



BL-M6600XS1

**802.11ax 150Mbps WLAN+BLE v5.0
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



(Top View)



(Bottom View)

Module Name: BL-M6600XS1	
Module Type: 802.11b/g/n/ax 150Mbps 1T1R WLAN + BLE v5.0 Combo 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	2023-03-15	Fnz
1.0	Official release	2023-05-20	Fnz

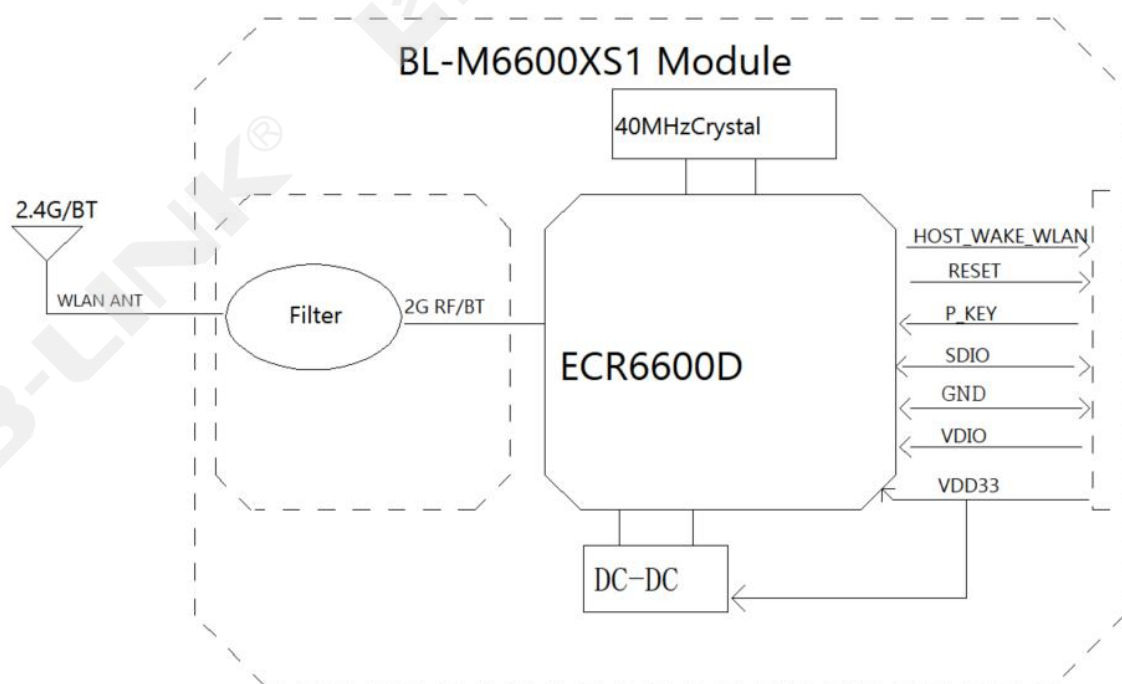
1. Introduction

BL-M6600XS1 is a highly integrated WLAN + BLE5.0 Combo module base on ECR6600D, which combines 1T1R WLAN subsystem, Bluetooth subsystem and SDIO interface Controller in a single chip. The module compatible IEEE 802.11b/g/n/ax standard and provides Maximum PHY rate up to 150Mbps, supports Bluetooth Low Energy with BT v5.0 compliant. It offering excellent WLAN performance and lower cost, ideal for wireless network applications such as OTT boxes, IP cameras, POS....

