

Product Specification

Revision	V1.0		
Date	2017-5-18		
Model Name	BL-M8822BS1		
ProductName	IEEE 802.11b/g/n/ac (2T2R) SDIO WLAN& BT Module		
Bilian Approve Field			
Engineer	QC	Sales	
Customer Approve Field			
Engineer	QC	Manufactory	Purchasing

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Revision History

Date	Document Revision	Product Revision	Description
2017/4/3	0.1	V0.1	Preliminary release
2017/5/18	0.1	V1.0	Update RF parameters ,Power Consumption and product pictures

1. Introduction

1.1 General Description

BL-M8822BS1 product is a highly integrated module that support 2-stream 802.11ac solutions with Multi-user MIMO (Multiple In, Multiple Out) with integrated Bluetooth 2.1/3.0/4.1 controller, SDIO (SDIO1.1/2.0/3.0) interface, and HS-UART Mixed interface. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip. The product provides a complete solution for a high-performance integrated wireless and Bluetooth device.

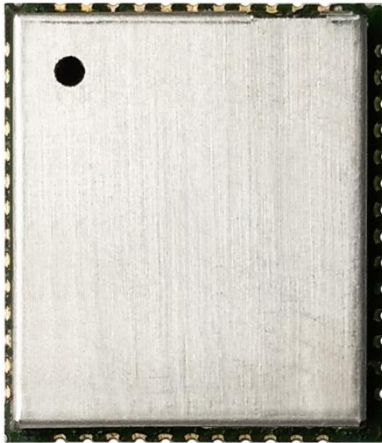


Figure 1 Top View



Figure 2 Bottom View

Note: The above pictures are for reference only

1.2 Features

- Operating Frequencies : 2.4~2.4835GHz and 5.15~5.85GHz
- Host Interface is SDIO3.0 (comply with SDIO1.1/2.0) and UART
- IEEE Standards : IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to 867Mbps
- Connect to external antenna through the half hole connector
- Power Supply: 3.3V±0.2V

1.3 Applications

- MID
- IP Camera

- STB
- Smart TV
- E-book
- Other devices which need to be supported by wireless network

