



BL-M8189FS6(VQ1)

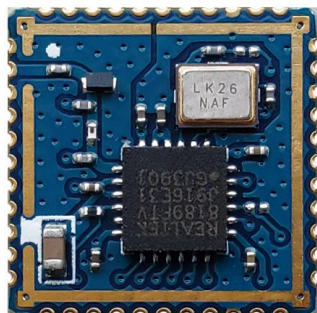
802.11n 72.2Mbps WLAN

SDIO Module Specification

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(Top View)



(Bottom View)

Module Name: BL-M8189FS6(VQ1)	
Module Type: 802.11b/g/n 72.2Mbps 1T1R WLAN SDIO Module	
Revision: V1.3	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
LB-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date	Revised By
1.0	Official release	2020-03-225	
1.1	Optimized for ESD instructions	2020-04-25	
1.2	Update the specification version	2023-04-04	Ch
1.3	Update product picture	2023-09-04	Fnz

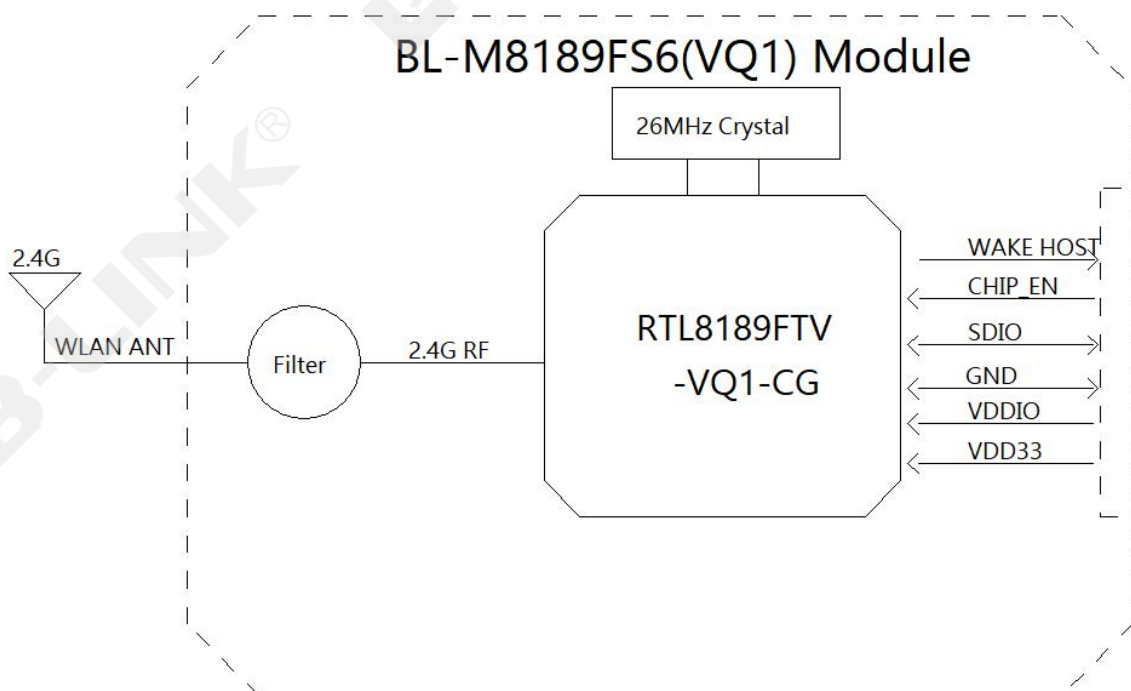
1. Introduction

BL-M8189FS6(VQ1) is a highly integrated WLAN module, it contains a WLAN MAC, a 1T1R capable WLAN base band. It supports IEEE 802.11b/g/n standard and provides the highest PHY rate up to 72.2Mbps, offering feature-rich wireless connectivity and reliable throughput from an extended distance.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz
- Host Interface is SDIO 2.0
- IEEE Standards: IEEE 802.11b/g/n
- Wireless PHY rate can reach up to 72.2Mbps
- Connect to external antenna through half hole pad
- Power Supply: $3.3 \pm 0.2V$ main power supply; $3.3 \pm 0.2V$ or $1.8 \pm 0.1V$ for VDIO (SDIO and Digital I/O power supply)

