BL-M8723DU1

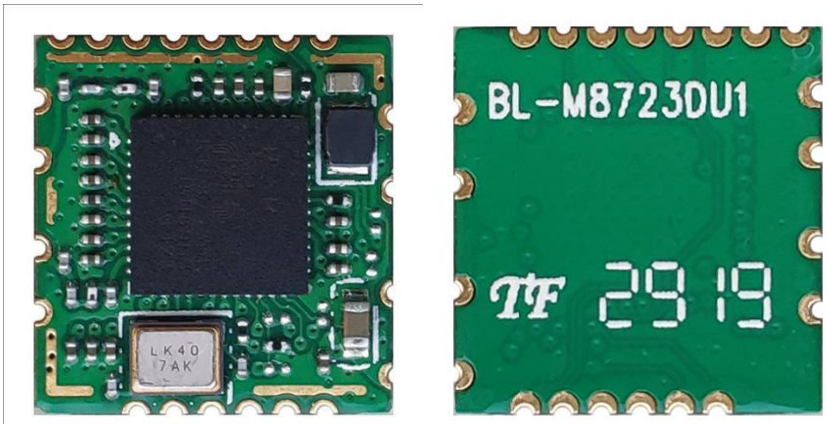
802.11n 150Mbps WLAN + BT4.2

USB2.0 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-M8723DU1	
Module Type: 802.11b/g/n 150Mbps WLAN + BT4.2 USB2.0 Module	
Revision: V1.2	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
BL-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date
0.1	First release	2017-04-21
1.0	Final release	2021-05-21
1.1	Update the ESD Description	2021-06-21
1.2	Update the Package	2022-01-06

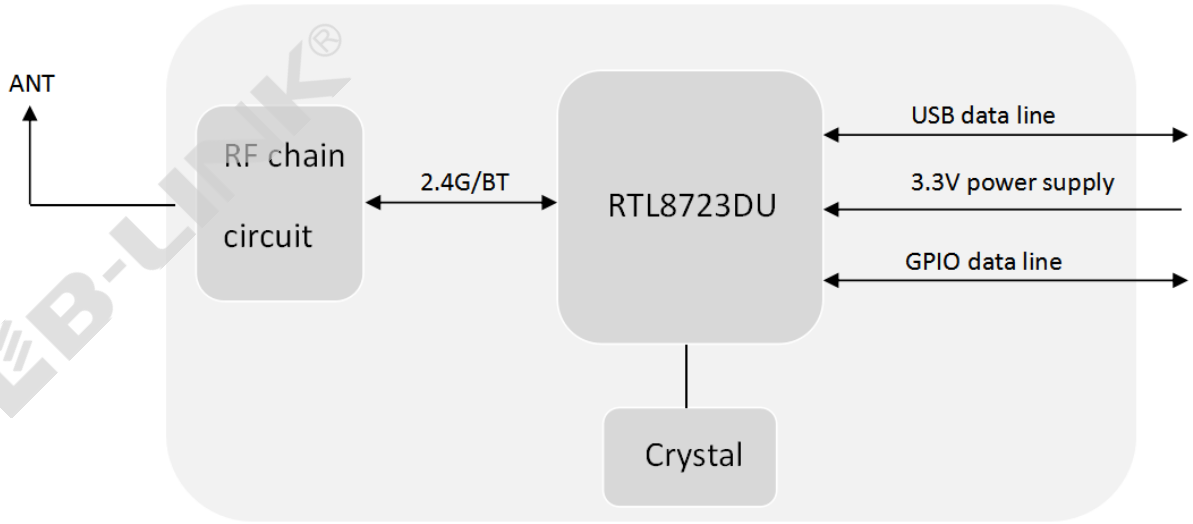
1. Introduction

BL-M8723DU1 is a highly integrated single-chip 802.11n Wireless LAN (WLAN) USB2.0 Multi-Function network interface controller with integrated Bluetooth 2.1//4.2 controller. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in s single chip. The RTL8723DU provides a complete solution for a high-performance integrated wireless and Bluetooth device. The integration provides better coordination between 802.11 and Bluetooth, and with sophisticated dynamic power control and packet traffic arbitration, RTL8723DU is able to provide the best coexistence performance Overview.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz
- Host Interface is USB2.0
- IEEE Standards: IEEE 802.11b/g/n
- Wireless data rate can reach up to 150Mbps
- Bluetooth controller complies with Bluetooth core specification V4.2
- Connect to external antenna through half hole
- Power Supply: DC 3.3V±0.2V