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz
- Host Interface is SDIO 2.0
- IEEE Standards: IEEE 802.11b/g/n/ax
- Support 802.11ax MCS0 to MCS7 (20MHz band width only)
- Maximum PHY rate up to 150Mbps (802.11n mode MCS7 HT40)
- 3.3V main power and 3.3V I/O power supply

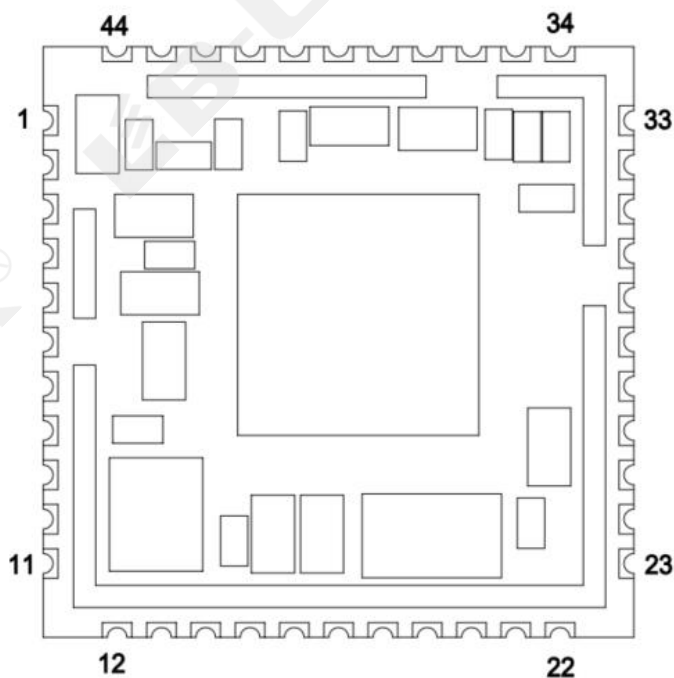
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M6600XS1
Chipset	ECR6600D
WLAN Standards	IEEE802.11b/g/n/ax
BT Specification	Bluetooth Low Energy v5.0
Host Interface	SDIO 2.0
Antenna	Connect to the external antenna through half hole pad
Dimension	12*12*1.7mm (L*W*H)
Power Supply	DC 3.3±0.2V @500 mA (Max)
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	Description
1	GND	RF		RF Ground connections
2	ANT	RF		RF Pad for 2.4G WLAN_ANT and BT_ANT
3	GND	RF		RF Ground connections
4	NC	/		NC
5	NC	/		NC
6	HOST_WAKE_WLAN	I/O	3.3V	Function1. General Purpose Input / Output Pin GPIO17 Function2. Host to wake-up this WLAN device input
7	NC	/		NC
8	GND	P		Ground connections
9	VDD33	P		DC 3.3V main power supply
10	NC	/		NC
11	NC	/		NC
12	POWER_KEY	I	3.3V	Chip_EN active high input, this pin can externally shut down the module when it pulled low. There is no pull-up resistor inside and high level input is required to enable the module.
13	WLAN_WAKE_HOST	I/O	3.3V	1. General Purpose Input / Output Pin GPIO25 2. WLAN to wake-up Host output
14	SD_D2	I/O	3.3V	SDIO data line 2
15	SD_D3	I/O	3.3V	SDIO data line 3
16	SD_CMD	I/O	3.3V	SDIO command line
17	SD_CLK	I	3.3V	SDIO clock line
18	SD_D0	I/O	3.3V	SDIO data line 0
19	SD_D1	I/O	3.3V	SDIO data line 1
20	GND	P		Ground connections
21	NC	/		NC
22	VDIO	P		DC 3.3V I/O power supply (1.8V I/O power supply is not supported)
23	NC	/		NC
24	NC	/		NC
25	NC	/		NC
26	NC	/		NC
27	NC	/		NC
28	NC	/		NC