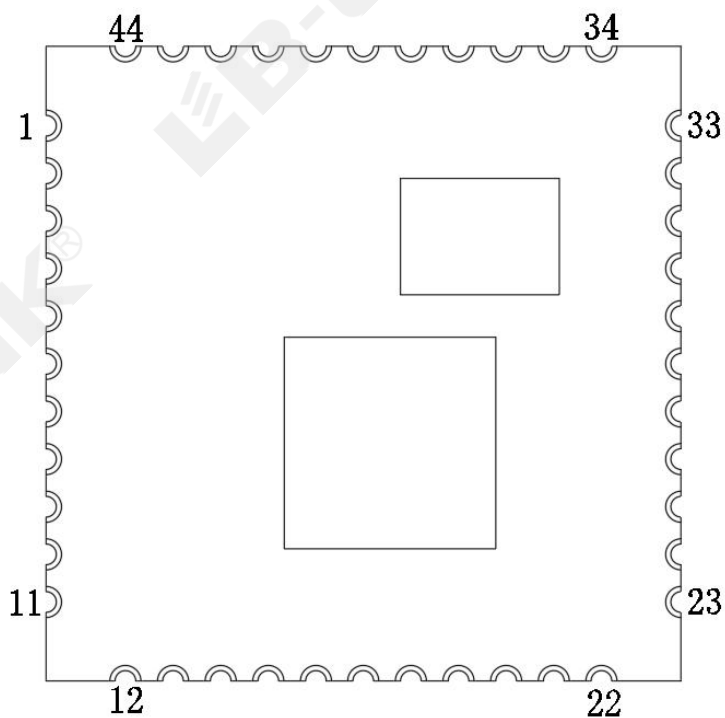
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8189FS6(VQ1)
Chipset	RTL8189FTV-VQ1-CG
WLAN Standards	IEEE802.11b/g/n
Host Interface	SDIO 2.0 for WLAN
Antenna	Connect to the external antenna through half hole pad
Dimension	12.0*12.0*1.5mm (L*W*H)
Power Supply	DC 3.3±0.2V(main power) @ 500 mA (Max) DC 3.3±0.2V or 1.8±0.1V(SDIO and Digital I/O power)
Operation Temperature	-20°C to +70°C
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



(Top View)

2.1 Pin Definition

No.	Pin Name	Type	I/O Level	Module Pin Description
1	GND	RF		Ground for RF
2	WLAN ANT	RF		RF pad for WLAN ANT
3	GND	RF		Ground for RF
4	NC	--		No connection
5	NC	--		No connection
6	NC	--		No connection
7	NC	--		No connection
8	NC	--		No connection
9	VDD33	P		DC 3.3V Main power supply
10	NC	--		No connection
11	NC	--		No connection
12	CHIP_EN	I	VDD33	This pin can Externally Shutdown the module when it pulled low. Internal pull high by 100K resistor
13	WAKE_HOST	O	VDDIO	Shared with GPIO0. WLAN wake-up HOST output
14	SD_D2	I/O	VDDIO	SDIO data line 2
15	SD_D3	I/O	VDDIO	SDIO data line 3
16	SD_CMD	I/O	VDDIO	SDIO command input
17	SD_CLK	I	VDDIO	SDIO clock input
18	SD_D0	I/O	VDDIO	SDIO data line 0
19	SD_D1	I/O	VDDIO	SDIO data line 1
20	GND	P		Ground connections
21	NC	--		No connection
22	VDDIO	P		Supply voltage for digital IO, 3.3V or 1.8V is alternative
23	NC	--		No connection
24	NC	--		No connection
25	NC	--		No connection
26	NC	--		No connection
27	NC	--		No connection
28	NC	--		No connection
29	NC	--		No connection

