



BL-M8723DS1

802.11n 150Mbps WLAN+BTv4.2

SDIO Module Specification

SHENZHEN BILIAN ELECTRONIC CO.,LTD

Add: 10~11/F, Building 1A, Huaqiang idea park, Guangming district, Shenzhen.

Guangdong,ChinaWeb:www.b-link.net.cn



(TopView)



(BottomView)

Module Name:BL-M8723DS1	
Module Type:802.11b/g/n 150Mbps WLAN + Bluetooth v4.2 SDIOModule	
Revision:V1.0	
CustomerApproval:	
Company:	
Title:	
Signature:	Date:
LB-linkApproval:	
Title:	
Signature:	Date:

RevisionHistory

Revision	Summary	ReleaseDate	RevisedBy
0.1	Initialrelease	2022-03-21	
1.0	officialrelease(Updatepicture)	2023-06-16	Drq

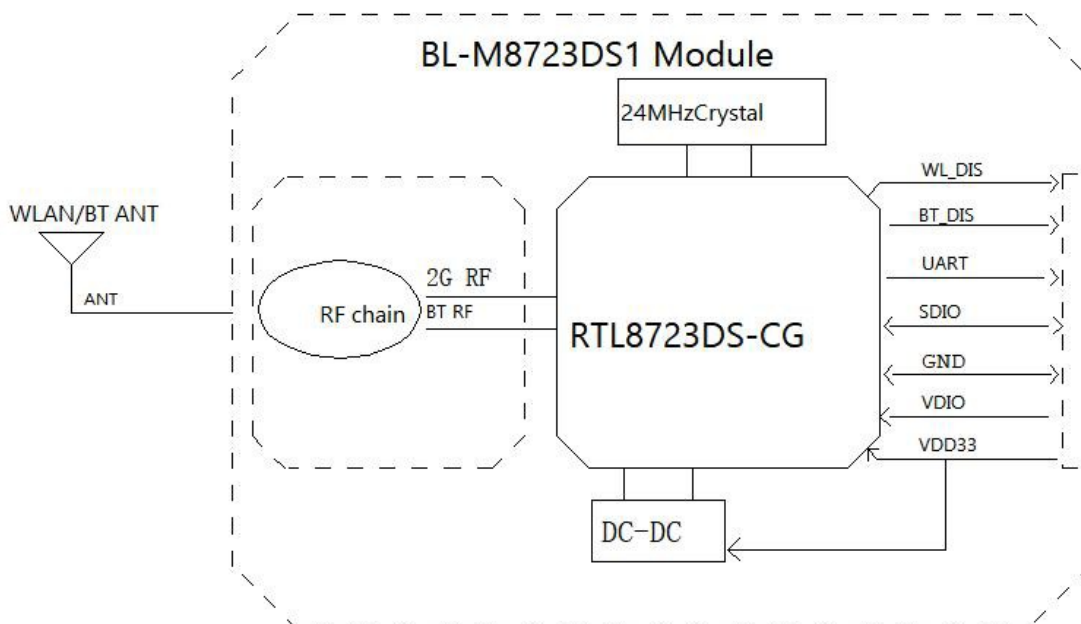
1. Introduction

BL-M8723DS1 is a highly integrated IEEE802.11b/g/n WLAN and Bluetooth 2.1/4.2 combomodule based on RTL8723DS chip, which combines MCU with SDIO and HS-UART interface, a WLAN MAC, a 1T1R capable WLAN baseband, BT Protocol Stack, BT Baseband, modem, and WLAN/BT RF in a single chip. The module provides a complete solution for a high throughput performance integrated WLAN and Bluetooth.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz
- IEEE Standards: IEEE802.11b/g/n
- Wireless PHY rate can reach up to 150Mbps
- Supports Bluetooth v2.1+EDR/v4.2
- Connect to external antenna through half hole pad
- Power Supply: 3.3V main power and 1.8V/3.3V I/O power

1.2 Block Diagram



1.3 General Specifications

ModuleName	BL-M8723DS1
Chipset	RTL8723DS-CG
WLANStandards	IEEE802.11b/g/n
BTStandards	Bluetooth Core Specification v4.2/2.1
HostInterface	SDIO for WLAN & UART for Bluetooth
Antenna	Connect to the external antenna through half hole pad
Dimension	12*12*2.1mm(L*W*H)
PowerSupply	DC 3.3V±0.2V @ 450 mA (Max) main power DC 3.3V±0.2V or 1.8V±0.1V
OperationTemperature	-20°C to +70°C
OperationHumidity	10% to 95% RH(Non-Condensing)

