

# H158V-S

## Wi-Fi 单频 1X1 802.11b/g/n SDIO 模组规格书

Wi-Fi Single-band 1X1 802.11b/g/n SDIO Module Datasheet



# H158V-S 模组规格书

## H158A-S Module Datasheet

**办公室:** 广东省深圳市宝安区航城大道骏翔 U8 智造 U6 栋 6 楼

**工厂:** 湖南省长沙市浏阳经济技术开发区利通路 8 号

**电话:** +86-755-2955-8186

**网址:** www.fn-link.com

**Office:** 6 Floor, Building U6, Junxiang U8 Park,  
Hangcheng Avenue, Bao'an District,  
Shenzhen City, CHINA

**Factory:** No.8, Litong Road, Liuyang Economic & Technical  
Development Zone, Changsha, Hunan, CHINA

**TEL:** +86-755-2955-8186

**Website:** www.fn-link.com

客户承认 : \_\_\_\_\_ 公司

\_\_\_\_\_ 标题

\_\_\_\_\_ 签名

\_\_\_\_\_ 日期

\_\_\_\_\_ 欧智通

## 修订履历

### Revision History

版本 Version	日期 Date	修改记录 Revision content	编辑 Draft	核准 Approved
1.0	2021/3/24	初版发行 New version	Lxy	SZS
1.1	2021/4/22	增加英文说明 Added EN version	Lxy	SZS
1.2	2021/6/10	增加模组天线应用注意事项 Added antenna area clearance description	Lxy	Lgp

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# 1 概述 Overview

## 1.1 简介 Introduction

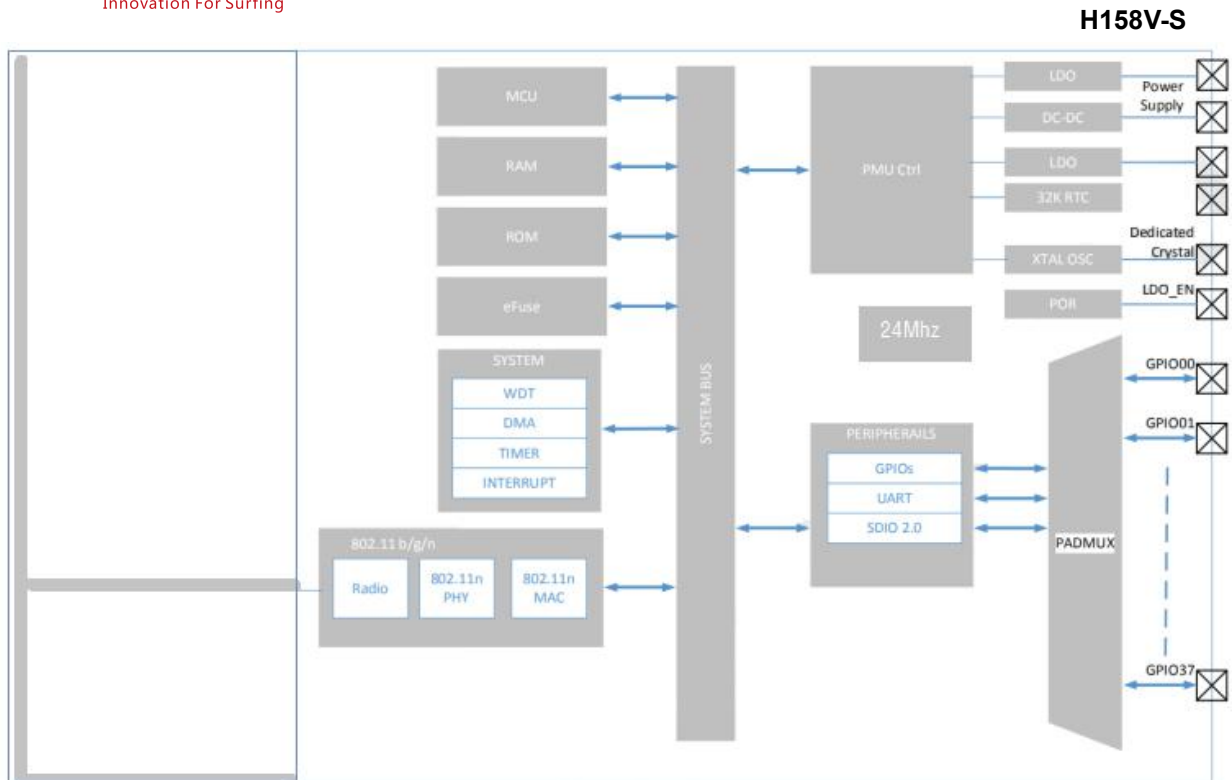
H158V-S 是一款具有高集成度，优越性能的无线模组，支持 SDIO2.0 协议，基于南方硅谷 SV6158 方案，自带 PCB 板载天线。支持 802.11b/g/n 标准。

H158V-S is an excellent performance WLAN SDIO2.0 network interface device. Based on iCOMM chipset SV6158. support 802.11b/g/n standard. Module integrated PCB printed antenna.

## 1.2 特性 Features

- 工作在 2.4GHz 频段  
Operate at ISM 2.4GHz frequency bands
- 单发单收支持最大速率 150Mbps  
Wi-Fi 1 T 1 R allow data rates supporting up to 150 Mbps PHY rates
- SDIO 时钟最高支持 50Mhz  
SDIO clock up to 50Mhz
- 模组尺寸 23x21mm  
Module size is 23x21mm
- 模组自带 PCB 板载天线  
Module have integrated PCB printed antenna

## 1.3 方框图 Block Diagram



## 1.4 通用规格 General Specification

型号 Model	H158V-S
描述 Description	Wi-Fi module
尺寸 Dimension	长 x 宽 x 高: 23 x 21 x 2.4 mm
Wi-Fi 接口 Interface	SDIO V2.0
工作温度 Operating temperature	-10°C to 70°C
存储温度 Storage temperature	-40°C to +85°C
RoHS	符合欧盟 RoHS 指令 All hardware components are fully compliant with EU RoHS directive

## 1.5 推荐工作条件 Recommended Operating Rating

	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
工作温度 Operating Temperature	-10	25	70	° C