29	UART_TX	I	3.3V	1. General Purpose Input / Output Pin GPIO6 2. UART_TXD reserved for test purpose, can be left float
30	UART_RX	O	3.3V	1. General Purpose Input / Output Pin GPIO5 2. UART_RXD reserved for test purpose, can be left float
31	GND	P		Ground connections
32	V-EFUSE	P		DC 1.8V power supply reserved for test purpose, can be left float
33	GND	P		Ground connections
34	BOOT_0	I		BOOT Strap pin, internal pull Low, do not pull High during power on!
35	BOOT_1	I		BOOT Strap pin, internal pull High, do not pull Low during power on!
36	GND	P		Ground connections
37	RESET	I	3.3V	Reset active low input, internal pull-up to 3.3V by 4.7K
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	70	°C
External Antenna VSWR		/	1.92	2.5	/
Supply Voltage	VDD33	3.1	3.3	3.5	V
	VDIO (3.3V)	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	0.7	--	3.5	V
VIL	Input Low Voltage	0	--	0.3	V
VOH	Output High Voltage	0.9	--	--	V
VOL	Output Low Voltage	0	--	0.1	V

3.3 Current Consumption

Conditions : VDD33/VDIO=3.3V ; Ta:25°C			
Use Case	VDD33 Current		
	Typ(I _{RMS})	Max(I _{peak})	Units
Unassociated (Linux Driver)	112	140	mA
2.4G TCP throughput TX 75Mbps (Linux Drive)	183	24	mA
2.4G TCP throughput RX 84Mbps (Linux Drive)	120	220	mA
2.4G 11b@1Mbps TX(RF-Test)17dBm	312	340	mA
2.4G 11b@1Mbps RX(RF-Test)	73	90	mA
2.4G 11b@11Mbps TX(RF-Test)17dBm	313	340	mA
2.4G 11g@54Mbps TX(RF-Test)14dBm	193	220	mA
2.4G 11n@HT20_MCS7 TX(RF-Test)14dBm	190	200	mA
2.4G 11n@HT40_MCS0 TX(RF-Test)15dBm	215	240	mA
2.4G 11n@HT40_MCS7 TX(RF-Test)13dBm	187	200	mA
2.4G 11n@HT40_MCS7 RX(RF-Test)	40	50	mA
2.4G 11ax@HE_MU 20M_MCS0 TX(RF-Test)15dBm	207	240	mA
2.4G 11ax@HE_MU 20M_MCS0 RX(RF-Test)	40	50	mA
2.4G 11ax@HE_MU 20M_MCS7 TX(RF-Test)13dBm	190	220	mA
2.4G 11ax@HE_MU 20M_MCS7 RX(RF-Test)	40	50	mA
BLE 1M TX(RF-Test)5dBm	73	90	mA

BLE 2M TX(RF-Test)5dBm	81	150	mA
BLE 2M RX	36	50	mA

4. WLAN & Bluetooth RF Specifications

4.1 2.4G WLAN RF Specification

Conditions : VDD33/VDIO=3.3V ; Ta:25°C			
Features		Description	
Standard		IEEE 802.11b/g/n/ax	
Frequency Range		2.4~2.484GHz (2.4GHz ISM Band)	
Channels		Ch1~Ch14 (For 20MHz Channels)	
Modulation		802.11b (DSSS): DBPSK, DQPSK, CCK; 802.11g (OFDM): BPSK, QPSK, 16QAM, 64QAM; 802.11n (OFDM): BPSK, QPSK, 16QAM, 64QAM; 802.11ax (OFDMA): BPSK, QPSK, 16QAM, 64QAM;	
Data Rate		802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7 6.5~72.2Mbps; 802.11n (HT40): MCS0~MCS7 13.5~150Mbps; 802.11ax (HE_MU,26~242RU) MCS0~MCS7: 0.4~86Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz) MCS0~MCS7: 3.6~86Mbps;	
Frequency Tolerance		≤ ±20ppm	
2.4G Transmitter Specifications (TX power tolerance calibrated, customers can define the target TX power 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	Recommended Target TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11b@1Mbps	17	±2	≤ -10
802.11b@11Mbps	17	±2	≤ -10
802.11g@6Mbps	16	±2	≤ -10
802.11g@54Mbps	14	±2	≤ -25
802.11n@HT20_MCS0	15	±2	≤ -10
802.11n@HT20_MCS7	13	±2	≤ -28
802.11n@HT40_MCS0	15	±2	≤ -10
802.11n@HT40_MCS7	13	±2	≤ -28
802.11ax@HE_MU 20M_MCS0	15	±2	≤ -10