2. Pin Assignments



(TopView)

2.1 Pin Definition

No	PinName	Type	I/O Level	Description
1	BT_DIS#	I	VDD33	Shared with GPIO11. This pin can externally shut down BT function when BT DIS # is pulled Low, and UART interface will be also disabled. This pin can be also defined as the BT Radio-off function with host interface remaining connected. There is no pull-up resistor inside the module and high level input is required to enable
2	NC	/		NC
3	GND	P		Ground connections
4	NC	/		NC
5	NC	/		NC

6	NC	/		NC
7	NC	/		NC
8	GND	P		Groundconnections. (This pin has been connected to other GNDs on the module,soit NC or connected to other signals such as UART_CTS inthe customer's application circuit will not affect normal use)
9	UART_TX	O	VDIO	High-Speed UART Dataoutput
10	UART_RX	I	VDIO	High-Speed UART Datainput
11	UART_CTS	I	VDIO	High-Speed UART CTSinput
12	GND	RF		RF Groundconnections
13	WLAN/BTANT	RF		RF Pad for 2.4G WLAN/BTANT
14	GND	RF		RF Groundconnections
15	NC	/		NC
16	NC	/		NC
17	HOST_WAKE_DEV	I	VDIO	Shared withGPIO13. This pin can be configured as the host wakes up the WLANorBluetooth controller or both of them in Remote Wake
18	DEV_WAKE_HOST_BT	O	VDIO	Shared withGP1O14. This pin is shared with either WLAN or BT functions to wakeupthe host when the remote wake function is enabled. Thepolarity can be defined by the customer. It can be configured asssharedwake up pin by both WL and BT when any of WL and BTfunction issue the wake signal to thehost.
19	NC	/		NC
20	VDD33	P		DC 3.3V powersupply
21	NC	/		NC
22	NC	/		NC
23	WL_DIS#	I	VDD33	Shared withGP1O9. This pin can externally shut down WLAN function when WL DIS# is pulled low, and SDIO interface will be also disabled. This pin can also be configured as the WLAN Radio-off function withhostinterface remaining connected. There is no pull-up resistorinside the module and high level input is required to enableWLANfunction.
24	DEV_WAKE_HOST_WL	O	VDIO	Shared withGPIO6. This pin is shared with either WLAN or BT functions to wakeupthe host when the remote wake function is enabled. Thepolarity can be defined by the customer. It can be

				wake up pin by both WL and BT when any of WL and BTfunction issue the wake signal to the host.
25	SD_D2	I/O	VDIO	SDIO dataline2
26	SD_D3	I/O	VDIO	SDIO dataline3
27	SD_CMD	I/O	VDIO	SDIO commandline
28	SD_CLK	I	VDIO	SDIO clockinput
29	SD_D0	I/O	VDIO	SDIO dataline0
30	SD_D1	I/O	VDIO	SDIO dataline1
31	GND	P		Groundconnections
32	NC	/		NC
33	VDIO	P		1.8V or 3.3V power supply for some digitalI/O
34	NC	/		NC
35	CLK_IN	I	VDD33	General Purpose Input/Output PinGPIO8
36	PCM_OUT	O	VDIO	1. PCM data output, shared withGPIO1. 2. Strap Pin, internal pull low by 100K resistor toset "SPS_Mode" , do not pull High during
37	PCM_CLK	I	VDIO	PCM Clock input, shared withGPIO3
38	PCM_IN	I	VDIO	PCM data input, shared withGPIO0
39	PCM_SYNC	O	VDIO	PCM synchronization control, shared withGPIO2
40	NC	/		NC
41	NC	/		NC
42	GND	P		Groundconnections
43	NC	/		NC
44	GND	P		Groundconnections

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

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	/
Supply Voltage	VDD33	3.1	3.3	3.5	V
	VDIO(3.3V)	3.1	3.3	3.5	V
	VDIO(1.8V)	1.7	1.8	1.9	V

3.2 Digital 3.3V GPIO DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input HighVoltage	2.0	3.3	3.6	V
VIL	Input LowVoltage	--	0	0.9	V
VOH	Output HighVoltage	2.97	--	3.3	V
VOL	Output LowVoltage	0	--	0.33	V

3.3 Digital 1.8V IO DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input HighVoltage	1.3	1.8	1.9	V
VIL	Input LowVoltage	--	0	0.8	V
VOH	Output HighVoltage	1.62	--	1.8	V
VOL	Output LowVoltage	0	--	0.18	V