VBAT	3.0	3.3	3.6	V
VDDIO	1.7	1.8 or 3.3	3.6	V

## 1.6 电流功耗 Current informations

Vcc=3.3V, Ta=25° C, unit: mA	
电流 Current	平均值 Average
11b 11Mbps TX mode	186.6
11g 54Mbps TX mode	158
11n HT20 MCS7 TX mode	159.4
11n HT40 MCS7 TX mode	161
RX mode	35.7
Saving mode DTIM3	0.21
BLE TX	90.3
BLE RX	33

## ※1.7 EEPROM information

NA

## 2 射频规格 WiFi Specification

### 2.1 Wi-Fi 射频规格 2.4G band Specification

功能 Feature	描述 Description
无线标准 WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant
频率范围 Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)
支持信道 Number of Channel	2.4GHz: Ch1 ~ Ch14
频谱模板 Spectrum Mask	符合 IEEE 标准 compliant with IEEE Standard
频率误差 Freq. Tolerance	±20PPM
输出功率 Output Power	11b /11M : 17± 2 dBm EVM ≤ -9dB
	11g /54M : 15± 2 dBm EVM ≤ -26dB
	11n /MCS7: 15± 2 dBm EVM ≤ -28dB

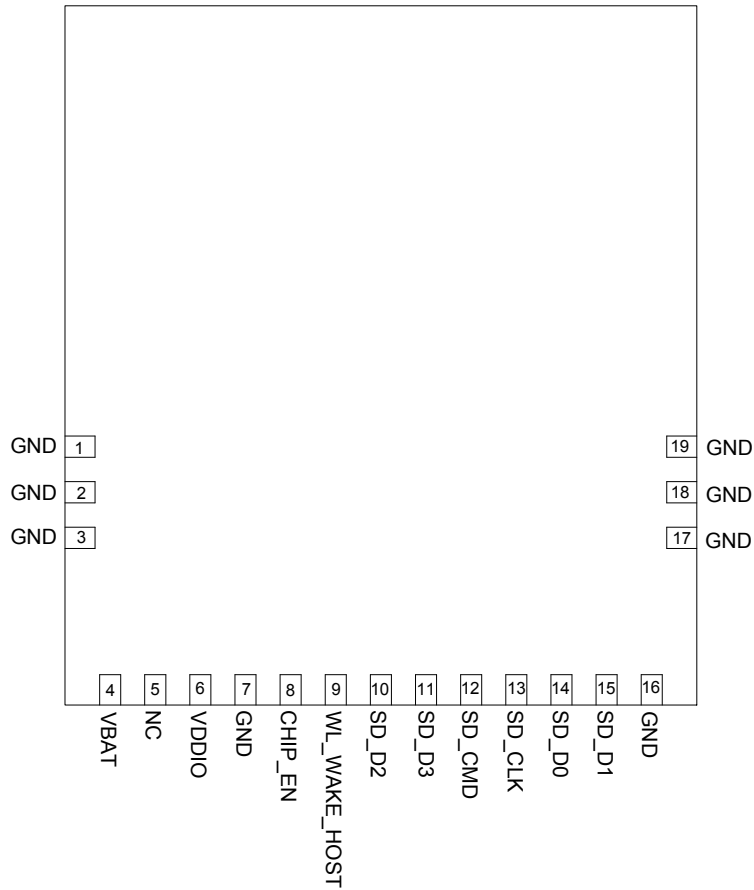
	其他速率对应功率由驱动配置 Other rate power setting by driver	
接收灵敏度 Sensitivity	典型值 Typical value	标准值 Standard value
11b,20MHz@8% PER	- 1M @ -94 dBm	≤-83
	- 2M @ -92 dBm	≤-80
	- 5.5M @ -91 dBm	≤-79
	- 11M @ -89 dBm	≤-76
11g,20MHz@10% PER	- 6M @ -89 dBm	≤-85
	- 9M @ -88 dBm	≤-84
	- 12M @ -87 dBm	≤-82
	- 18M @ -84 dBm	≤-80
	- 24M @ -81 dBm	≤-77
	- 36M @ -78 dBm	≤-73
	- 48M @ -73 dBm	≤-69
	- 54M @ -71 dBm	≤-68
11n,20MHz@10% PER	- MCS0 @ -89 dBm	≤-85
	- MCS1 @ -86 dBm	≤-82
	- MCS2 @ -84 dBm	≤-80
	- MCS3 @ -80 dBm	≤-77
	- MCS4 @ -77 dBm	≤-73
	- MCS5 @ -72 dBm	≤-69
	- MCS6 @ -71 dBm	≤-68
	- MCS7 @ -70 dBm	≤-67
11n ,40MHz@10% PER	- MCS0 @ -89 dBm	≤-82
	- MCS1 @ -85 dBm	≤-79
	- MCS2 @ -83 dBm	≤-77
	- MCS3 @ -80 dBm	≤-74
	- MCS4 @ -76 dBm	≤-70
	- MCS5 @ -71 dBm	≤-66
	- MCS6 @ -70 dBm	≤-65
	- MCS7 @ -68 dBm	≤-64
最大输入电平 Maximum Input Level	802.11b : -10 dBm 802.11g/n : -20 dBm	
天线 Antenna reference	增益 ≤2 dBi antennas with 0~2 dBi peak gain	



