



BL-M8192FU1

802.11n 300Mbps WLAN

USB2.0 Module Specification

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(Top View)



(Bottom View)

Module Name: BL-M8192FU1	
Module Type: 802.11b/g/n 300Mbps 2T2R WLAN USB Module	
Revision: V1.2	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
BL-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date	Revised By
1.0	Official release	2020-03-19	
1.1	Design diagram optimization	2021-04-16	
1.2	Content optimization	2023-03-28	Cxf

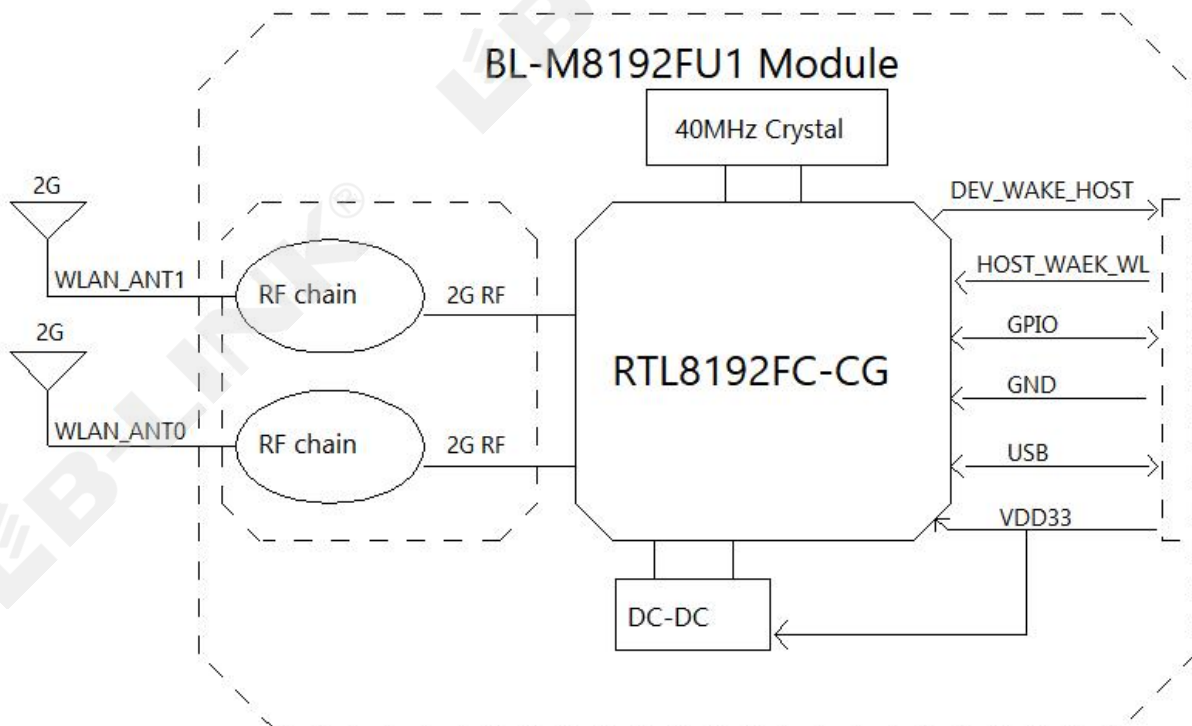
1. Introduction

BL-M8192FU1 is a highly integrated WLAN module, it contains a WLAN MAC, a 2T2R capable WLAN base band. It supports IEEE 802.11b/g/n standard and provides the highest PHY rate up to 300Mbps, offering feature-rich wireless connectivity and reliable throughput from an extended distance.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz
- Host Interface is USB2.0
- IEEE standard :IEEE 802.11b/g/n
- Wireless PHY rate up to 300Mbps
- Connect to external antenna through half hole
- DC 3.3V±0.2V single power supply

