LN882H-CBU Module Specification

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LN882H-CBU is a low-power embedded Wi-Fi module. It consists of a highly integrated wireless RF chip LN882H and a few peripheral components, supporting both AP and STA dual-role connections, as well as low-power Bluetooth connectivity.

1 Product Overview

LN882H-CBU features an 32-bit MCU with an internal operating frequency up to 160 MHz, along with 128 KB ROM and 296 KB RAM. The MCU is specifically designed with signal processing extension instructions, enabling efficient audio encoding and decoding. It offers a rich array of peripherals, including PWM,UART, and SPI. Up to five 32-bit PWM outputs make the chip highly suitable for high-quality LED control.

1.1 Characteristic

- Built-in low-power 32-bit CPU that also serves as an application processor
- The clock frequency supports 160 MHz
- Operating voltage:3.0V~3.6V
- Peripherals:5×PWM, 2×UART, 1×SPI
- Wi-Fi Connectivity
  - 802.11 b/g/n
  - Channel 1-14@2.4GHz
  - Supports WEP, WPA/WPA2, WPA/WPA2 PSK (AES), and WPA3 security modes
  - Maximum output power of +18 dBm under the 802.11b mode
  - Supports STA/AP/STA+AP operating modes
  - Supports both SmartCon and AP distribution network configurations(including Android and iOS devices)
  - Board-mounted PCB antenna
  - Operating temperature: -40°C to 105°C
- Bluetooth Connectivity
  - Bluetooth mode supports a transmission power of 1 dBm
  - Complete Bluetooth coexistence interface
  - Board-mounted PCB antenna

1.2 Application Area

- Smart Building
- Smart Home/Home Appliances
- Smart socket, smart light
- Industrial Wireless Control
- Infant surveillance camera

- web camera
- Intelligent Public Transport

1.3 Update Note

Date updated	Update Content	Updated version
2024-05-14	New document	V1.0.0

2 Module Interface

2.1 Dimension Packaging

LN882H-CBU dimensions: 15.8±0.35mm (W) × 20.3±0.35mm (L) × 2.5±0.15mm (H).The dimensions are shown below:

Top View

2.2 Pin Definition

Pin number	Symbol	IO Type	Function
1	GPIOA5	I/O	The regular GPIO can be reused as SPI_SCK(corresponding to Pin 13 of the IC)
2	GPIOA6	I/O	The regular GPIO can be reused as SPI_MOSI(corresponding to Pin 14 of the IC)
3	GPIOA4	I/O	Ordinary GPIO (corresponding to IC's Pin 12)
4	GPIOA1	I/O	Ordinary GPIO (corresponding to IC's Pin 9)
5	GPIOA0	I/O	ADC port,corresponding to IC's GPIOA0 (corresponding to IC' s Pin 8)
6	GPIOB8	I/O	UART_RX1,corresponds to IC's GPIOB8 (corresponds to IC' s Pin 29)
7	GPIOB9	I/O	UART_TX1,print log port,corresponding to IC's GPIOB9 (corresponding to IC' s Pin 30)
8	GPIOA7	I/O	Supports hardware PWM(corresponding to IC's Pin 15)
9	GPIOA10	I/O	Supports hardware PWM(corresponding to IC's Pin 21)
10	GPIOA11	I/O	Supports hardware PWM(corresponding to IC's Pin 22)
11	GPIOA12	I/O	Supports hardware PWM(corresponding to IC's Pin 23)
12	GPIOB3	I/O	Supports hardware PWM(corresponding to IC's Pin 24)
13	GND	P	Power supply location

