Module Specification

Product Description	**2.4G wifi6 & BT5.2 combo Module**
Module NO.	**W800CS**
Customer Name	
Customer PN	

Wrote By： Alice 2022-11-20	Check： Denny 2022-11-20	approve： Brian 2022-11-23

Customer acknowledgement column		
R&D Department	Engineering Department	Quality Department

1. Change History of Revision

Revision	Date	Contents of Revision Change	Author
1.0	2022-11-20	New version	Alice
1.1	2023-2-15	Modify package information	Alice

2. Overview

W800CS is a single-die wireless local area network (WLAN) and Bluetooth (BT) combination solution to support IEEE 802. 11b/g/n/ax single band wifi6 WLAN standards and BT 5.2 Module, enabling seamless integration of WLAN/BT and low-energy technology

3. Features

- Operates in 2.4GHz frequency
- Support wifi6
- Support 802.11b/g/n/ax
- Support Mu-MIMO,OFDMA
- Data rates: up to 286.8Mbps@TX and 229.4Mbps@RX
- WLAN Support 20MH/40MHz bandwidth
- Supports SDIO 2.0
- Supports allthemandatory and optionalfeatures of Bluetooth 2.1+EDR/3.0/4.x/5.2
- Supports advanced master and slave topologies

4. General Specification

Model Name	W800CS
Module size	12*12*1.6mm (without shielding cover)
Product Description	802.11 b/g/n/ax 2.4G WiFi6 + BT5.2 Module
Data Rates	Up to 286Mbps
Frequency Band	2.4GHz ISM
Modulation Method	BPSK/ QPSK/ 16-QAM/ 64-QAM/256-QAM
Security	WEP/WPA/WPA2/WPA3-SAE Personal, MFP
Interface	Wifi: SDIO 2.0 BT: UART
Output Impedance	50Ω±5Ω
Operating Temperature	-10 ~ +70° C ambient temperature
Storage Temperature	-55 ~ 125°C ambient temperature
Humidity	Less than 85 % Non-condensing

5. DC Characteristics

1）Power Supply Characteristics

Symbol	Parameter	Min	Typical	Max	Units
VD33A, VD33D	3.3V I/O Supply Voltage	3.0	3.3	3.6	V
VDD33	3.3V Rating Current	-	-	1000	mA
VDDIO		1.8	3.3		V