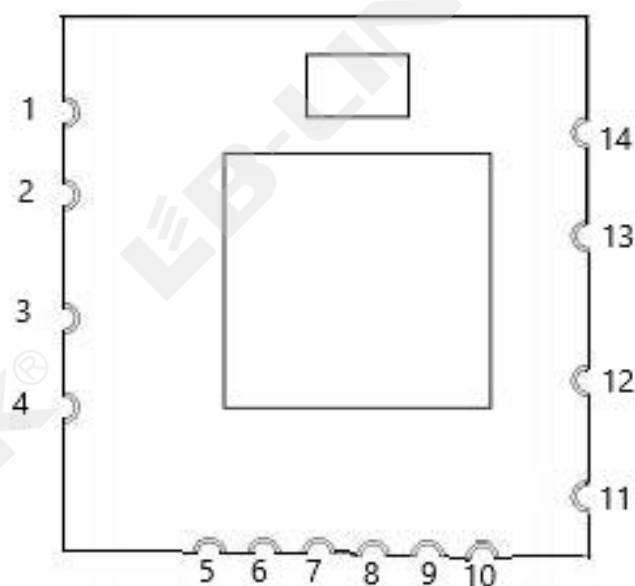
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8192FU1
Chipset	RTL8192FC-CG
WLAN Standard	IEEE 802.11 b/g/n
Host Interface	USB2.0
Antenna	Connect to the external antennas through half hole pad
Dimension	12.9*12.2*1.75mm (L*W*H)
Power Supply	DC 3.3V±0.2V @ 600 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	Module Pin Description
1	GND	RF		RF Ground for WLAN_ANT0
2	WLANT_ANT0	RF		2.4G RF for WLAN_ANT0
3	WLANT_ANT1	RF		2.4G RF for WLAN_ANT1

4	GND	RF		RF Ground for WLAN_ANT1
5	NC	--		No connection(floating)
6	NC	--		No connection(floating)
7	NC	--		No connection(floating)
8	HOST_WAEK_WL	I	VDD33	Host wake up WLAN
9	DEV_WAKE_HOST	O	VDD33	Device wake up host
10	CHIP_EN	I		Reset signal (internal pull high; active low)
11	VDD33	P		VDD 3.3V Power Supply
12	DM	AI/O		USB2.0 Transmitter/Receiver Differential Pair
13	DP	AI/O		USB2.0 Transmitter/Receiver Differential Pair
14	GND	P		Ground connection

P: Power or Ground; I/O: In/Output; I: Input; O :Output; AI/O: Analog In/Output; RF: Analog RF Port or RF Ground;

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

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

WLAN Radio Off (Linux Driver)	30	50	mA
WLAN Unassociated (Linux Driver)	50	75	mA

2.4G 11b@1Mbps TX (RF-Test)17dBm	270	300	mA
2.4G 11b@1Mbps RX (RF-Test)	110	113	mA
2.4G 11b@11Mbps TX (RF-Test)17dBm	265	290	mA
2.4G 11b@11Mbps RX (RF-Test)	107	110	mA
2.4G 11g@6Mbps TX (RF-Test)14dBm	240	250	mA
2.4G 11g@6Mbps RX (RF-Test)	105	110	mA
2.4G 11g@54Mbps TX (RF-Test)14dBm	200	220	mA
2.4G 11g@54Mbps RX (RF-Test)	100	115	mA
2.4G 11n@HT20_MCS0 TX (RF-Test)14dBm	200	220	mA
2.4G 11n@HT20_MCS0 RX (RF-Test)	107	118	mA
2.4G 11n@HT20_MCS7 TX (RF-Test)14dBm	180	210	mA
2.4G 11n@HT20_MCS7 RX (RF-Test)	106	110	mA
2.4G 11n@HT40_MCS7 TX (RF-Test)14dBm	170	200	mA
2.4G 11n@HT40_MCS7 RX (RF-Test)	105	110	mA
2.4G 11n@HT40_MCS8 TX (2RF-Test)14dBm	270	300	mA
2.4G 11n@HT40_MCS8 RX (2RF-Test)	130	150	mA
2.4G 11n@HT40_MCS15 TX (2RF-Test)14dBm	240	280	mA
2.4G 11n@HT40_MCS15 RX (2RF-Test)	140	170	mA

