User Manual

E103-W13

CC3301 2.4GHz Wi-Fi6+BLE5.4



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1. Overview

1.1 Introduction



E103-W13 is a 2.4GHz Wi-Fi 6 + low-power Bluetooth 5.4 dual-mode WIFI module launched by Chengdu Ebyte based on TI's 10th generation Combo chip CC3301. It integrates a 2.4GHz PA internally and is suitable for output power. A complete wireless solution up to +21 dBm and also seamlessly integrates with TI Sitara MPU (Linux)/MCU+ (FreeRTOS) and processors for other applications.

Functionally, the module supports IEEE802.11 a/b/g/n/ax standards, and the application throughput is up to 50Mbps. In the 2.4G Hz frequency band, the module supports multiple working modes (for example, concurrent STA and AP), and can also connect Wi-Fi devices on different radio frequency channels (Wi-Fi networks) . It also has extremely high security and supports WPA2 and WPA3 encryption methods meet a variety of high-standard and high-reliability wireless communication scenarios. E103-W13 is an industrial-grade WIFI module that truly combines ease of use with high reliability and performance.

1.2 Features

- Support IEEE802.11 a/b/g/n/ax standards ;
- Support Bluetooth low energy 5.4 ;
- Supports WPA 2 /WPA 3 multiple WIFI security encryption methods;
- Support 4-bit SDIO or SPI host interface ;
- Application throughput up to 50Mbps ;
- Companion IC for any processor or MCU host capable of running the TCP/IP stack ;
- Integrated 2.4GHz PA, suitable for complete wireless solutions with output power up to +2 1 dBm ;
- Working temperature: -40℃~+85℃.

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1.3 Application scenarios

-Medical and healthcare
  ·Multi-parameter patient monitor
  ·Electrocardiogram (ECG)
  ·Hospital electronic bed and bed control system
  ·Telemedicine system
-Building and home automation:
  · HVAC systems and thermostats
  ·Video surveillance, video doorbells, and low-power cameras
  ·Building security systems and electronic locks
-Smart appliances
-Smart wear
-Asset tracking
-Factory automation
-Grid infrastructure

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2 Parameters

2.1 Limit parameters

The main parameters	performance		Remark
	minimum value	maximum value	
VPA (V)	-0.5	4.2	Exceeding 3.6 V will permanently burn the module
VIO(V)	-0.5	1.98	
Blocking power (dBm)	-	10	Less likely to be burned if used at close range
Working temperature (℃)	-40	+85 _	Industrial grade

2.2 Working parameters

The main parameters			performance			Remark
			minimum value	Typical value	maximum value	
Working voltage VPA (V)			twenty one	3.3	4.2	Recommended 3.3V power supply
Operating voltage VIO (V)			1.62	1.8	1.98	
Communication level (V)				1.8		-
Working temperature (℃)			-40	-	+85 _	Industrial grade design
Working frequency band (Hz)			2.412G	2.442G	2.472G	Support 2.4G frequency band
Power consumption	Maximum transmit power (dBm)		19	20	twenty one	Test 2.412GHz
	Working current (mA)	VDDPA	-	194mA _	-	Instantaneous power consumption (+20 dBm at 1 DSSS/6 OFDM) WLAN power Modes
		VDD MainNote	-	97mA	-	Instantaneous power consumption (+20 dBm at 1 DSSS/6 OFDM) WLAN power Modes
	Sleep current (μA)	VDDPA	-	7uA _	-	hibernate
		VDD Main	-	175uA _	-	Low Power Deep Sleep (LPDS)
WiFi version			802.11a/b/g/n /ax			-
RF interface			Pad			Pad size 0.81mm*0.81mm, 50Ω characteristic impedance .

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Receive sensitivity	- 98 dBm	1 DSSS, 20-MHz bandwidth. At < 10% PER limit.
Baud rate value range	160-2000000bps _	Default baud rate 115200 bps
Air speed	150Mbps	\
reference distance	300m	Sunny and open, antenna gain 0 dBi , onboard PCB antenna.