6. Electrical Specifications

1) WiFi 2.4G RF Specification

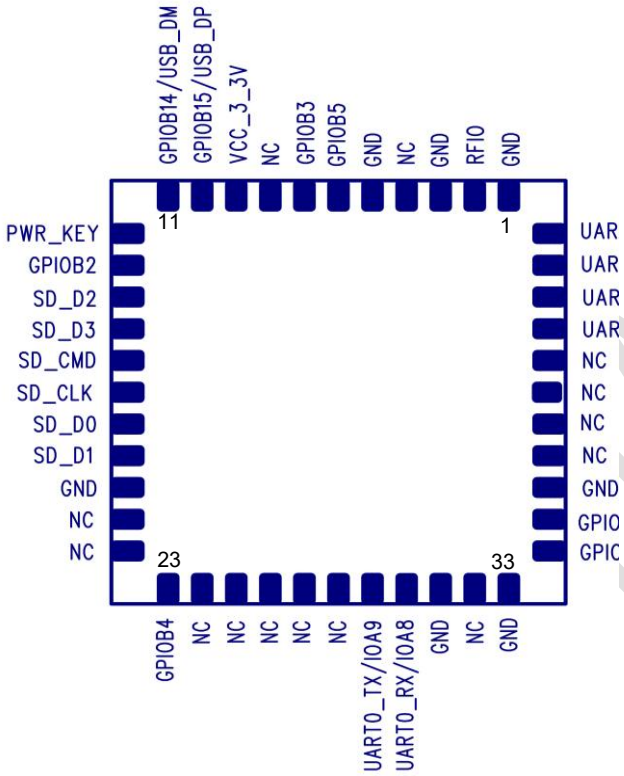
Feature	Description
WLAN Standard	IEEE 802. 11b/g/n/ax WiFi compliant
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)
Number of Channels	2.4GHz：Ch1 ~ Ch14
Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM,16-QAM, QPSK, BPSK 802.11 ax : 256-QAM, 64-QAM, 16-QAM, QPSK, BPSK
Output Power	802.11b / 1Mbps : 17dBm ± 2 dB @ EVM ≤ -10dB 802.11b /11Mbps : 17dBm ± 2 dB @ EVM ≤ -15dB
	802.11g / 6Mbps : 17dBm ± 2 dB @ EVM ≤ -5dB 802.11g /54Mbps : 14 dBm ± 2 dB @ EVM ≤ -28dB
	802.11n /MCS0(20/40M) : 17 dBm ± 2 dB @ EVM ≤ -5dB 802.11n /MCS7(20/40M) : 14 dBm ± 2 dB @ EVM ≤ -30dB
	802.11ax /HE0(20/40M) : 17 dBm ± 2 dB @ EVM ≤ -5dB 802.11ax /HE11(20/40M) : 13 dBm ± 2 dB @ EVM ≤ -32dB
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -93 dBm, typical
	- 2Mbps PER @ -90 dBm, typical
	- 5.5Mbps PER @ -88 dBm, typical
	- 11Mbps PER @ -86 dBm, typical
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -91 dBm, typical
	- 9Mbps PER @ -89 dBm, typical
	- 12Mbps PER @ -86 dBm, typical
	- 18Mbps PER @ -83 dBm, typical
	- 24Mbps PER @ -80 dBm, typical
	- 36Mbps PER @ -77 dBm, typical
	- 48Mbps PER @ -74 dBm, typical
	- 54Mbps PER @ -72 dBm, typical
Receive	- MCS=0 PER @ -90 dBm, typical
	- MCS=1 PER @ -87 dBm, typical
	- MCS=2 PER @ -84 dBm, typical
	- MCS=3 PER @ -81 dBm, typical

Sensitivity (11n,20MHz) @10% PER	- MCS=4 PER @ -78 dBm, typical
	- MCS=5 PER @ -75 dBm, typical
	- MCS=6 PER @ -72 dBm, typical
	- MCS=7 PER @ -70 dBm, typical
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 PER @ -87 dBm, typical
	- MCS=1 PER @ -84 dBm, typical
	- MCS=2 PER @ -81 dBm, typical
	- MCS=3 PER @ -78 dBm, typical
	- MCS=4 PER @ -75 dBm, typical
	- MCS=5 PER @ -72 dBm, typical
	- MCS=6 PER @ -69 dBm, typical
	- MCS=7 PER @ -67 dBm, typical
Receive Sensitivity (11ax,20MHz) @10% PER	- HE=0 PER @ -90 dBm, typical
	- HE=1 PER @ -88 dBm, typical
	- HE=2 PER @ -86 dBm, typical
	- HE=3 PER @ -84 dBm, typical
	- HE=4 PER @ -81 dBm, typical
	- HE=5 PER @ -79 dBm, typical
	- HE=6 PER @ -76 dBm, typical
	- HE=7 PER @ -73 dBm, typical
	- HE=8 PER @ -70 dBm, typical
	- HE=9 PER @ -68 dBm, typical
Receive Sensitivity (11ax,40MHz) @10% PER	- HE=0 PER @ -88 dBm, typical
	- HE=1 PER @ -86 dBm, typical
	- HE=2 PER @ -83 dBm, typical
	- HE=3 PER @ -80 dBm, typical
	- HE=4 PER @ -77 dBm, typical
	- HE=5 PER @ -74 dBm, typical
	- HE=6 PER @ -72 dBm, typical
	- HE=7 PER @ -69 dBm, typical
	- HE=8 PER @ -66 dBm, typical
	- HE=9 PER @ -64 dBm, typical
Maximum Input Level	802.11b : -10 dBm
	802.11g/n/ax : -20 dBm
Antenna Reference	Small antennas with 0~2 dBi peak gain