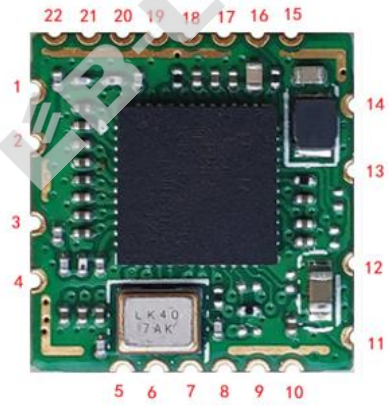
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8723DU1 WLAN USB2.0 Module
Chipset	RTL8723DU-CG
WiFi Standards	IEEE 802.11b/g/n
Host Interface	USB2.0
Antenna	Connect to the external antenna through half hole
Dimension	SMD 22Pins, 12.9*12.2*1.8mm (L*W*H)
Power Supply	DC 3.3V±0.2V @ 450 mA (Max)
Operation Temperature	-10℃ to +50℃
Operation Humidity	10% to 95% RH (Non-Condensing)
Storage Temperature	-40℃ to +70℃
Storage Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



(Top view)

2.1 Pin Definition

No	Pin Name	Type	Description	Supply
1	GND	RF	Ground	
2	RF-S0	RF	WLAN/BT RF TX/RX signal port 0	
3	NC	--	No connection(floating)	

4	GND	P	Ground	
5	BT_PCM_IN	I/O	General Purpose Input/Output Pin	
6	BT_PCM_OUT	I/O	General Purpose Input/Output Pin	
7	BT_PCM_SYNC	I/O	General Purpose Input/Output Pin	
8	BT_PCM_CLK	I/O	General Purpose Input/Output Pin	
9	BT_WAKE_HST	O	Chip wakeup host	
10	HST_WAKE_BT	I	host wakeup Chip	
11	VDD33	P	The power input 3.3V	
12	DM	I/O	High-Speed USB D- Signal	
13	DP	I/O	High-Speed USB D+ Signal	
14	GND	P	Ground	
15	NC	--	No connection(floating)	
16	WL_DIS#	I	This Pin Can Externally Shutdown the RTL8723DU WLAN function when WL_DISn is Pulled Low. When this pin de-asserted, USB interface will be disabled. The WLAN Radio-off function with host interface remaining connected.	
17	BT_DIS#	I	This Pin Can Externally Shutdown the RTL8723DU BT function when BT_DISn is Pulled Low. This pin can also support the BT Radio-off function with host interface remaining connected.	
18	NC	--	No connection(floating)	
19	HST_WAKE_WL	I/O	General Purpose Input/Output Pin	
20	WL_WAKE_HST	I/O	General Purpose Input/Output Pin	
21	NC	--	No connection(floating)	
22	NC	--	No connection(floating)	

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	-10	25	50	℃
External Antenna VSWR	/	1.7	/	1

Supply Voltage	VDD	3.1	3.3	3.5	V

3.2 Digital I/O DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	2.0	3.3	3.6	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 Current Consumption

Conditions : VDD=3.3V ; Ta:25℃			
Use Case	VDD Current (average)		
	Typ	Max	Units
WIFI Unssociated (Linux)	120	130	mA
2.4G TX CCK 1Mbps @ 16.5dBm (RF-Test)	320	330	mA
2.4G TX CCK 11Mbps @ 16.5dBm (RF-Test)	285	300	mA
2.4G TX HT40 MCS0 @ 14dBm (RF-Test)	240	250	mA
2.4G TX HT40 MCS7 @ 14dBm (RF-Test)	180	190	mA
2.4G RX Active HT20 MCS7 (RF-Test)	92	96	mA
BT			
BT Unssociated (Linux Driver)	25	40	mA
Bluetooth TX @ 6dBm	159	186	mA
Bluetooth RX	138	165	mA

4. WiFi RF Specifications

4.1 2.4G WiFi RF Specification

Conditions: VDD=3.3V; Ta:25℃

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, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64;
Date 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;
Frequency Tolerance	≦ ±15ppm