4. WLAN RF Specifications

4.1 2.4G WLAN 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): CCK, DQPSK, DBPSK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64;
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 (HT20): MCS8~MCS15(2T2R_MIMO) 13~144.4Mbps; 802.11n (HT40): MCS0~MCS7 13.5~150Mbps; 802.11n (HT40): MCS8~MCS15(2T2R) 27~300Mbps;
Frequency Tolerance	$\leq \pm 20\text{ppm}$

2.4G Transmitter Specifications(ANT0 & ANT1,TX power of some rates is calibrated, customers can define the target TX power of other rates by modifying configuration file of the driver software. Customers must define the TX power same or lower than recommended Target TX Power as below)

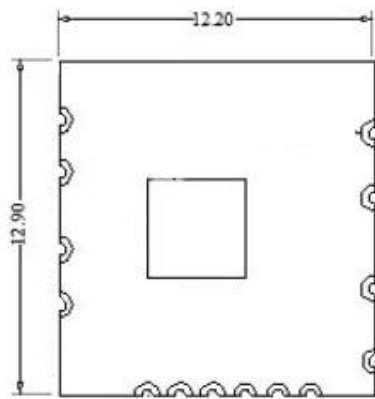
TX Rate	TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11b@1Mbps	Recommended Target TX Power :17	± 1.5	≤ -10
802.11b@11Mbps	Calibrated TX Power :17	± 1.5	≤ -10
802.11g@6Mbps	Recommended Target TX Power :14	± 1.5	≤ -10
802.11g@54Mbps	Calibrated TX Power :14	± 1.5	≤ -25
802.11n@HT20_MCS0	Recommended Target TX Power :14	± 1.5	≤ -10
802.11n@HT20_MCS7	Calibrated TX Power :14	± 1.5	≤ -28
802.11n@HT40_MCS0	Recommended Target TX Power :14	± 1.5	≤ -10
802.11n@HT40_MCS7	Calibrated TX Power :14	± 1.5	≤ -28

2.4G Receiver Specifications (ANT0 & ANT1)

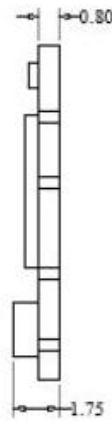
RX Rate	Min Input Level (Typ.dBm)	Max Input Level (Typ.dBm)	PER
802.11b@1Mbps	-93	-10	< 8%
802.11b@11Mbps	-85	-10	< 8%
802.11g@6Mbps	-90	-10	< 10%
802.11g@54Mbps	-73	-10	< 10%
802.11n@HT20_MCS0	-88	-10	< 10%
802.11n@HT20_MCS7	-68	-10	< 10%
802.11n@HT40_MCS0	-86	-10	< 10%
802.11n@HT40_MCS7	-67	-10	< 10%

5. Mechanical Specifications

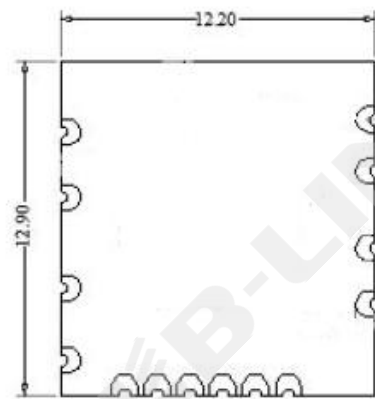
5.1 Module Outline Drawing



(Top View)

