BL3359-P

Embedded Product

Version：1.1 Release date： May 24, 2019

WiFi Module

Features

- 192MHz ARM Cortex M4 MCU
- 384KB SRAM/1MB FLASH
- Support AES，MD5，SHA1
- Support XIP
- Working voltage: DC 3.3V
- Wi-Fi related features
  - Support 802.11 b/g/n with 20M
  - Support station and soft AP
  - 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
- Peripheral
  - 2x UART
  - 2x ADC
  - 1x SPI
  - 4x PWM
  - Up to 14 GPIOs
  - Working temperature: -25℃ to +85℃
  - Stamp style SMD for surface mounting production

Applications

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

Model

Model	Antenna type	Note
BL3359-P	PCB antenna	Default

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Content

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1. Overview

BL3359-P is a cost-effective embedded Wi-Fi module designed by BroadLink, which integrates an ARM Cortex-M4F processor speed up to 125MHz, 256KB SRAM and 2MB flash with 3.3V single 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 BL3359-P Power Consumption Data

Specifications	Min.	Typ.	Max.	Units
VDD	**3.0**		**5.0**	V
VIL(input low voltage)	-0.3		1.0	V
VIH(input high voltage)	2.1		3.6	V
VOL(output low voltage)		0		V
VOH(output high voltage)		3.3		V
Io			40	mA
Standby (SP mini)		50		mA
pulse current @TX 11b @17dBm 11Mbps			210	mA
pulse current @TX 11g @15dBm 54Mbps			210	mA
pulse current @TX 11n @14dBm 65Mbps			210	mA

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2.2. Working Environment

Please refer to Table 2 for working environment data.

Table 2 BL3359-P Working Environment Data

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	125	℃
TA	Ambient operating temperature	-25	85	℃
Vdd	Supply voltage	3.0	5	V
Vio	Voltage on IO pin	0	3.3	V

3. Radio Specifications

3.1. Basic Radio Specification

Please refer to Table 3 for radio specification.

Table 3 BL3359-P Radio Specification

Radio range	2.412 GHz - 2.462 GHz
Wireless standards	IEEE 802.11 b/g/n
Radio output (conductive)	802.11b:17±1.5dBm@11Mbps
	802.11b: 17±1.5dBm@1Mbps
	802.11g: 14±1.5dBm@54Mbps
	802.11g: 14±1.5dBm@6Mbps
	802.11n: 14±1.5dBm@MCS7/HT20
	802.11n: 14±1.5dBm@MCS0/HT20
Antenna type	Internal: PCB antenna
	External: Not supported
Receiving sensitivity	802.11b<-85dBm@11Mbps
	802.11g<-72dBm@54Mbps
	802.11n/HT20<-70dBm@MCS7

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/STA+AP/WIFI Direct

3.2. Radio Performance

3.2.1. IEEE 802.11b

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		**17**		dBm
Frequency Error	**-10**		**+20**	ppm
EVM@11Mbps			**-20**	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%)			**-87**	dBm
Maximum Input Level (FER≦8%)			-10	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	**-20**		**+20**	ppm
EVM@54Mbps			-28	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%)			**-73**	dBm
Maximum Input Level (FER≦10%)	-10			dBm

3.2.3 IEEE802.11n

IEEE802.11n 20MHz bandwidth mode

Table 10Basic 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	**-20**		**+20**	ppm
EVM@HT20, MCS7			**-28**	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%)			**-71**	dBm
Maximum Input Level (FER≦10%)			-20	dBm

3.2.4 Testing Data for OTA

Refer to Table 1 for testing data.

Table 16 Actual power for EIRP, TRP and TIS

Testing equipment	Testing item	Mode	Speed	Channel	Power/dBm
CMW500	EIRP	11b	11M	1	<20
				6	<20
				13	<20
		11g	6M	1	<20
				6	<20
				13	<20
	TRP	11g	6M	1	≥12
				6	≥12
				13	≥12
	TIS	11g	54M	1	≤-72
				6	≤-72
				13	≤-72

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4. BL3359-P Hardware Information

4.1. PIN Sequence

Please refer to Fig 1 for the pin sequence.

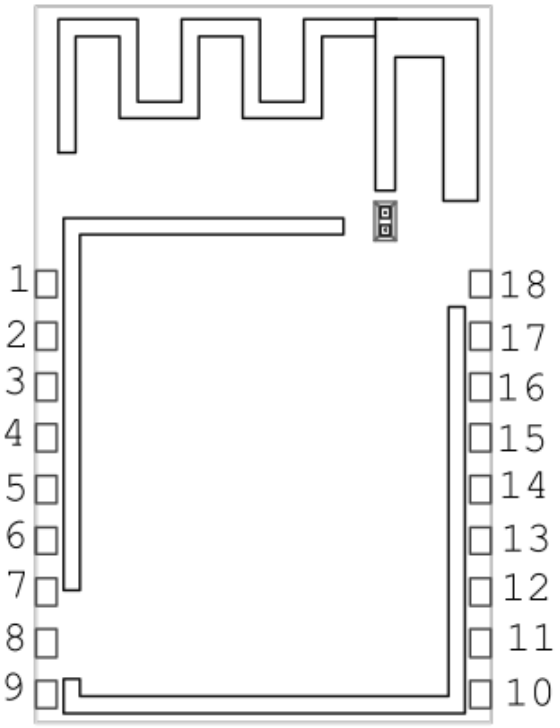

Fig 1 BL3359-P pin sequence

4.2. PIN Definitions

Please refer to Table17 for the pin definitions.

