

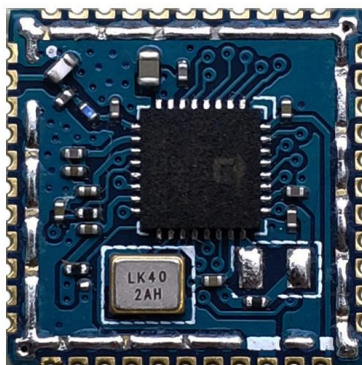


BL-M602CS1

**802.11n 72.2Mbps WiFi
SDIO Module Specification**

SHENZHEN BILIAN ELECTRONIC CO., LTD

Add: 10~11/F, Building 1A, Huaqiang idea park, Guangming district, Shenzhen. Guangdong, China
Web: www.b-link.net.cn



Module Name: BL-M602CS1	
Module Type: 802.11b/g/n 72.2Mbps 1T1R WiFi SDIO Module	
Revision: V1.0	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
BL-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date
0.1	Initial release	2021-03-24
1.0	Final release	2021-05-31

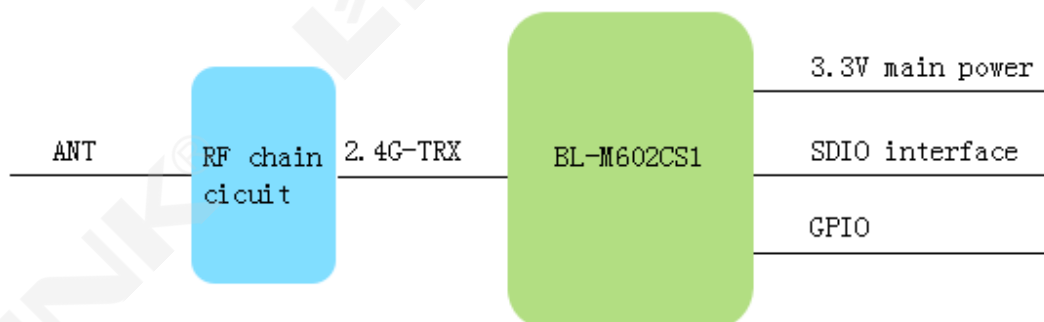
1. Introduction

BL-M602CS1 is a highly integrated WiFi 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 SDIO2.0
- IEEE Standards: IEEE 802.11b/g/n
- Wireless data rate can reach up to 72.2Mbps
- Connect to external antenna through half hole pad
- Power Supply: $3.3\pm0.2V$ main power supply; $3.3\pm0.2V$

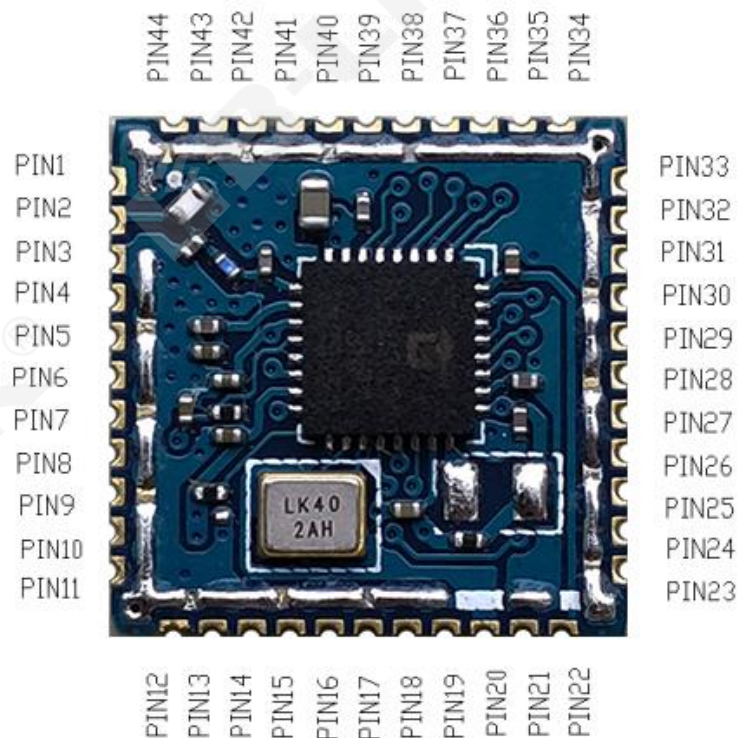
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M602CS1 WiFi Module
Chipset	BL602C
WiFi Standards	IEEE802.11b/g/n/, 1T1R, 2.4GHz, 72.2Mbps (Max)
Host Interface	SDIO 2.0
Antenna	Connect to the external antennas through half hole pad
Dimension	SMD 44Pins, 12*12*1.5mm (L*W*H)
Power Supply	DC 3.3±0.2V(main power) @ 350 mA (Max)
Operation Temperature	-20°C to +50°C
Operation Humidity	10% to 95% RH (Non-Condensing)
Storage Temperature	-45°C to +85°C