2) Bluetooth RF Specification

Feature	**Description**		
General Specification			
Bluetooth Standard	BT5.2		
Host Interface	UART		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2402 MHz ~ 2480 MHz		
Number of Channels	79 channels		
Modulation	GFSK, π/4-DQPSK, 8-DPSK		
RF Specification			
	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Output Power (Class 1)	0	5	7
Sensitivity @ BER=0. 1% for GFSK (1Mbps)		-95	
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-89	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-88	
Maximum Input Level	GFSK (1Mbps):-10dBm		
	π/4-DQPSK (2Mbps) :-10dBm		
	8DPSK (3Mbps) :-10dBm		

7. Pin Definition



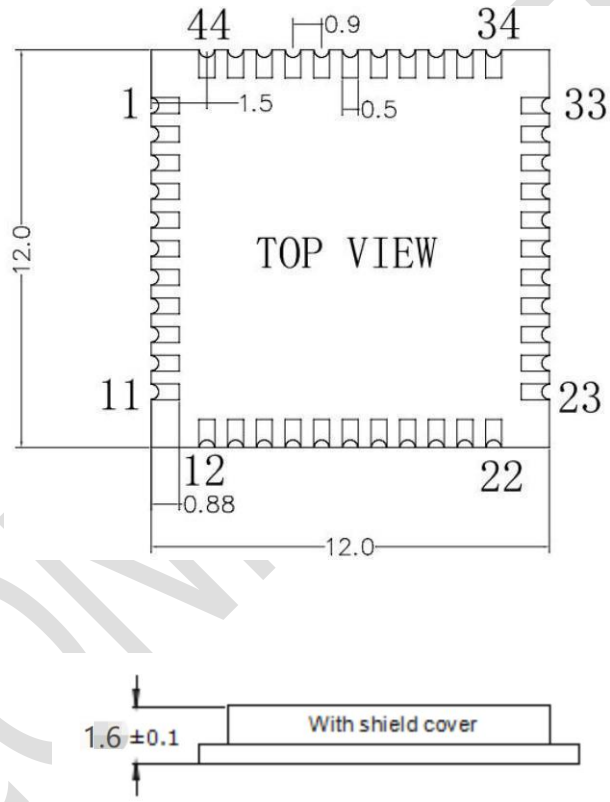
Pin Number	Name	Description
1	GND	GND
2	WIFI&BT ANT	WIFI&BT RF signal, connect to external antenna
3	GND	GND
4	NC	Reserved.Floating
5	NC	Reserved.Floating
6	HOST_WAKE_BT	HOST wake-up Bluetooth device
7	BT WAKE_HOST	Bluetooth device to wake-up HOST
8	NC	Reserved.Floating
9	VBAT	3.3V/1A Main Power input
10	NC	Reserved.Floating
11	NC	Reserved.Floating
12	WIFI PWRKEY	WLAN Enable; Active High
13	WIFI WAKE HOST	WLAN to wake-up HOST
14	SDIO_DATA2	SDIO data 2
15	SDIO_DATA3	SDIO data 3
16	SDIO_CMD	SDIO command interface
17	SDIO_CLK	SDIO clock
18	SDIO_DATA0	SDIO data 0

19	SDIO_DATA1	SDIO data 1
20	GND	GND
21	NC	Reserved.Floating
22	VDDIO	1.8V or 3.3V
23	NC	Reserved.Floating
24	NC	Reserved.Floating
25	PCM_OUT	PCM Data output
26	PCM_CLK	PCM Clock
27	PCM_IN	PCM data input
28	PCM_SYNC	PCM sync signal
29	NC	Reserved.Floating
30	NC	Reserved.Floating
31	GND	GND
32	NC	Reserved.Floating
33	GND	GND
34	BT EN	Bluetooth Enable; Active High
35	NC	Reserved.Floating
36	GND	GND

37	NC	Reserved.Floating
38	NC	Reserved.Floating
39	NC	Reserved.Floating
40	NC	Reserved.Floating
41	UART_RTS	UART RTS
42	UART_TX	UART Data Out
43	UART_RX	UART Data In
44	UART_CTS	UART CTS

