MMBQ13 WIFI Module
FCC ID:2ALLFMMBQ13

Specification

Version 1.1

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1. GENERAL DESCRIPTION

The MMBQ13 module supports standard IEEE802.11 b/g/n protocol, TCP/IP stack and support STA, AP, STA+AP work mode. It can be used in the present device for additional Wi-Fi feature, or to design standalone network controller.

MMBQ13 is a total solution for Wi-Fi network, which can be used separately. It can boot from external flash directly and designed to work with external MCU. In this case, MMBQ13 can be added to any micro-controller system through UART interface.

MMBQ13 is highly integrated with antenna switch, BALUN, PA, PMU. It just needs a few components for external circuit, which help to save the PCB room and cost furthest.

1.1. Features

- Support 02.11 b/g/n20/n40;
- Embedded TCP/IP protocol stack;
- Integrated TR switch/Balun/LNA/PA/antenna;
- MCU clock frequency up to 160M, internal cache 8kB;
- Integrated 16Mbits flash;
- **Supply voltage range: 4.75V~5.25V DC, single 5V is recommended to use.**
- Support OTA firmware upgrade, which can be initiated with mobile phone APP and AT command;
- Support STA, AP , AP+STA mode;
- Support Smart Link;
- Support WEP/TKIP/WPA/WPA2 protocol;
- Support 802.11e and WMM/WMM PS;
- Support UART;
- Support HT20/40;

	parameter	description
Hardware feature	General description	
	Network standard	802.11 b/g/n20/n40
	Frequency range	2412~2462MHz

	Supply voltage	4.75~5.25V (single 5V is recommended)
	Operating current	Max: 330mA
	MCU operation frequency	160MHz
	FLASH	16M (bits)
	SRAM	192KByte (120 KB available to users)
	Package	15mm * 20mm * 9.5mm
	Pin type and number	DIP , 4 pin
	Antenna	In PCB
	Operation temperature range	-20°~85°C
	Storage temperature range	-40°~125°C
	Hardware interface	
	UART	Support 1 UART, for download
Software feature	Work mode	STA/AP
	Security mechanism	WEP/WPA-PSK/WPA2-PSK
	Encryption type	WEP/TKIP/WPA/WPA2
	Firmware upgrade	UART/OTA
	Network protocol	TCP/UDP/DHCP/ARP/ICMP
	Customer configuration	AT+ Instruction Set, Smart LinkAPP

Table 1 Major hardware and software features

2. Pin assignment

There are 4 pins in MMBQ13 module, Figure1 is the pin assignment, Table 2 is the pin definition.

Figure 1 MMBQ13 pin assignment

PIN	Signal Name	Description
1	VDD	Supply Input Pin
2	RXD	UART receive data
3	TXD	UART transmit data
4	GND	GND