2.4G Transmitter Specifications			
TX Rate	TX Power (dBm)	TX Power Tolerance (dB)	EVM (dB)
802.11b@1~11Mbps	17	±1.5	≦-15
802.11g@6Mbps	14	±1.5	≦-15
802.11g@54Mbps	14	±1.5	≦-25
802.11n@HT20_MCS0	14	±1.5	≦-10
802.11n@HT20_MCS7	14	±1.5	≦-28
802.11n@HT40_MCS0	14	±1.5	≦-10
802.11n@HT40_MCS7	14	±1.5	≦-28

2.4G Receiver Specifications			
RX Rate	Min Input Level (dBm)	Max Input Level (dBm)	PER
802.11b@1Mbps	-92	-5	< 8%
802.11b@11Mbps	-86	-5	< 8%
802.11g@6Mbps	-88	-5	< 10%
802.11g@54Mbps	-72	-5	< 10%
802.11n@HT20_MCS0	-88	-5	< 10%
802.11n@HT20_MCS7	-68	-5	< 10%
802.11n@HT40_MCS0	-86	-5	< 10%
802.11n@HT40_MCS7	-65	-5	< 10%

4.2 Bluetooth RF Specification

Conditions: VDD=5V; Ta:25℃	
Features	Description

Bluetooth Specification	Bluetooth v2.1+EDR/4.2
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)
Channels	Bluetooth Classic: Ch0~Ch78 (For 1MHz Channels); Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels);
Power Classes	Bluetooth Classic: Class1; Bluetooth Low Energy: Class1.5;
Date Rate & Modulation	BR_1Mbps: GFSK; EDR_2Mbps: π/4-DQPSK; EDR_3Mbps: 8DPSK; LE_1M: GFSK;

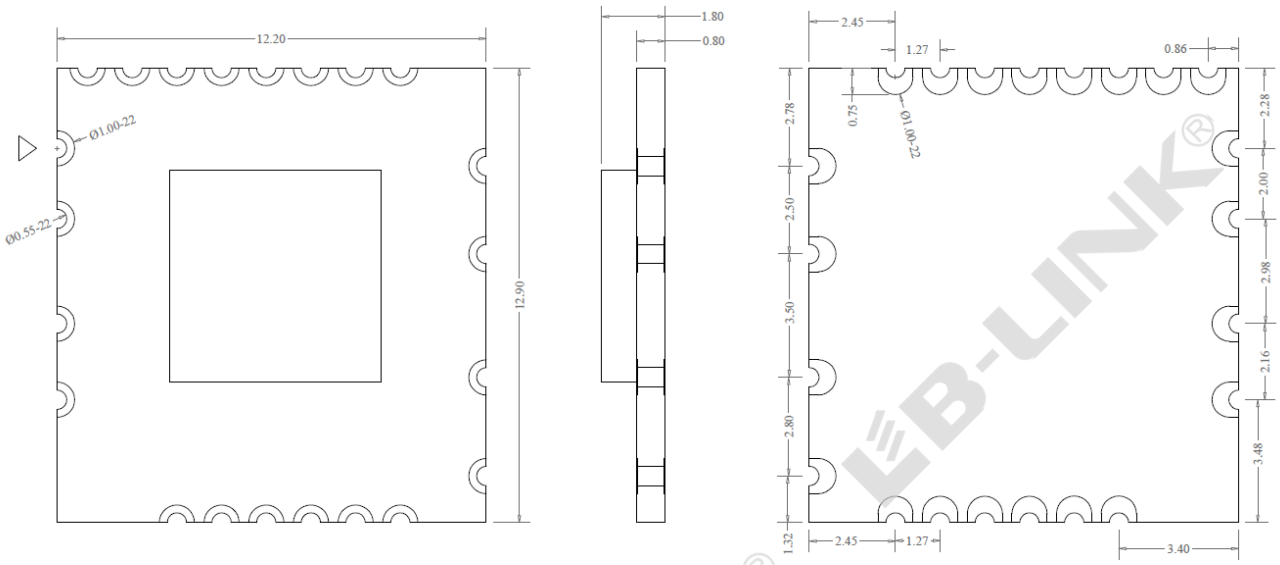
Bluetooth Transmitter Specifications			
Items	**Min (dBm)**	**Typ (dBm)**	**Max (dBm)**
TX Power			
BR_1M	0	4	8
EDR_2M	0	4	8
EDR_3M	0	4	8
LE_1M	0	4	8