### 3 引脚定义 Pin Assignments

#### 3.1 引脚示意图 Pin Outline

<顶视图>  
<Top view>



#### 3.2 引脚定义 Pin Definition

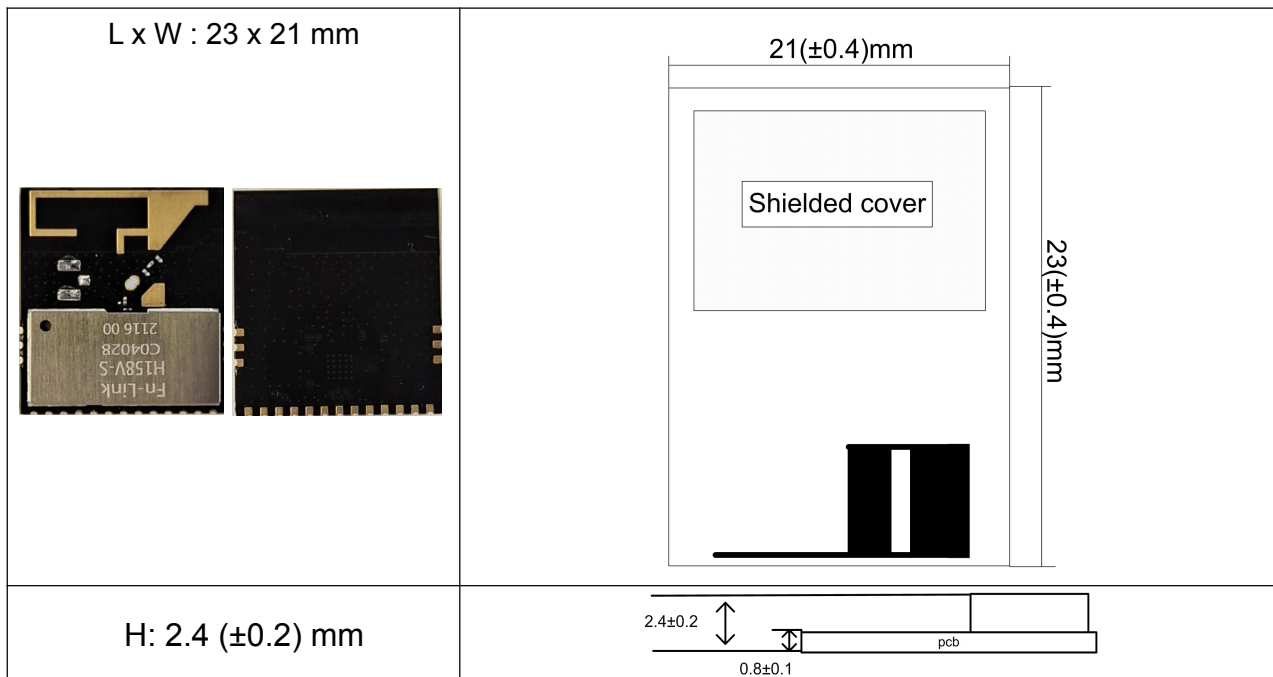
序号 PIN#	名称 NAME	类型 TYP	描述 Description	电平 Voltage
1	GND		GND connection	
2	GND		GND connection	
3	GND		GND connection	
4	VBAT	P	DC input 3.3V	3.3V
5	NC		No connection	

6	VDDIO	P	DC input 1.8V or 3.3V	1.8V or 3.3V
7	GND		GND connection	
8	CHIP_EN	I	Enable module, default internal pull high with 10K	VDDIO
9	WL_WAKE_HOST	I/O	Module wake up host	VDDIO
10	SD_D2	I/O	SDIO Data line 2	VDDIO
11	SD_D3	I/O	SDIO Data line 3	VDDIO
12	SD_CMD	I/O	SDIO Command	VDDIO
13	SD_CLK	I	SDIO Clock	VDDIO
14	SD_D0	I/O	SDIO Data line 0	VDDIO
15	SD_D1	I/O	SDIO Data line 1	VDDIO
16	GND		GND connection	
17	GND		GND connection	
18	GND		GND connection	
19	GND		GND connection	

P:POWER I:INPUT O:OUTPUT

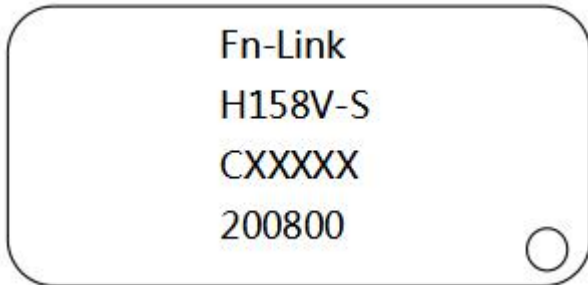
## 4 尺寸 Dimensions

### 4.1 产品图例 Module Picture

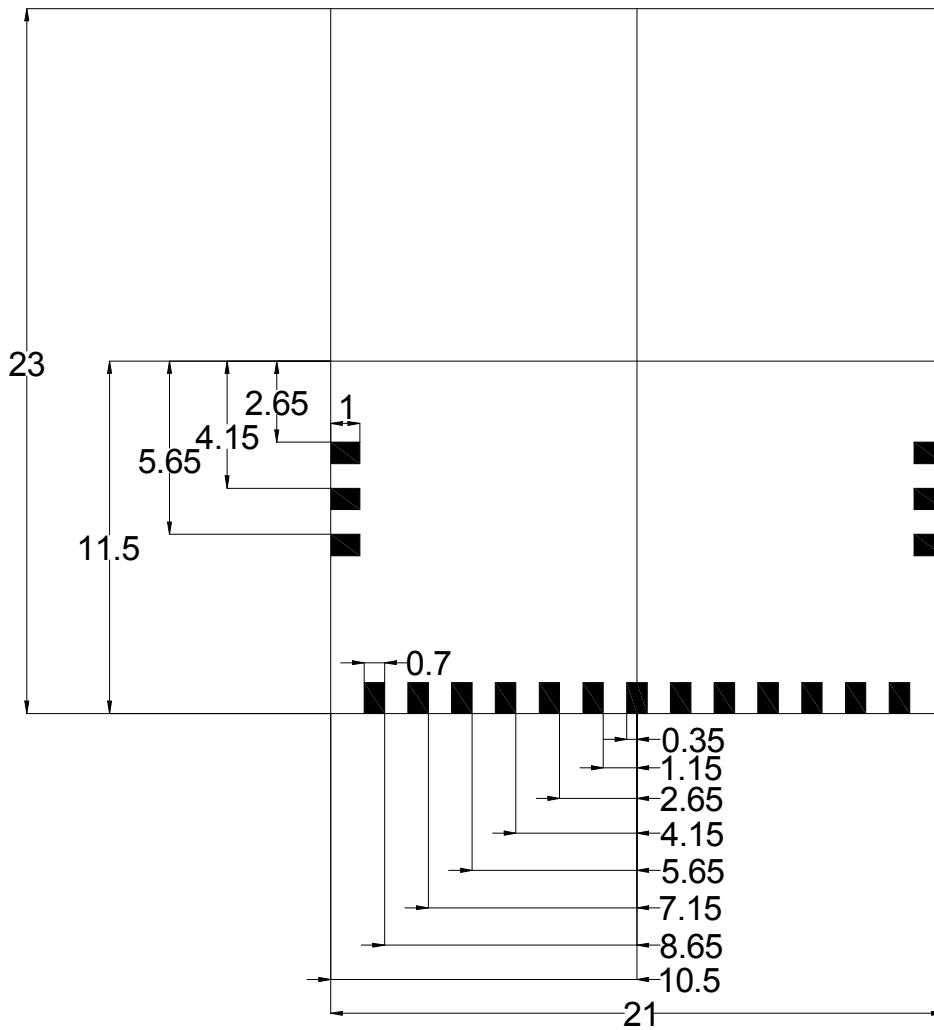


Weight	1.53g
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### 4.2 丝印信息 Marking Description