2. Pin Assignments



Top view

2.1 Pin Definition

No	Pin Name	Type	Description	Supply
1	GND	RF	Ground connections	
2	ANT	RF	WLAN RF port	
3	GND	RF	Ground connections	
4	NC	/	NC	
5	PAD_GPIO_8	I/O	SPI_MOSI/SPI_MISO, I2C_SCL, UART, PWM, AUXADC, GPIO	
6	PAD_GPIO_12	I/O	SPI_MOSI/SPI_MISO, I2C_SCL, UART, PWM, AUXADC, GPIO	
7	PAD_GPIO_11	I/O	SPI_SCLK, I2C_SDA, UART, PWM, AUXADC, GPIO	
8	NC	/	NC	
9	VDD33	P	3.3V Main power supply	
10	NC	/	NC	
11	NC	/	NC	
12	CHIP_EN	I	Chip enable	
13	PAD_GPIO_20	I/O	SF_D0, SPI_MOSI/SPI_MISO, I2C_SCL, UART, PWM, GPIO	
14	SD_D2	I/O	SDIO data line	
15	SD_D3	I/O	SDIO data line	
16	SD_CMD	I/O	SDIO command line	
17	SD_CLK	I	SDIO clock line	
18	SD_D0	I/O	SDIO data line	
19	SD_D1	I/O	SDIO data line	
20	GND	P	Ground connections	
21	NC	/	NC	
22	VDIO	P	VDIO for SDIO and Digital I/O pin, the power supply is same as the signal level of SDIO bus. Base on platform to choose 3.3V	
23	NC	/	NC	
24	XTAL32K_IN	I	Crystal oscillator 32.768KHz input	
25	NC	/	NC	
26	NC	/	NC	
27	NC	/	NC	
28	NC	/	NC	
29	NC	/	NC	

30	NC	/	NC	
31	GND	P	Ground connections	
32	NC	/	NC	
33	GND	P	Ground connections	
34	PAD_GPIO_22	I/O	SF_CLK_OUT, SPI_SS, I2C_SCL, UART, PWM, GPIO	
35	NC	/	NC	
36	GND	P	Ground connections	
37	NC	/	NC	
38	NC	/	NC	
39	NC	/	NC	
40	NC	/	NC	
41	NC	/	NC	
42	NC	/	NC	
43	NC	/	NC	
44	NC	/	NC	

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	50	°C
External Antenna VSWR		1	1.92	2.5	/
Supply Voltage	VDD33	3.1	3.3	3.5	V