3.4 Current Consumption

Conditions : VDD33=3.3V ;Ta:25°C			
UseCase	VDD33Current		
	Typ (I _{RMS})	Max (I _{Peak})	Units
WLAN Radio Off (LinuxDriver)	42	50	mA
WLAN Unassociated (LinuxDriver)	40	60	mA
2.4G 11b 1Mbps TX@ 17dBm (TX RFtest)	285	310	mA
2.4G 11b 1Mbps RX(RF-Test)	60	70	mA
2.4G 11b 11Mbps TX@ 17dBm (TX RFtest)	280	310	mA
2.4G 11b 11Mbps RX(RF-Test)	59	70	mA
2.4G 11g 6Mbps TX@ 17dBm (TX RFtest)	250	280	mA
2.4G 11g 6Mbps RX(RF-Test)	63	77	mA
2.4G 11g 54Mbps TX@ 15dBm (TX RFtest)	260	270	mA
2.4G 11g 54Mbps RX(RF-Test)	60	65	mA
2.4G 11n HT20_MCS0 TX@ 17dBm (TX RFtest)	255	272	mA
2.4G 11n HT20_MCS0 RX(RF-Test)	65	70	mA
2.4G 11n HT20_MCS7 TX @ 14dBm (TX RFtest)	220	285	mA

2.4G 11n HT20_MCS7 RX(RF-Test)	63	70	mA
2.4G 11n HT40_MCS7 TX@ 14dBm (TX RFtest)	220	270	mA
2.4G 11n HT40_MCS7 RX(RF-Test)	63	80	mA
BT			
BT BR_1M DH5 TX@ 5dBm(RF-Test)	125	152	mA
BT EDR_3M DH5 TX@ 5dBm(RF-Test)	119	147	mA
BT LE_1M TX@ 5dBm(RF-Test)	122	161	mA
BT BR_1M DH5 RX Active(RF-Test)	103	127	mA
BT EDR_3M DH5 RX Active(RF-Test)	102	130	mA
BT LE_1M RX Active(RF-Test)	110	133	mA

4. WLAN RFSpecifications

4.1 2.4G WLAN RFSpecification

Conditions : VDD33=3.3V ;Ta:25°C			
Features	Description		
WLANStandard	IEEE802.11b/g/n		
FrequencyRange	2.4~2.4835GHz (2.4GHz ISMBand)		
Channels	Ch1~Ch13 (For 20MHzChannels)		
Modulation	802.11b (DSSS): DBPSK, DQPSK,CCK; 802.11g (OFDM): BPSK, QPSK, 16QAM,64QAM; 802.11n (OFDM): BPSK, QPSK, 16QAM,64QAM;		
DataRate	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; 802.11n (HT40): MCS0~MCS7(1T1R_SISO)13.5~150Mbps;		
FrequencyTolerance	≤±20ppm		
2.4G Transmitter Specifications(TX power of some rates is calibrated, customers can define the targetTX power of other rates by modifying configuration file of the driver software. Customers must define theTX power same or lower than recommended Target TX Power asbelow)			
TXRate	TXPower (dBm)	TX PowerTolerance (dBm)	EVM (dB)
802.11b@1Mbps	Recommended TargetTX Power:17	±1.5	≤-10
802.11b@11Mbps	Calibrated TX Power : 17	±1.5	≤-10
802.11g@6Mbps	Recommended TargetTX Power:17	±1.5	≤-10
802.11g@54Mbps	Calibrated TX Power : 15	±1.5	≤-25

802.11n@HT20_MCS0	Recommended TargetTX Power:17	±1.5	≤-10
802.11n@HT20_MCS7	Calibrated TX Power : 14	±1.5	≤-28
802.11n@HT40_MCS0	Recommended TargetTX Power:17	±1.5	≤-10
802.11n@HT40_MCS7	Calibrated TX Power : 14	±1.5	≤-28
2.4G Receiver Specifications			
RXRate	Min Input Level (Typ, dBm)	Max InputLevel (Typ,dBm)	PER
802.11b@1Mbps	-93	-10	<8%
802.11b@11Mbps	-86	-10	<8%
802.11g@6Mbps	-90	-15	<10%
802.11g@54Mbps	-72	-15	<10%
802.11n@HT20_MCS0	-88	-15	<10%
802.11n@HT20_MCS7	-67	-15	<10%
802.11n@HT40_MCS0	-86	-15	<10%
802.11n@HT40_MCS7	-66	-15	<10%