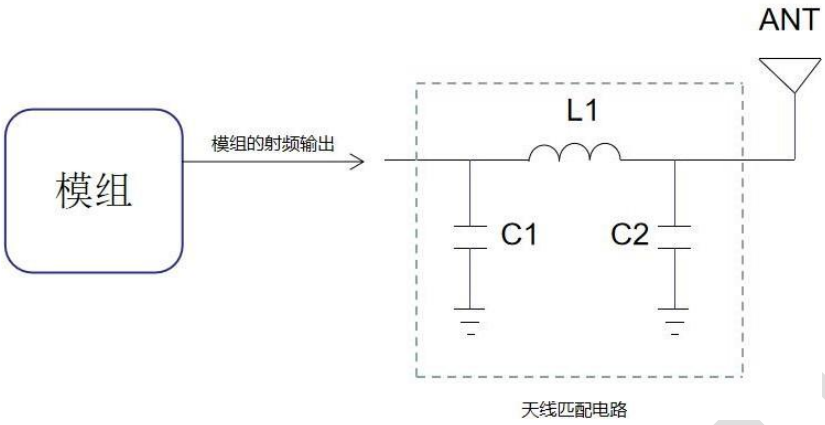
8. Size reference

Dimensions (mm)	Length	Width	Height
	12	12	1.6
	(Tolerance:±0.2mm)	**(Tolerance:±0.2mm)**	**(Tolerance:±0.2mm)**



9.External antenna reference design

External antenna reference design



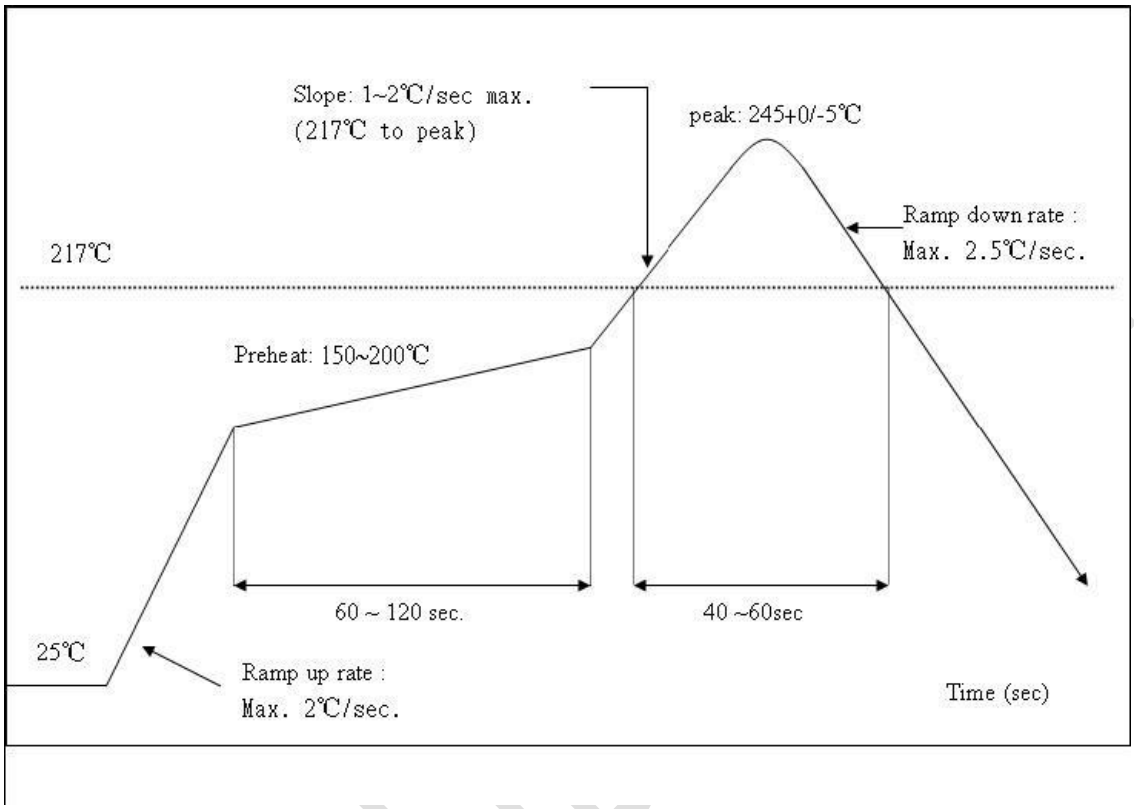
1. Above the dotted box part of the antenna matching is needed, the actual antenna matching electronic parameters shall prevail.
2. For RF part layout to do 50 ohm impedance. can't go on 90°of layout .The line length can't more than 20 mm.