Table 2 MMBQ13 pin definition

3. Package and dimensions

The dimensions of MMBQ13 module is 29mm * 36mm * 9.5mm (Figure 3), and it integrates 16Mb SPI Flash and 3 dBi PCB antenna.
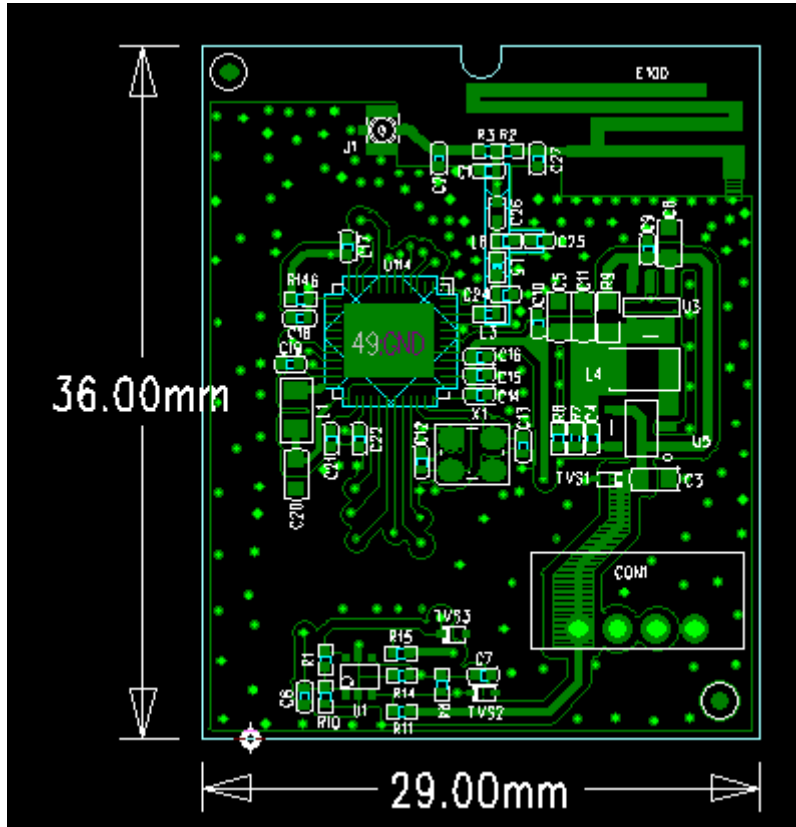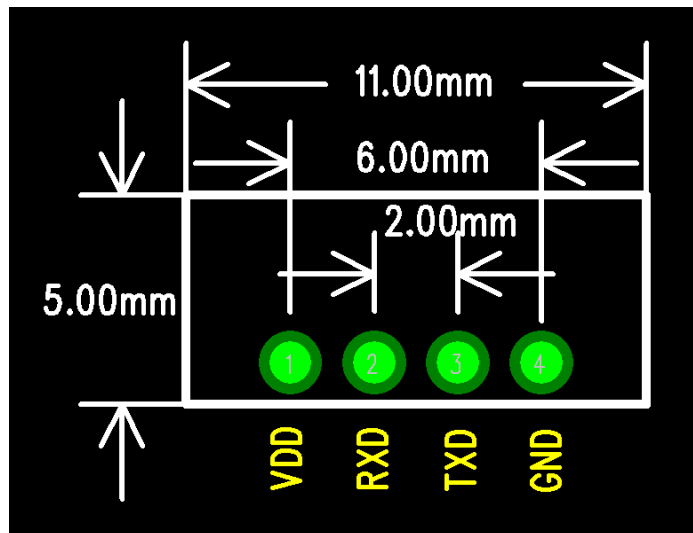
Figure 2 MMBQ13module exterior

Figure 3 MMBQ13 module dimensions

4. Main function description

4.1. MCU

The MCU of MMBQ13 is a low-power single chip, it supply integrated solution for embedded smart family system. It integrated 2.4 GHz WLAN CMOS PA and LNA. The RF front-end is single-ended double-direction. Also, it integrates LDO and DC-DC converter, which can separate digital circuit and analog circuit for lower noise.

4.2. Memory

4.2.1. Built- in SRAM

MMBQ13 integrates 192KB SRAM。

4.2.2. SPI Flash

MMBQ13 module collocates 16Mb FLASH.

4.3. Interface

4.3.1. UART

It support two UART supported which maximum baud rate up to 6 Mbps.

4.4. Absolute maximum ratings

	conditions	range	unit
Storage temperature	-	-40 to 125	℃
Highest temperature for soldering	-	250	℃
Supply voltage	-	**-0.3 to +3.6**	**V**

Table 3 absolute maximum ratings

4.5. Recommended operating range

Operation condition	name	Min.	Type	Max.	Unit
Temperature		-20	20	85	℃
Voltage	**VDD**	**4.75**	**5**	**5.25**	**V**

Table 4 recommended work conditions

5. RF specification

Parameter	Min.	Type	Max.	Unit
General parameter				
Frequency	2412		2462	MHz
Input impedance		50		Ω
Transmit power				
Output power (802.11b@11Mbps)	17	18	19	dBm
Output power (802.11g@54Mbps)	12	13	14	dBm
Output power (802.11n@HT20,MCS7)	12	13	14	dBm
Receive sensitivity				
Sensitivity (802.11b@11Mbps,CCK)	-86.0	-87.0	-88.0	dBm
Sensitivity (802.11g@54Mbps,OFDM)	-70	-72	-73.5	dBm
Sensitivity (802.11n@HT20,MCS7)	-68	-70	-72	dBm
Adjacent channel rejection				
OFDM, 6 Mbps		37		dB
OFDM, 54 Mbps		21		dB
HT20, MCS0		37		dB

Mode				dB
HT20, MCS7		20		dB

Table 5 RF specification

6. Power consumption

Mode	Min	Type	Max	Unit
Transmit 802.11b, CCK 11Mbps, P_{OUT}=+18.5dBm		250		mA
Transmit 802.11g, OFDM 54Mbps, P_{OUT}=+15dBm		220		mA
Transmit 802.11n, MCS7, P_{OUT}=+15dBm		220		mA
Receive 802.11b,CCK,1Mbp		60		mA
Receive 802.11g,OFDM,54Mbp		60		mA
Receive 802.11n,HT20,MCS7		60		mA
RX Power Saving, DTIM=1		2		mA
Sleep Mode		0.2		mA
Operating Mode		75		mA
Power Off		4		uA

Table 6 power consumption (The data are based on 3.3V VCC.)