802.11ax@HE_MU 20M_MCS7	13	±2	≤ -28
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	-84	-10	< 8%
802.11g@6Mbps	-88	-10	< 10%
802.11g@54Mbps	-70	-10	< 10%
802.11n@HT20_MCS0	-87	-10	< 10%
802.11n@HT20_MCS7	-68	-10	< 10%
802.11n@HT40_MCS0	-84	-10	< 10%
802.11n@HT40_MCS7	-65	-10	< 10%
802.11ax@HE_MU 20M_MCS0	-86	-10	< 10%
802.11ax@HE_MU 20M_MCS7	-67	-10	< 10%

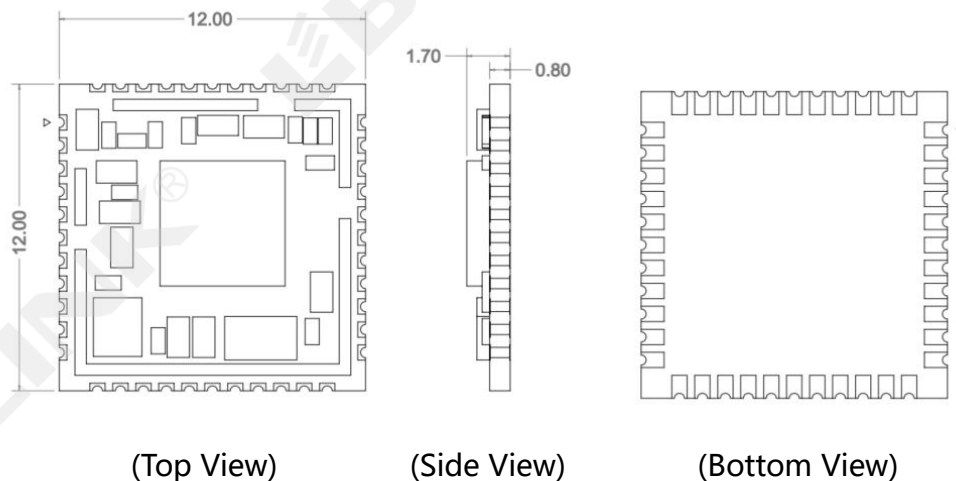
4.2 Bluetooth RF Specification

Conditions: VDD33/VDIO=3.3V; Ta:25°C			
Features	Description		
Bluetooth Specification	Bluetooth Low Energy v5.0		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels);		
Power Classes	Bluetooth Low Energy: Class1.5;		
Data Rate & Modulation	LE_1Mbps: GFSK (Uncoded); LE_2Mbps: GFSK (Uncoded);		
Bluetooth Transmitter Specifications			
Items	Min	Typ	Max
TX Power			
BLE 1M/2M	-2dBm	5dBm	10dBm
Items	Min	Typ	Max
BLE_1M Modulation Characteristics			
Δf1avg	225KHz	251.15KHz	275KHz
Δf2avg	185KHz	224.32KHz	/

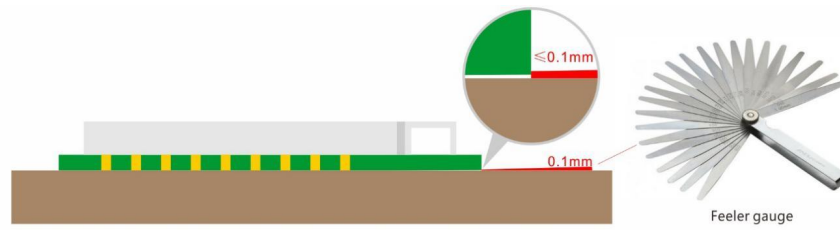
Δf_{2max}	185KHz	212.57KHz	/	
$\Delta f_{2avg}/\Delta f_{1avg}$	0.8	0.89	/	
Items	Min	Typ	Max	
BLE_2M Modulation Characteristics				
Δf_{1avg}	450KHz	502.99KHz	550KHz	
Δf_{2avg}	370KHz	459.83KHz	/	
Δf_{2max}	370KHz	440.49KHz	/	
$\Delta f_{2avg}/\Delta f_{1avg}$	0.8	0.91	/	
Bluetooth Receiver Specifications				
Items	Sensitivity		Maximum Input Level	
	Input Level(Typ)	PER	Input Level(Typ)	PER
BLE_1M	-86dBm	≤ 5%	-10dBm	≤ 5%
BLE_2M	-84dBm	≤ 5%	-10dBm	≤ 5%

