

C-8031U

The C-8031U is an integrated WIFI& Bluetooth BLE dual-mode module, using BK7231M_QFN32 Bluetooth dual-mode 5.1 and Wi-Fi 802.11n

The chip. Integrated with the hardware and software resources needed for complete Wi-Fi and Bluetooth applications, it can support dual role connectivity of AP and STA, and

Both classic Bluetooth and Bluetooth low power connections are supported. Up to 120 MHz of 32-bit MCU and 256 KB of built-in RAM,

Can make the chip support multi-cloud connection.

The C-8031U has a wealth of peripherals, such as PWM, I2C, UART, SPI, SDIO, and IrDA. You can directly use UART

Load and burn program. Up to six channels of 32-bit high speed PWM output using the chip are ideal for high quality LED control. Every 2 PWM can

Configured for phase controlled differential mode to support motor and strip drives.

The C-8031U integrates a prioritized Wi-Fi and Bluetooth control module to implement real-time priority and send/receive scheduling. C-8031U

External PA and LNA extensions can be supported by providing an indication of the status of the current transceiver.

The C-8031U is embedded with eFUSE and supports OTP read and write in FLASH. It can be used to provide unique serial numbers, encrypt codes, and protect calls

The interface is secure. Internal integration of true random number generator and security module to ensure safe communication and fast authentication and network connection.

C-8031U supports a low-power sleep mode, where the MCU can enter a sleep state and achieve a microamperage sleep current. Supported by the C-8031U

In deep sleep mode, you can run a 32-bit clock at a few microamps and wake up by this clock or by any GPIO.

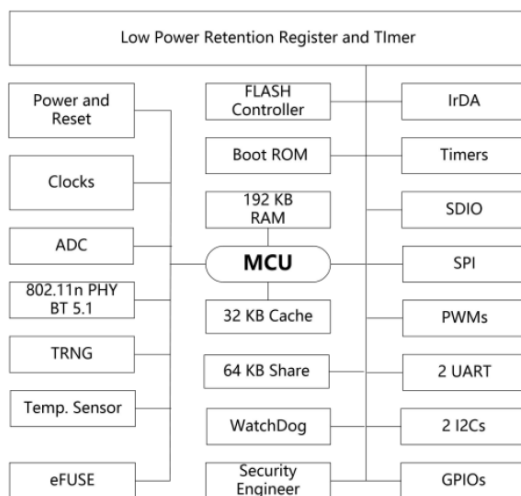
The C-8031U module has an onboard antenna and an external antenna is optional

Working voltage: DC 3.3-3.6V,

Operating temperature: -20°C to +85°C

- 802.11 b/g/n 1 x1 standard
- 17 dBm 54 Mbps output power
- 54 Mbps sensitivity - 76 dBm
- And STBC 20 MHz bandwidth
- support STA, AP, and Direct mode
- support AP and STA parallel dual roles
- MCU speed to 120 MHz
- Internal RAM 256 KB
- 2 MB or 4 MB internal Flash
- Download UART and SPI
- SDIO 50 MHz clock frequency
- high-speed SPI interface
- double the I2C interface
- six-way 32-bit counter and a low power consumption
- six-way support high-speed clock or low power clock PWM output
- all ten multi-channel high-speed ADC, and support internal filtering to 16
- EFUSE 32 bytes
- 256 Byte ~ 2 KByte OTP
- true random number generator
- 26 MHz and 32 KHz clock signal output

方框图 Module block diagram



5 性能参数 Performance Parameter

5.1 极限参数

项目	管脚名称	最小	最大	单位
电池和电源供电IO	VCCRXFE, VCCPA, VCCPAD, VCCIF, VSYS, VBAT, CEN, VCCPLL	-0.3	3.9	V
数字输入管脚		-0.3	3.9	V
模拟管脚	XI, XO	-0.3	1.5	
射频管脚	ANT	-0.3	1.5	V

5.2 推荐工作条件

参数	条件	最小	典型	最大	单位
工作电压	VBAT-pin	2.1	3.3	3.6	V
工作温度 (环境温度)		-40		105	°C
IO输出高电平VOH	IOH=-0.25mA	VBAT-0.3		VBAT	V
IO输出低电平VOL	IOH=0.25mA	VSS		VSS+0.3	V
IO输入输出驱动能力	通过寄存器设置		6	20	mA

5.3 功耗

参数	条件	最小	典型	最大	单位
发射电流	17 dBm, 802.11b 11 Mbps		210		mA
发射电流	15 dBm, 802.11g 54 Mbps		170		mA
接收电流	-10 dBm输入、802.11b 11 Mbps		50		mA
接收电流	-10 dBm输入、802.11g 54 Mbps		60		mA
正常待机电流	MCU停止运行, Modem断电		30		uA
低电压待机电流	MCU停止并进入低电压		10		uA
深度睡眠电流	所有主逻辑断电, 仅仅AON计数器工作		5		uA
关机电流	CEN=0		1		uA