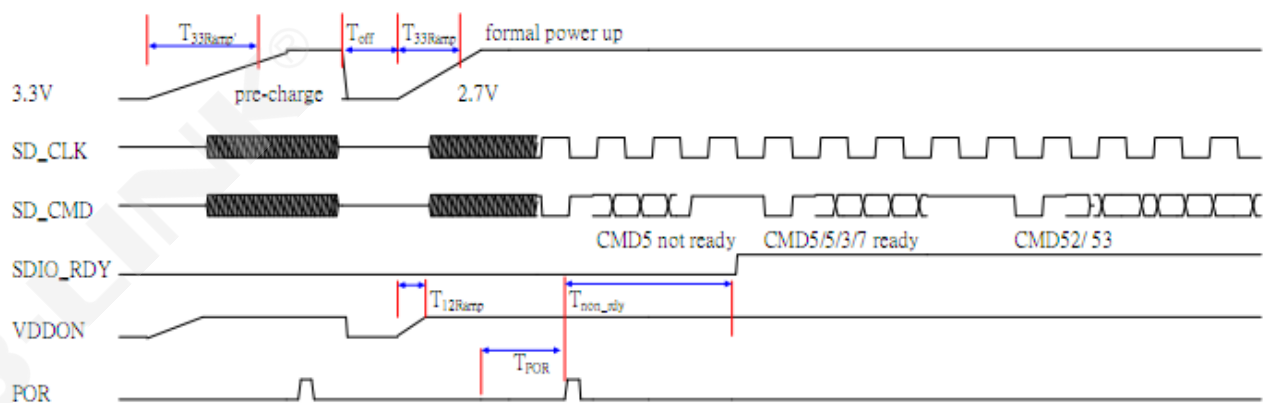
3.2 Current Consumption

Conditions : VDD33=3.3V ; Ta:25°C			
Use Case	VDD33 Current (average)		
	Typ	Max	Units
WiFi Radio Off (Linux Driver)	35	50	mA

WiFi Unassociated (Linux Driver)	40	60	mA
2.4G 1Mbps TX (RF-Test)	203	310	mA
2.4G 1Mbps RX (RF-Test)	35	40	mA
2.4G 11Mbps TX (RF-Test)	250	300	mA
2.4G 11Mbps RX (RF-Test)	35	40	mA
2.4G 6Mbps TX (RF-Test)	260	285	mA
2.4G 6Mbps RX (RF-Test)	40	45	mA
2.4G 54Mbps TX (RF-Test)	255	260	mA
2.4G 54Mbps RX (RF-Test)	40	45	mA
2.4G MCS0(HT20) TX (RF-Test)	272	283	mA
2.4G MCS0(HT20) RX (RF-Test)	40	45	mA
2.4G MCS7(HT20) TX (RF-Test)	262	280	mA
2.4G MCS7(HT20) RX (RF-Test)	40	45	mA

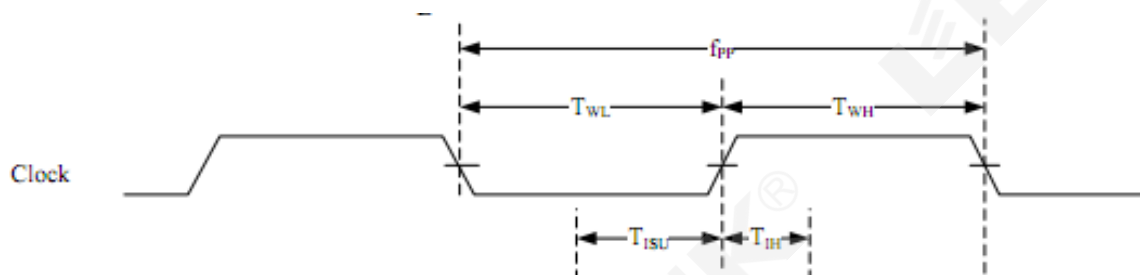
4. Interface Functional and Timing Specifications

4.1 SDIO Power On Sequence



	Min	Typical	Max	Unit
$T_{33\text{ramp}}$	0.2	0.5	2.5	ms
T_{off}	250	500	1000	ms
$T_{33\text{ramp}}$	0.2	0.5	2.5	ms
$T_{12\text{ramp}}$	0.1	0.5	1.5	ms
T_{por}	2	2	8	ms
$T_{\text{non-rdy}}$	1	2	10	ms

4.2 SDIO Timing



NO	Parameter	Mode	MIN	MAX	Unit
f_{PP}	Clock frequency	Default	0	25	MHz
		HS	0	50	MHz
T_{WL}	Clock low time	DEF	10		ns
		HS	7		ns
T_{WH}	Clock high time	DEF	10		ns