5. Mechanical Specifications

5.1 Module Outline Drawing

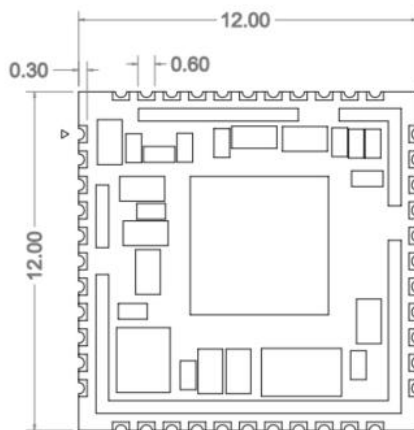


Module dimension: 12.0*12.0*1.7mm (L*W*H; Tolerance: $\pm 0.15\text{mm}$)

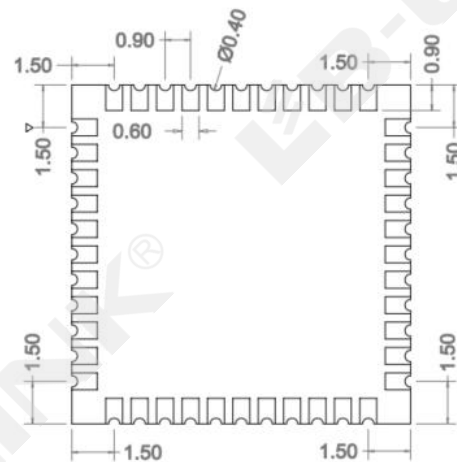


Module Bow and Twist: $\leq 0.1\text{mm}$

5.2 Mechanical Dimensions



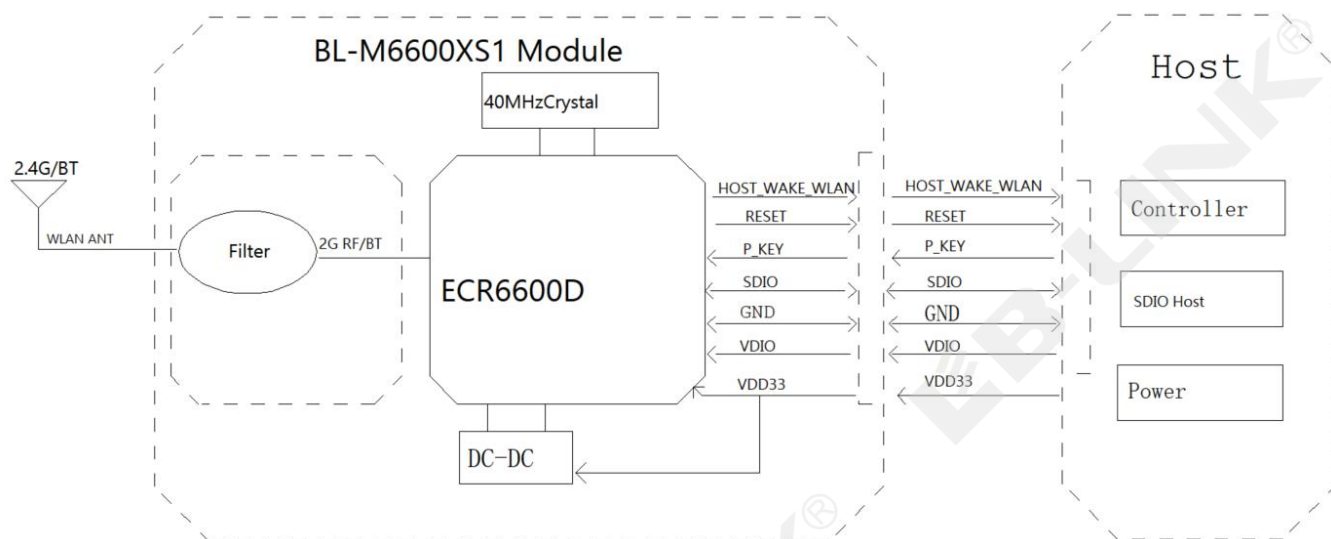
(Top View)