2. Functional Block Diagram

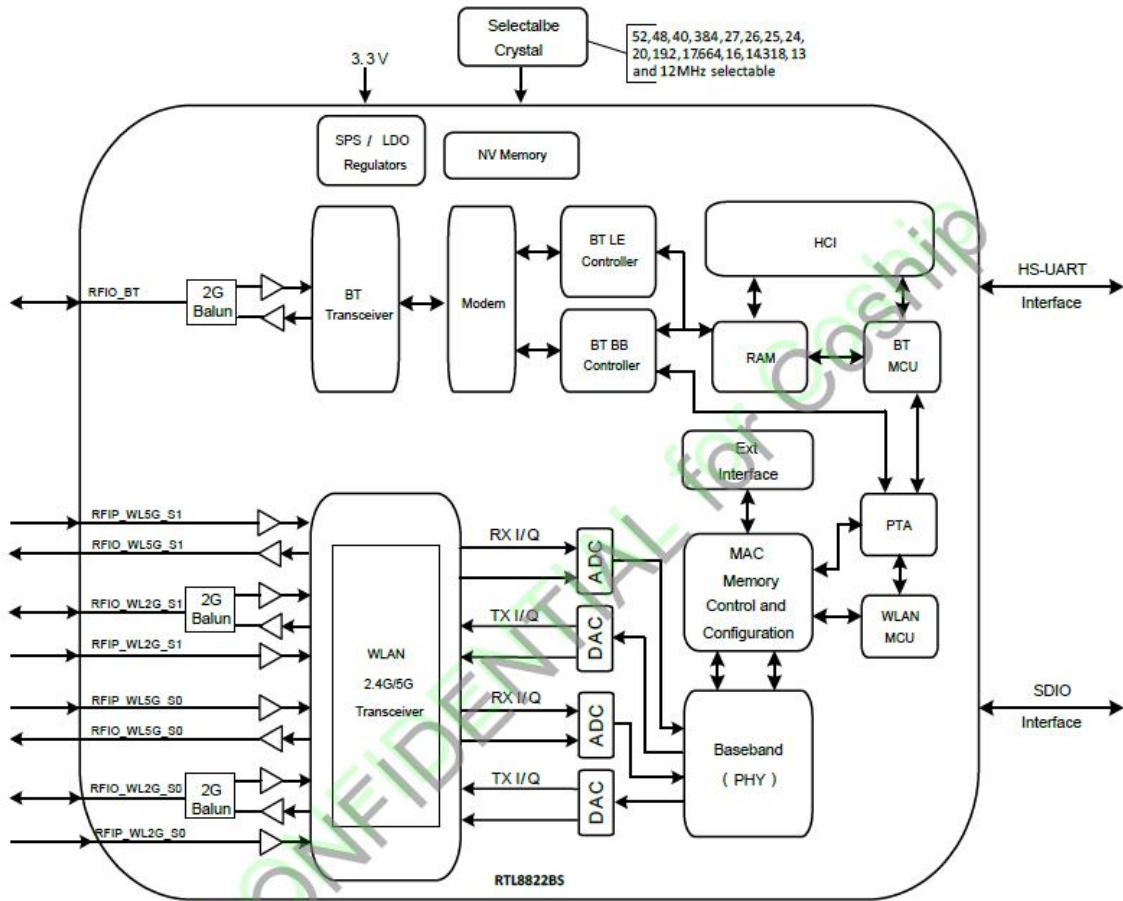


Figure 3 BL-M8822BS1 block diagram

3. Product Technical Specifications

3.1 General Specifications

Item	Description
Product Name	BL-M8822BS1
Main Chip	RTL8822BS-CG
Host Interface	SDIO (SDIO1.1/2.0/3.0) and UART
IEEE Standards	IEEE 802.11a/b/g/n/ac
Operating Frequencies	2.4GHz~2.4835GHz / 5.15~5.85Hz
Modulation	WIFI: 802.11b: CCK, DQPSK, DBPSK 802.11a/g: 64-QAM, 16-QAM, QPSK, BPSK

	802.11n: 64-QAM, 16-QAM, QPSK, BPSK 802.11ac: 256-QAM, 64-QAM, 16-QAM, QPSK, BPSK BT: 8DPSK, $\pi/4$ DQPSK, GFSK
Working Mode	Infrastructure, Ad-Hoc
Wireless Data Rate	WIFI: 802.11b: 1, 2, 5.5, 11Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: HT20 reach up to 14.4Mbps, HT40 reach up to 300Mbps 802.11ac: VHT20 reach up to 173.3Mbps, VHT40 reach up to 400Mbps, VHT80 reach up to 866.7Mbps BT: 1Mbps for Basic Rate 2, 3Mbps for Enhanced Data Rate
Rx Sensitivity	-95dBm (Min)
TX Power	18.5dBm (Max)
Antenna Type	Connect to external antenna through the half hole connector
Dimension(L*W*H)	13.1*15.1*3.5mm (L*W*H), Tolerance: ± 0.15 mm
Power Supply	3.3V \pm 0.2V
Power Consumption	Standby 195mA (Max) TX mode 650 mA (Max)
Clock Source	40MHz
Working Temperature	-10° C to +70° C
Storage Temperature	-40° C to +70° C

ESD CAUTION: Although this module is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this module. It must be protected from ESD at all times and handled under the protection of ESD.

3.2 DC Power Consumption

Vcc=3.3V, Ta= 25 ° C, unit: mA				
Supply current	Typ.		Max	
Standby (RF disabled)	195		216	
802.11b	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	410	436	358	388
Rxmode	210	232	206	226
802.11g	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	395	432	312	380
Rxmode	212	230	208	228

802.11n HT20	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	396	432	312	384
Rxmode	210	228	210	225
802.11n HT40	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	380	420	285	368
Rxmode	216	232	213	227
802.11a	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	398	432	347	416
Rxmode	214	228	210	230
802.11n HT40 (5G)	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	380	420	318	400
Rxmode	210	230	206	225
802.11ac	MCS0		MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	374	420	309	404
Rxmode	206	224	200	223
2T2R				
802.11n HT40 (2.4G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	544	608	410	556
Rxmode	220	241	213	239
802.11n HT40 (5G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	576	608	455	556
Rxmode	218	237	210	232
802.11ac (5G)	NSS2-MCS0		NSS2-MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	564	650	433	632
Rxmode	210	235	206	230