Pin number	Symbol	IO Type	Function
14	3.3V	P	Power supply 3V3
15	GPIOA2	I/O	UART_TX0, the user data transmission port, corresponds to GPIOA2 of IC(corresponding to Pin 10 of IC)
16	GPIOA3	I/O	UART_RX0, user data reception port, corresponding to GPIOA3 of IC(corresponding to Pin 11 of IC)
17	GPIOB4	I/O	Ordinary GPIO,can be reused as ADC2 (corresponding to IC's Pin 24)
18	EN	I/O	Reduction foot: effective at low voltage, with internal pull-up handling, compatible with other module designs for integration
19	GPIOB5	I/O	Ordinary GPIO (corresponding to IC's Pin 26)
20	GPIOB6	I/O	The regular GPIO can be reused as SPI_MISO(corresponding to Pin 27 of the IC)
21	GPIOB7	I/O	The regular GPIO can be reused as SPI_CS(corresponding to Pin 28 of IC)
Top surface measurement point	GPIOA9	I/O	Mode selection pin: pull low before power-up to enter programming mode (corresponding to IC's Pin 17)

> **Note**:P represents the power pin, and I/O represents the input/output pins.

3 Electrical Parameters

3.1 Absolute Electrical Parameters

Parameter	Description	Least value	Crest value	Unit
Ts	Storage Temperature	-55	125	℃
VBAT	Service voltage	-0.3	3.9	V
Electrostatic release voltage (human model)	TAMB-25℃	-4	4	kV
Electrostatic release voltage (machine model)	TAMB-25℃	-200	200	V

3.2 Normal Running Conditions

Parameter	Description	Least value	Representative value	Crest value	Unit
Ta	Working temper	-40	-	105	℃
VBAT	Service voltage	3	3.3	3.6	V
VOL	IO low-level output	VSS	-	VSS+0.3	V
VOH	IO High-level output	VBAT-0.3	-	VBAT	V
Imax	IO drive current-		6	20	mA

3.3 Radio frequency power consumption

Operative mode	Pattern	Speed	Transmission Power	Average Rate/ Reception Value	Peak (typical value)	Unit
Launch	11b	11Mbps	+18dBm	297	375	mA
Launch	11g	54Mbps	+18dBm	242	355	mA
Launch	11n	MCS7	+18dBm	236	353	mA

Operative mode	Pattern	Speed	Transmit power/ receiving power	Average value	Peak (typical value)	Unit
Receive	11b	11Mbps	Continuous Reception	78	90	mA
Receive	11g	54Mbps	Continuous Reception	78	90	mA
Receive	11n	MCS7	Continuous Reception	78	90	mA

3.4 Working Current

Work pattern	Working state,Ta=25°C	Average value	Maximum value (typical value)	Unit
Quick connection network status (Bluetooth network configuration)	The module is in Quick Connect mode Network status: The Wi-Fi indicator light flashes.	88	288	mA
Fast-link distribution network status (AP distribution network)	The module is in a hot spot distribution network state, and the Wi-Fi indicator light is flashing slowly.	105	370	mA
Fast-link distribution network status (EZ distribution network)	The module is in Quick Connect mode Network status: The Wi-Fi indicator light flashes.	92	354	mA
Network connection status	The module is in networked operation mode, and the Wi-Fi indicator light is always on.	93	222	mA
Poor network connection status	The module and hotspot are located at Poor network connection status Wi-Fi indicator light remains on	100	373	mA
Network connection status	The module is operating offline. The Wi-Fi indicator light remains off.	96	388	mA

4 Radio Frequency Parameters

4.1 Basic Radio Frequency Characteristics

Parameter Item	Define
Service frequency	2.412~2.462 GHz
Wi-Fi standard	IEEE 802.11b/g/n (Channels 1–14)
Data transmission rate	11b：1、2、5.5、11 (Mbps)；
	11g：6、9、12、18、24、36、48、54(Mbps);
	11n：HT20 MCS0~7;
Antenna type	PCB antenna gain 0 dBi

4.2 Wi-Fi Transmission Performance

Parameter Item	Least value	Representative value	Crest value	Unit
RF average output power Rate, 802.11b CCK Mode 11 M	–	18	–	dBm
RF average output power, 802.11g OFDM Mode 54M	–	18	–	dBm
RF average output power Rate,802.11n OFDM Mode MCS7(HT20)	–	18	–	dBm
Frequency error	-20	–	20	ppm