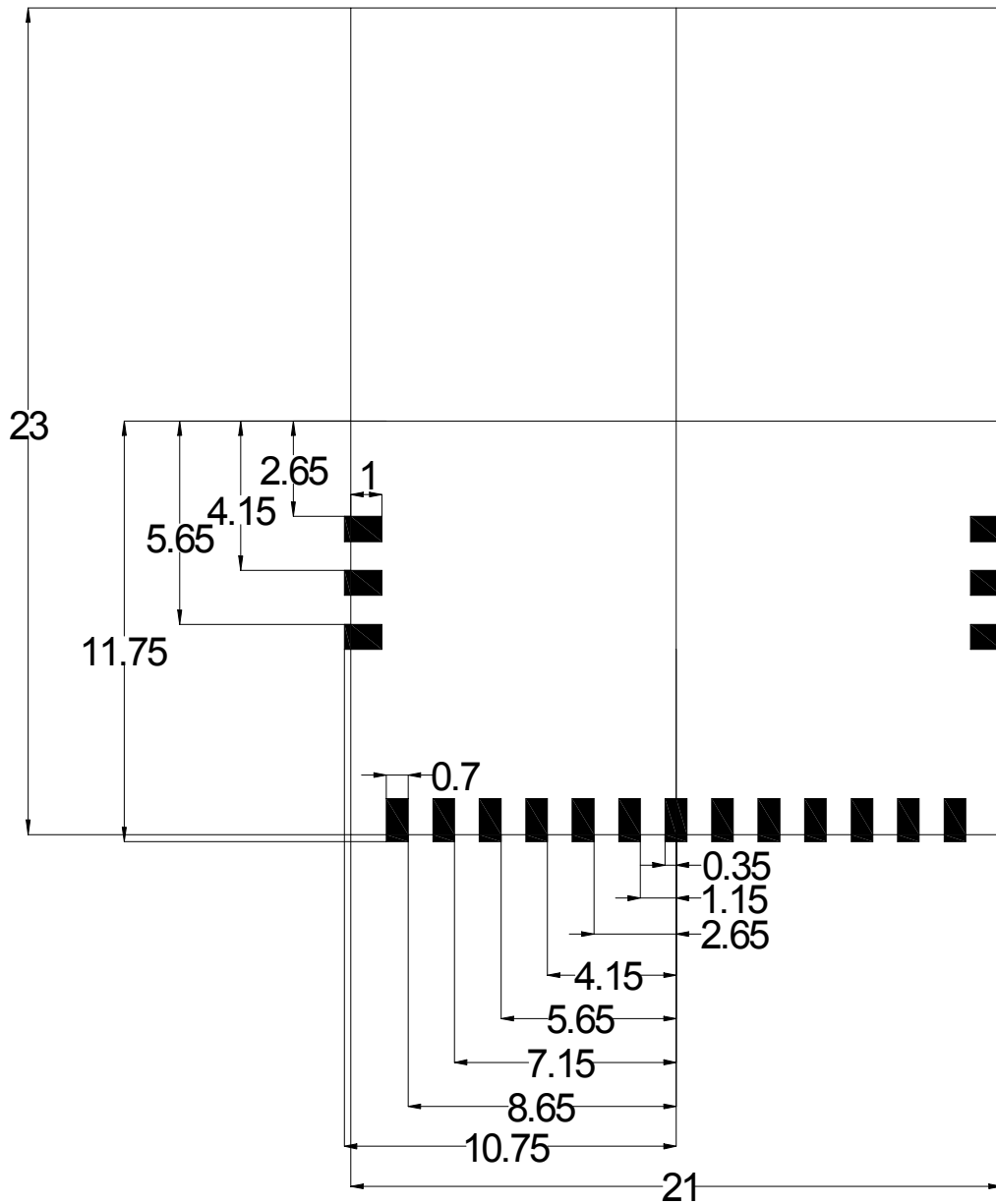


### 4.3 模组尺寸 Physical Dimensions



#### 4.4 推荐封装尺寸 Layout Reference

(unit: mm )