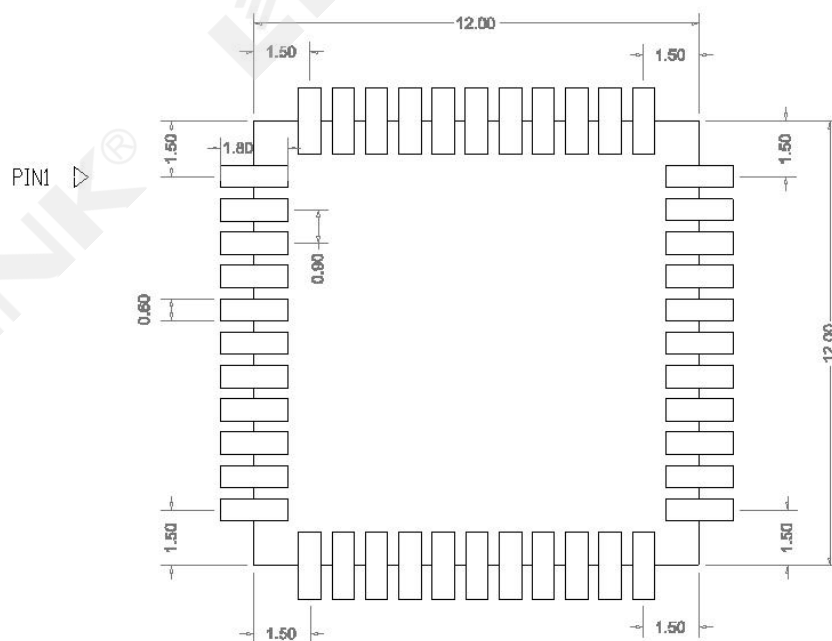
(Bottom View)

6. Application Information

6.1 Typical Application Circuit

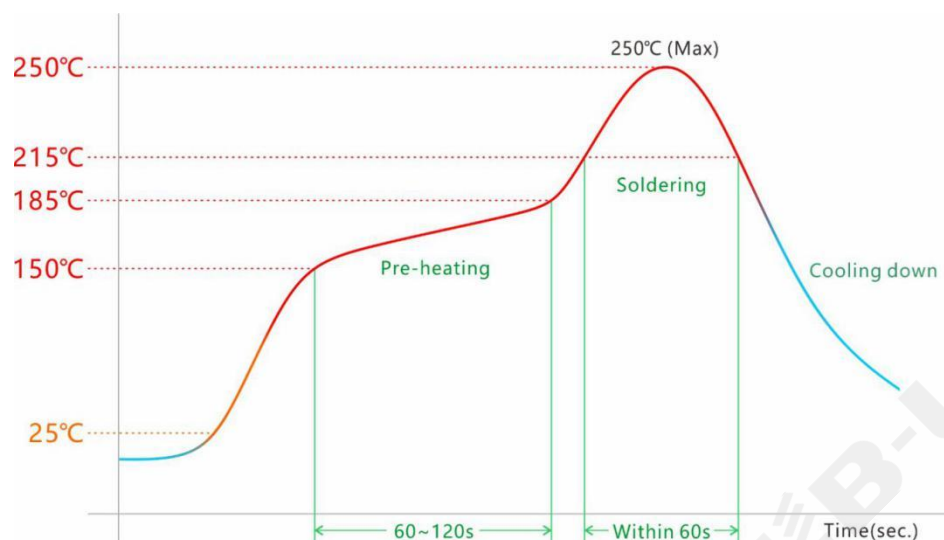


6.2 Recommend PCB Layout Footprint



(Design size: mm)

