BroadLink

World's leading smart home solution provider

Embedded Wi-Fi Module

BL1207-P

Product

Version：1.1 Release date： 3/27/2024

Features

- 100MHz 32-bit MCU
- 384KB SRAM
- External 2MB FLASH
- Support AES, MD5 and SHA1
- Support XIP

●Working Voltage: DC 12V

●Support BLE (BT4.2)

●Wi-Fi related features

▪Support 802.11 b/g/n standards

▪Support Station and SoftAP

▪Support SmartConfig and AP configuration

▪Support WEP/WPA2

▪Support multiple cloud services

▪Integrated balun/PA/LNA

▪TCP/IP stack optimized for IoT application

▪PCB antenna

●Peripherals:

▪1xUART

●Working temperature: 0℃ to +85℃

●Stamp-style package for SMT soldering

Applications

- Smart transportation
- Smart home / appliances
- Instruments
- Health care
- Industrial automation
- Intelligent security
- Smart energy

Model

Model	Antenna type	Note
BL1207-P	PCB antenna	Default

Content

1. Overview

BL1207-P is a cost-effective embedded Wi-Fi module designed by BroadLink, highly integrated with 32-bit MCU speed up to 100MHz, with 12V power supply.

The module integrates radio transceiver, MAC, baseband, all Wi-Fi protocols, configurations, and network stack. It can be widely used in applications like smart home devices, remote monitoring devices and medical care instruments.

2. Basic Specifications

2.1. Power Consumption

Please refer to Table 1 for power consumption data.

Table 1 BL1207-P Power Consumption Data

Specifications	Min.	Typ.	Max.	Units
VDD	5	12	24	V
VIL(input low voltage)	0		0.4	V
VIH(input high voltage)	4		5.5	V
VOL(output low voltage)	0		0.4	V
VOH(output high voltage)	4		5.5	V
Standby (RX)		38		mA
pulse current @TX 11b @17.5dBm 11Mbps		125		mA
pulse current @TX 11g @16dBm 54Mbps		116		mA
pulse current @TX 11n @15dBm 65Mbps		110		mA
BLE @6dBm		80		mA

2.2. Working Environment

Please refer to Table 2 for working environment data.

Table 2 BL1207-P Working Environment Data

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	125	℃
TA	Ambient operating temperature	0	85	℃
Vdd	Supply voltage	5	24	V

3. Radio Specifications

3.1. Basic Radio Specification

Please refer to Table 3 for radio specification.

Table 3 BL1207-P Radio Specification

Radio range	2400MHz-2483.5MHz
Wireless standards	IEEE 802.11 b/g/n, BLE
Radio output power	802.11b: 16±1dBm@11Mbps
	802.11g: 15±1dBm@54Mbps
	802.11n: 14±1dBm@MCS7/HT20
	BLE: 0±1dBm
Antenna type	Internal: PCB antenna
	External: Not supported
Receiving sensitivity	802.11b≦-89dBm@11Mbps
	802.11g≦-76dBm@54Mbps
	802.11n/HT20≦-73dBm@MCS7
	BLE ≦- 97dBm
Stack	IPv4, TCP/UDP/FTP/HTTP/HTTPS/TLS/mDNS
Data rate (max)	11M@802.11b, 54M@802.11g, MCS7@802.11n
Security	Encryption standard: Open/WEP-Open/WPA/WPA2
	Encryption algorithm: WEP64/WEP128/TKIP/AES
Network types	STA/AP

3.2. Radio Performance

3.2.1. IEEE802.11b

Table 4 Basic Specifications under IEEE802.11b

ITEM	**Specification**
Modulation Type	DSSS / CCK
Frequency range	2412MHz~2462MHz
Channel	CH1 to CH11
Data rate	1, 2, 5.5, 11Mbps

Table 5 Transmitting Performance under IEEE802.11b

TX Characteristics	Min.	Typical	Max.	Unit
Power@11Mbps		**16**		dBm
Frequency Error	**-15**		**+15**	ppm
EVM@11Mbps			**-14**	dB
Transmit spectrum mask				
Pass				

Table 6 Receiving Performance under IEEE802.11b

RX Characteristics	Min .	Typical	Max.	Unit
11Mbps Input Level Sensitivity				
Minimum Input Level (FER≦8%)			**-89**	dBm

3.2.2. IEEE 802.11g

Table 7 Basic Specifications under IEEE802.11g

ITEM	**Specification**

Modulation Type	OFDM
Frequency range	2412MHz~2462MHz
Channel	CH1 to CH11
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps

Table 8 Transmitting Performance under IEEE802.11g

TX Characteristics	Min.	Typical	Max.	Unit
Power@54Mbps		**15**		dBm
Frequency Error	**-15**		**+15**	ppm
EVM@54Mbps			-30	dB
Transmit spectrum mask				
Pass				

Table 9 Receiving Performance under IEEE802.11g

RX Characteristics	Min .	Typical	Max.	Unit
54Mbps Input Level Sensitivity				
Minimum Input Level (FER≦10%)			**-76**	dBm

3.2.3 IEEE802.11n

IEEE802.11n 20MHz bandwidth mode

Table 10 Basic Specifications under IEEE802.11n with 20MHz

ITEM	**Specification**
Modulation Type	OFDM
Frequency range	2412MHz~2462MHz
Channel	CH1 to CH11
Data rate	MCS0/1/2/3/4/5/6/7

Table 11 Transmitting Performance under IEEE802.11n with 20MHz

TX Characteristics	Min.	Typical	Max.	Unit
Power@HT20, MCS7		**14**		dBm
Frequency Error	**-15**		**+15**	ppm
EVM@HT20, MCS7			**-30**	dB
Transmit spectrum mask				
Pass				

Table 12 Receiving Performance under IEEE802.11n with 20MHz

RX Characteristics	Min.	Typical	Max.	Unit
MCS7 Input Level Sensitivity				
Minimum Input Level (FER≦10%)			**-73**	dBm

4. BL1207-P Hardware Information

4.1. PIN Sequence

Please refer to Fig 1 for the pin sequence.

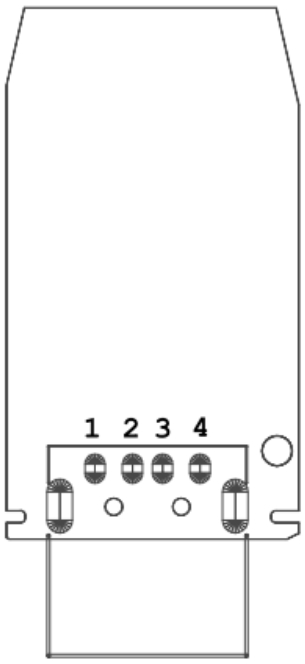


Fig 1 BL1207-P pin sequence (TOP VIEW)

4.2. PIN Definitions

Please refer to Table 13 for pin definitions.

Pin	Interface	Description	Type
1	GND	GND	POWER
2	TX	UART0_TX 5V	O
3	RX	UART0_RX 5V	I
4	VDD	12V INPUT	POWER

Table 13 BL1207-P PIN Definitions

4.3 Recommendations

The following precautions should be considered during PCB designing:

Do not place any electrical components or grounding in antenna area on main board and it's better to leave this area blank on PCB.

It is recommended to not place any electrical components within 10mm range of module antenna and not design any circuit or bond copper on main board under this area.

Do not use the module inside any metal case or containers with metal painting.

Keep the antenna of Wi-Fi module next to the edge of main board during design of PCB to ensure better performance of antenna.

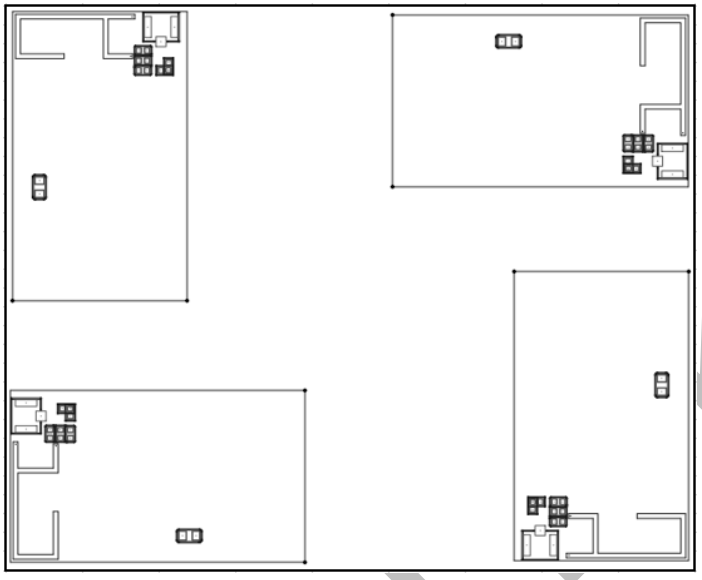
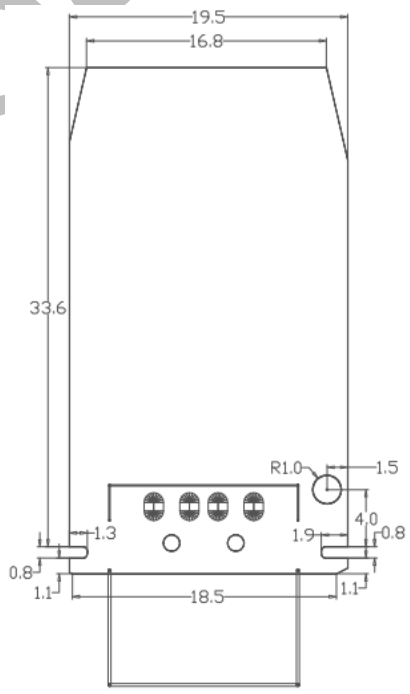