3.3 RF Specifications

TX Power	2.4G: 802.11b: 17 ± 1.5 dBm 802.11g/11n-HT20: 15 ± 1.5 dBm
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	<p>802.11n -HT40: 14 ± 1.5 dBm</p> <p>5G:</p> <p>802.11a/11n-HT20: 13 ± 1.5 dBm</p> <p>802.11n-HT40: 13 ± 1.5 dBm</p> <p>802.11ac: 12 ± 1.5 dBm</p>
TX Constellation Error (EVM)	<p>2.4G:</p> <p>802.11b: < -22 dB@11Mbps</p> <p>802.11g: < -28 dB@54Mbps</p> <p>802.11n-HT20: < -28 dB@72.2Mbps</p> <p>802.11n-HT40: < -28 dB@150Mbps</p> <p>5G:</p> <p>802.11a: < -28 dB@54Mbps</p> <p>802.11n-HT20: < -28 dB@72.2Mbps</p> <p>802.11n-HT40: < -28 dB@150Mbps</p> <p>802.11ac: < -33 dB@433Mbps</p>
Receiver Minimum Input Sensitivity@PER	<p>1Mbps: -95 dBm@PER<8%;</p> <p>11Mbps: -85 dBm@PER<8%;</p> <p>54Mbps: -74 dBm@PER<10%;</p> <p>150Mbps: -68 dBm@PER<10%;</p> <p>300Mbps: -67 dBm@PER<10%;</p> <p>433Mbps: -59 dBm@PER<10%;</p> <p>867Mbps: -57 dBm@PER<10%;</p>

RFTest Report										
PathA										
2.4G										
Mode	Rate (Mbps)	Power (dBm)			EVM (dB)			Sensitivity (dBm)		
		CH1	CH7	CH13	CH1	CH7	CH13	CH1	CH7	CH13
11b	1	19.73	19.43	19.35	-25.90	-25.91	-25.74	-95	-95	-95
	11	17.40	17.26	17.58	-21.02	-21.38	-21.64	-86	-85	-85
11g	6	16.92	16.99	17.00	-28.69	-28.98	-27.59	-91	-91	-91
	54	15.18	15.49	15.18	-34.23	-34.09	-33.52	-74	-73	-73
Mode	Rate (Mbps)	Power (dBm)			EVM (dB)			Sensitivity (dBm)		
		CH3	CH7	CH11	CH3	CH7	CH11	CH3	CH7	CH11
11n	MCS0	16.46	16.29	16.03	-30.01	-30.03	-30.93	-87	-87	-87