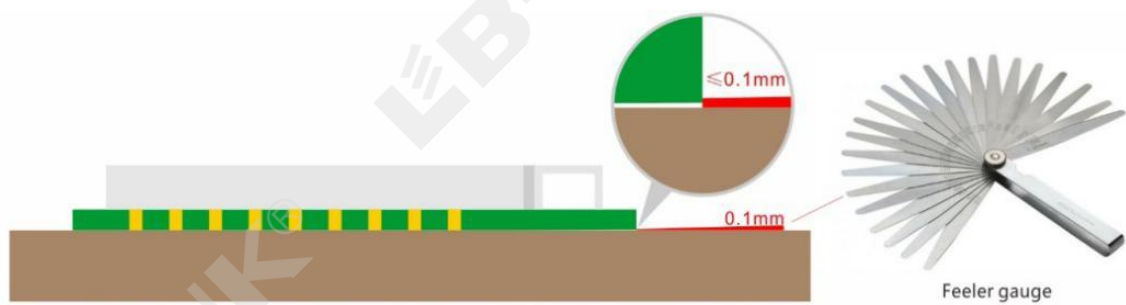


(Side View)



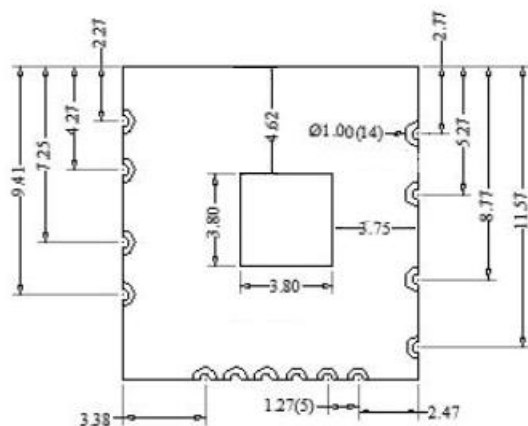
(Bottom View)

Module dimension: 12.9*12.2*1.75mm(L*W*H; Tolerance: ± 0.15 mm)

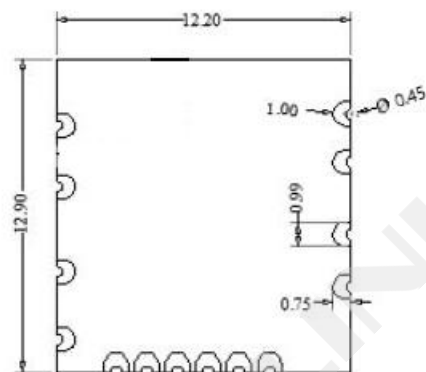


Module Bow and Twist: ≤ 0.1 mm

5.2 Mechanical Dimensions



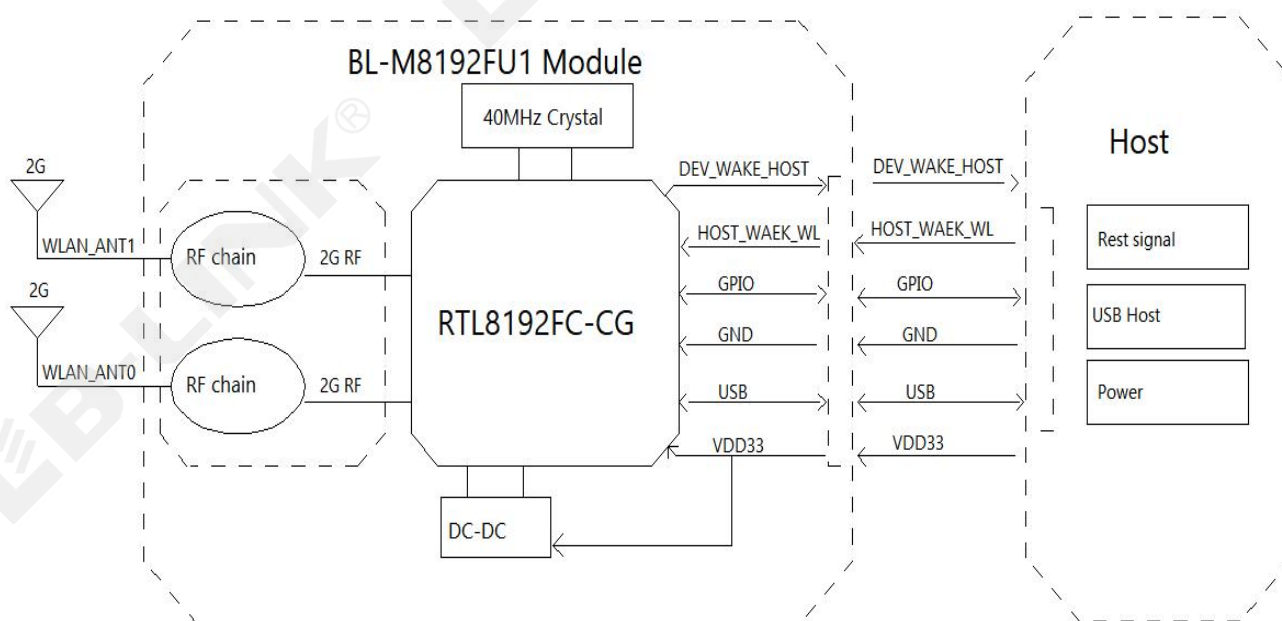
(Top View)