Table17 BL3359-P pin definitions

pin	Function 1	Function 2	Function 3	Function 4	Function 5	default
1	GPIOA17	TX1				

2	GPIOA18	RX1				
3	GPIOA12		ADC_CH4		IR_TX	
4	GPIOB3					
5	GPIOA8		ADC_CH0			
6	GPIOA14		ADC_CH6		IR_RX	
7	GPIOA15					
8	VDD					
9	GND					
10	RST					
11	GPIOA6					
12	GPIOA19			PWM0	SPI_MOSI	
13	GPIOA20			PWM1	SPI_MISO	
14	GPIOA21			PWM2	SPI_CLK	
15	GPIOA22			PWM3	SPI_CS	
16	RX0	GPIOB1				
17	TX0	GPIOB0				
18	GND					

Note:

1. In default, UART0 is used for bypass communication and UART2 is used for output of debugging information. Please refer to the description in DC Characteristics for UART output current level.

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2. NRST is hardware reset for the module and will be effective with VIL. Configuration information will be remained after module reset. The module is already designed with RC reset upon power-on.

3. The pins for reset button and LED indication should be defined according to actual firmware and circuit design.

4. In default, PIN11 (GPIO2) is the module software reset PIN and will be effective with VIH. The previous configuration information will be cleared after the module is reset (reset to factory settings).

5. TX and RX in UART0 are used for communication with external MCU powered by 3V. Please refer to the description in 3.3. DC Characteristics for UART output current level.

6. It is recommended to ground unused GPIOs with 10pF capacitor.

4.4. Mechanical Dimensions

Fig 6 BL3359-P

Note: Dimensions (13.3±0.2) mm * (21±0.2) mm * (2.6)mm (with shielding case)

4.5. Recommended Pad Size

Please refer to Fig 7 for the recommended pad size

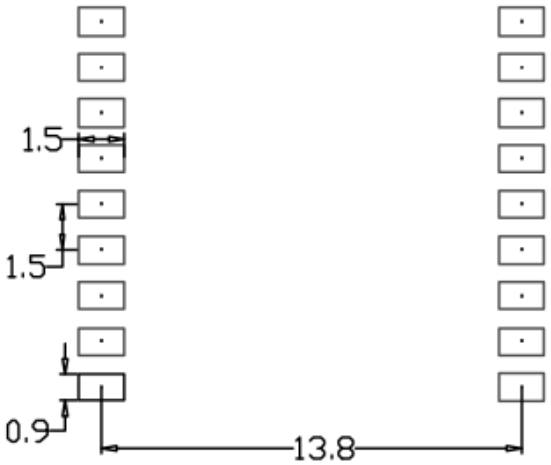

Fig 7 BL3359-P Recommended pad size

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4.6. Certifications

1. Compliant and certified with SRRC standard (CMIIT ID: 2017DP6839).
2. Compliant with requirement of RoHS 2.0.
3. Compliant with requirement of REACH.

4.7. Label

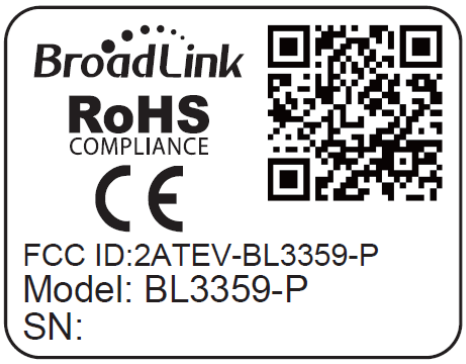

Fig 8 BL3359-P label content

Please refer to Fig 8 for the content description on label.

Model: ******* : Module model

SN: 00ACA3FE75D7 : Module unique MAC address

FCC ID:2ATEV-BL3359-P

The QR code contains information including but not limited to:
CMIIT ID:xxxxxxxxxxxx
FCC ID: 2ATEV-BL3359-P
IC: 25062-BL3359P
Manufacturer:
Hangzhou BroadLink Technology Co., Ltd.
Building C, 57 Jiang'er Road, Binjiang District, Hangzhou, Zhejiang, P.R.China

4.8. Shielding Case Dimensions

Please refer to Fig 9 for the dimensions of shielding case.