4.3 Wi-Fi Reception Performance

Parameter Item	Least value	Representative value	Crest value	Unit
PER<8%, RX se-nsitivity,802. 11b DSSS Mode 11M	–	-88	–	dBm
PER<10%, RX sensitivity,802.11 g OFDM Mode 54M	–	-74	–	dBm
PER <10%, RX sensitivity 802.11n OFDM Mode MCS7(HT20)	–	-72	–	dBm
PER<10%, RX sensitivity,Blood 1M	–	-90	–	dBm

4.4 Bluetooth Transmission Performance

Parameter Item	Least value	Representative value	Crest value	Unit
Service frequency	2402	–	2480	MHz
Air Speed	–	1	–	Mbps
Transmitting power	-20	1	20	dBm
Frequency error	-150	–	150	KHz

4.5 Bluetooth Reception Performance

Parameter Item	Least value	Representative value	Crest value	Unit
RX sensitivity	_	-90	_	dBm
Maximum RF signal input	-10	_	_	dBm
Intermodulation	_	_	-23	dBm
Common Channel Suppression Ratio	_	10	_	dB

5 Antenna Information

5.1 Antenna Type

The LN882H-CBU antenna is an onboard PCB antenna.

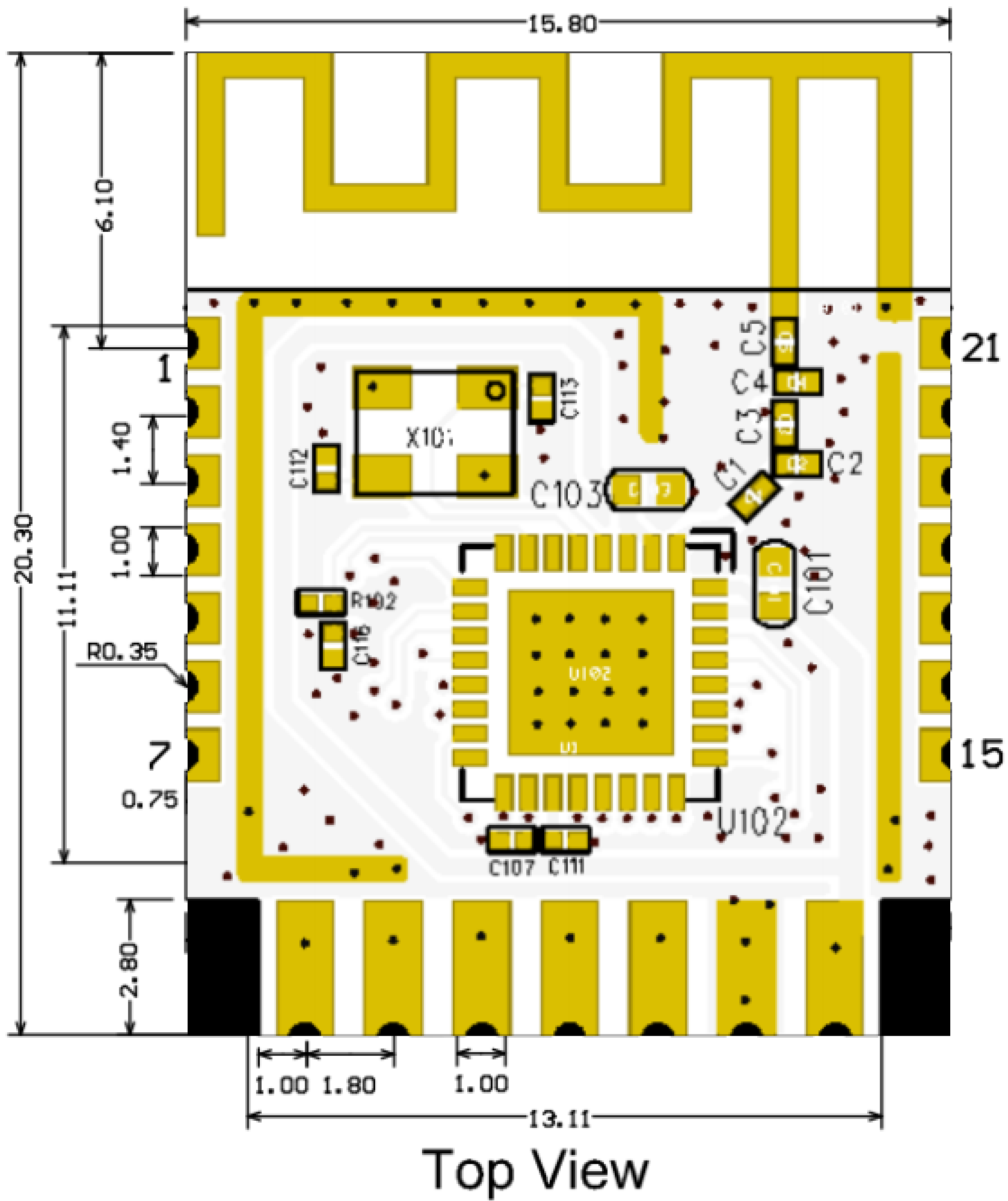
5.2 Reduce Antenna Interference

When using a PCB board-mounted antenna on the Wi-Fi module, to ensure optimal Wi-Fi performance, it is recommended that the distance between the module antenna section and other metal components be at least 15 mm. Do not trace or even copper-clad the user's PCB board in the antenna area to avoid affecting antenna performance.

6 Packaging Information and Production Guidelines

6.1 Mechanical Dimension

LN882H-CBU PCB dimensions:15.8±0.35 mm (W) × 20.3±0.35 mm (L) × 1.0±0.1 mm (H).



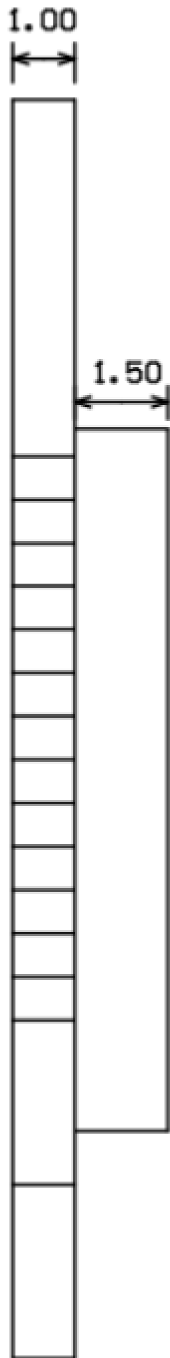
21 B7 B6 B5 EN B4 A3 15 A2

A5 1 A6 A4 A1 A0 B8 B9 7 A9

3.3V GND B3 A12 A11 A10 A07

14 8

Bottom View



Side View

6.2 LN882H-CBU **Recommended Package**