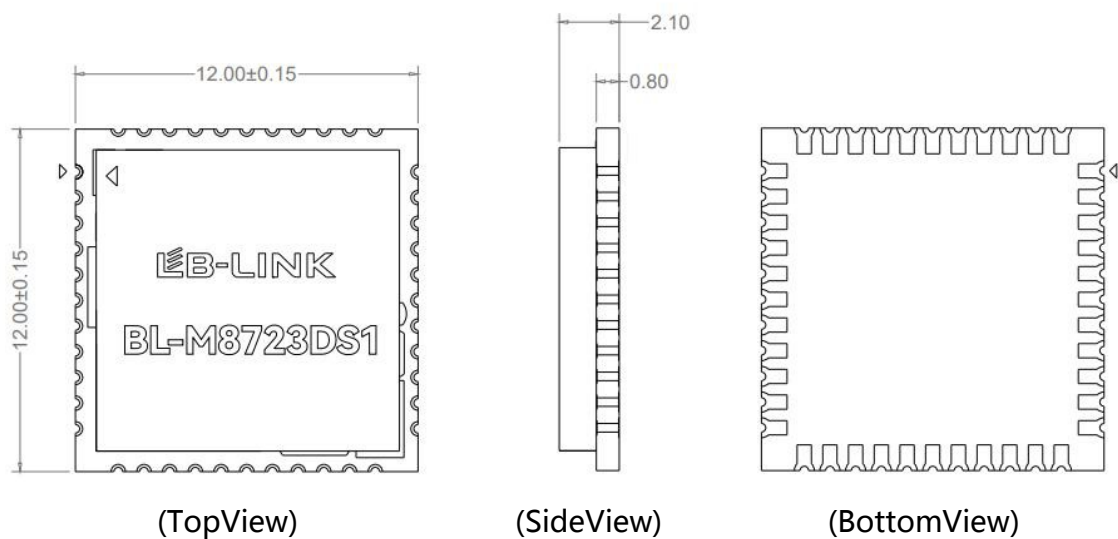
4.2 Bluetooth RF Specification

Conditions : VDD33=3.3V ;Ta:25°C			
Features	Description		
BluetoothSpecification	Bluetooth Core Specificationv4.2/v2.1		
FrequencyRange	2.4~2.4835GHz (2.4GHz ISMBand)		
Channels	Bluetooth Classic: Ch0~Ch78 (For 1MHzChannels); Bluetooth Low Energy: Ch0~Ch39 (For 2MHzChannels);		
PowerClasses	Bluetooth Classic:Class1; Bluetooth Low Energy:Class1.5;		
Data Rate &Modulation	BR_1Mbps:GFSK; EDR_2Mbps:π/4- DQPSK;EDR_3Mbps:8DP SK;LE_1Mbps:GFSK;		
Bluetooth TransmitterSpecifications			
Items	Min (dBm)	Typ (dBm)	Max (dBm)
TXPower			
BR_1M TXPower	2	5	8
EDR_2/3M TXPower	2	5	8
LE_1M TXPower	2	5	8
BR_1M(DH1) ModulationCharacteristics			
Δf1avg	140KHz	166.26KHz	175KHz
Δf2avg	115KHz	156.33KHz	/

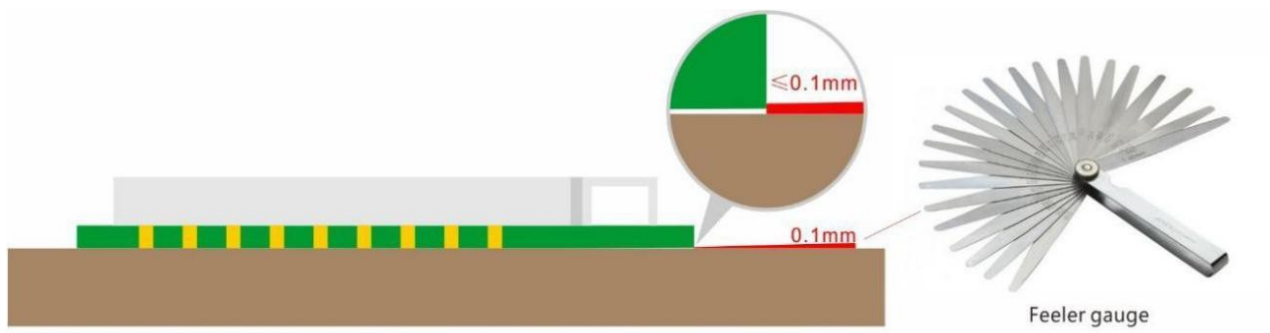
Δf2max	115KHz	152.29KHz	/	
Δf2avg/Δf1avg	0.8	1.09	/	
EDR_3M(3DH5) ModulationAccuracy				
8DPSK RMSDEVM	/	0.047	0.13	
8DPSKDEVM	/	0.089	0.25	
LE_Modulationcharacteristics				
Δf1avg	225kHz	251.7kHz	275kHz	
Δf2avg	185KHz	241.2KHz	275kHz	
Δf2max	185kHz	244.7kHz	/	
Δf2avg /Δf1avg	0.8	0.93	/	
Bluetooth ReceiverSpecifications				
Items	Sensitivity		Maximum InputLevel	
	InputLevel(Typ)	BER	InputLevel(Typ)	BER
BR_1M(DH1)	-88dBm	≤0.1%	-20dBm	≤0.1%
EDR_3M(3DH5)	-82dBm	≤0.01%	-20dBm	≤0.1%
Items	Sensitivity		Maximum InputLevel	
	InputLevel(Typ)	PER	InputLevel(Typ)	PER
LE_1M	-87dBm	≤5%	-20dBm	≤5%