5. WiFi RF Specifications

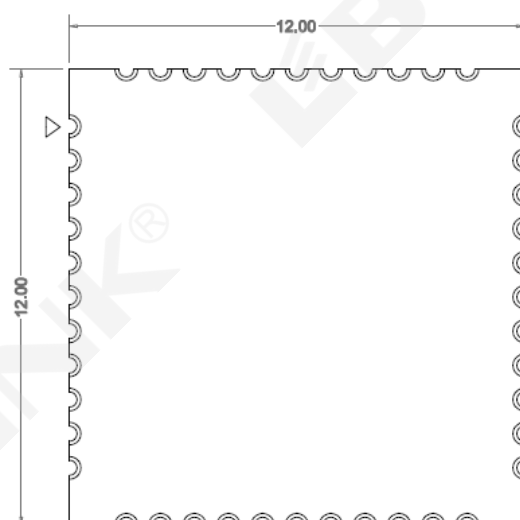
5.1 2.4G WiFi RF Specification

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	$\leq \pm 15\text{ppm}$

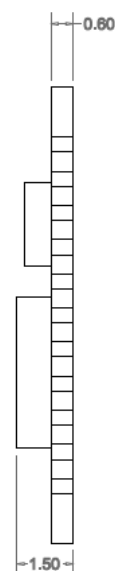
2.4G Transmitter Specifications			
TX Rate	TX Power	TX Power Tolerance	EVM
802.11b@1~11Mbps	17dBm	±2dBm	≤-10dB
802.11g@6Mbps	15dBm	±2dBm	≤-10dB
802.11g@54Mbps	15dBm	±2dBm	≤-25dB
802.11n@HT20_MCS0	14dBm	±2dBm	≤-10dB
802.11n@HT20_MCS7	14dBm	±2dBm	≤-28dB
2.4G Receiver Specifications			
RX Rate	Min Input Level(Typ)	Max Input Level(Typ)	PER
802.11b@1Mbps	-92dBm	-10dBm	< 8%
802.11b@11Mbps	-86dBm	-10dBm	< 8%
802.11g@6Mbps	-90dBm	-15dBm	< 10%
802.11g@54Mbps	-70dBm	-15dBm	< 10%
802.11n@HT20_MCS0	-88dBm	-15dBm	< 10%
802.11n@HT20_MCS7	-68dBm	-15dBm	< 10%