10. SDIO interface electrical characteristics

1. SDIO (except CLK) directly connected to the main control, the line should be as parallel as possible, the line length difference is controlled within 50 mil, and the adjacent layer should be far away from other power sources and clock line;
2. SDIO is a high-speed routing, need to do 50 ohm impedance design;
3. SDIO CLK is a high frequency line, it is recommended to string a 22R or 0R resistance, and then a capacitor NC to the ground, the whole CLK line needs to be processed, not parallel to the signal line, the adjacent layer should be far away from the power supply / other signal lines.

11. Recommended Reflow Profile

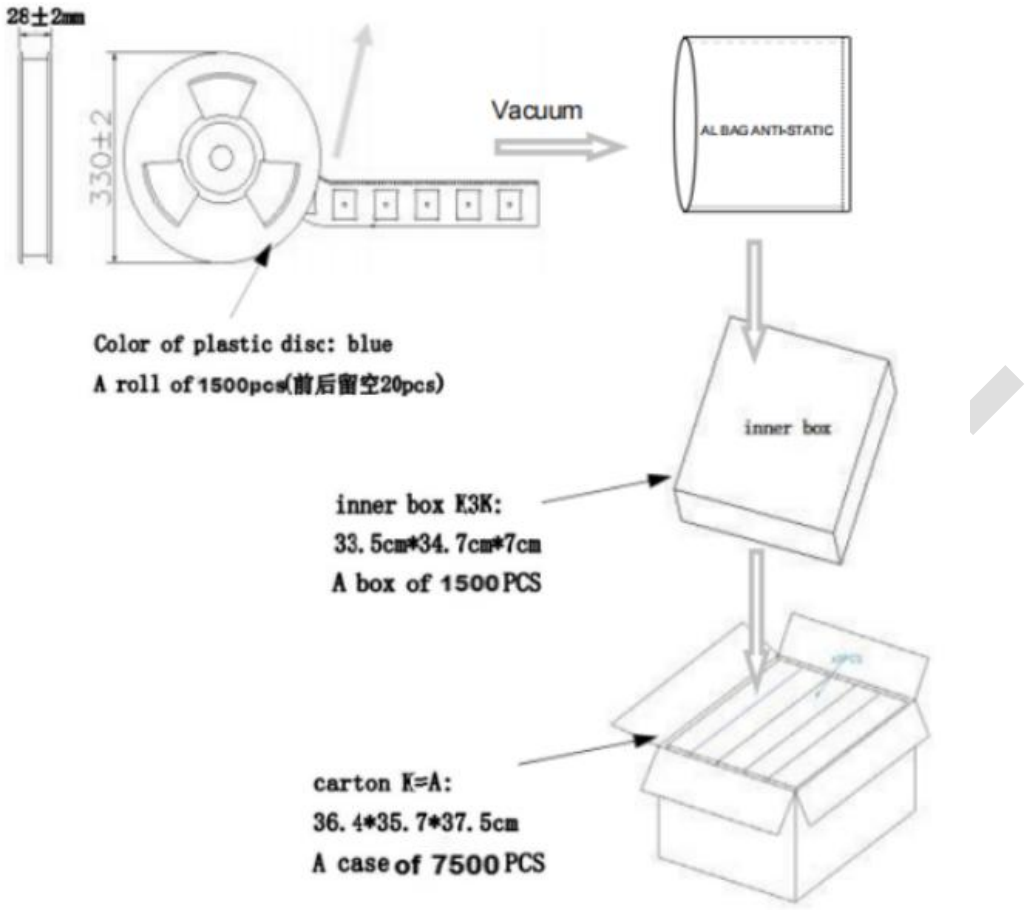
Referred to IPC/JEDEC standard.
Peak Temperature : <250°C
Number of Times : ≤2 times



12. RoHS compliance.

This product is RoHS compliance.