HT40	MCS7	14.69	14.49	14.69	-35.4 3	-34.9 7	-35.3 8	-68	-68	-68			
PathB													
Mode	Rate (Mbps)	Power (dBm)			EVM (dB)			Sensitivity (dBm)					
		CH1	CH7	CH13	CH1	CH7	CH13	CH1	CH7	CH13			
11b	1	19.52	19.55	19.34	-25.1 4	-25.7 8	-25.9 1	-95	-95	-95			
	11	17.66	17.61	17.73	-22.0 2	-22.0 7	-22.1 3	-86	-86	-86			
11g	6	17.38	17.24	17.03	-28.4 7	-28.4 8	-28.8 0	-91	-91	-91			
	54	15.08	15.45	15.15	-32.3 5	-33.7 0	-33.4 6	-74	-74	-74			
Mode	Rate (Mbps)	Power (dBm)			EVM (dB)			Sensitivity (dBm)					
		CH3	CH7	CH11	CH3	CH7	CH11	CH3	CH7	CH11			
11n HT40	MCS0	16.47	16.11	16.34	-29.9 4	-31.1 4	-30.7 3	-88	-88	-88			
	MCS7	14.44	14.38	14.32	-32.3 9	-33.4 9	-33.6 7	-69	-69	-69			
RFTest Report													
PathA													
5G													
Mode	Rate (Mbps)	Power (dBm)				EVM (dB)				Sensitivity (dBm)			
		CH 36	CH 100	CH 140	CH 161	CH 36	CH100	CH140	CH161	CH 36	CH 100	CH 140	CH 161
11a	6	16.3 4	16.5 5	16.3 5	16.2 2	-22.1 3	-22.9 0	-26.6 3	-23.9 8	-91	-91	-91	-91
	54	13.5 1	13.7 8	13.7 7	13.4 5	-30.0 7	-30.3 3	-33.0 9	-30.0 1	-75	-75	-75	-75
Mode	Rate (Mbps)	Power (dBm)				EVM (dB)				Sensitivity (dBm)			
		CH 38	CH 102	CH 142	CH 159	CH 38	CH102	CH142	CH159	CH 38	CH 102	CH 142	CH 159
11n 40	MCS0	16.4 1	16.4 5	16.1 7	16.0 1	-21.9 6	-23.0 4	-24.9 6	-22.3 5	-88	-89	-89	-89
	MCS7	13.4 8	13.8 7	13.7 7	13.2 6	-30.1 2	-30.3 0	-31.1 4	-30.2 6	-70	-70	-70	-70
Mode	Rate (Mbps)	Power (dBm)				EVM (dB)				Sensitivity (dBm)			
		CH 42	CH 106	CH 138	CH 155	CH 42	CH106	CH138	CH155	CH 42	CH 106	CH 138	CH 155
11ac	MCS0	15.5	15.4	15.6	15.5	-31.3	-32.4	-31.6	-30.6	-85	-85	-85	-84

		3	2	5	7	5	8	5	0				
	MCS9	12.4 3	12.4 0	12.6 8	12.5 1	-33.6 1	-35.7 4	-35.2 6	-33.8 6	-61	-61	-61	-61
PathB													
5G													
Mode	Rate (Mbps)	Power (dBm)				EVM (dB)				Sensitivity (dBm)			
		CH 36	CH 100	CH 140	CH 161	CH 36	CH100	CH140	CH161	CH 36	CH 100	CH 140	CH 161
11a	6	16.2 8	16.2 9	16.2 7	16.3 2	-23.9 5	-22.1 2	-24.0 9	-22.6 7	-91	-91	-91	-91
	54	14.3 7	13.7 6	14.1 0	13.7 8	-31.1 0	-30.6 9	-30.3 0	-30.1 0	-75	-75	-75	-75
Mode	Rate (Mbps)	Power (dBm)				EVM (dB)				Sensitivity (dBm)			
		CH 38	CH 102	CH 142	CH 159	CH 38	CH102	CH142	CH159	CH 38	CH 102	CH 142	CH 159
11n 40	MCS0	15.4 4	15.5 5	15.3 4	15.5 2	-26.8 8	-24.0 3	-26.1 5	-24.1 7	-88	-88	-88	-88
	MCS7	13.5 6	13.2 2	13.4 7	13.5 2	-31.2 4	-30.2 6	-33.0 2	-30.2 4	-70	-70	-70	-70
Mode	Rate (Mbps)	Power (dBm)				EVM (dB)				Sensitivity (dBm)			
		CH 42	CH 106	CH 138	CH 155	CH 42	CH106	CH138	CH155	CH 42	CH 106	CH 138	CH 155
11ac	MCS0	15.3 1	15.3 5	15.5 2	15.6 0	-26.7 0	-24.4 9	-30.7 4	-24.9 8	-84	-84	-84	-84
	MCS9	12.4 9	12.3 2	12.6 1	12.4 3	-33.3 2	-32.9 7	-34.0 3	-33.7 9	-60	-59	-59	-59