Recommended footprint

15.80
20.30
6.10
8.34
1
15
8
1.40
1.00
2.00
2.80
1.50
3.20
1.50
4.65
1.00 1.80
1.00

6.3 Production Guide

1. The factory-produced surface-mount and plug-in packaged modules adopt assembly methods selected according to the customer's substrate design specifications. Substrate designs intended for surface-mount packaging are manufactured using the SMT surface-mount process, while those designed for plug-in packaging are produced via the wave soldering process. Upon unpacking, module products should undergo soldering within 24 hours; otherwise, they must be stored in a desiccator with humidity not exceeding 10</sp_3 <%4>%, RH, or re-vacuum-packed with recorded exposure time, ensuring total exposure duration does not exceed 168 hours.

   - (SMT process) Instruments or equipment required for SMT mounting:
     - chip shooter
     - SPI
     - reflow soldering
     - Furnace Temperature Tester
     - AOI
   - (Bump welding process) Instruments or equipment required for bump welding:
     - Wave soldering equipment
     - Wave soldering fixture
     - Thermostatic soldering iron
     - Tin bars, tin wires, flux
     - Furnace Temperature Tester
   - Instruments or equipment required for baking:
     - Cabinet oven
     - Anti-static, high-temperature resistant pallet
     - Anti-static, high-temperature resistant gloves

2. The storage conditions for the factory-produced modules are as follows:

   - The moisture-proof bag must be stored in an environment with temperature <40°C and humidity <90%RH.
   - For dried packaged products, the shelf life is 12 months from the date of packaging seal.