6. Mechanical Specifications

6.1 Module Outline Drawing

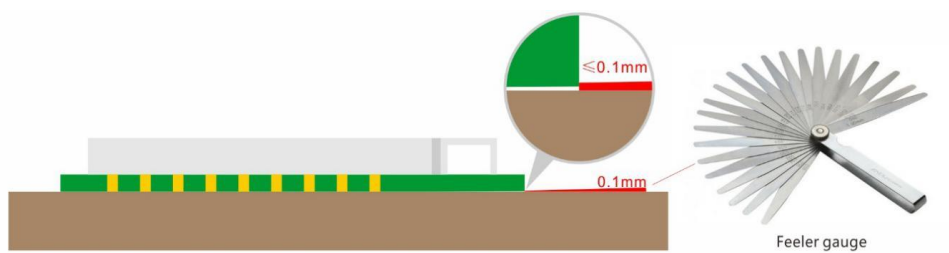


top view



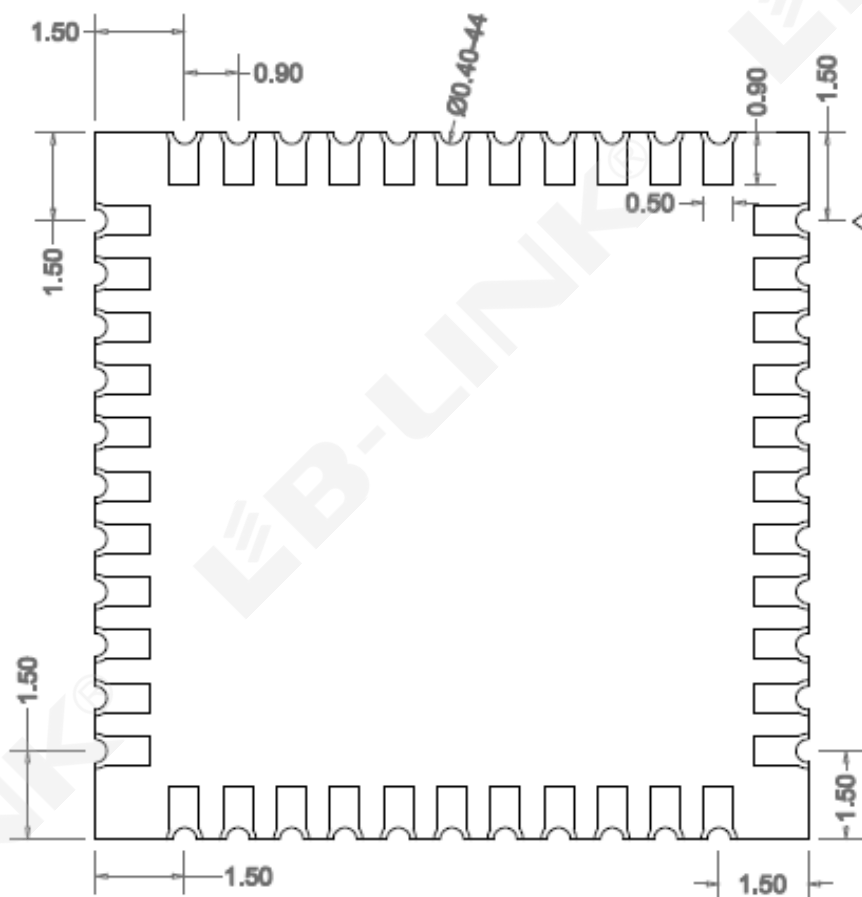
side view

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



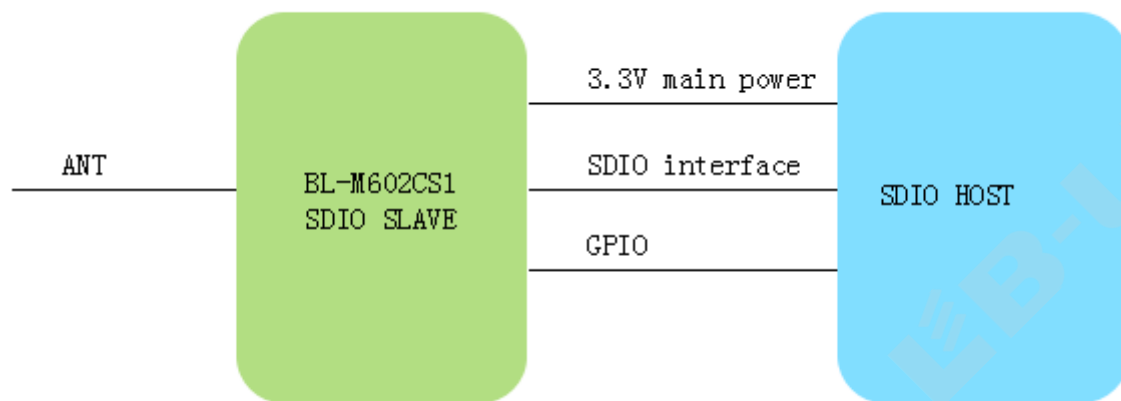
Module Bow and Twist: $\leq 0.1\text{mm}$