4. Pin Assignments

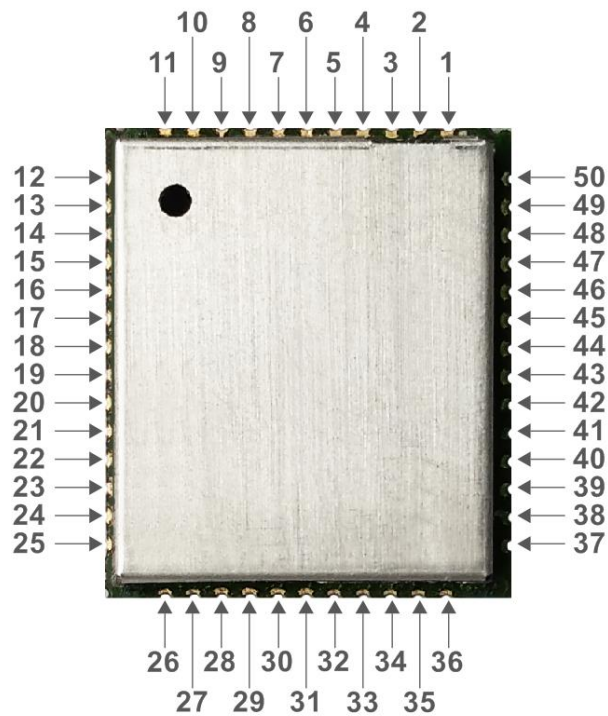


Figure 4 Pin Assignments (Top view)

The following signal type codes are used in the tables:

I: Input O: Output
 O/D: Open Drain P: Power Pin

Pin No:	Pin Name	Type	Description
1、3、4、5、6、7、 8、10、11、23、32、 39	GND	P	Ground
12、13、14、24、 25、26、33、35、 37、45、46、47、 48	/	/	NC
2	WL/BT_ANT0	I/O	RF port 0
9	WL_ANT1	I/O	RF port 1
15	WL_REG_ON	I	Low asserting reset for wifi
16	WL_WAKE_HOST	O	WLAN to wake up HOST
17	SDIO_CMD	I/O	SDIO command line

18	SDIO_CLK	I/O	SDIO clock line
19	SDIO_DATA3	I/O	SDIO data line 3
20	SDIO_DATA2	I/O	SDIO data line 2
21	SDIO_DATA0	I/O	SDIO data line 0
22	SDIO_DATA1	I/O	SDIO data line 1
27	PCM_SYNC	I/O	PCM sync signal
28	PCM_IN	I	PCM data input
29	PCM_OUT	O	PCM data output
30	PCM_CLK	I/O	PCM clock
31	LPO	I	External low power clock input (32.768KHz)
34	VDDIO	P	I/O Voltage supply input
36	VBAT	P	3.3V Main Power Supply
38	BT_REG_ON	I	Low asserting reset for Bluetooth
40	UART_TXD	O	Bluetooth UART interface
41	UART_RXD	I	Bluetooth UART interface
42	UART_RTS_N	/	GND
43	UART_CTS_N	I	Bluetooth UART interface
44	SD_RESET	I	SDIO System reset
49	HOST_WAKE_BT	I	HOST wake up Bluetooth device
50	BT_WAKE_HOST	O	Bluetooth device to wake up HOST

5. Application Information

5.1 Supported Platform

Operating System	CPU Framework	Driver
WIN10	X86 Platform	Enable
LINUX (Kernel 2.6.24~3.19.3)	ARM, MIPSII, X86 Platform	Enable

NOTE: The linux driver only support for the current kernel version.