Bluetooth Receiver Specifications				
Items	**Sensitivity**		**Maximum Input Level**	
	Input Level (Typ: dBm)	**BER**	**Input Level (Typ: dBm)**	**BER**
BR_1M	-90	≦0.1%	-10dBm	≦0.1%
EDR_2M	-90	≦0.01%	-10dBm	≦0.1%
EDR_3M	-85	≦0.01%	-10dBm	≦0.1%
	Input Level(Typ)	**PER**	**Input Level (Typ)**	**PER**
LE_1M	-80	≦30.8%	-10dBm	≦30.8%

Note: For BER receiver sensitivity test, bit error rate (BER) better than 0.1% for a minimum of 1600000 bits transmitted by the tester; For EDR receiver sensitivity test, bit error rate (BER) better than 0.01% for a minimum of 16000000 bits transmitted by the tester; For LE receiver sensitivity test, packet error rate (PER) better than 30.8% for a minimum of 1500 packets transmitted by the tester.

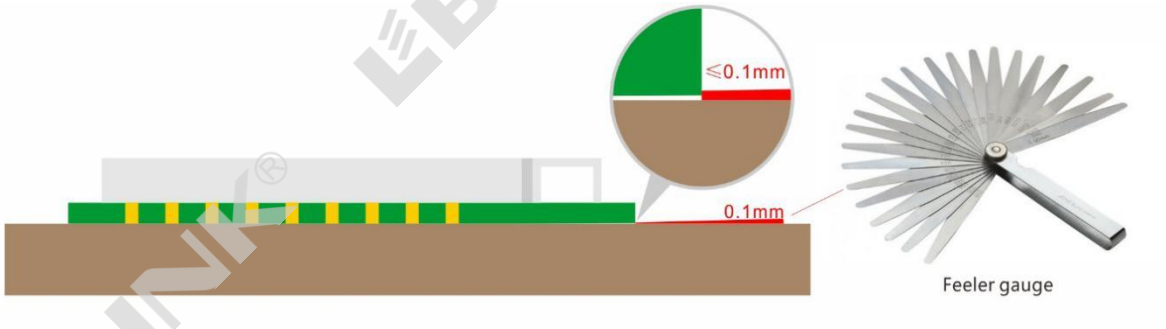
5. Mechanical Specifications

5.1 Module Outline Drawing



top view side view bottom view

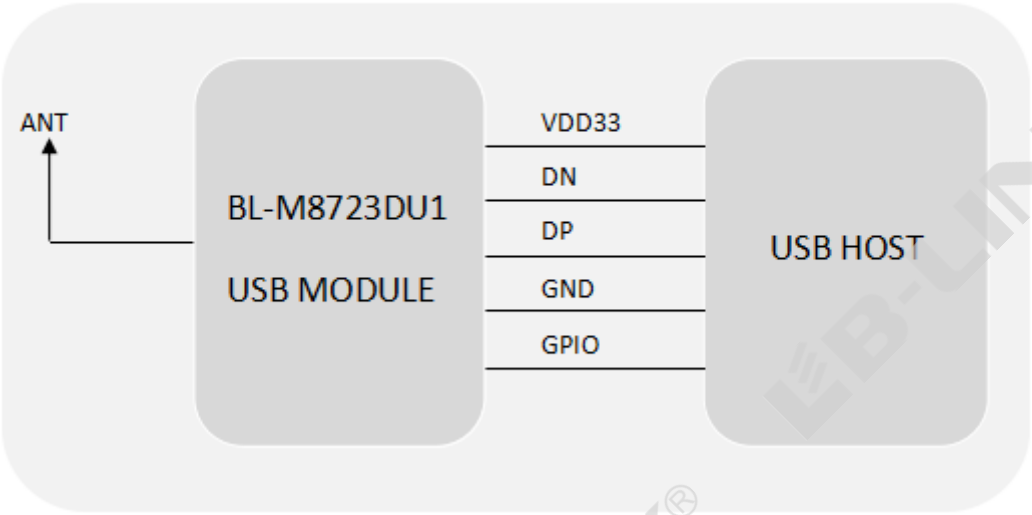
Module dimension: 12.9*12.2*1.8mm(L*W*H; Tolerance: ±0.15mm)