(Bottom View)

6. Application Information

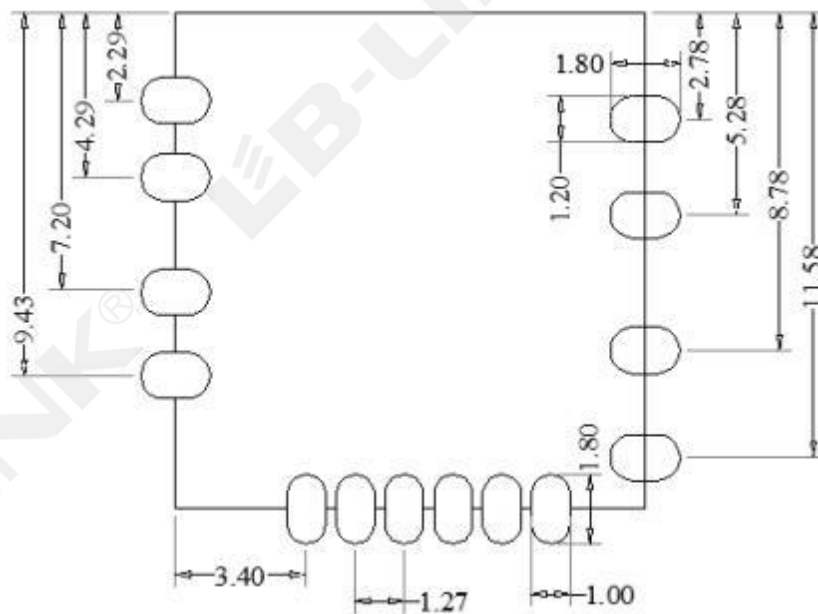
6.1 Typical Application Circuit



6.2 HW Application Note

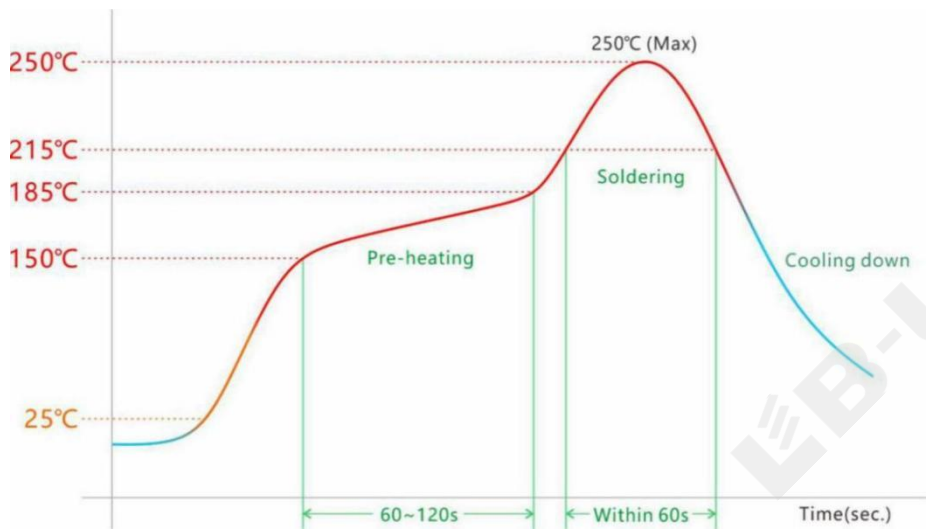
- PCB traces of the USB high-speed signal pair as short as possible, minimize the length mismatch of signal pair, avoid layer change and maintain a complete reference plane to reduce signal reflections and impedance changes.
- PCB traces of the RF path as short as possible, as far away from other signal as possible, and should be maintain continuous 50Ω characteristic impedance, structure of "Differential Coated Coplanar Wave-guide With Ground" with the advantages of impedance control and GND surrounding isolation interference may be an ideal choice. It is necessary to maintain a complete GND reference layer below the RF path area.
- The module's RF PAD and antenna PAD / RF connector PAD on customer's motherboard are significantly wider than PCB traces of the RF path, which will cause RF impedance discontinuity. To improve this problem, in addition to adjusting the local