



NodeMCU-BU01 SPECIFICATION

Version V1.0

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Documentation/revision/ revocation resume

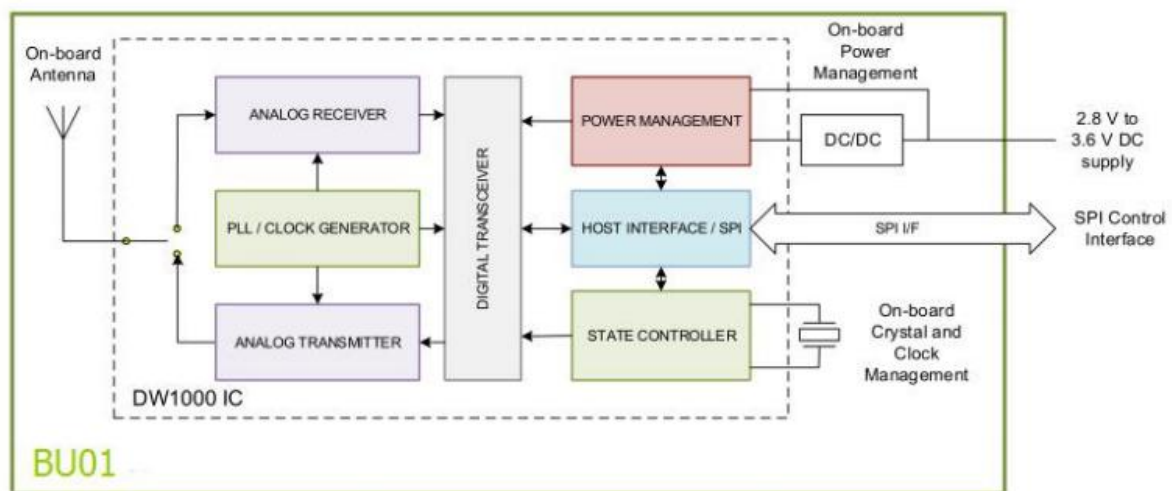
Version	Date	Development/revision	Development	Approval
V1.0	2020.05.20	Initial development	Xie Yiji	

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1. Product Overview

NodeMCU-BU01 is designed as a development board for the BU01 module, equipped with STM32F103C8T6MCU, peripherals to add temperature and humidity sensors and three-dimensional acceleration sensor, for customers to develop debugging to provide convenience. BU01 is an ultra-wideband (UWB) transceiver module based on Decawave DW1000 design. BU01 integrated the antenna, RF circuit, power management and clock circuits. BU01 can be used in bidirectional ranging or TDOA positioning systems, Positioning accuracy up to 10cm, and supports data rates up to 6.8Mbps.



Characteristics

- Easy integration without RF design
- Extension of communications using RTLS infrastructure
- Support high label density
- Compliance with IEEE 802.15.4-2011UWB standards
- Support 4 channels 3.5GHz to 6.5GHz
- Programmable transmit power
- 3.3 V /5V power supply
- Power consumption <1mA in sleep mode
- Support for bidirectional ranging and TDOA

- Support SPI interface
- Data rate 100 kbps, 850kbps, 6.8Mbps

Main parameters

Table 1 Key parameter descriptions

Model Name	NodeMCU-BU01
Dimensions	35*55.5 (±0.2) (W*H) mm
Package	DIP-40
Antenna	PCB antenna
Frequency range	3.5GHz to 6.5GHz
Interface	The all IO of PWM/I2C/GPIO、MCU
Operating temperature	-40℃~85℃
Storage environment	-40℃ ~ 125℃, < 90%RH
Power supply range	5V or 3.3V
Power consumption	Development board :160 mA (with MCU, sensors)

