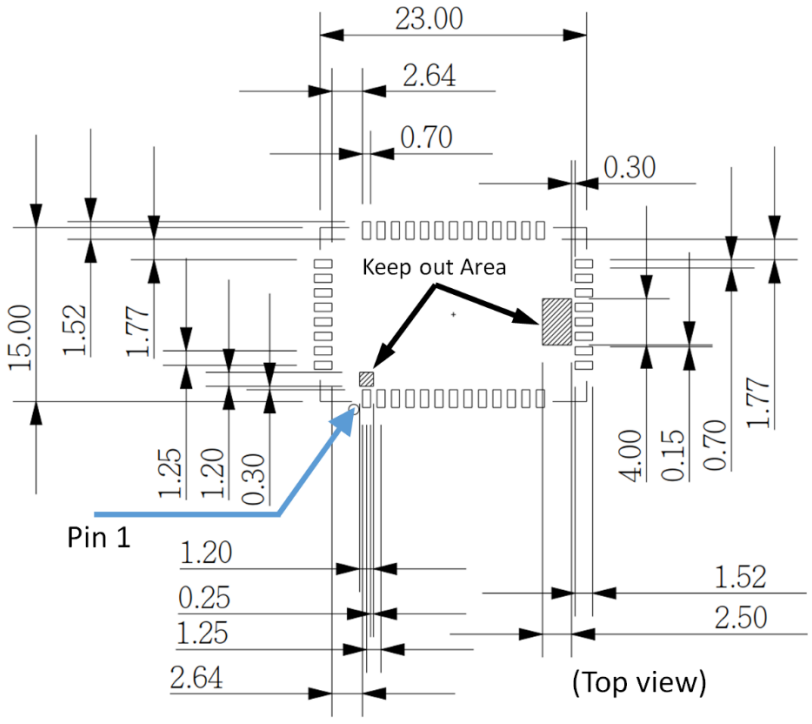


Figure.2 Dimensions

1.5. Recommended Land-pattern

The following figure shows the recommended land-pattern of WNB301H



WNB301H *Under development or planning

■ General Features

- Support 3GPP Rel14 NB-IoT air interfaces and protocols
- Support Band: B1, B3, B5, B8, B20, B28
- Output power: 23 dBm±2dB@ Class 3
- Sensitivity: -129 dBm±1dB
- Control Via AT Commands
- Temperature range: -40°C to +85°C
- Supply voltage: 3.1V to 4.2V, Typ.:3.6V
- Power consumption: 3.0uA@PSM /1.7mA @ Idle Mode, DRX=1.28s

■ Other Features

- Support firmware update via UART and FOTA
- Support DRX/eDRX/PSM in the different 3GPP modes of operation
- Integrated power management unit for direct-from-battery operation

■ Interface

UART | I2C | SPI* | USIM with 1.8V/3V operation | ADC | GPIO

■ Protocol Stacks

IPv4 | IPv6 | NON-IP | UDP | TCP | CoAP | DTLS | LWM2M

■ Cloud Platform

- OceanConnect
- Tianyi platform
- OneNET
- The other international cloud platforms which support OMA LWM2M protocol (Please contact with LITE-ON for details)

■ Certifications

CE* | FCC* | CCC | CTA* | GCF* | RoHS Compliant

■ Package

- Low profile and Compact Form Factor: 23.0 x 15.0 x 2.2 mm
- Weight: 1.45g
- 42 Pin Stamp Pad of LCC package

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