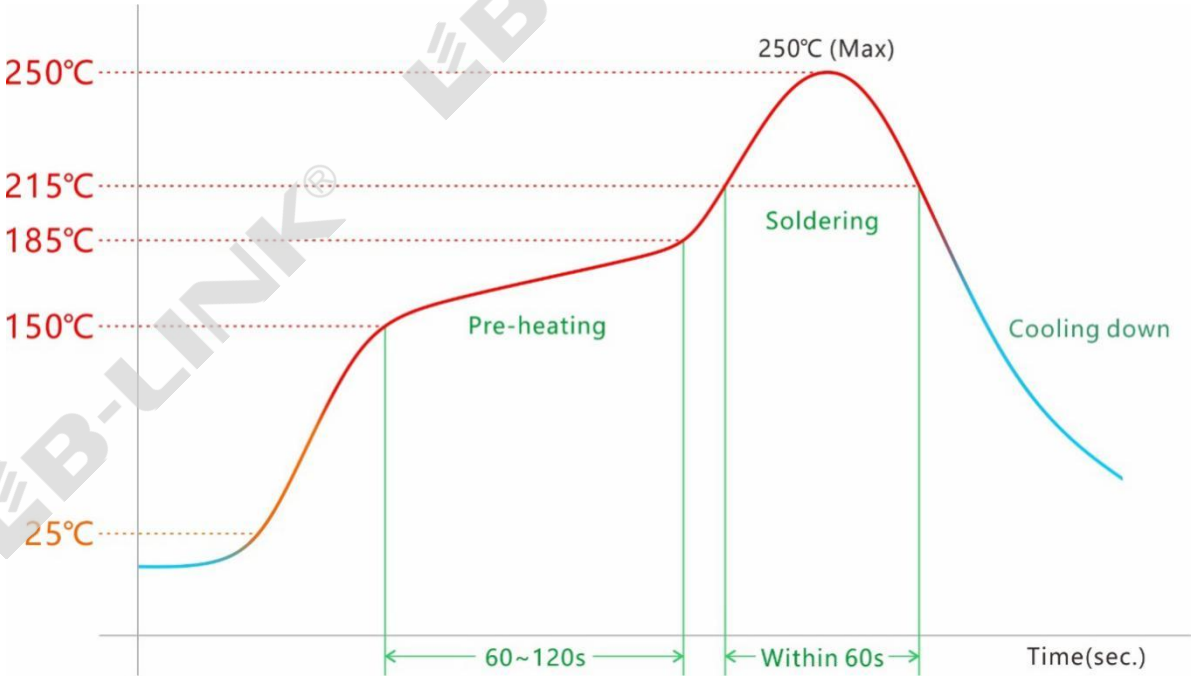
Module Bow and Twist: ≤0.1mm

6. Application Information

6.1 Typical Application Circuit



6.2 Reflow Soldering Standard Condition



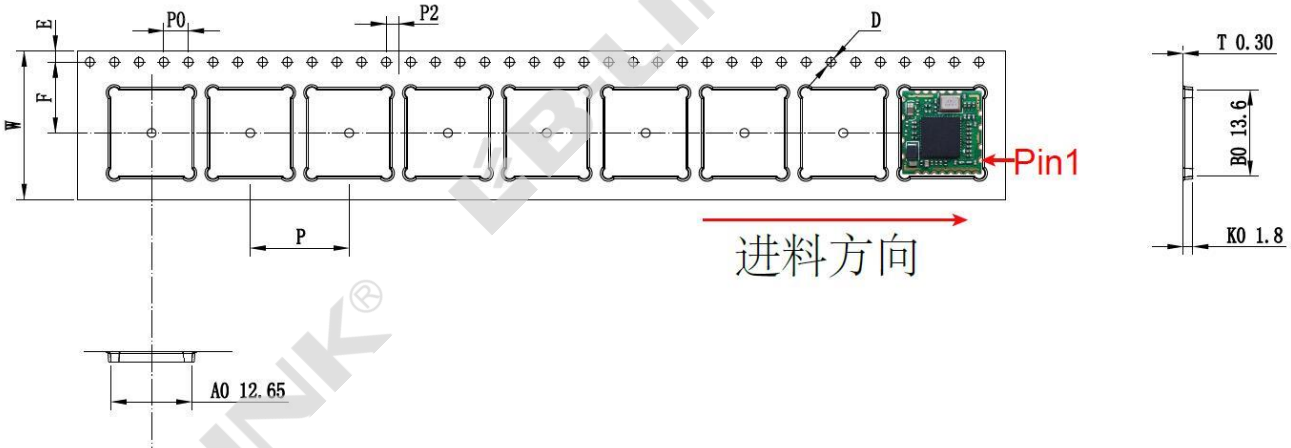
Please use the reflow within 2 times.
Set up the highest temperature within 250℃.