## 6 时序要求 Host Interface Timing Diagram

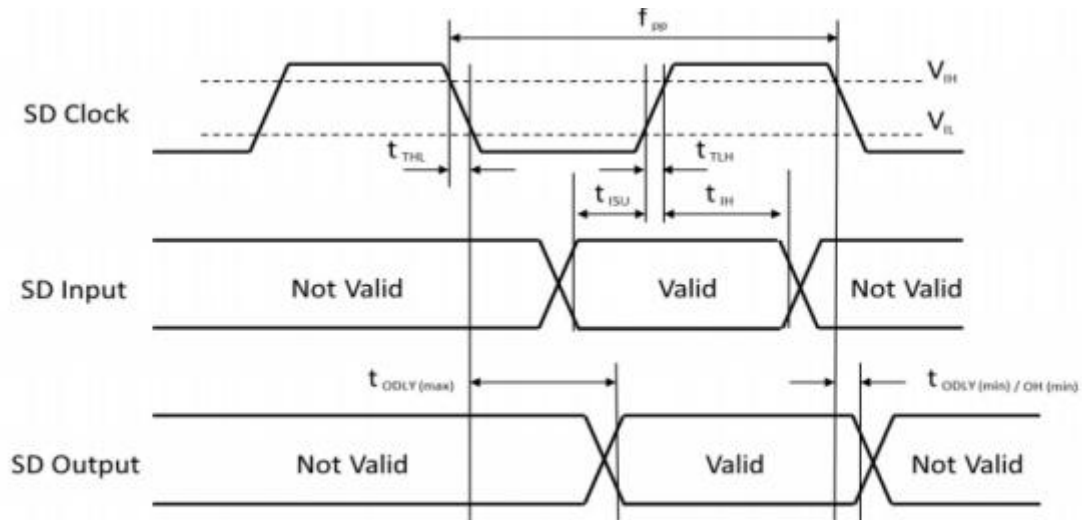
### 6.1 SDIO 引脚概述 SDIO Pin Description

模组支持 SDIO V2.0 版本，1.8V 和 3.3V 电平。

Module with SDIO V2.0 interface, support 1.8V and 3.3V voltage level

SDIO 4-Bit Mode	
DATA0	Data Line 0
DATA1	Data Line 1
DATA2	Data Line 2
DATA3	Data Line 3
CLK	Clock
CMD	Command Line

## 6.2 默认模式时序 SDIO Default Mode Timing Diagram



SDIO TIMING WAVEFORM

SDIO version 2.0 Timing Specifications

Symbol	Parameter	Min.	Typ.	Max.	Unit
<b>Clock CLK (All values are referred to min(V<sub>IH</sub>) and max(V<sub>IL</sub>).</b>					
f <sub>PP</sub>	Clock frequency Data Transfer Mode	0		50	MHz
t <sub>TLH</sub>	Clock rise time			3	ns
t <sub>THL</sub>	Clock fall time			3	ns
<b>Inputs CMD, DAT (reference to CLK)</b>					
t <sub>ISU</sub>	Input set-up time	6			ns
t <sub>IH</sub>	Input hold time	2			ns
<b>Outputs CMD, DAT (reference to CLK)</b>					
t <sub>ODLY</sub>	Output Delay time during Data Transfer Mode			14	ns
t <sub>OH</sub>	Output Hold time	2.5			Ns

## 6.3 SDIO 上电时序 SDIO Power-on sequence

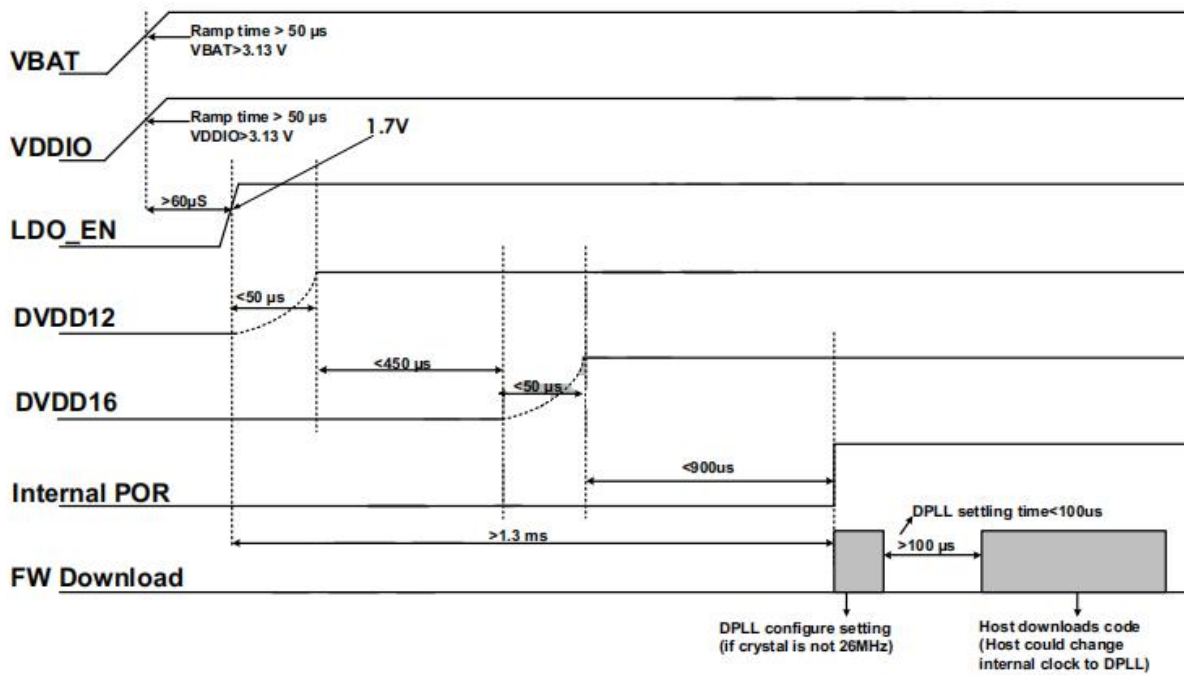
图 4 显示从上电到驱动加载上电顺序，包括由 LDO\_EN 引发的初始化设备上电复位。LDO\_EN 输入电平必须保持与 VDDIO 电压电平相同。在初始通电后，LDO\_EN 信号可以保持在低电平以关闭模组，或者脉冲低电平以引导随后的复位。在 LDO\_EN 被拉高并且主机启动模组的上电时序如下：

1. 在 1.3 毫秒内，将完成内部上电复位（POR）。主机可以下载 DPLL 设置的固件代码，如果晶体不是默认设置 26MHz。内部运行时钟就是晶体频率。
2. 经过 100us 的 DPLL 设置时间后，主机可以将内部时钟设置为全速，完成所有固件代

码的下载。

Figure 4 shows the power-on sequence of the module from power-up to firmware download, including the initial device power-on reset evoked by LDO\_EN signal. The LDO\_EN input level must be kept the same as VDDIO voltage level. After initial power-on, the LDO\_EN signal can be held low to turn off the SV6158 or pulsed low to induce a subsequent reset. After LDO\_EN is assert and host starts the power-on sequence of the SV6158. From that point, the typical SV6158 power-on sequence is shown below:

1. Within 1.3 millisecond, the internal power-on reset (POR) will be done. And host could download firmware code of DPLL setting if the crystal is not default setting, 26MHz. The internal running clock is crystal frequency.
2. After 100us of DPLL settling time, host could set internal clock to full speed and finish all the downloading of firmware code.