6.2 Mechanical Dimensions

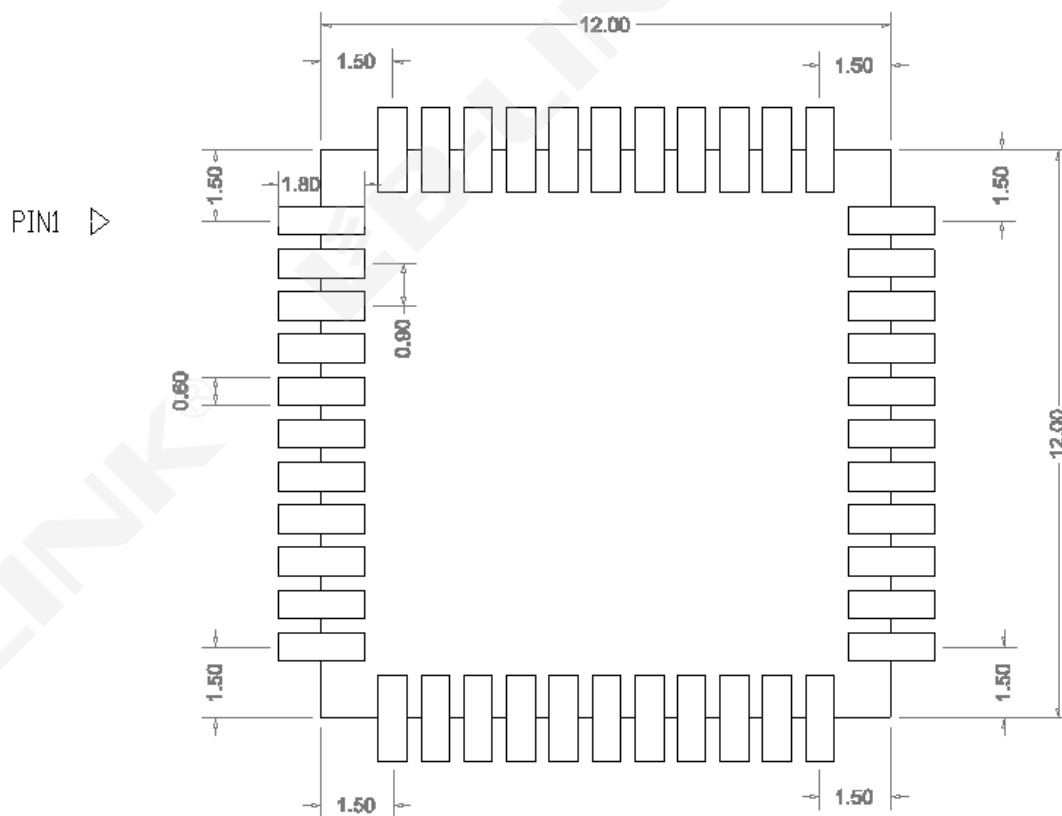


7. Application Information

7.1 Typical Application Circuit

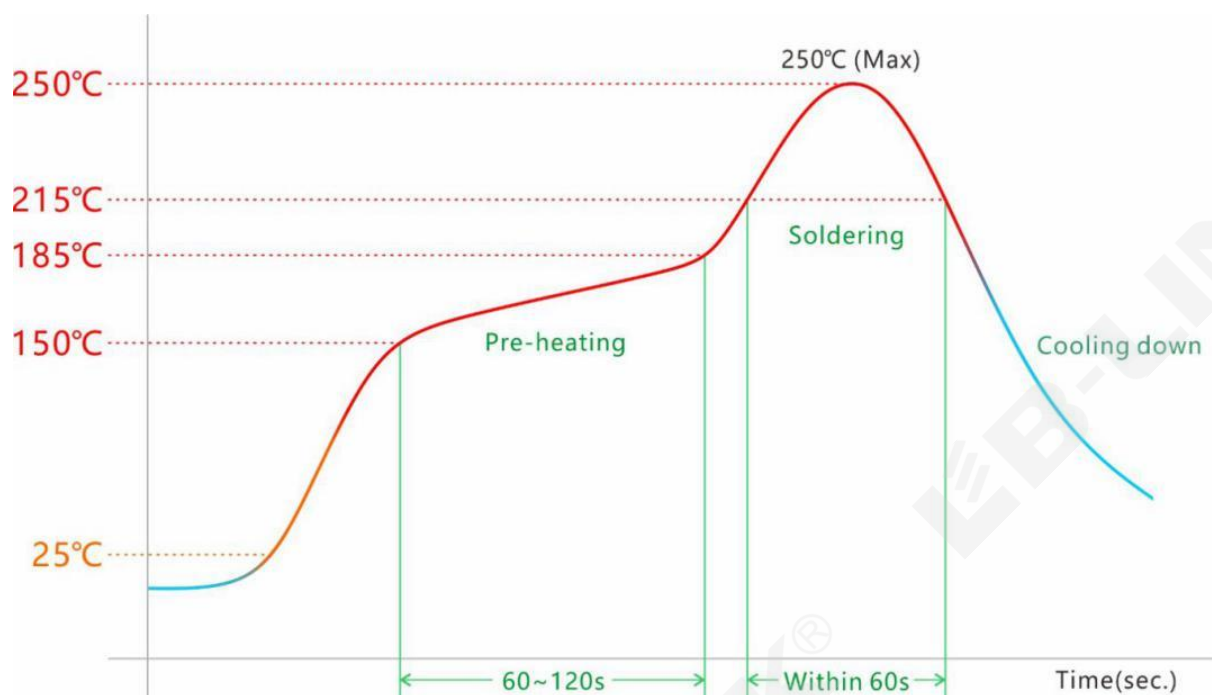


7.2 Recommend PCB Layout Footprint



Top View

7.3 Reflow Soldering Standard Conditions



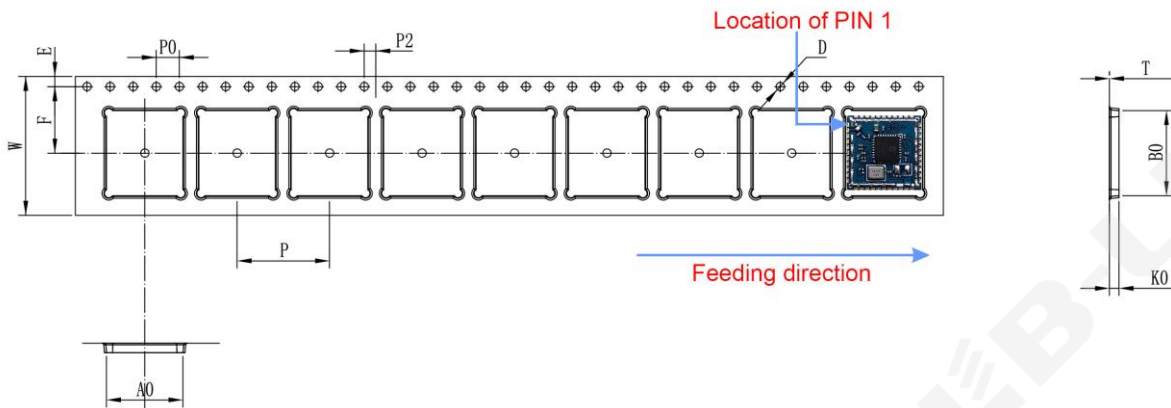
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

8. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	BL602C	Bouffalo Lab CO., LTD	
2	PCB	BL-M602CS1	Shenzhen Tie Fa Technology limited	
			Guangdong KINGSHINE ELECTRONICS CO., LTD	
			Quzhou Sunlord Electronics Co., Ltd	
3	Crystal	40MHz-10pF-1 0ppm-2520	HUBEI TKD ELECTRONICS TECHNOLOGY CO., LTD.	
			LUCKI CM ELECTRONICS CO., LTD	
			HOSONIC ELECTRONIC CO., LTD.	
			SHENZHEN KAIYUEXIANG ELECTRONICS CO., LTD	

9. Package and Storage Information

9.1 Package Dimensions



ITEM	W	AO	BO	KO	E	F	P	P0	P2	D	T
DIM	24.00±0.3	12.85±0.1	14.30±0.1	1.85±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. 2000 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 25.3mm (with a width of 21.3mm 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.

9.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40°C to +85°C,
Storage humidity: 10% to 95 (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!