6.3 Reflow Soldering Standard Conditions



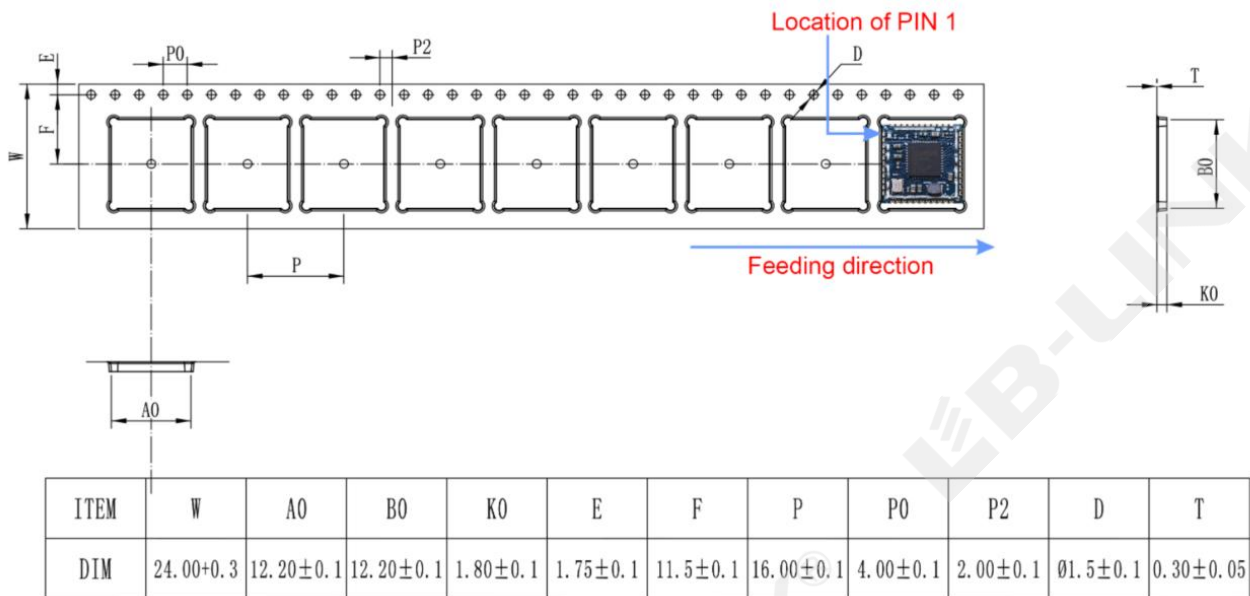
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	ECR6600D	BEIJING ESWIN COMPUTING TECHNOLOGY CO.,LTD	
2	PCB	BL-M6600XS1	ShenZhen Tie Fa Technology Limited	
			SHEN ZHEN QILI ELECTRON CO.,LTD	
			Jiangsu Lantek Electronics Tech Co.,LTD	
3	Crystal	26MHz-2016	LUCKI CM ELECTRONICS CO.,LTD	
			Chengde oscillator Electronic Technology CO.,LTD	
			JinHua East Crystal Electronic CO.,LTD	
			SHENZHEN KAIYUEXIANG ELECTRONICS CO.,LTD	
			HOSONIC ELECTRONIC CO.,LTD	

8. Package and Storage Information

8.1 Package Dimensions



Package specification:

- 1,000 modules per roll and 10,000 modules per box.
- Outer box size: 37.5*36*29cm.
- 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).
- Put 1 package of dry agent (20g) and humidity card in each anti-static vacuum bag.
- 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: (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