**Figure 4 : Power-on sequence**

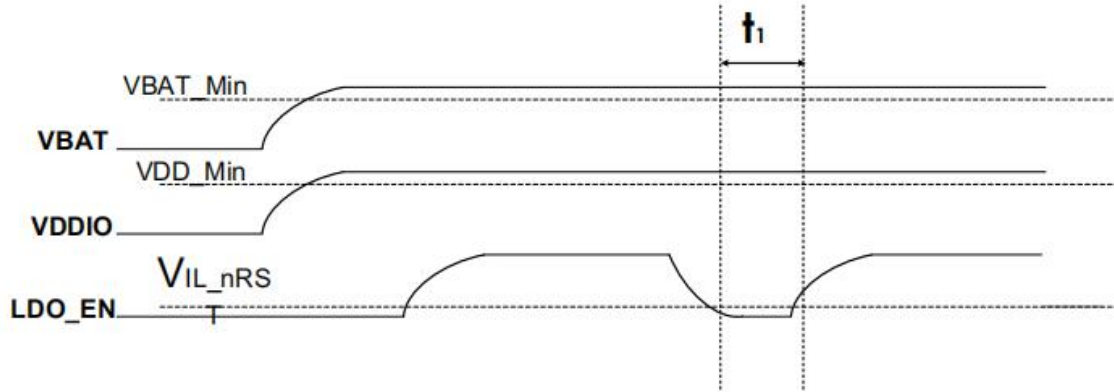


Figure 5 : Reset Timing

Table 2 : Reset Timing Parameters

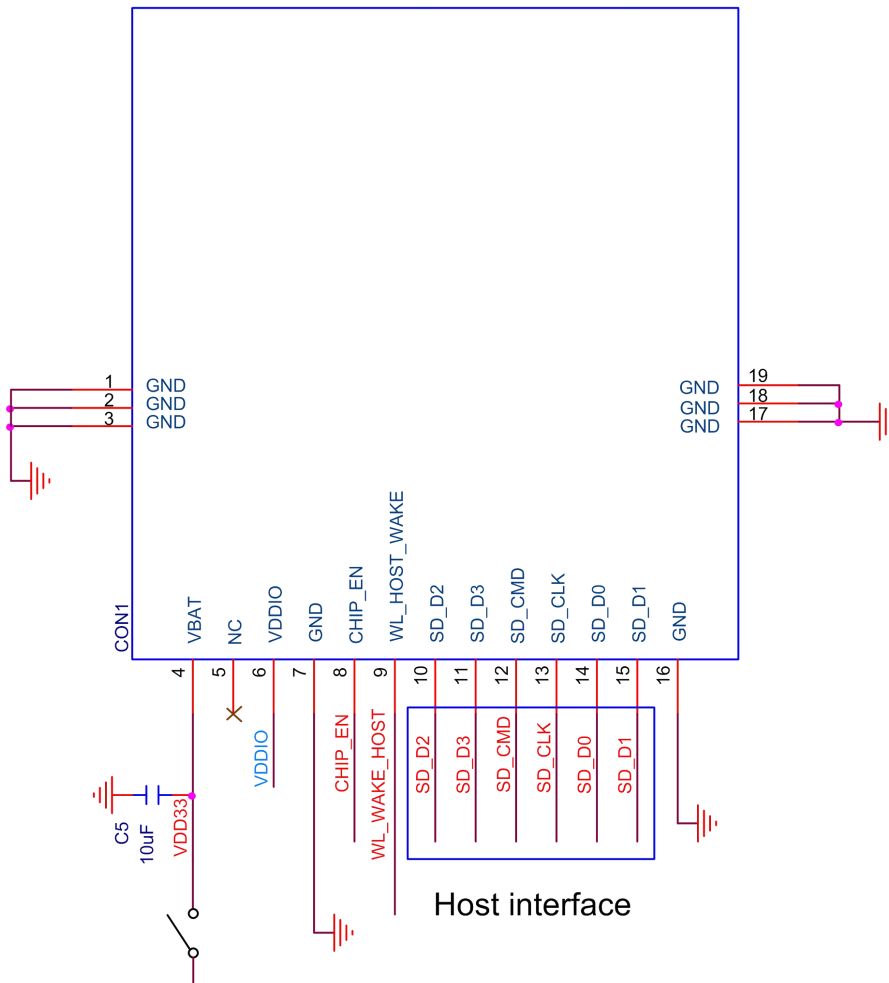
Parameters	Description	Min.	Unit
t1	Duration of LDO_EN signal level < VIL_nRST to reset the chip	30	us

模组 LDO\_EN 引脚可用于完全复位整个芯片。此信号复位解除后，芯片处于关闭模式，等待主机通信。在此之前，MAC、BB 和 SOC 断电，所有模块保持复位。一旦主机启动了通信，芯片就会打开时钟晶体，然后再打开 DPLL。待时钟稳定运行后，所有模块的复位完成。

The SV6158 LDO\_EN pin can be used to completely reset the entire chip. After this signal has been de-asserted, the SV6158 is in off mode waits for host communication. Until then, the MAC, BB, and SOC blocks are powered off and all modules are held in reset. Once the host has initiated communication, the SV615XP turns on its crystal and later on DPLL. After all clocks are stable and running, the resets to all blocks are automatically de-asserted.