30	NC	--		No connection
31	GND	P		Ground connection
32	NC	--		No connection
33	GND	P		Ground connection
34	NC	--		No connection
35	NC	--		No connection
36	GND	P		Ground connection
37	NC	--		No connection
38	NC	--		No connection
39	NC	--		No connection
40	NC	--		No connection
41	NC	--		No connection
42	NC	--		No connection
43	NC	--		No connection
44	NC	--		No connection

P: Power, I: Input, O: Output, I/O: In/Output, RF: Analog RF Port

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-20	25	70	°C
External Antenna VSWR			1.7	2.0	/
Supply Voltage	VDD33	3.1	3.3	3.5	V

3.2 Digital 3.3V GPIO DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	2.0	3.3	3.5	V

VIL	Input Low Voltage		0	0.9	V
VOH	Output High Voltage	2.97	--	3.3	V
VOL	Output Low Voltage	0	--	0.33	V

3.3 Digital 1.8V I/O DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	1.3	1.8	2.0	V
VIL	Input Low Voltage	--	0	0.8	V
VOH	Output High Voltage	1.62	--	1.8	V
VOL	Output Low Voltage	0	--	0.18	V

3.4 Current Consumption

Conditions : VDD33=3.3V ; ;VDDIO=3.3V Ta:25°C			
Use Case	VDD33 Current(average)		
	Typ	Max	Units
WLAN Unassociated (Linux Driver)	40	60	mA
2.4G 11b@1Mbps TX@17dBm (RF test)	263	310	mA
2.4G 11b@1Mbps RX(RF test)	59	70	mA
2.4G 11b@11Mbps TX@17dBm (RF test)	270	320	mA
2.4G 11b@11Mbps RX(RF test)	57	68	mA
2.4G 11g@6Mbps TX@16dBm (RF test)	260	285	mA
2.4G 11g@6Mbps RX (RF test)	60	70	mA
2.4G 11g@54Mbps TX@14dBm (RF test)	255	270	mA
2.4G 11g@54Mbps RX (RF test)	55	65	mA
2.4G 11n@HT20_MCS0 TX@16dBm (RF test)	272	283	mA
2.4G 11n@HT20_MCS0 RX (RF-Test)	60	70	mA
2.4G 11n@HT20_MCS7 TX@14dBm (RF test)	262	280	mA
2.4G 11n@HT20_MCS7 RX (RF-Test)	59	68	mA