3. Modules leaving the factory should be baked if they are at risk of moisture exposure.

- The vacuum packaging bag was found damaged before opening.
- Upon opening, no humidity indicator card was found inside the packaging bag.
- After opening the package, if the humidity indicator card reads 10% or higher, the color ring turns pink.
- The total exposure time after unsealing exceeds 168 hours
- More than 12 months have passed since the first sealed packaging date

4. The baking parameters are as follows:

- Baking temperature: Roll packaging 60°C, humidity ≤ 5%RH; Tray packaging 125°C, humidity ≤ 5%RH(High-temperature resistant trays are not used for plastic-informed boxes).
- Baking time:48 hours for roll packaging;12 hours for tray packaging
- Alarming temperature setting: reel packaging 65°C; pallet packaging 135°C
- After cooling to below 36°C under natural conditions, production can begin.
- If the exposure time after baking exceeds 168 hours, bake again if not fully used.
- If the exposure time exceeds 168 hours without baking, it is not recommended to use reflow or wave soldering processes for this batch of modules. Since the modules contain Grade 3 humidity-sensitive components that may become damp after exceeding the permitted exposure time, high-temperature soldering could lead to component failure or poor solder joints.

5. During the entire production process, please provide electrostatic discharge (ESD) protection for the modules.

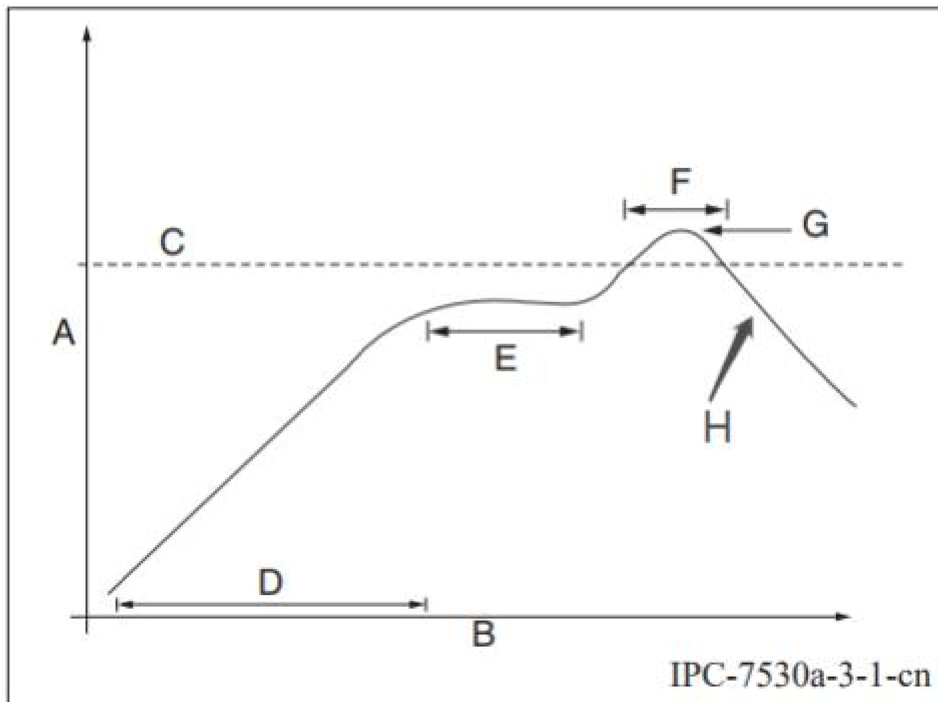
6. To ensure the product pass rate, it is recommended to use SPI and AOI testing equipment to monitor the quality of solder paste printing and mounting.