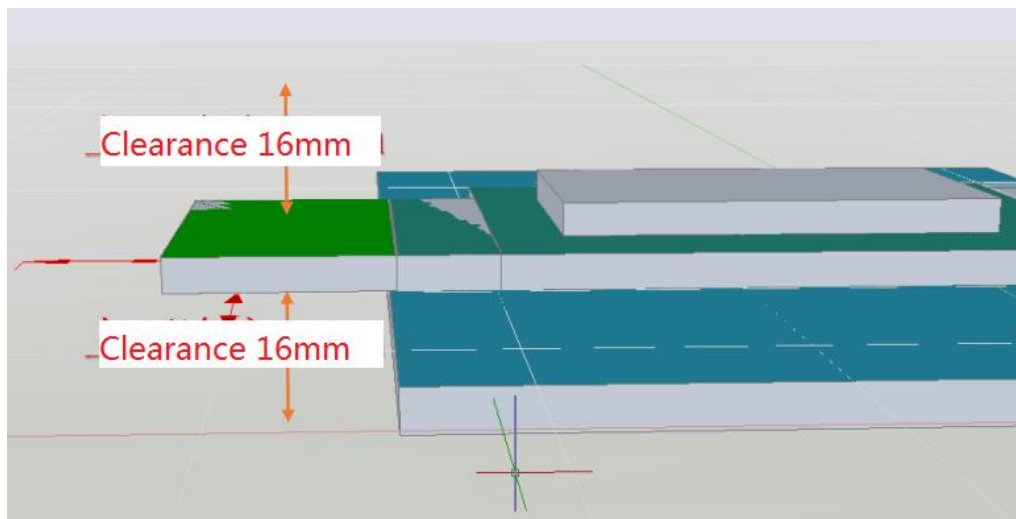
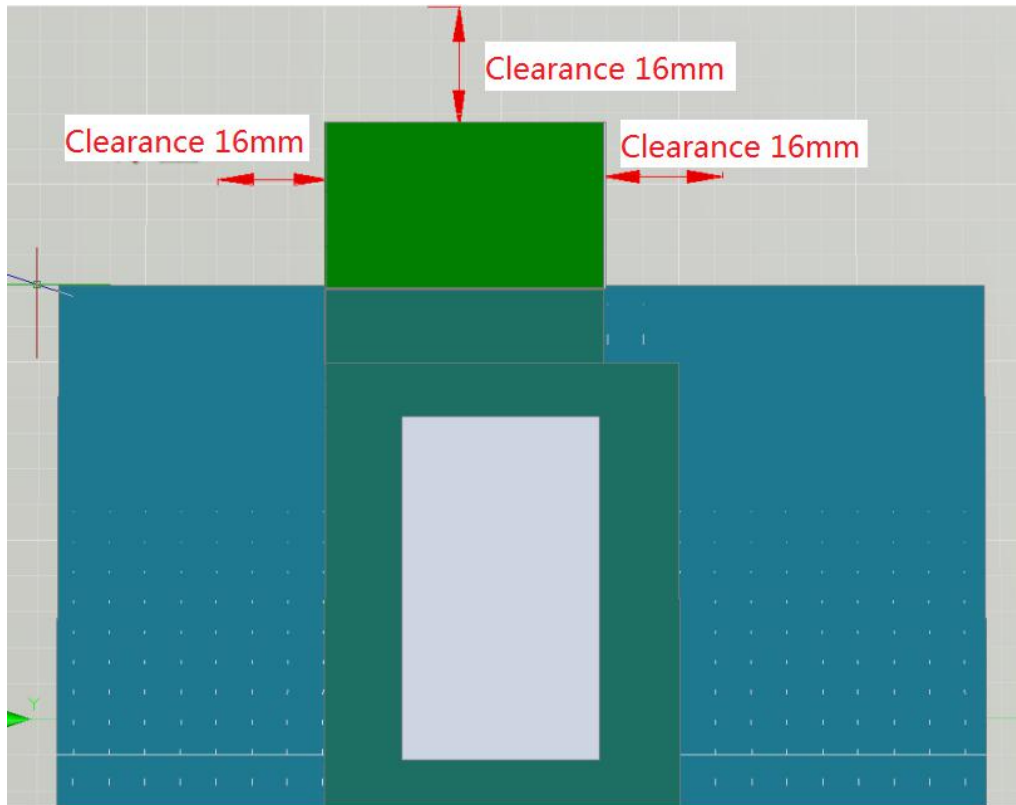
## 7 参考电路 Reference Design



**备注 Note:**

天线区域保持尽可能多净空区间，至少需以下图为例做设计。

**Antenna keep as more as possible clean space.**



## 8 订购信息 Ordering Information

Part No.	Description
FGH158VSXX-00	SV6158P,b/g/n,WiFi,1T1R,SDIO,23x21mm,带天线,带屏蔽盖

## 9 关键器件列表 Key Material List

名称	描述	厂商
Crystal	3225,24MHZ,CL=12pF,10ppm	ECEC,HOSONIC,TKD,JWT
PCB	H158V-S-V1.0,black,4L,23X21X0.8mm	XY-PCB,LX-PCB,SL-PCB,Sunlord
Chipset	SV6158,11b/g/n,SDIOWiFi,4x4mm,QFN32	iCOMMSEMI
Inductor	0603 4.7uH,20%,400mA	Sunlord,cenke,ceaiya,Microgate
Shielding	H158V-S-V1.0 shielding	Suntech,Jlitong
TVS	0201 ESD	WAY-ON,Murata,Sunlord