13. Packaging Information



ESD CAUTION

The module is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although the module is with built- in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

14. Wireless module before the SMT note:

■ When customers Open stencil must be sure the hole bigger to the Wireless module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.

5.Can't get the wifi module bare hands when needs,must we wear the gloves and static ring.

■ The furnace temperature according to the size of the customer the mainboard ,generally like to stick on a tablet standard temperature of 250 ±5,can do 260 ± 5.

Storage and use Wifi module control should pay attention to the following matters:

3. Module of the storage life of vacuum packaging：

1-1.Storage life：12 months. Storage conditions:<40℃. Relative humidity:<90%R.H.

1-2.After this bag is opened , devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be :

1-3.Check the humidity card: stored at≦20%RH.If:30%~40%(pink)or greater than 40%(red).Labeling module has moisture absorption.

1. Mounthed within 168 hours at factoryconditions of: t≦30%℃， ≦60%R.H.

2. Once opened, the workshop the preservation of life for 168 hours.

1-4.If baking is required,devices may be baked for:

3.Modules must be to remove module moisture problem.

4. Baking temperature: 125 ℃, 8 hours.

5. After baking, put proper amount of desiccant to seal packages.

1-5. The actual number of module vacuum packing which is based on the actual number of packages to the customer requirements.

2. Module reel packaging items as follows.

2-1.Storage life：12 months. Storage conditions:<40℃. Relative humidity:<90%R.H.

2-2.Module apart packing after 168 hours， To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions：125℃，8hours.

14.Wifi 模块贴片装机前注意事项：

1. 客户在开钢网时一定要将 wifi 模块焊盘的孔开大，请按 1 比 1 再向外扩大 0.7mm 比例开钢网，厚度按 0.12mm.

2. 有需要拿 wifi 模块时不可以光手去拿，一定要戴上手套以及静电环.

3. 过炉温度要根据客户主板的大小而定，一般像平板电脑上的标准温度为250+-5°，也可以做到260+-5°

***Wifi* 模块储存及使用管制应注意事项如下：**

1. 模块的真空包装之储存期限：

1-1.保存期限：12个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H.

1-2.模块包装被拆后，SMT 组装之时限：

1-3.检查湿度卡： 显示值应小于30%（蓝色）， 如：30%~40%(粉红色）或者大于40%（红色）表示模块已吸湿气.

■ 工厂环境温度湿度管制 ： ≦ 30%℃ ，≦60%R.H。

■ 拆封后，车间的保存寿命为 168 小时.

1-4.如在拆封后的 168 个小时内未使用完，需要烘烤，烘烤条件如下：

■ 模块须重新烘烤，以除去模块吸湿问题.

■ 烘烤温度条件：125℃，8 小时.

■ 烘烤后，放入适量的干燥剂再密封包装.

1-5. 模块真空包装数量以客户要求的实际包装数量为准.

2. 模块卷盘包装事项如下：

2-1.保存期限：12个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H.

2-2.模块拆开包装168小时后，如要上线贴片需要重新烘烤，以除去模块吸湿问题，烘烤温度条件：125℃，8小时。

2-3. 模块卷盘包装以客户要求的实际包装数量为准.

3. 模块托盘包装事项如下：

3-1.保存期限：3个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H.

2-3. The actual number of module reel packing which is based on the actual number of packages to the customer requirements.

3.Module pallet packaging items as follows：

3-1.Storage life：3 months. Storage conditions:<40℃. Relative humidity:<90%R.H.

3-2.Module if not used within 48 hours, before launch the need for baking, baking temperature: 125 ℃, 8 hours.

3-3. Pallet packaging each plate is 100 PCS.The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.

3-2.模块如在 48 小时内未使用，在上线之前需要进行烘烤，烘烤温度条件：125℃，8 小时。

3-3. 托盘包装每盘为 100pcs，模块托盘包装以客户要求的实际包装数量为准.

注：以上包装方式根据客户要求而定，包装以实际出货为准.