5. MechanicalSpecifications

5.1 Module OutlineDrawing

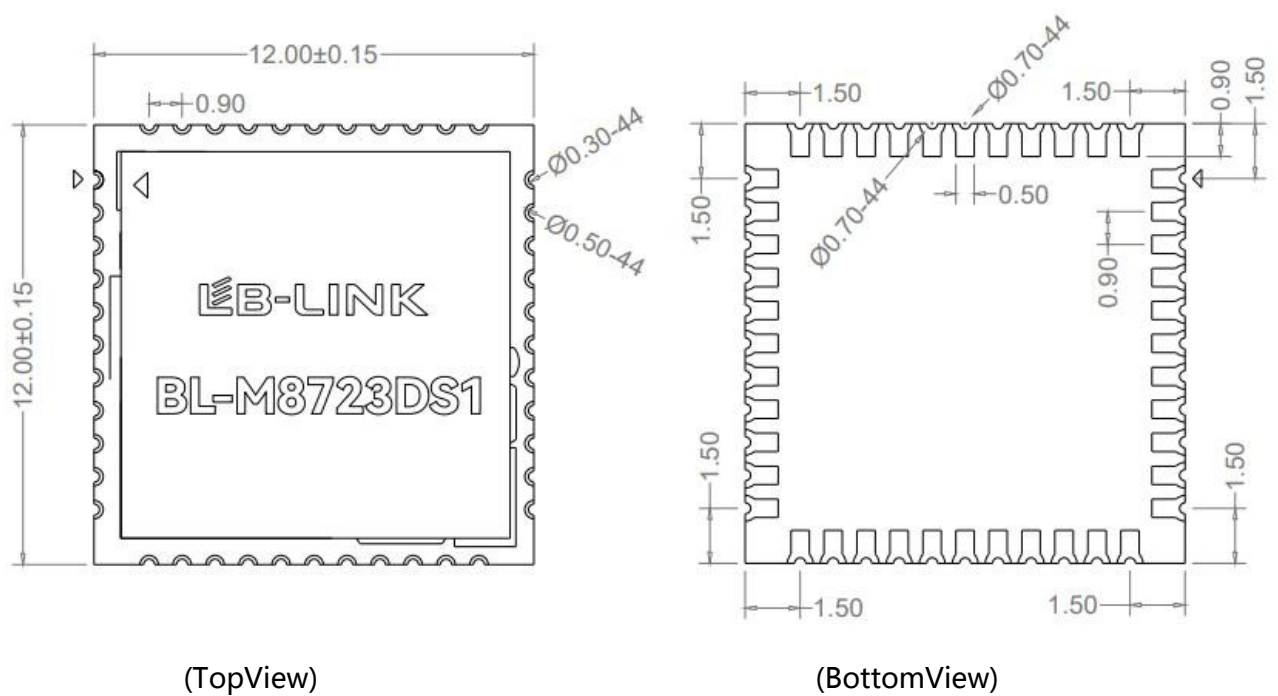


Module dimension: 12.0*12.0*2.1mm (L*W*H; Tolerance:±0.15mm)