4. WLAN RF Specifications

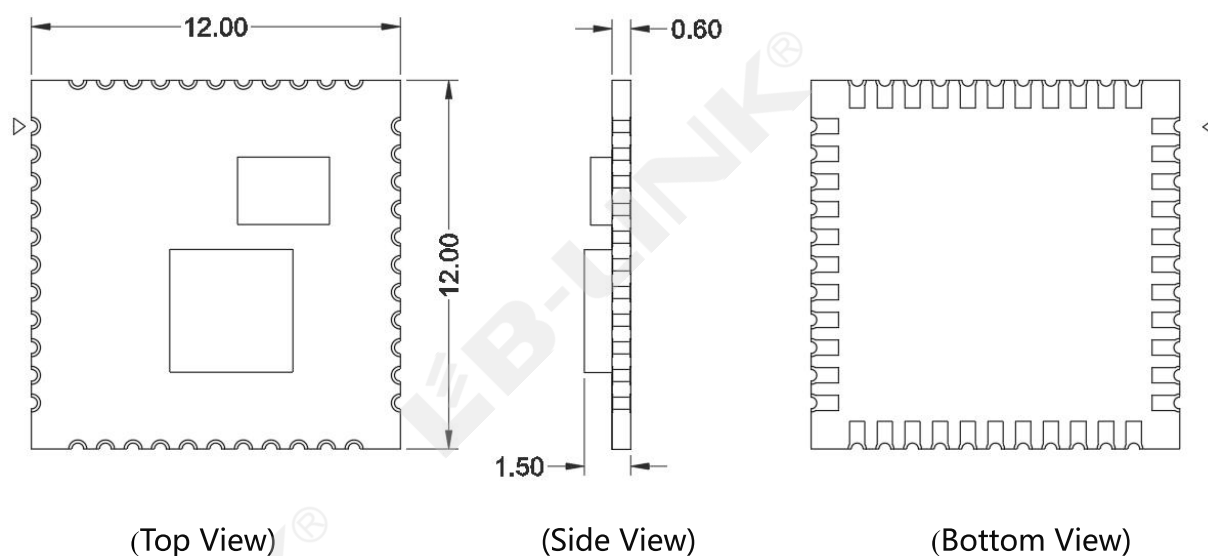
4.1 2.4G WLAN RF Specification

Conditions : VDD33=3.3V Ta:25°C			
Features	Description		
WLAN Standard	IEEE 802.11b/g/n		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Ch1~Ch13 (For 20MHz Channels)		
Modulation	802.11b (DSSS): DBPSK, DQPSK, CCK; 802.11g (OFDM): BPSK, QPSK, 16QAM, 64QAM; 802.11n (OFDM): BPSK, QPSK, 16QAM, 64QAM;		
Date Rate	802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7(1T1R_SISO) 6.5~72.2Mbps;		
Frequency Tolerance	≤ ±20ppm		
2.4G Transmitter Specifications (TX power of some rates is calibrated, customers can define the target TX power of other rates by modifying configuration file of the driver software. Customers must define the TX power same or lower than recommended Target TX Power as below)			
TX Rate	TX Power (dBm)	TX Power Tolerance (dBm)	EVM
802.11b@1Mbps	Recommended Target TX Power :17	±2dBm	≤-10dB
802.11b@11Mbps	Calibrated TX Power :17	±2dBm	≤-15dB
802.11g@6Mbps	Recommended Target TX Power :16	±2dBm	≤-10dB
802.11g@54Mbps	Calibrated TX Power :14	±2dBm	≤-25dB
802.11n@HT20_MCS0	Recommended Target TX Power :16	±2dBm	≤-10dB
802.11n@HT20_MCS7	Calibrated TX Power :14	±2dBm	≤-28dB
2.4G Receiver Specifications			
RX Rate	Min Input Level(Typ.dBm)	Max Input Level(Typ.dBm)	PER
802.11b@1Mbps	-92	-10	< 8%

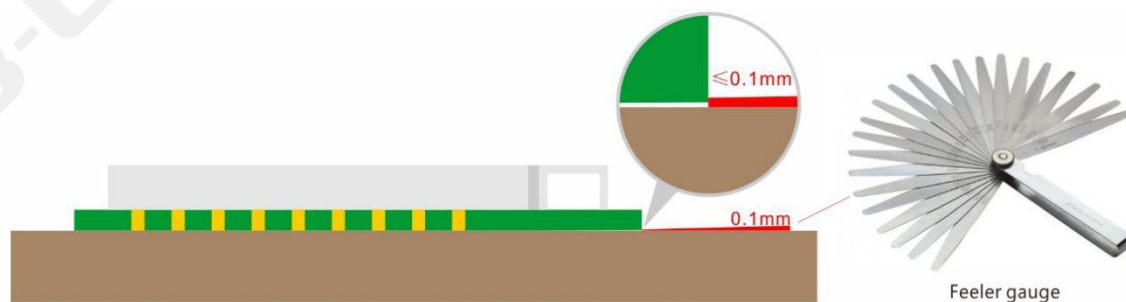
802.11b@11Mbps	-86	-10	< 8%
802.11g@6Mbps	-90	-10	< 10%
802.11g@54Mbps	-72	-10	< 10%
802.11n@HT20_MCS0	-88	-10	< 10%
802.11n@HT20_MCS7	-69	-10	< 10%