Note: The current size is also different under different WiFi protocols. Users can go to the official website to view the detailed parameters of "CC3301" as a reference.

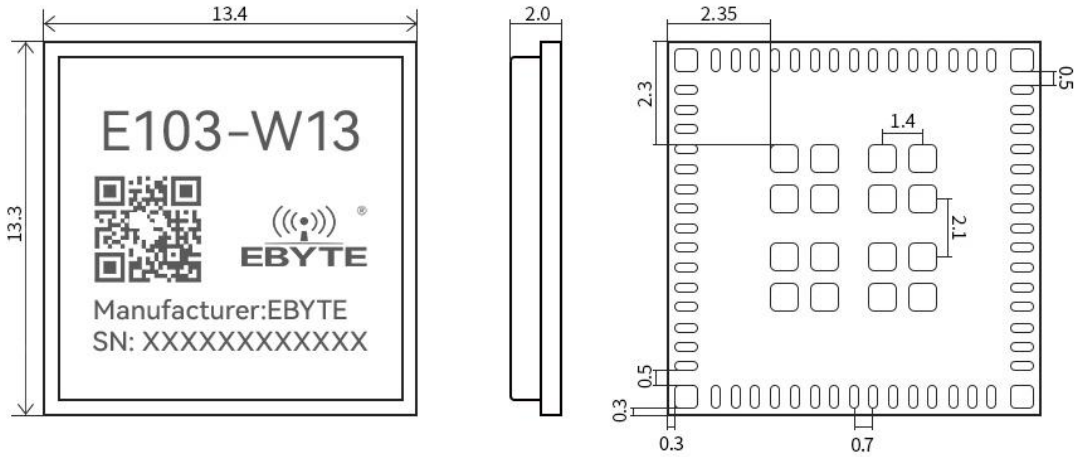
2.3 Hardware parameters

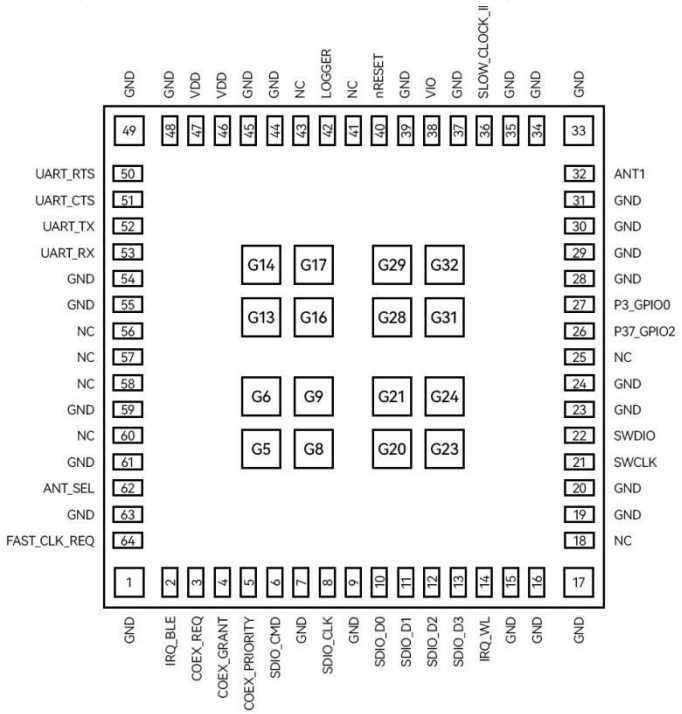
Hardware parameters	Parameter value	Remark
Packaging method	SMD type	-
Interface mode	Bottom pad	-
Communication Interface	UART serial port	T TL level
Dimensions	13.3 * 13.4mm _	-
Product Weight	0.77g	±0.1g
RF interface	SMD pad	Equivalent impedance is about 50 Ω

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3 Mechanical dimensions and pin definitions