2. Electrical parameters

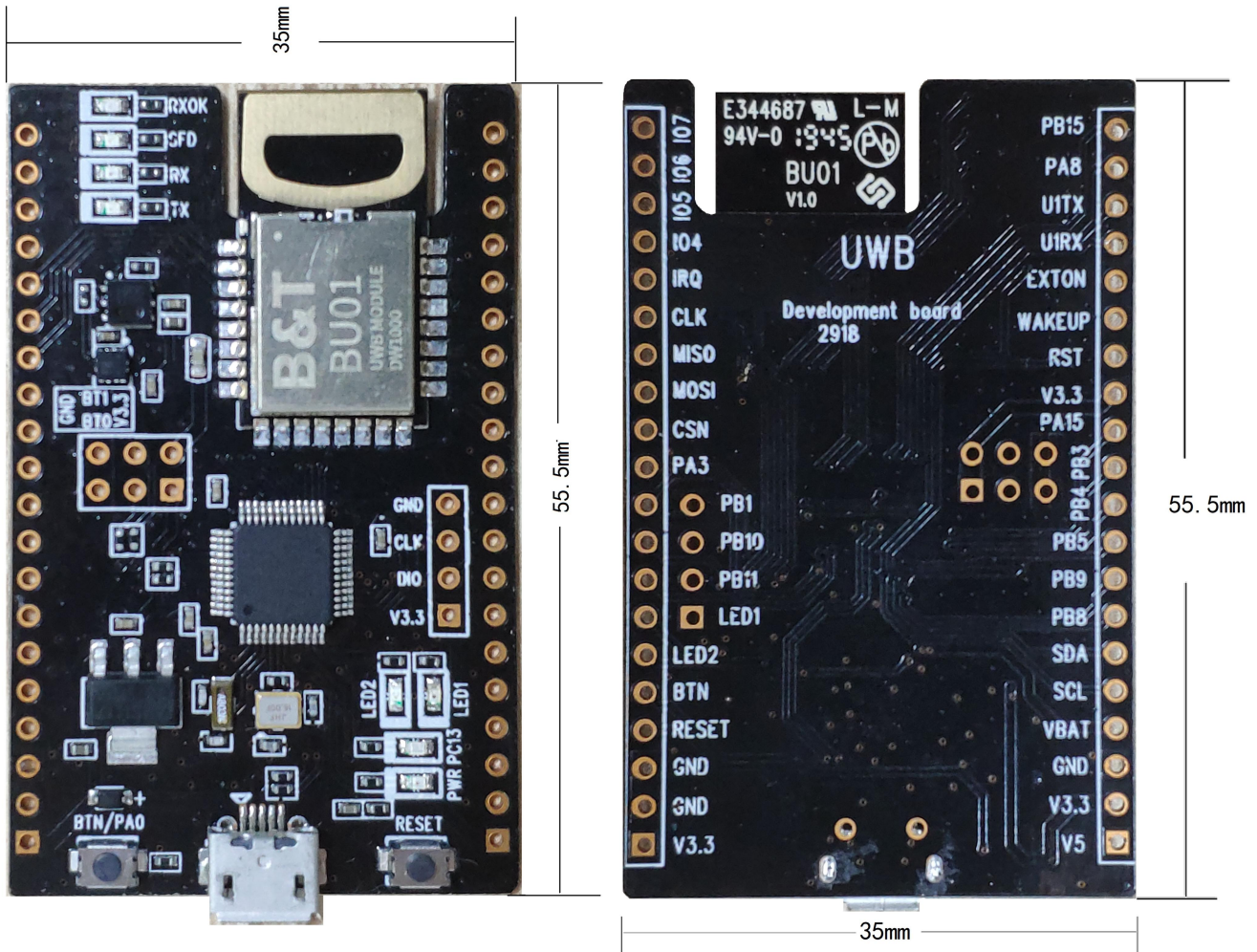
Electrical characteristics

Absolute maximum rating

Any more than the following absolute maximum ratings can cause chip damage

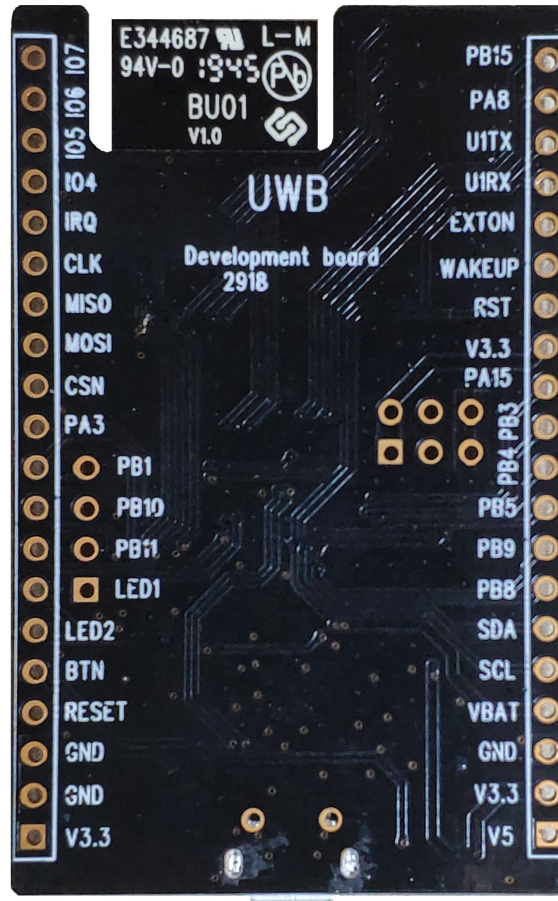
Name of name	Minimum value	Typical values	Maximum value	Units
Micro USB supply voltage	–	5	–	V
Pin header 3.3 V supply voltage	–	3.3	–	V
Operating temperature	–40	–	+85	°C
Storage temperature	–40	–	+125	°C