7. Recommended Reflow Profile
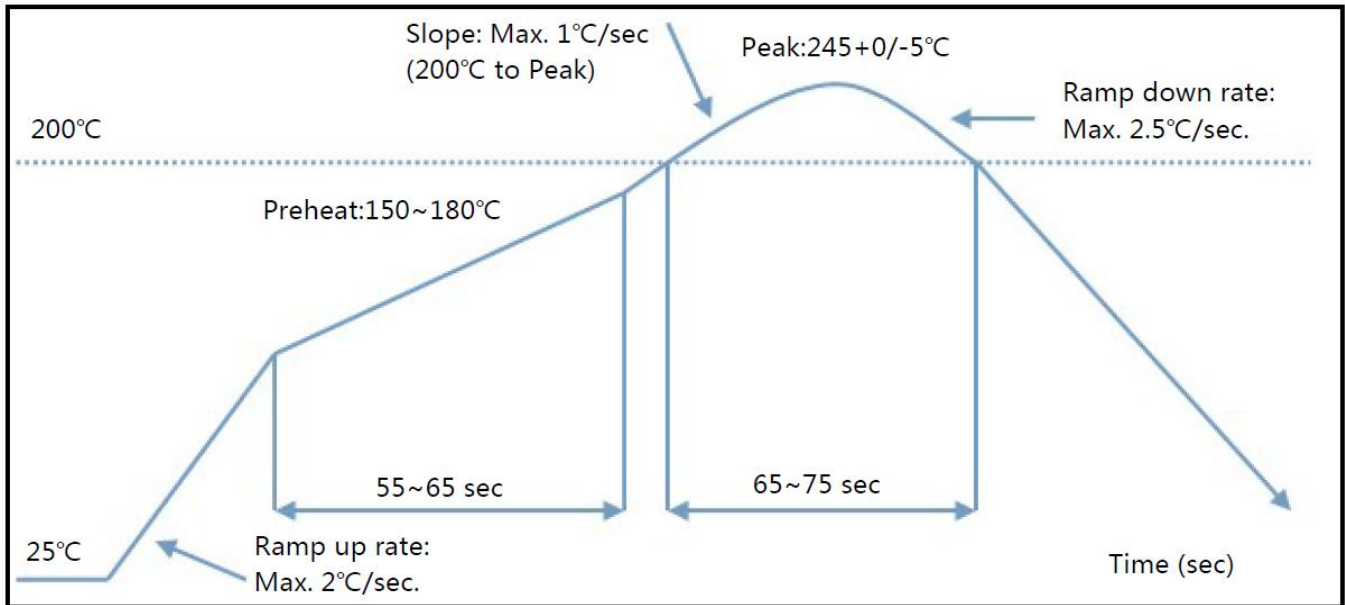
Peak Temperature: <250℃

Number of Times: ≤2 times

Figure 4 Soldering temperature curve

FCC Warnning:
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.

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.

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.

 (OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. Additional measurements (15C) and/or equipment authorizations (e.g either a complete new certification or a Class II Permissive Change) may need to be addressed depending on co-location or simultaneous transmission issues if applicable.

Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

the Integrator will be responsible to satisfy SAR/ RF Exposure requirements, when the module integrated into any (portable, mobile, fixed) host device.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled

environment. This equipment should be installed and operated with a minimum distance of 20cm

between the radiator & your body. This transmitter must not be co-located or operating in

conjunction with any other antenna or transmitter.

The final host device, into which this RF Module is integrated" has to be labelled with an auxilliary lable stating the FCC ID of the RF Module, such as "Contains FCC ID: 2ALLFMMBQ13". (e.g either a complete new certification or a Class II Permissive Change) may need to be addressed depending on co-location or simultaneous transmission issues if applicable.