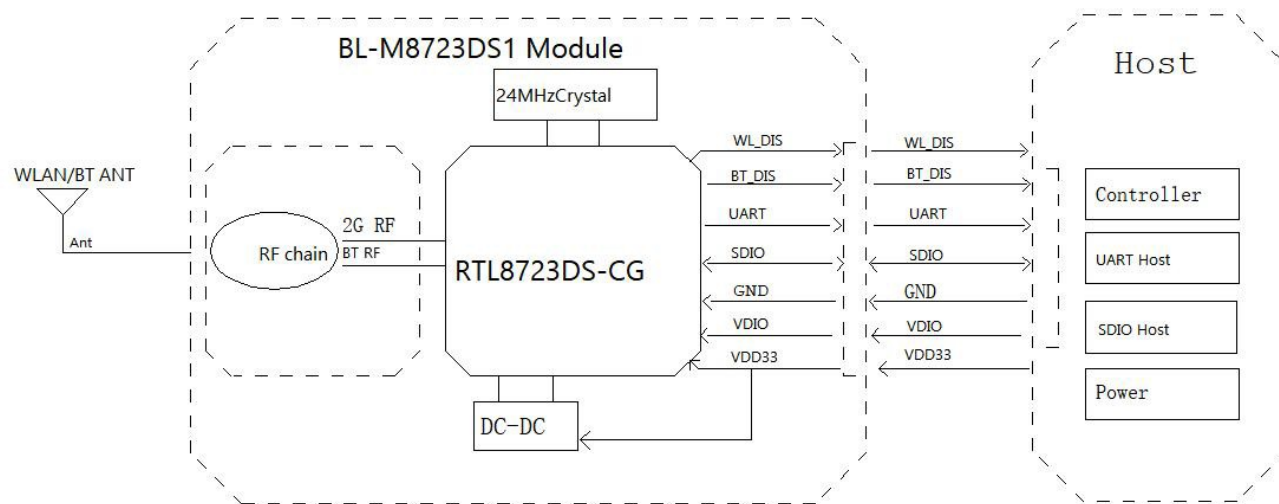
Module Bow and Twist : $\leq 0.1\text{mm}$