3. Appearance dimensions



4. Definition of pins

NodeMCU-BU01 module has a total of 50 interfaces, such as the pin diagram, the pin function definition table is the interface definition.



NodeMCU-BU01 Foot Schemes

Foot function definition table

Pin No.	Item	Functional Description
1	I07	default value is used as SYNC input. this pin can be reconfigured as a universal I /O pin GPIO7 under software control.
2	I06	universal I /O pin. when powered on, it is used as the SPIPHA (SPI phase selection) pin for configuring the SPI mode of operation. After power on, this pin will default to universal I /O pin.
3	I0 5	universal I /O pin. when powered on, it is used as a SPIPOL (SPI polarity selection) pin for configuring SPI working mode. after power on, this pin will default to

		universal I /O pin.
4	I04	universal I /O pin.
5	IRQ	The interrupt request output from the DWM1000 to the host processor and is connected to the MCU PB0. by default, the IRQ is a high-level efficient output, but can be configured as low-level valid if required. to run correctly in SLEEP and DEEPSLEEP mode, it should be configured to run efficiently at high levels. this pin will float in hibernation and DEEPSLEEP states and may cause a pseudo interrupt unless it is pulled low. This pin can be reconfigured as a generic I /O line GPIO8. when no IRQ function is used
6	CLK	SPI clock and connected to MCU PA5
7	MISO	SPI data output and connected to MCU PA6
8	MOSI	SPI data input and connected to MCU PA7
9	CSN	SPI chip select and connect with MCU PA4. this is a low level effective enable input. SPICSn jumps from high to low indicate the beginning of a new SPI transaction. SPICSn can also be used as a wake-up signal to get DW1000 out of sleep or sleep state.
10	PA3	PA3 on the MCU
11	PB1	PB1 on the MCU
12	PB10	PB10 on the MCU
13	PB11	PB11 on the MCU
14	LED1	PA2, connection LED1 on the MCU
15	LED2	PA1, connection LED2 on the MCU
16	BTN	PA0, connection BTN keys on the MCU
17	RESET	Reset pin on MCU, connect reset button
18	GND	Ground
19	GND	Ground
20	V3.3	3.3 V Power supply
21	V5	5V power supply