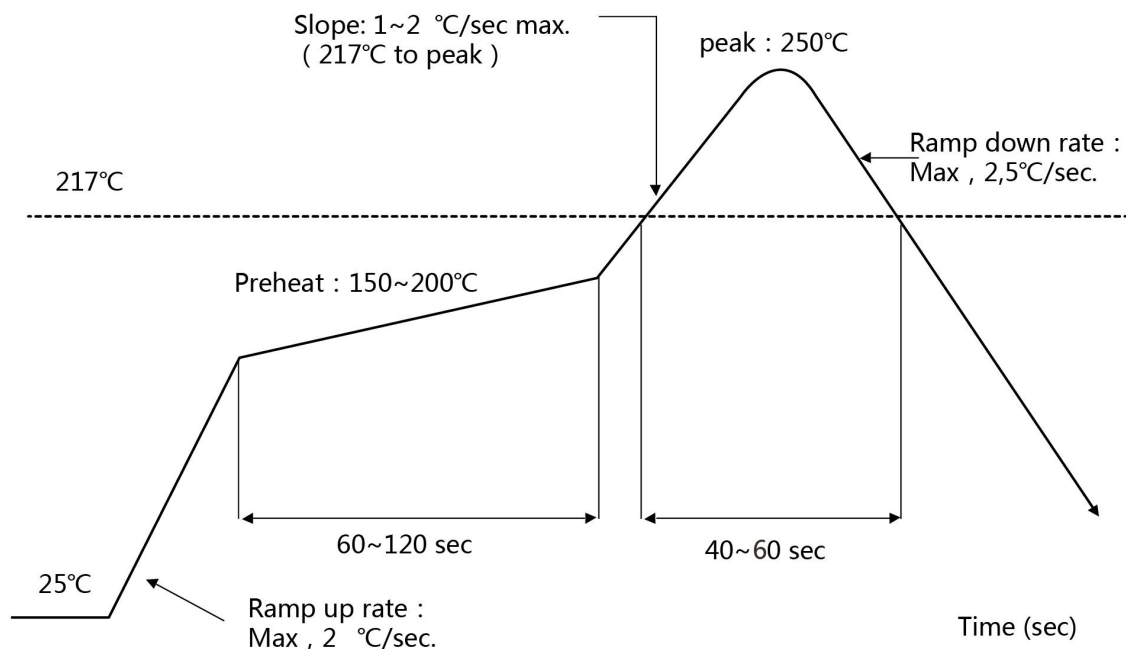
## 10 环境要求 Environmental Requirements

### 10.1 推荐回流曲线 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



## 10.2 使用说明 The notice before installed

贴装 Wi-Fi 模块注意：

- 1 使用 WIFI 模块，请确保静电防护措施。
- 2.回流焊温度应综合根据客户产品而定，如客户主板的温度设定为  $250+5^{\circ}\text{C}$ 。

关于模块的包装、存放和使用注意事项如下：

1 卷装模块及真空包装贮存寿命：1)。保质期：8 个月，储存环境条件：温度： $<40^{\circ}\text{C}$ ，相对湿度： $<90\%r.h$ 。

2 组件真空包装一旦打开，组装时限：

卡片：

1)检查湿度显示值应小于 30%（蓝色），如：30%~40%（粉色），或大于 40%（红色）的模块已被吸湿。

2.) 工厂环境温湿度控制： $\leq 30^{\circ}\text{C}$ ，相对湿度 $\leq 60\%$ 。。

3). 车间一经开放，就可以保存 168 小时的生命。

3. 一旦打开，如 168 小时内未用完：

1). 必须再次拆卸模块，以去除模块的吸湿性。

2). 烘烤温度： $125^{\circ}\text{C}$ ，8 小时。

3). 烘烤后，放入适量干燥剂密封包装。

Wi-Fi module installed note:

1. Take and use the WIFI module, please insure the electrostatic protective measures.
2. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at  $250 + 5 \text{ }^{\circ}\text{C}$  for the MID motherboard.

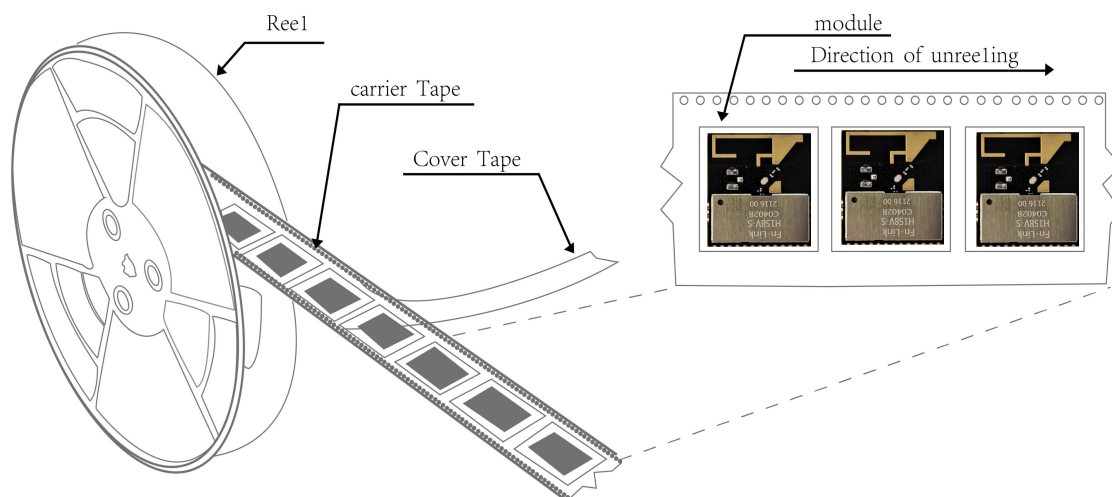
About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in:  $< 40 \text{ }^{\circ}\text{C}$ , relative humidity:  $< 90\%$  r.h.
2. The module vacuum packing once opened, time limit of the assembly:  
Card:1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.  
2.) factory environmental temperature humidity control:  $\leq -30 \text{ }^{\circ}\text{C}$ ,  $\leq 60\%$  r.h..  
3). Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
  - 1). The module must be again to remove the module moisture absorption.
  - 2). The baking temperature:  $125 \text{ }^{\circ}\text{C}$ , 8 hours.
  - 3). After baking, put the right amount of desiccant to seal packages.

## 11 包装 Package

### 11.1 编带 Reel

A roll of 350pcs



## 11.2 包装详情 Packaging Detail

编带和胶盘包装 the take-up package



Using self-adhesive tape

Size of black tape:24mm\*32.6m the cover tape :21.3mm\*32.6m

Color of plastic disc:blue

A roll of 350pcs



NY bag size:420mm\*450mm



size : 335\*335\*55mm



The packing case size:335\*255\*360mm

### 12.3 湿敏特性 Moisture sensitivity

根据 IPC/JEDEC J-STD-020 标准，模块为 3 级湿度敏感设备，请小心使用这种组件的所有相关要求。

此外，客户必须注意以下情况：

- a) 密封袋中的计算保质期：在<40° C 和<90%相对湿度（RH）下 12 个月。
- b) 生产过程中的环境条件：根据 IPC/JEDEC J-STD-033A 第 5 段，30° C/60%RH。
- c) 如果条件允许，打开密封袋和回流过程之间的最长时间必须为 168 小时
- b) 遵守“IPC/JEDEC J-STD-033A 第 5.2 段”
- d) 如果不遵守条件 b) 或 c) ，则需要烘烤
- e) 如果袋内湿度指示器指示相对湿度大于等于 10%，则需要烘烤

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH).
- b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.
- c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- b) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected
- d) Baking is required if conditions b) or c) are not respected
- e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more