Fig 2 BL1207-P Recommended PCB Layout

4.4. Mechanical Dimensions

Please refer to Fig 3 for the dimensions of module.



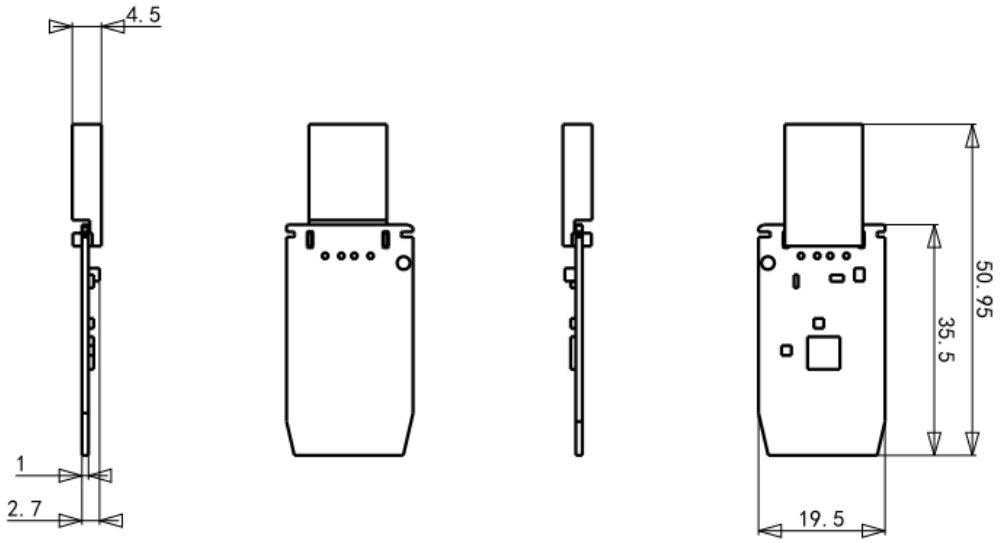


Fig 3 BL1207-P Dimensions

5. Reference Design

5.1. Power Supply Requirement

It is recommended to supply the module with power higher than 200mA (12V) to ensure enough power supply to the module and avoid power down during data transmission.

Revision History

Date	Version	Updated Content
11/20/2023	1.0	Preliminary version
3/27/2024	1.1	Added current parameters

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FCC Statement:
Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IC Statement:
This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radioexempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

ce matériel est conforme aux limites de dose d'exposition aux rayonnements, CNR-102 énoncée dans un autre environnement.cette eqipment devrait être installé et exploité avec distance minimale de 20 entre le radiateur et votre corps.

FCC ID: 2ATEV-BL1207-P
IC: 25062-BL1207P
CAN ICES-3 (B)/NMB-3(B)

(1) Operational use conditions

Module has professional users use condition limitations, Host product manufacturer please ensure giving such warning like “Product is limited to professional users use” in your product’s instruction.

(2) Antenna used

Antenna Type	Max. Antenna Gain
PCB	2.96dBi

(3) Labelling Instruction for Host Product Integrator

Please notice that if the FCC and IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. For FCC, this exterior label should follow “Contains FCC ID: 2ATEV-BL1207-P”. In accordance with FCC KDB guidance 784748 Labeling Guidelines. For IC, this exterior label can use wording “Contains IC: 25062-BL1207P”.

§ 15.19 and RSS-Gen Labelling requirements shall be complied on end user device. Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

(4) Installation Notice to Host Product Manufacturer

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and difference antenna configurations.

(5) Antenna Change Notice to Host manufacturer

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID and IC ID (new application) procedure followed by a Class II permissive change application.

(6) FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, 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.

Host manufacturer in any case shall ensure host product which is installed and

operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 Information to the user or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:

For Class B

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.

For Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.