impedance of these PADs, a " π " circuit can be reserved near the antenna / RF connector, which can match the impedance of the entire RF path and the impedance of the antenna.

6.3 Recommend PCB Layout Footprint



(Design size: mm)

6.4 Reflow Soldering Standard Conditions



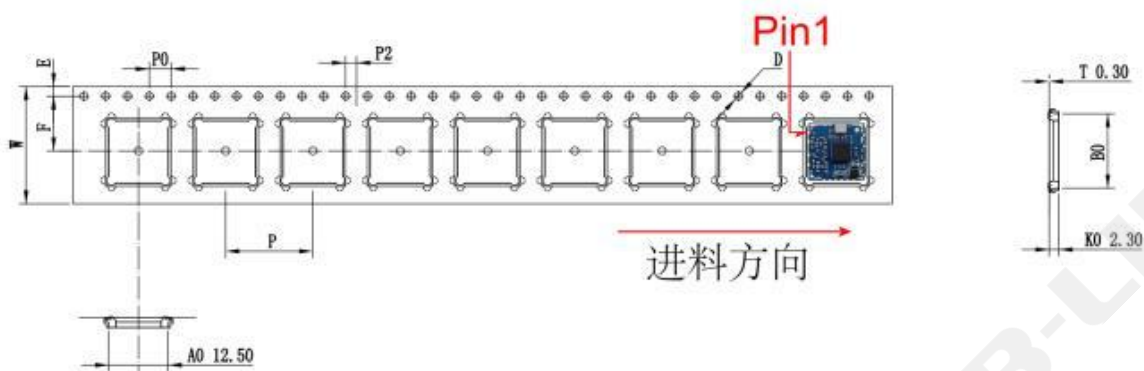
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8192FC-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8192FU1	ShenZhen Tie Fa Technology Limited	
			Huizhou Dayawan Kexiang Technology Circuit Board Co., Ltd	
			Quzhou Sunlord Electronics Co.,Ltd	
3	Crystal	40MHz-2520	HUBEI TKD CRYSTAL ELECTRONIC SCIENCE AND TECHNOLOGY CO.,LTD	
			LUCKI CM ELECTRONICS CO.,LTD	
			HOSONIC ELECTRONIC CO.,LTD	

8. Package and Storage Information

8.1 Package Dimensions



ITEM	W	AO	BO	KO	E	F	P	P0	P2	D	T
DIM	24.00±0.3	12.50±0.1	13.50±0.1	2.30±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. 1500 modules per roll and 7500 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: -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!



ESD CAUTION