5.2 Typical Application Circuit

RF reference circuit

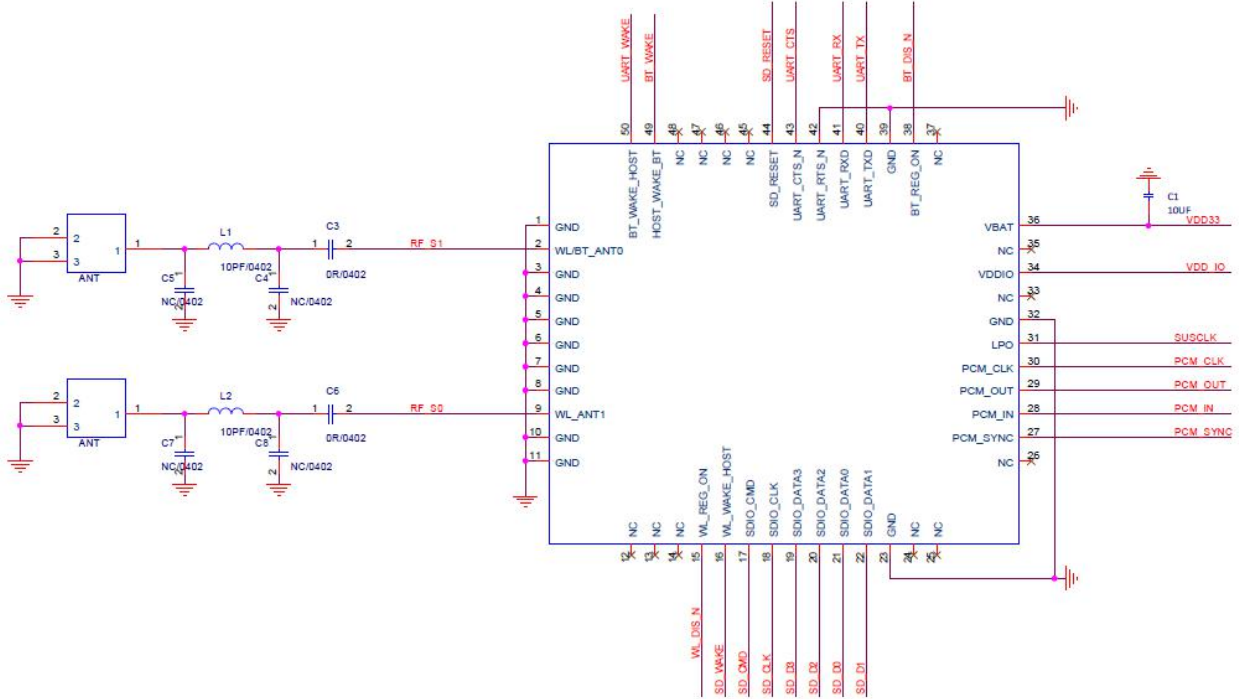


Figure 5 Typical application circuit

NOTE: RF trace need to keep 50 ohm impedance.