5.2 Mechanical Dimensions

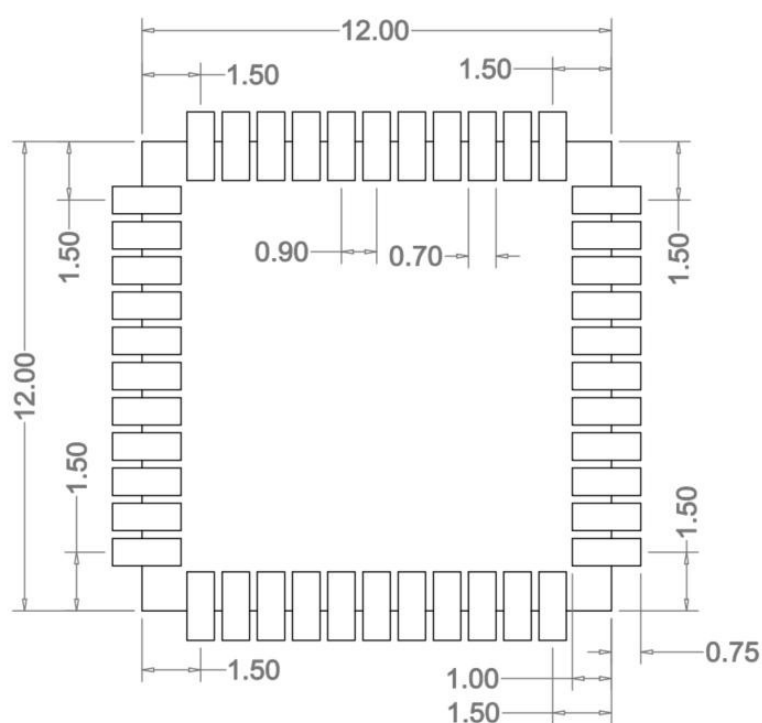


6. Application Information

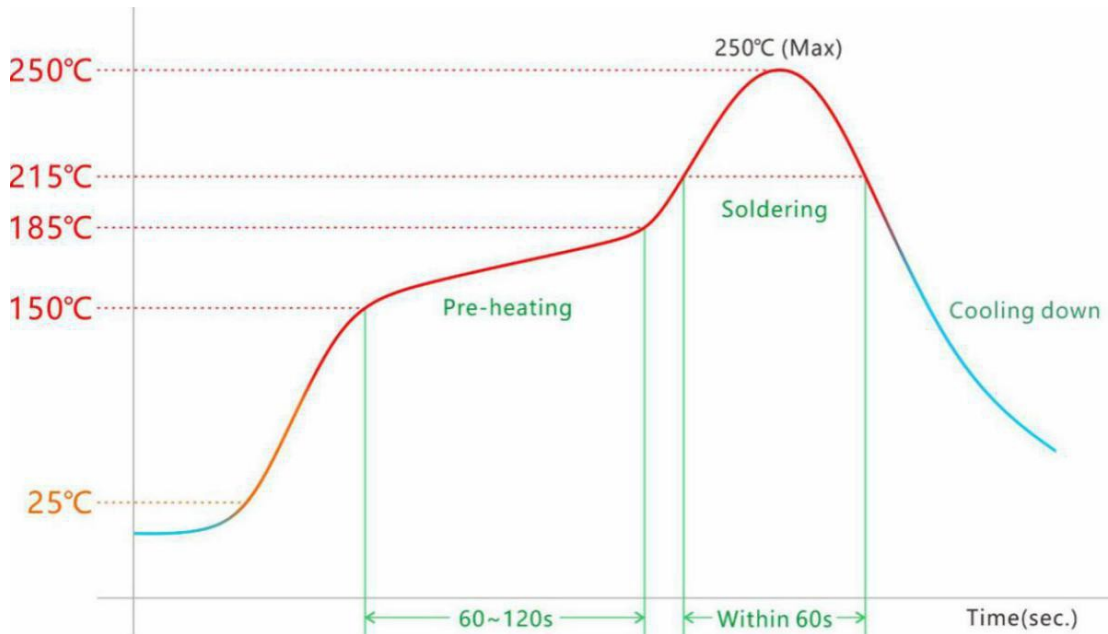
6.1 Typical Application Circuit



6.2 Recommend PCB Layout Footprint



6.3 Reflow Soldering Standard Conditions



Please use the reflow within 2times.

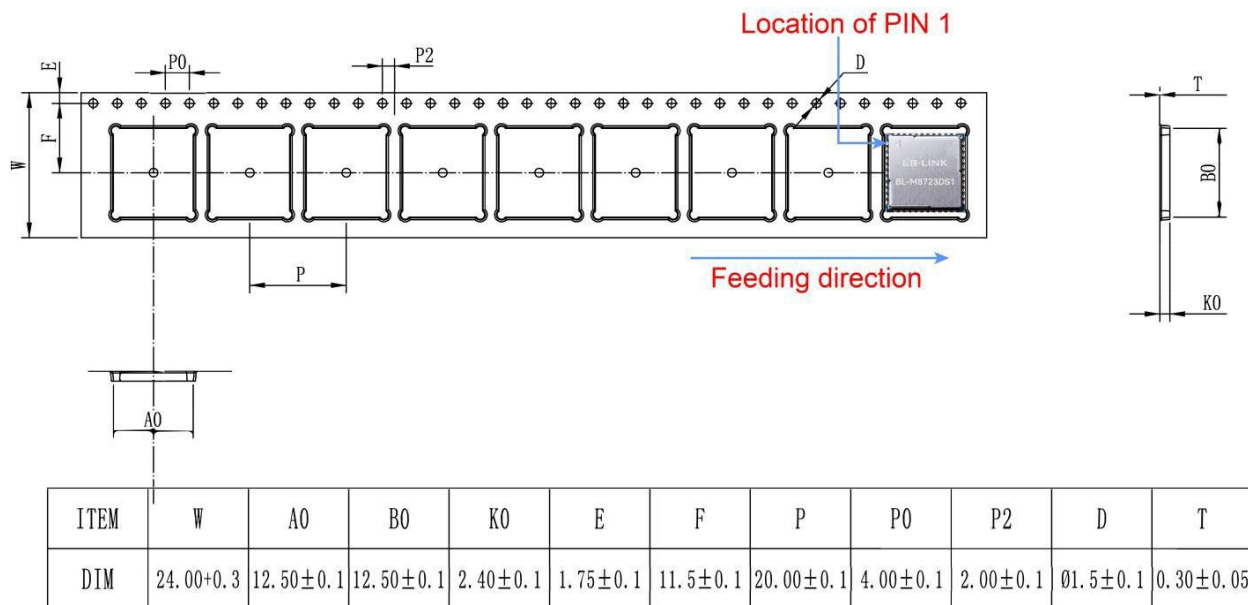
Set up the highest temperature within 250°C.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8723DS-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8723DS1	Huizhou Dayawan Kexiang Technology Circuit Board Co., Ltd	
			Quzhou Sunlord Electronics Co., Ltd	
			Shen Zhen Tie Fa Technology Limited	
			SHEN ZHEN QILI ELECTRON CO., LTD	
3	Crystal	24MHz-2520	LUCKI CM ELECTRONICS CO., LTD	
			Chengde oscillator Electronic Technology CO., LTD	
			HUBEI TKD CRYSTAL ELECTRONIC SCIENCE AND TECHNOLOGY CO., LTD	

8. Package and Storage Information

8.1 Package Dimensions



Package Specification:

- 1,000 modules per roll and 5,000 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 StorageConditions

Absolute MaximumRatings:

Storage temperature: -40°C to +85°C

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

Recommended

StorageConditions:Storage

temperature: 5°C to +40°C Storage

humidity: 20% to 90%RH

Please use this Module within 12month aftervacuum-packaged.