注意: 所有测量结果都是在常温和3.3V电压下获得

参数	条件	最小	典型	最大	单位
工作频率		2412		2484	MHz
灵敏度	HT20 MCS7		-72		dBm
	54 Mbps OFDM		-75		dBm
	6 Mbps OFDM		-91		dBm
	11 Mbps DSSS		-88		dBm
	1 Mbps DSSS		-99		dBm
邻信道抑制比	HT20 MCS7		25		dB
	54 Mbps OFDM		26		dB
	11 Mbps DSSS		40		dB

5.5 Wi-Fi 发射特性

参数	条件	最小	典型	最大	单位
工作频率		2412		2484	MHz
发射功率 (EVM符合标准要求)	HT20 MCS7		16		dBm
	54 Mbps OFDM		17		dBm
	11 Mbps DSSS		19		dBm

5.6 BLE 接收特性

参数	条件	最小	典型	最大	单位
工作频率		2402		2480	MHz
空中速率			1		Mbps
灵敏度				-97	dBm

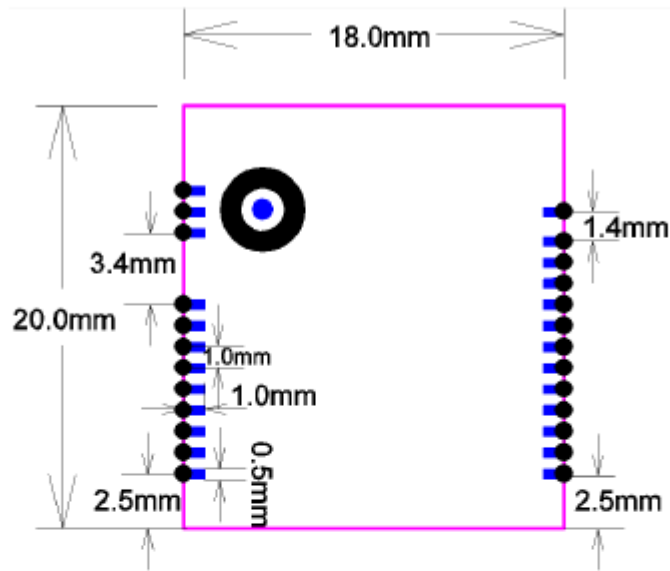
最大射频信号输入		-10			dBm
互调				-23	dBm
共信道抑制比C/I			10		dB
邻信道抑制比C/I	+1MHz		0		dB
	-1MHz		0		dB
	+2MHz		-20		dB
	-2MHz		-27		dB
	+3MHz		-25		dB
	-3MHz		-36		dB
带外阻塞Blocking	30 MHz ~2000 MHz	-10			dB
	2000 MHz ~ 2400 MHz	-20			dB
	2500 MHz ~ 3000 MHz	-10			dB
	3000 MHz ~12.5 GHz	-10			dB

5.7 BLE 发射特性

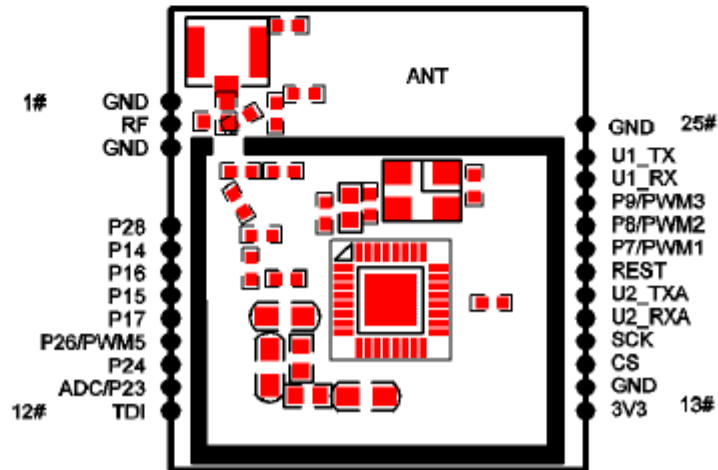
参数	条件	最小	典型	最大	单位
工作频率		2402		2480	MHz
空中速率			1		Mbps
发射功率		-20	5	20	dBm
20dB带宽 BW			1		MHz
Freq Offset		-150		150	KHz
Max Drift		-50		50	KHz
Drift Rate			80	400	Hz/us
Δf_{1avg}		225	244	275	KHz
Δf_{2max}		185	195		KHz
$\Delta f_{1avg}/\Delta f_{2avg}$		0.8	0.85		
邻信道发射功率	2MHz Offset		-45	-20	dBm
	>=3MHz Offset		-47	-30	dBm