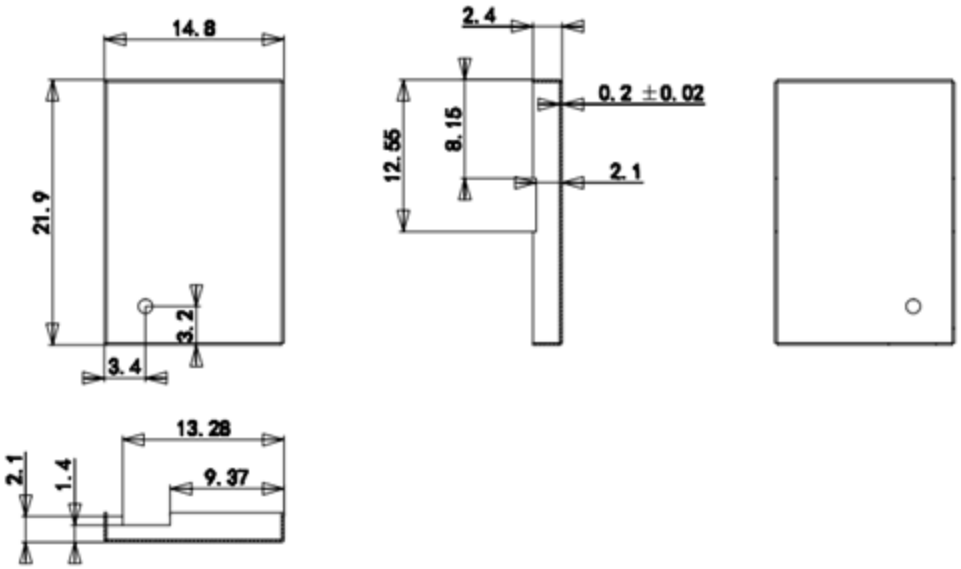

Fig 9 BL3359-P Dimensions of shielding case

(Unit: mm)

4.9. Packaging

BL3359-P is packed in reel with 850 pcs/reel

5. Reference Design

5.1. UART Interface Design

For devices with 3.3V power supply, you can directly connect the device UART port with module UART port according to the illustration in Fig 12.

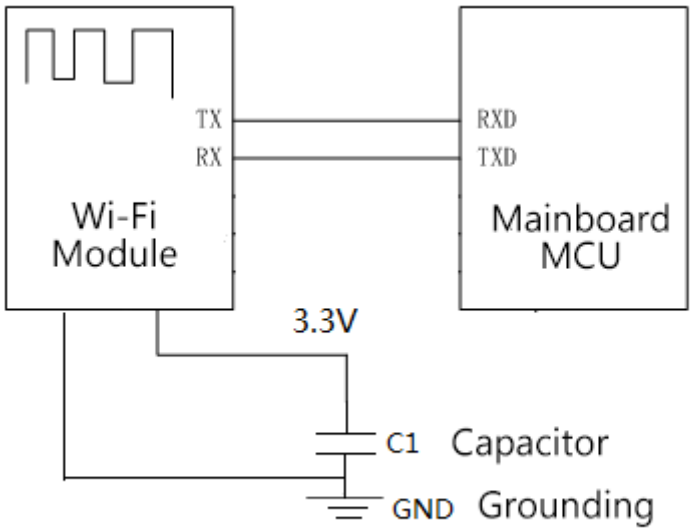

Fig 12 Circuit diagram (3.3V)

If your device is powered by 5V, you can refer to the circuit shown in Fig 13 or design your own circuit for power conversion. The value of resistor can be adjusted according to actual circuit design.

5.2. Power Supply Requirement

If an LDO is used to supply the module with 3.3V power, C1 capacitor can be considered to be used with 10u-22u; If a DCDC is used to supply 3.3V power, C1 capacitor can be considered to be used with 22uF.

It is recommended to supply the module with power higher than 400mA to ensure enough power supply to the module and avoid power down during data transmission.

The module is designed with 2x 3.3V pins. You can power the module with either pin or both pins.

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.

Note: This product 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 product 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 product 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.

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 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.

2.2 List of applicable FCC rules
FCC Part 15.247

2.6 RF exposure considerations
This equipment complies with the FCC RF 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 and any part of your body.

2.8 Label and compliance information
FCC ID label on the final system must be labeled with "Contains FCC ID:

2ATEV-BL3359-P" or "Contains transmitter module FCC ID: 2ATEV-BL3359-P".

2.9 Information on test modes and additional testing requirements

Contact Hangzhou BroadLink Technology Co., Ltd. will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

2.10 Additional testing, Part 15 Subpart B disclaimer

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, Hangzhou BroadLink Technology Co., Ltd. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

Note 1: This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.
A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: Additional testing and certification may be necessary when multiple modules are used.

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This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures. Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without reassessment permissive change.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionnement en association avec une autre antenne ou transmetteur.

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.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

This module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products. Additional testing and certification may be necessary when multiple modules are used.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The host product shall be properly labeled to identify the modules within the host product.
The ISED certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labeled to display the ISED certification number for the module, preceded by the word "contains" or similar wording expressing the same meaning, as follows:
Contains IC: 25062-BL3359P

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.

Revision History

Date	Version	Updated Content
12/10/2018	1.0	Preliminary version
4/23/2019	1.1	Modified RF power, packaging and label information.
5/13/2019	1.2	Revised some parameters and added actual testing data of antenna and certification information.

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