The Module shall be stored without opening thepacking.

After the packing opened, the Module shall be used within72hours.When the color of the humidity indicator in the packingchanged,The Module shall be baked before soldering.

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

ESDSensitivity :

ESD Protection: 2KV(HBM ,Maximumrating)

The Module is a static-sensitive electronicdevice.

Do not operate or store near strong electrostaticfields.Take proper ESDprecautio



ESD CAUTION

FCC Statement

This

equipment 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 equipment 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 equipment 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.

§ 15.19 Labeling requirements.

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.

§ 15.21 Information to user.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC WARNING

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished to the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment 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 equipment 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 equipment 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20

cm between the radiator and your body. Radiation

Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other

antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module **2BDDW-BLM8723DS1**”

General Statements The module is limited to OEM installation only. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module. This module should be installed and operated with a minimum distance 20cm between the radiator and your body. OEM integrator shall equip the antenna to comply with antenna requirement part 15.203 & 15.204 and must not be co-located or operating in conjunction with any other antenna or transmitters. And OEM host shall implement a Class III Permissive Change (C2PC) or a new FCC ID to demonstrate compliance with FCC standard. This module is for use with external antennas only, and the antenna is recommended as below:

Antenna Information				
Model name	Antenna Type	Connector	Max gain dBi	Application range
Aigain-WIFI	PCB Antenna	/	2.57dBi	2400-2500MHz

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the module. The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed. This module supports Bluetooth 2402-2480MHz & 2.4G WLAN 2412-2462MHz which complies with part 15.247. The product is typically used in industrial, household and general office/ITE and audio & video end-products.

Requirement per KDB996369D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.

Explanation: This module meets the requirements of FCC part 15C(15.247). It specifically identified AC Power Line Conducted Emission, Radiated Spurious emissions, Bandedge and RF Conducted Spurious Emissions, Conducted Peak Output Power, Bandwidth, Power Spectral Density, Antenna Requirement.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If these condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The antenna can't be replaced by other authorized antennas, and the gain of each replacement antenna is no more than 2.57 dBi. This module is limited used antenna as below:

Antenna Information				
Model name	Antenna Type	Connector	Max gain dBi	Application range
Aigain-WIFI	PCB Antenna	/	2.57dBi	2400-2500MHz

2.4 Limited module procedures

In accordance with 47CFR 15.212 Modular Transmitters and KDB 996369 D01 ‘Module Equip Auth Guide v02’. FCC ID 2BDDW-BLM8723DS1 cannot meet the integrated antenna and do not contain power supply regulation on the module.

If a modular transmitter is approved as a “limited module,” then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions. A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a limited single module. The module without antenna and the module was not tested in stand-alone configuration – it was tested in the Host.

2.5 Trace antenna designs

If trace antenna designs are applicable, full-detail design specifications are required per D02 Module Q&A Question 11.

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ –Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.4 a) Information that includes permitted variances (e.g., trace boundary limits,

thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);

b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);

c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;

d) Appropriate parts by manufacturer and specifications;

e) Test procedures for design verification; and

f) Production test procedures for ensuring compliance.

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation:not applicable

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information:

(1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module complies with 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 your body."This module is designed to comply with the FCC statement, FCC ID is: **2BDDW- BLM8723DS1**.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also

identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation:

This module is limited used antenna as below:

Antenna Infomation				
Model name	Antenna Type	Connector	MAx gain dBi	Application range
Aigain-WIFI	PCB Antenna	/	2.57dBi	2400-2500MHz

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BDDW-BLM8723DS1.

2.9 Information on test modes and additional

testing requirements Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: Hangzhou Soundlive Electronic Co., Ltd.

can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product

as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuitry, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.

OEM integration instructions:

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:

The final end product must be labeled in a visible area with the following: "Contains Transmitter Module FCC ID: **2BDDW-BLM8723DS1**".

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in this manual.

The WFCO smart power control system gives the user control of devices throughout the RV, ranging from lights, to the water pump, to the awnings and slideouts. Whether using the APP through a smart device or using voice commands, the end user has complete control of their RV. The device is installed in the RV entrance, as shown in the drawing location 1.



The module is installed in the Power Pro Control System position 1 in the following figure.

The installation requirement is SMT mount. The antenna is in the picture position 2, and the distance between the antenna and the human body is greater than 20cm. The device is only used indoors.