6.1 模块尺寸图

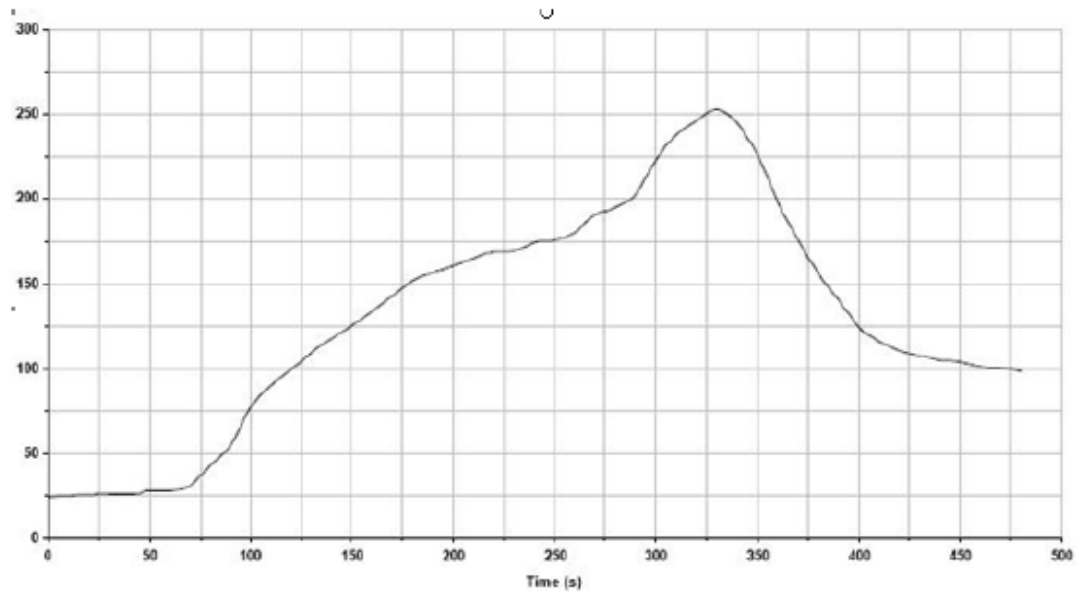
(20*18*2.9mm SMD, 板材厚度 0.8mm)



6.2 模块脚位定义图



推荐回流温度 Reflow Temperature Profile



Key features of the profile:

- Initial Ramp=1-2.5°C/sec to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)=3°C/sec Max
- Time above liquidus temperature(217°C): 45 - 90 seconds
- Device absolute maximum reflow temperature: 250°C

1.1 List of applicable FCC rules:

The module complies with FCC Part 15.247.

1.2 Summarize the specific operational use conditions:

The module has been certified for Fix, Mobile, Portable applications.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

1.3 Limited module procedures:

The module has its own RF shielding, which belong to signal module Standard requires: Clear and specific instructions describing the conditions, limitations and procedures for third-parties to use and/or integrate the module into a host device (see Comprehensive integration instructions below).

Resolve: Supply example as follows:

Installation Notes:

- 1) C-8031U Module Power supply range is DC 3.3V~3.6V, when you use C-8031U Module design product, the power supply cannot exceed this range.
- 2) When connect C-8031U Module to the host device, the host device must be power off.
- 3) Make sure the module pins correctly installed.
- 4) Make sure that the module does not allow users to replace or demolition.

1.4 Trace antenna designs:

Not applicable.

1.5 RF exposure considerations:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.

Note: the host product manuals must include a statement in order to alert the users of FCC RF exposure compliance.

1.6 Antennas

PCB antenna, 1dBi

The antenna is permanently attached, can't be replaced.

1.7 Label and compliance information

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.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The system integrator must place an exterior label on the outside of the final product housing the B100 Modules. Below is the content that must be included on this label.

The host product Labeling Requirements:

NOTICE: The host product must make sure that FCC labeling requirements are met. This includes

clearly visible exterior label on the outside of the final product housing that displays the contents shown in below:

Contains FCC ID: 2ARDBC-8031U

Contains IC: 25276-C8031U

1.8 Information on test modes and additional testing requirements:

When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements. In setting up the configurations, if the pairing and call box options

for testing does not work, then the host product manufacturer should coordinate with the module manufacturer for access to test mode software.

1.9 Additional testing, Part 15 Subpart B disclaimer:

The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

1.10 Information on test modes and additional testing requirements:

When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements.

FCC warning:

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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter, End-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance.

Canada warning:

- English:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

This device may not cause interference.

This device must accept any interference, including interference that may cause undesired operation of the device.

- French:

Cet appareil contient des émetteurs/récepteurs exemptés de licence qui sont conformes aux flux RSS exemptés de licence de Innovation, Science et Développement économique Canada. L'exploitation est soumise aux deux conditions suivantes:

Cet appareil ne doit pas causer d'interférences.

Ce dispositif doit accepter toute interférence, y compris toute interférence pouvant causer un fonctionnement indésirable du dispositif

Les antennes utilisées pour cet émetteur doivent être installées pour assurer une distance de séparation d'au moins 20 cm par rapport à toutes les personnes et ne doivent pas être localisées ou fonctionner conjointement avec d'autres antennes ou émetteurs. Les utilisateurs doivent avoir des conditions de fonctionnement de l'émetteur pour satisfaire à la conformité à l'exposition RF.