The pin definitions are as follows:

serial number	Pin name	Type	VIO Level	use
1	GND	GND		Ground

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2	IRQ_BLE	PD		IRQ_BLE to Host (in shared SDIO mode)
3	COEX_REQ	I	1.8V	External coexistence interface-request
4	COEX_GRANT	O	1.8V	External Coexistence Interface - Grant
5	COEX_PRIORITY	I	1.8V	External coexistence interface-priority
6	SDIO_CMD	I/O	1.8V	SDIO_CMD_WL (SPI_DIN)
7	GND	GND		Ground
8	SDIO_CLK	I	1.8V	SDIO_CLK_WL (SPI_CLK). Must be driven by host.
9	GND	GND		Ground
10	SDIO_D0	I/O	1.8V	SDIO_D0_WL (SPI_DOUT)
11	SDIO_D1	I/O	1.8V	SDIO_D1_WL.
12	SDIO_D2	I/O	1.8V	SDIO_D2_WL
13	SDIO_D3	I/O	1.8V	SDIO_D3_WL (SPI_CS)
14	IRQ_WL	PD		IRQ_WL to Host
15	GND	GND		Ground
16	GND	GND		Ground
17	GND	GND		Ground
18	NC			
19	GND	GND		Ground
20	GND	GND		Ground
twenty one	SWCLK	I	1.8V	Serial wire debug CLK
twenty two	SWDIO	I/O	1.8V	Serial wire debug DIN/DOUT
twenty three	GND	GND		Ground
twenty four	GND	GND		Ground
25	NC			
26	P37_GPIO2	O	1.8V	General-purpose digital I/O
27	P3_GPIO0	I/O	1,8V	General-purpose digital I/O

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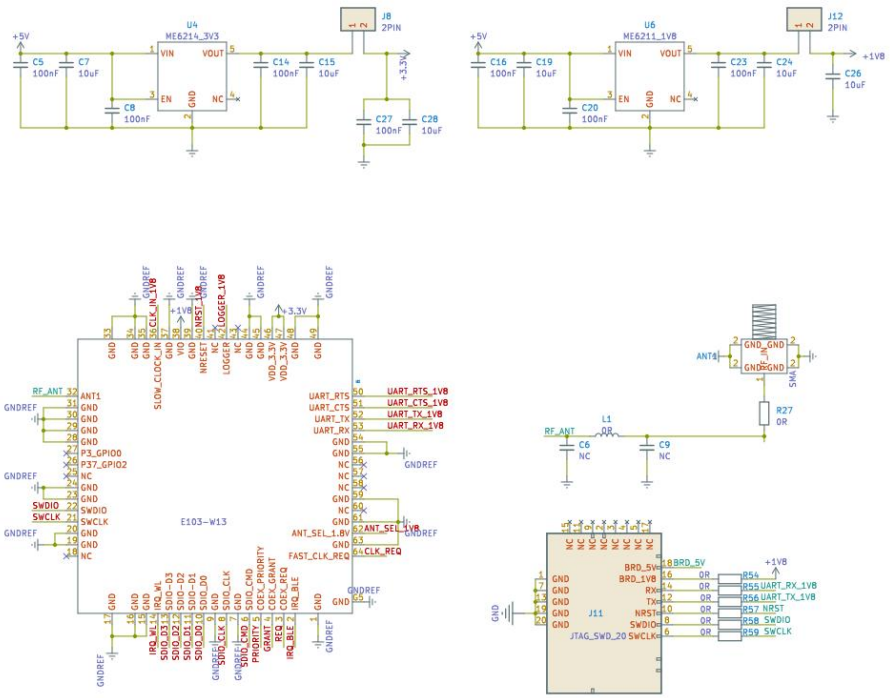
28	GND	GND		Ground
29	GND	GND		Ground
30	GND	GND		Ground
31	GND	GND		Ground
32	ANT1	ANA		Bluetooth Low Energy and WLAN 2.4-GHz RF Port
33	GND	GND		Ground
34	GND	GND		Ground
35	GND	GND		Ground
36	SLOW_CLOCK_IN	I	1.8V	32.768-kHz RTC clock input
37	GND	GND		Ground
38	VIO	POW		1.8-V supply for IO / SRAM / digital / analog domain
39	GND	GND		Ground
40	nRESET	I	1.8V	Reset line for enabling or disabling device (active low)
41	NC			
42	LOGGER	PU	1.8V	Tracer (UART TX Debug Logger)
43	NC			
44	GND	GND		Ground
45	GND	GND		Ground
46	VDD	POW		3.3-V supply for PA
47	VDD	POW		3.3-V supply for PA
48	GND	GND		Ground
49	GND	GND		Ground
50	UART_RTS	O	1.8V	UART RTS for Flow Control for BLE HCI
51	UART_CTS	I	1.8V	UART CTS for flow control for BLE HCI
52	UART_TX	O	1.8V	UART TX for BLE HCI
53	UART_RX	I	1.8V	UART RX for BLE HCI
54	GND	GND		Ground
55	GND	GND		Ground
56	NC			
57	NC			