5. Mechanical Specifications

5.1 Module Outline Drawing

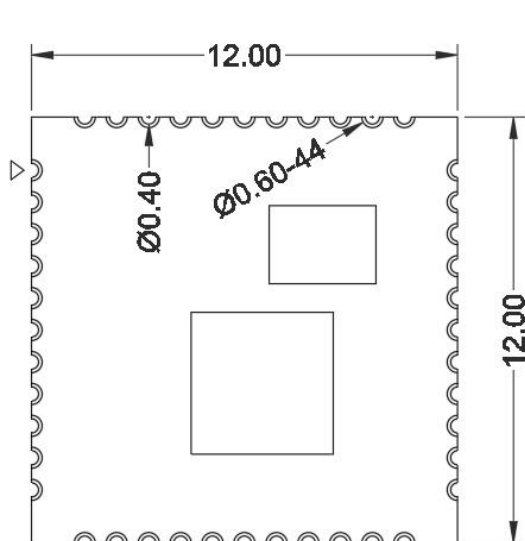


Module dimension: 12.0*12.0*1.5mm (L*W*H; Tolerance: ± 0.15 mm)

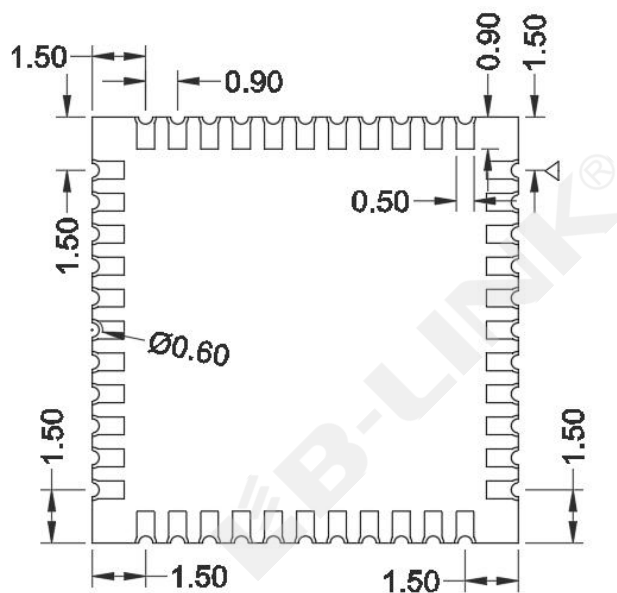


Module Bow and Twist: ≤ 0.1 mm

5.2 Mechanical Dimensions



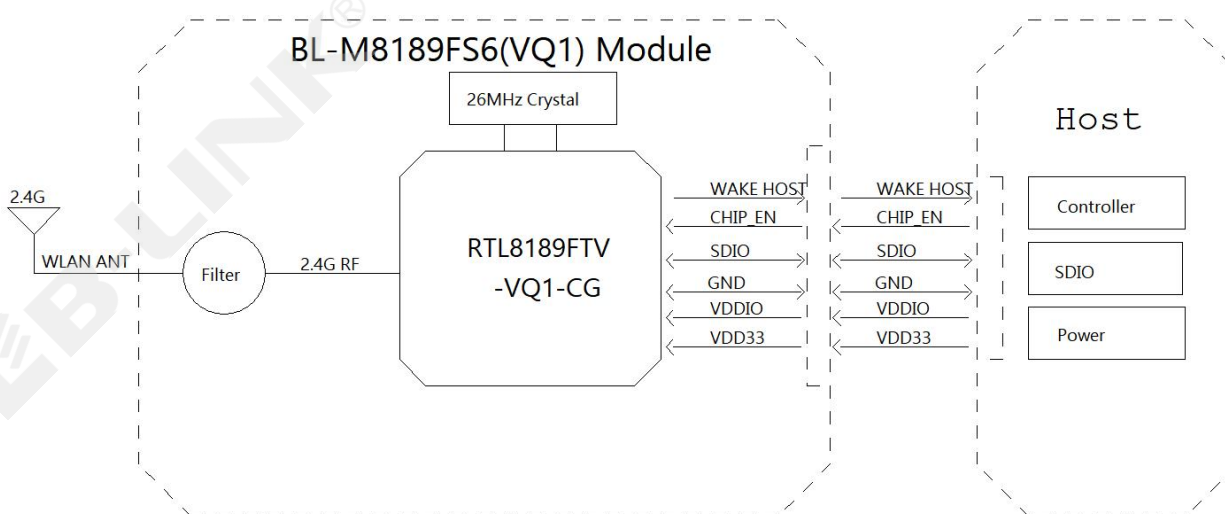
(Top View)