7. Key Components Of Module

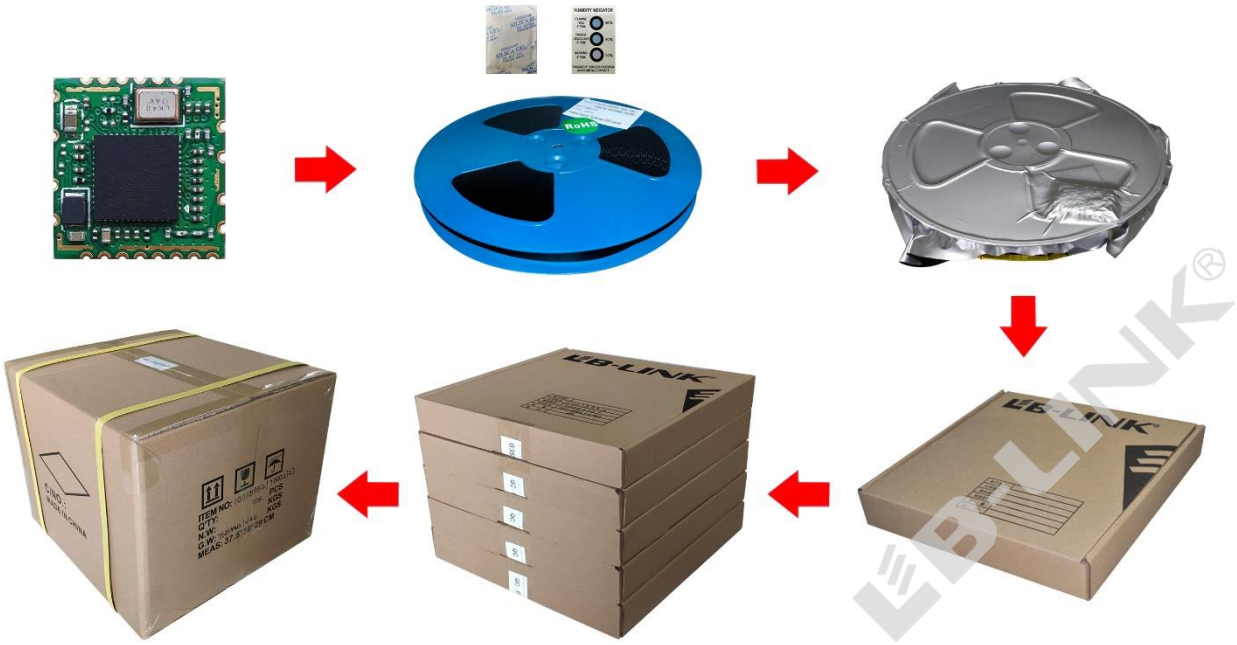
No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL88723DU-CG	Realtek	
2	PCB	BL-M8723DU1	Shenzhen Tie Fa Technology	
			Guangdong KINGSHINE ELECTRONICS CO., LTD	
			Quzhou Sunlord Electronics Co., Ltd	
3	Crystal	40MHz-11.5pF/12pF-10 ppm-3225	Lucki Electronics Co., Ltd	
			Shenzhen Kaiyuexiang Electronics 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	PO	P2	D	T
DIM	24.00+0.3	12.65±0.1	13.60±0.1	1.80±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. 1,500 modules per roll and 7,500 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: -45℃ to +85℃,
Storage humidity: 10% to 95 (Non-Condensing)
Recommended Storage Conditions:
Storage temperature: 5℃ to +40℃,
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℃, 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!