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58	NC			
59	GND	GND		Ground
60	NC			
61	GND	GND		Ground
62	ANT_SEL	I/O	1.8V	Default antenna select control line
63	GND	GND		Ground
64	FAST_CLK_REQ	O		Fast clock request from the device
G5~G32	GND	GND		Ground

4 Recommended wiring diagram

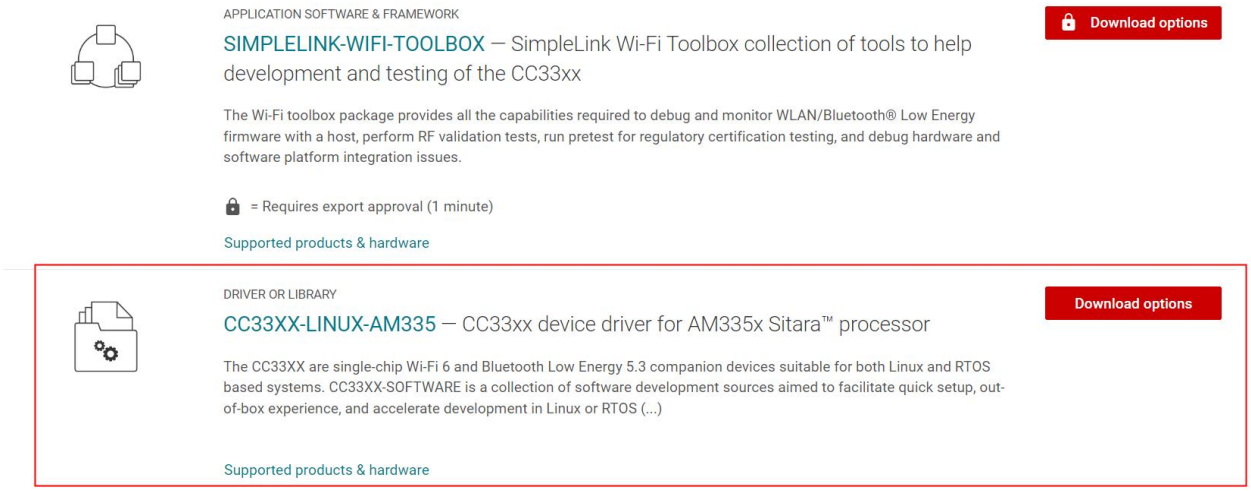


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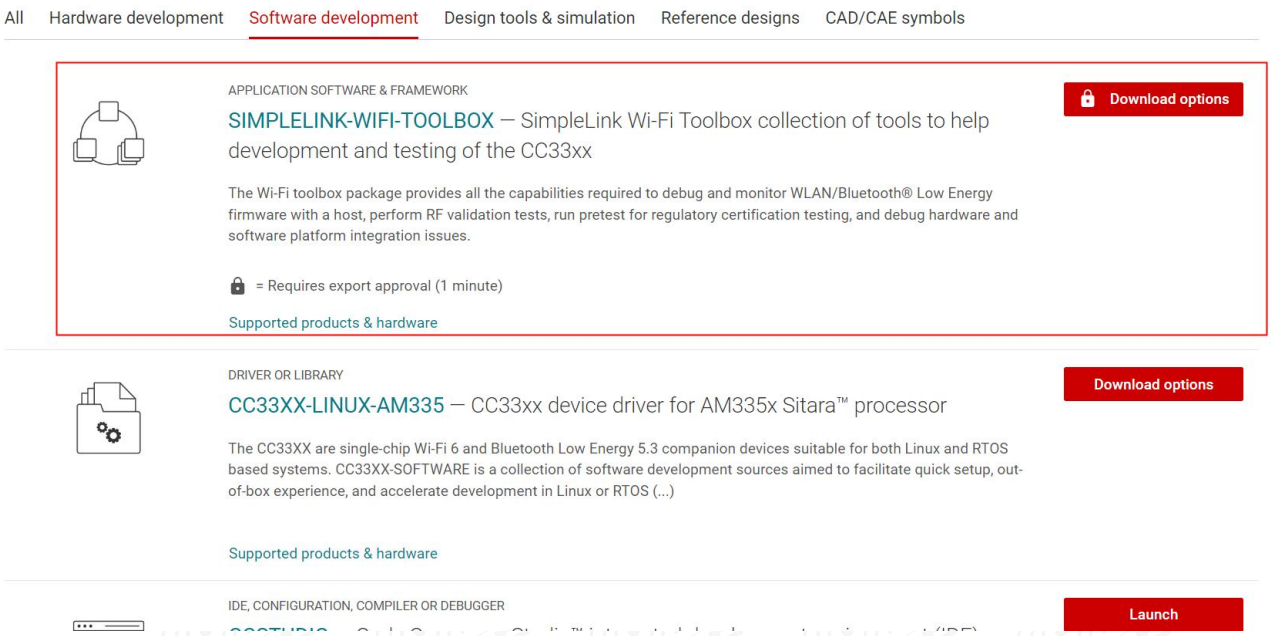
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5 Quick start

This module does not come with firmware and requires secondary development and use by customers. The SDK package for WIFI-related functions can be obtained from the CC3301 interface on Ti's official website.
Website: https://www.ti.com/product/CC3301



As well as radio frequency debugging, you can use the official SIMPLELINK-WIFI-TOOLBOX tool for radio frequency related debugging. The specific usage steps need to be based on the actual downloaded version.