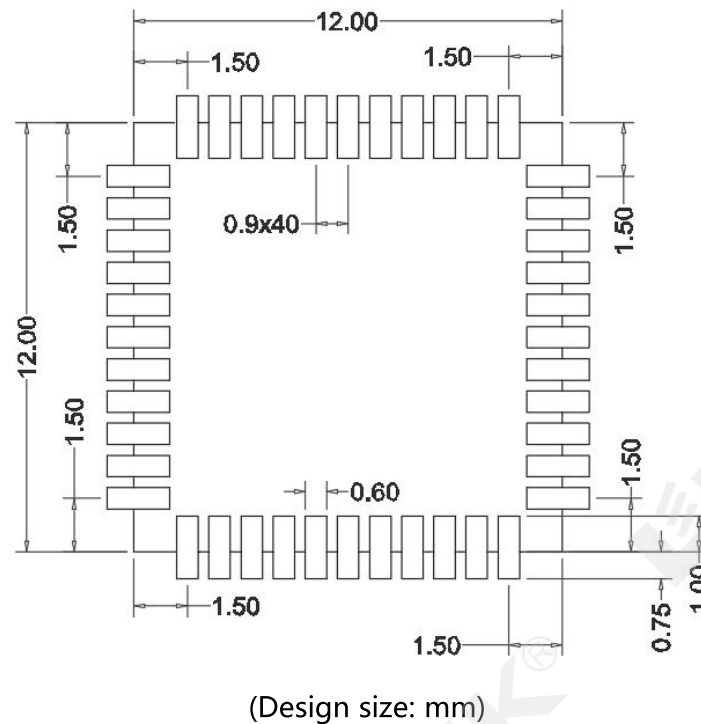
(Bottom View)