6. Mechanical Specifications

Module dimension: Typical (L*W * H): 13.1.0mm*15.1mm*3.5mm Tolerance : +/-0.15mm

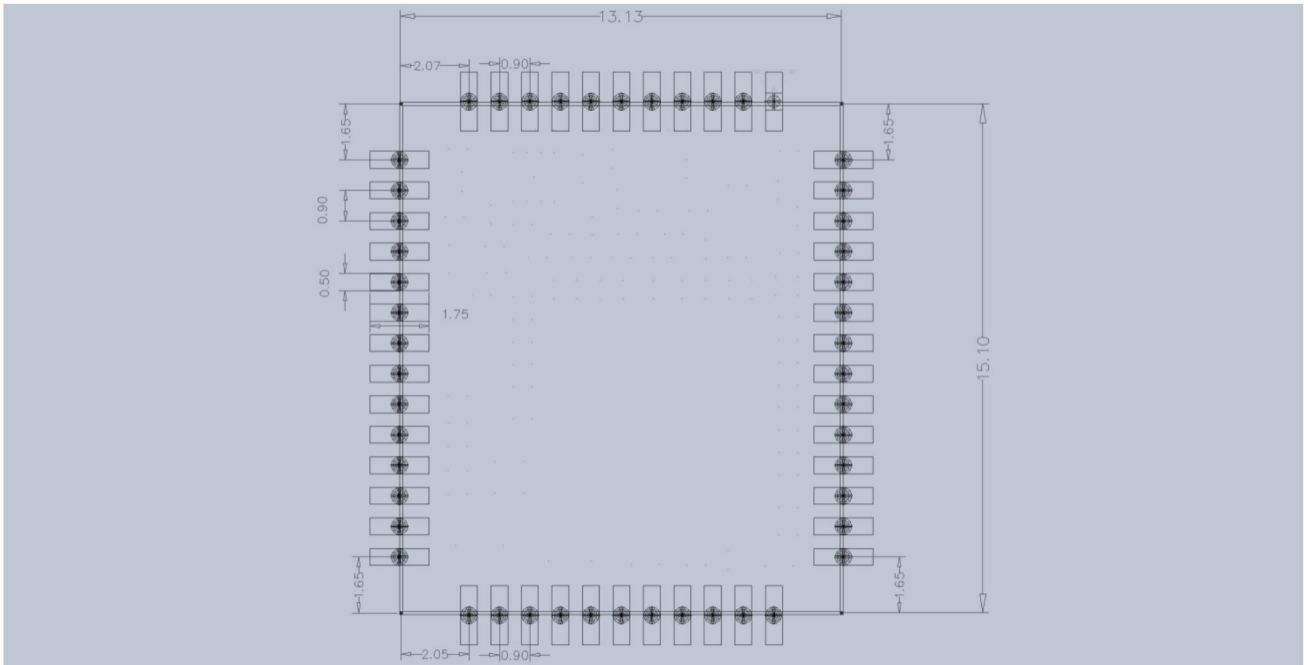


Figure 6 Module dimension

7. Others

7.1 Package Information



Figure 7 Package Information

7.2 Storage Temperature and Humidity

1. Storage Condition: Moisture barrier bag must be stored under 30°C, humidity under 85% RH.

The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.

Humidity indicator cards must be blue, <30%.

2. Products require baking before mounting if humidity indicator cards reads > 30% temp < 30°C, humidity < 70% RH, over 96 hours.

Baking condition: 125°C, 12 hours.

Baking times: 1 time.

7.3 Recommended Reflow Profile

Reflow soldering shall be done according to the solder reflow profile, Typical Solder Reflow Profile is

illustrated in Figures 8. The peak temperature is 245°C.

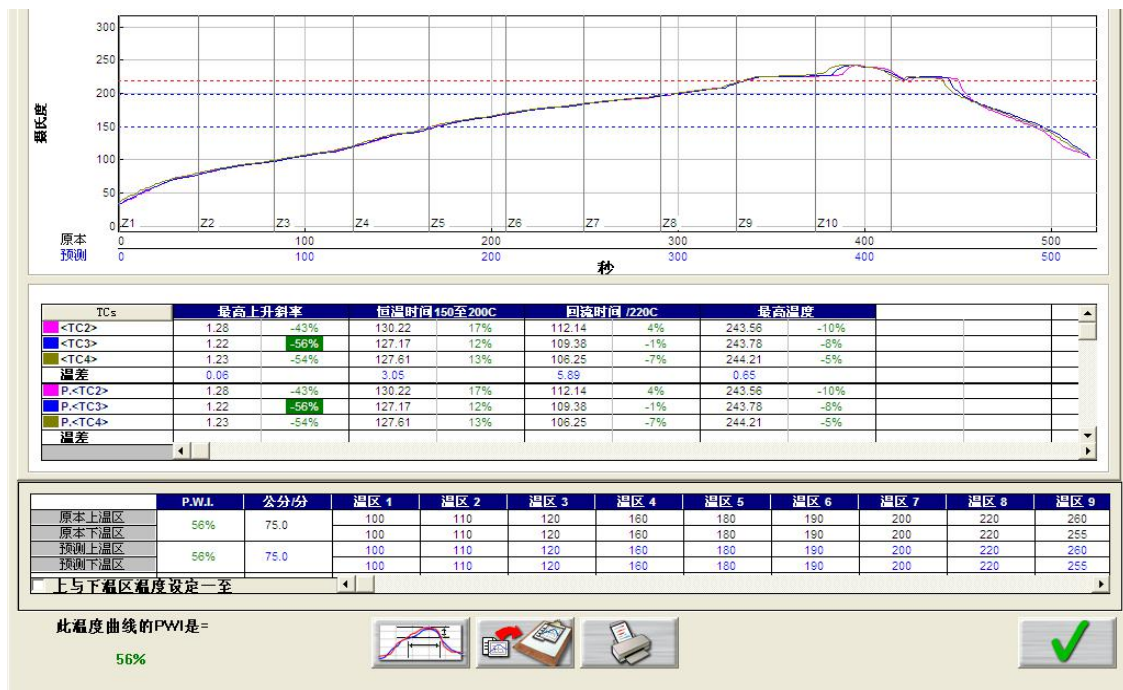


Figure 8 Typical Solder Reflow Profile