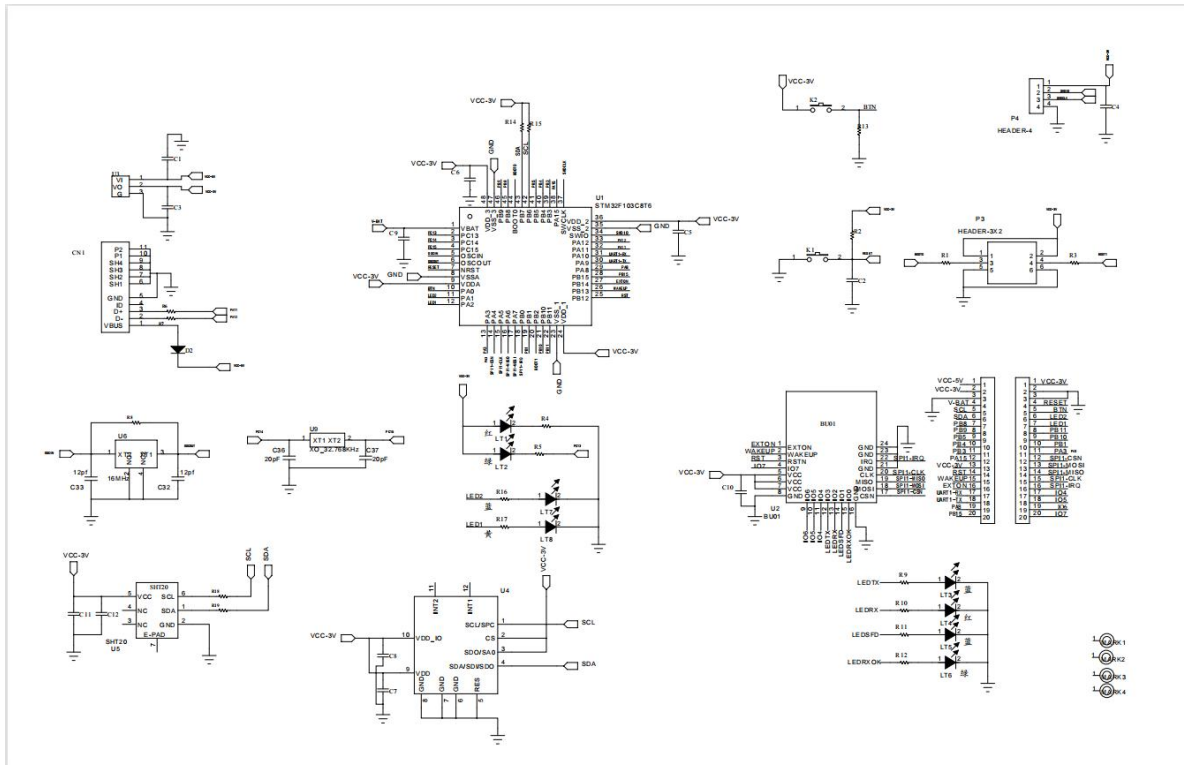
22	V3.3	3.3 V Power supply
23	GND	Ground grounding
24	VBAT	Vbat MCU battery power
25	SCL	SCL pin on MCU, default pull up 3.3 V, internal connect sensor SCL pin
26	SDA	SDA pin on MCU, default pull up 3.3 V, internal connect sensor SDA pin
27	PB8	PB8 on the MCU
28	PB9	PB9 on the MCU
29	PB5	PB5 on the MCU
30	PB4	PB4 on the MCU
31	PB3	PB3 on the MCU
32	PA15	PA15 on the MCU
33	V3.3	3.3 V Power supply
34	RST	Reset pin on BU01 and connected to MCU PB12
35	WAKEUP	the wake-up pin on the BU01 and is connected to the PB13 of the MCU. when set to a valid high level state, the WAKEUP pin brings the DW1000 into working mode from a dormant or DEEPSLEEP state. If not used, the pin can be grounded
36	EXTON	The EXTON pin on the BU01 is connected to the MCU PB14 and the external device is enabled. position and remain active during wake-up until the device enters sleep mode. can be used to control external DC-DC converters or other circuits not required when the device is in sleep mode to minimize power consumption
37	U1RX	UART1-RX on the MCU
38	U1TX	UART1-TX on the MCU
39	PA8	PA8 on the MCU
40	PB15	PB15 on the MCU
DIO	Swdio	SWDIO feet on MCU, default flash pin
CLK	Swclk	SWDIO feet on MCU, default flash pin

BT0	BOOT0	BOOT0 foot on MCU, control MCU start mode
BT1	BOOT1	BOOT1 foot on MCU, control MCU start mode
RESET keys	RESET	Reset button
BTN/PA0 keys	BTN/PA0	Press button to pull up PA0 pin

BOOT pin controls start-up mode:

BOOT0	BOOT1	MODE
0	x	FLASH
1	1	SRAM
1	0	ISP

5. Schematic diagrams



6. Design guidance

1. Antenna layout requirements

It is forbidden to place metal parts around the antenna, and to put away from high frequency devices.

2. Power supply

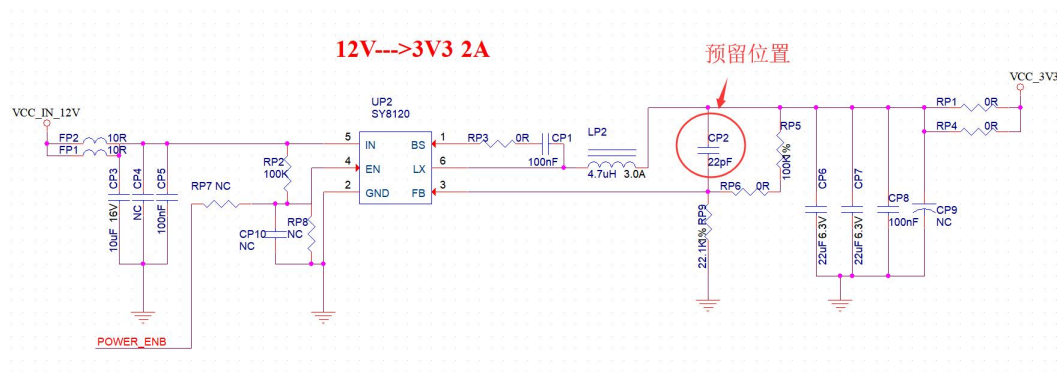
Programme I:

Standard Micro USB interface power supply

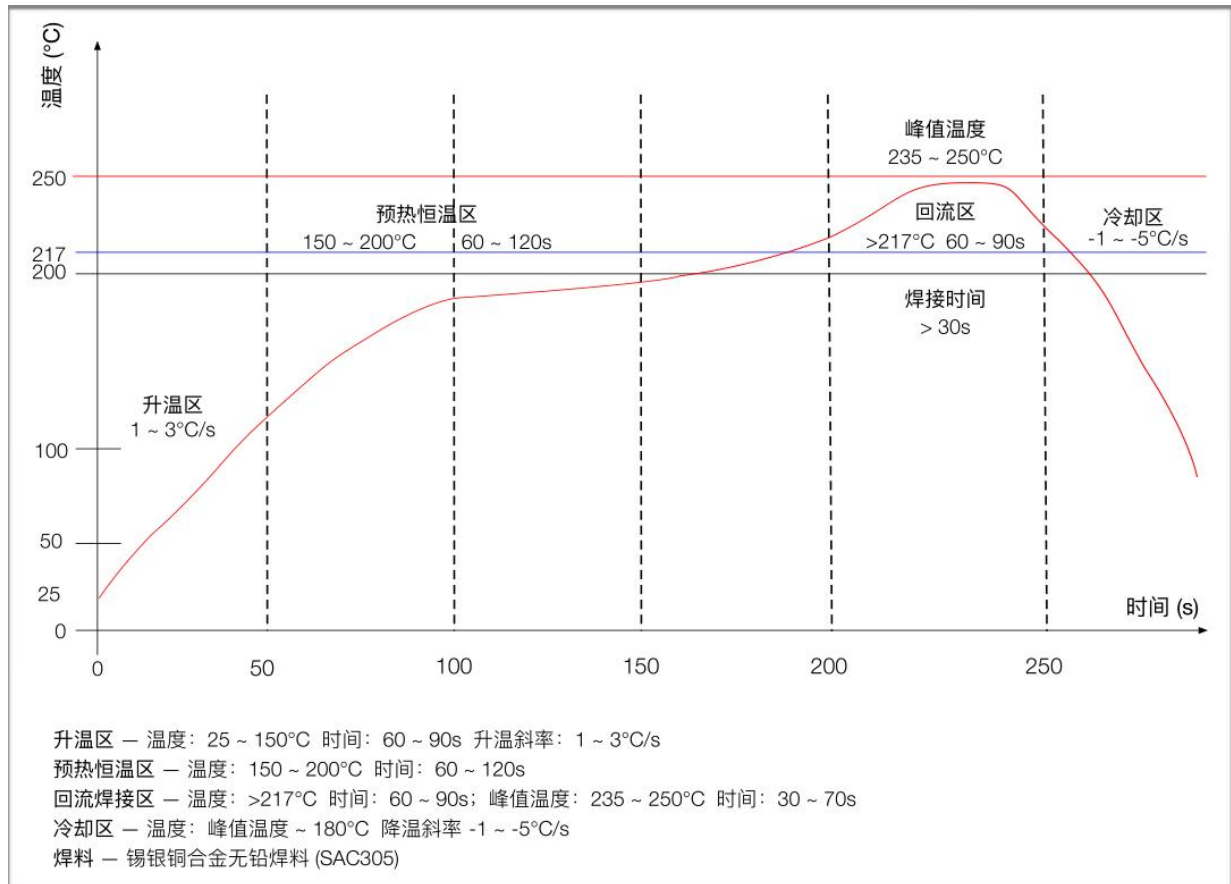
Programme II:

Pin 3.3 V Power supply

- (1)、 recommend 3.3 V voltage, peak over 500mA current
- (2)、 recommend the use of LDO power supply; if used DC-DC the recommended ripple is controlled within 30mV.
- (3)、 DC-DC power supply circuit is suggested to reserve the position of dynamic response capacitance, which can optimize the output ripple when the load changes greatly.
- (4)、 3.3 V The proposed addition of ESD devices.



7. ROLLING OF Reflow soldering



8. Packaging information

as shown below, the NodeMCU-BU01 packing is electrostatic bag packing.

9. Contact us

Official website: <https://www.ai-thinker.com>

Development DOCS: <https://docs.ai-thinker.com>

Official Forum: <http://bbs.ai-thinker.com>

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