6. Application Information

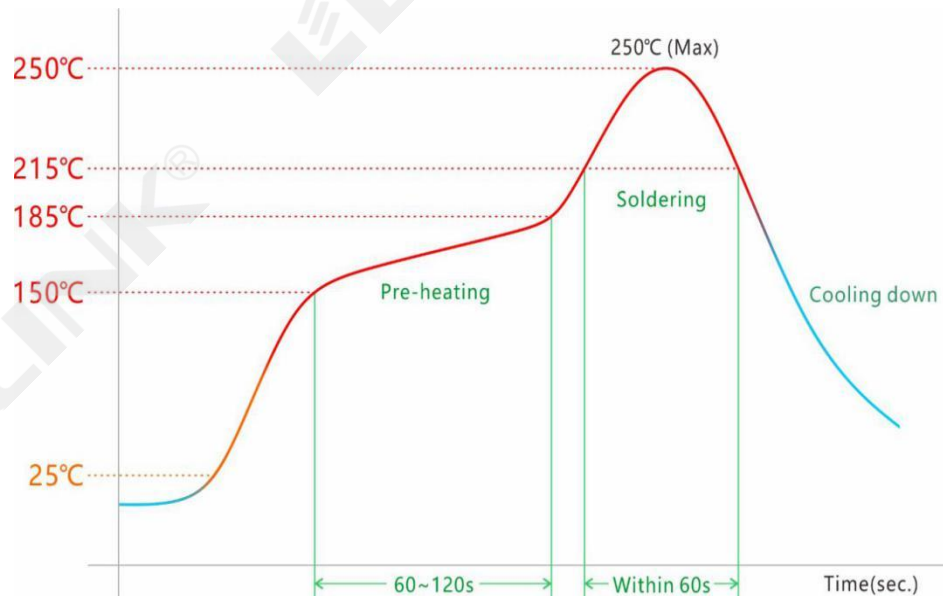
6.1 Typical Application Circuit



6.2 Recommend PCB Layout Footprint



6.3 Reflow Soldering Standard Conditions



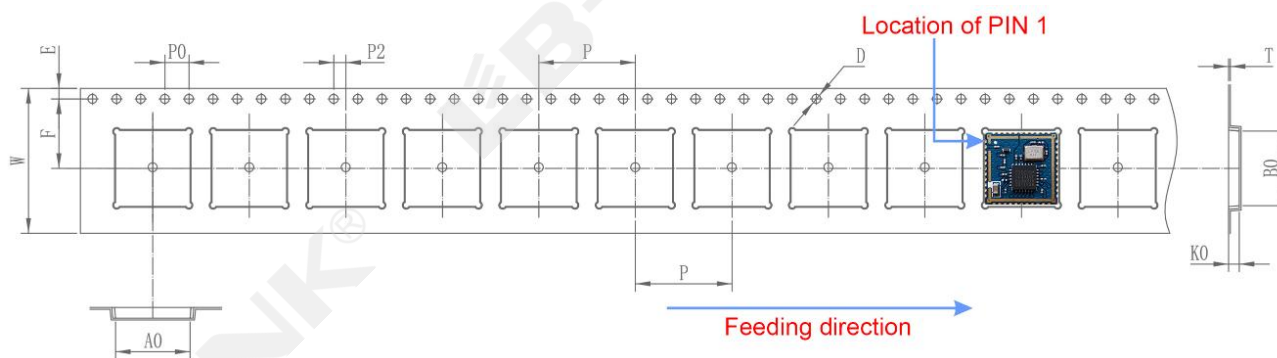
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8189FTV-VQ1-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8189FS6	SHEN ZHEN QILI ELECTRON CO.,LTD	
			Huizhou Dayawan Kexiang Technology Circuit Board Co., Ltd	
			Jiangsu Lantek Electronics Tech Co.,LTD	
3	Crystal	26MHz-3225	LUCKI CM ELECTRONICS CO.,LTD	
			HUBEI TKD CRYSTAL ELECTRONIC SCIENCE AND TECHNOLOGY CO.,LTD	
			JinHua East Crystal Electronic CO.,LTD	
			Chengde oscillator Electronic Technology CO.,LTD	

8. Package and Storage Information

8.1 Package Dimensions



ITEM	W	AO	BO	KO	E	F	P	P0	P2	D	T
DIM	24.00±0.3	12.25±0.1	12.5±0.1	1.75±0.1	1.75±0.1	11.5±0.1	16.00±0.1	4.00±0.1	2.00±0.1	Ø1.5±0.1	0.30±0.05



Package specification:

1. 2,000 modules per roll and 10,000 modules per box.
2. Outer box size: 37.5*36*29cm.
3. The diameter of the blue environment-friendly rubber plate is 13 inches, with a total thickness of 28mm (with a width of 24mm carrying belt).
4. Put 1 package of dry agent (20g) and humidity card in each anti-static vacuum bag.
5. Each carton is packed with 5 boxes.

8.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40°C to +85°C

Storage humidity: 10% to 95% RH (Non-Condensing)

Recommended Storage Conditions:

Storage temperature: 5°C to +40°C

Storage humidity: 20% to 90% RH

Please use this Module within 12month after vacuum-packaged.

The Module shall be stored without opening the packing.

After the packing opened, the Module shall be used within 72hours.

When the color of the humidity indicator in the packing changed, the Module shall be baked before soldering.

Baking condition: 60°C, 24hours, 1time.

ESD Sensitivity:

ESD Protection: 2KV(HBM, Maximum rating)

The Module is a static-sensitive electronic device.

Do not operate or store near strong electrostatic fields.

Take proper ESD precautions!



ESD CAUTION