6.4 Recommended Furnace Temperature Curve

Select the appropriate welding method based on the process requirements: refer to the recommended reflow soldering furnace temperature curve for SMT, and the recommended wave soldering furnace temperature curve for wave soldering processes. There may be a discrepancy between the set furnace temperature and the actual measured temperature; all temperatures presented in this document are measured values.

Method 1:SMT process (Recommended furnace temperature curve for SMT reflow soldering)

Set the furnace temperature according to the reflow soldering furnace temperature curve requirements. The reflow soldering temperature curve is shown in the figure below:

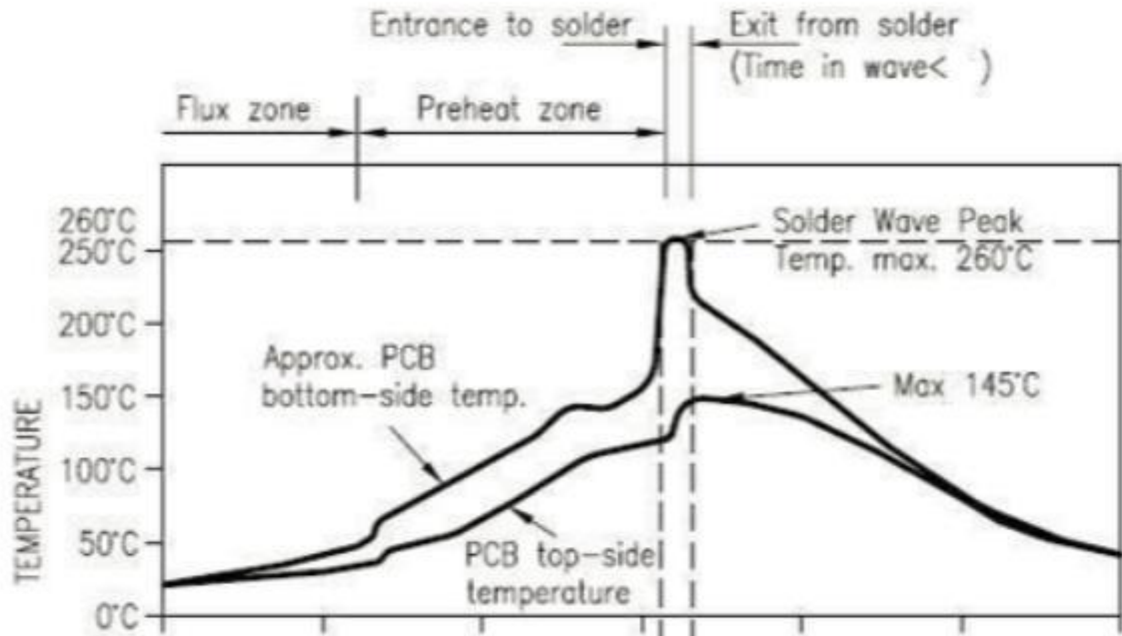


- A: Temperature axis
- B: Time Axis
- C: The liquidus temperature range of the alloy is 217-220°C
- D: The temperature rise slope is 1-3°C/S
- E: The holding time is 60-120 seconds; the holding temperature range is 150-200°C
- F: The time above the liquid phase line is 50-70 seconds
- G: The peak temperature is 235-245°C
- H: The cooling slope is 1-4°C/S

> **Note**: The above recommended curves are based on the SAC305 alloy solder paste as an example; for other alloy solder pastes, follow the furnace temperature curve specified in the solder paste specification document.

Method 2: Wave soldering process (wave soldering furnace temperature curve)

Please refer to the recommended furnace temperature for wave soldering. The peak temperature is 260 °C ±5°C, and the wave soldering temperature curve is shown in the figure below:



Recommended temperature curve for wave soldering furnaces		Recommended temperature for manual welding repair	
Preheat temperature	80-130℃	Welding temperature	360℃±20℃
Preheating time	75-100S	Weld period	Less than 3S/point
Wave peak contact time	3-5S	NA	NA
Cylinder temperature	260±5℃	NA	NA
Temperature Increase Slope	≤2℃/S	NA	NA
Cooling slope	≤6℃/S	NA	NA