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6 Welding operation guide

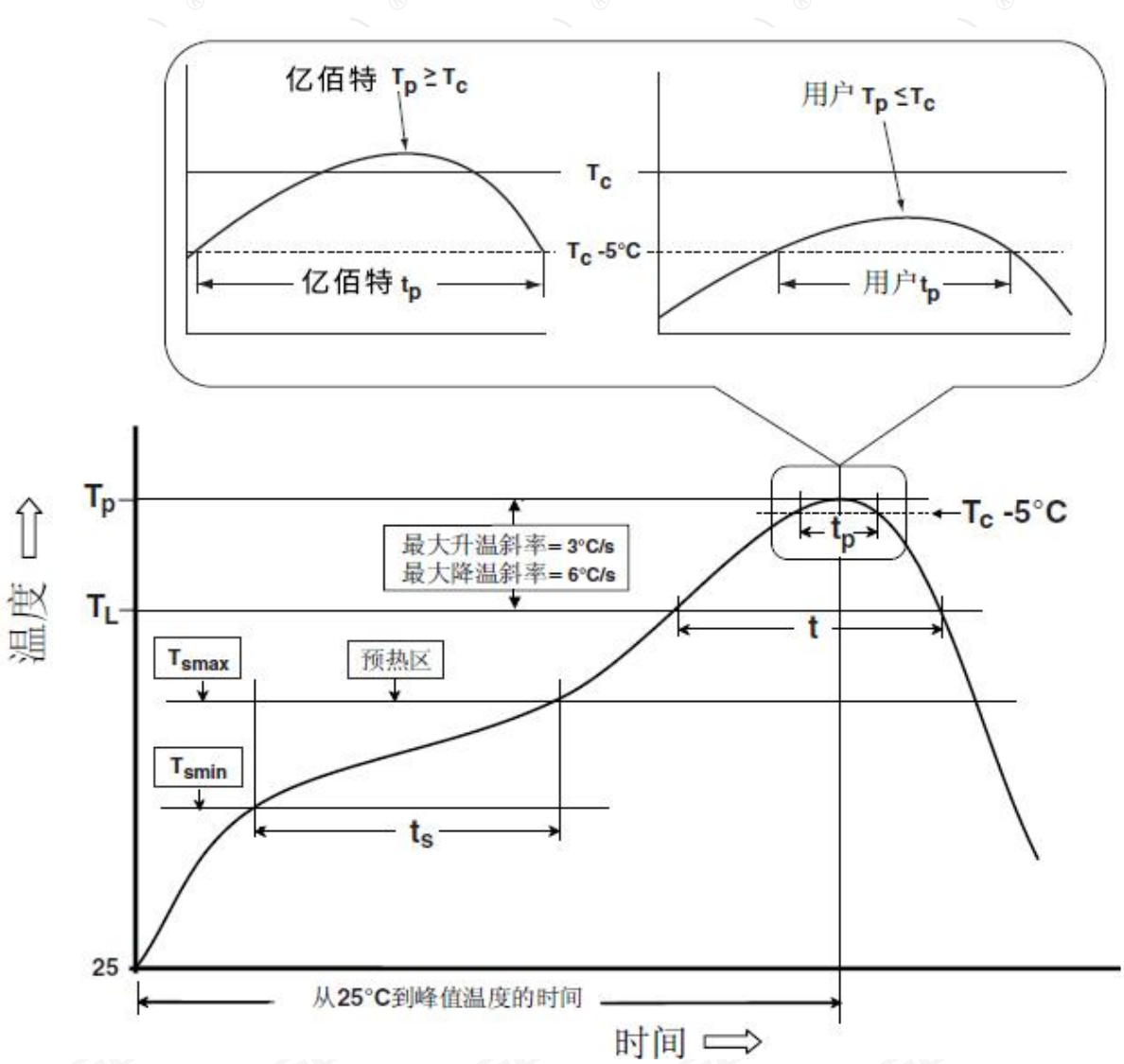
6.1 Reflow soldering temperature

Reflow soldering curve characteristics		Lead process assembly	Lead-free process assembly
Preheat /keep warm	Minimum temperature (Tsmin)	100℃	150℃
	Maximum temperature (T smax)	150℃	200℃
	Time (T smin ~T smin)	60-120 seconds	60-120 seconds
Temperature rise slope (T L ~T p)		3℃/second, maximum	3℃/second, maximum
Liquidus temperature (TL)		183℃	217℃
Holding time above T L		60~ 90 seconds	60~ 90 seconds
Package peak temperature T p		Users should not exceed the temperature indicated on the product's "Moisture Sensitivity" label.	Users should not exceed the temperature indicated on the product's "Moisture Sensitivity" label.
The time (T p) within 5°C of the specified classification temperature (Tc), see the figure below		20 seconds	30 seconds
Cooling slope (T p ~T L)		6℃/second, maximum	6℃/second, maximum
Time from room temperature to peak temperature		6 minutes, maximum	8 minutes, maximum
※The peak temperature (Tp) tolerance definition of the temperature curve is the upper limit of the user			

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6.2 Reflow soldering curve



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7 Revise history

Version	Revision date	Revision Notes	Maintenance man
1.0	2024-1-16	initial version	Hao

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