PB-02 Specifications

Version V1.0

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Document development / revision / revocation resume

Version	Date	Development/revision	Development	Approval
V1.0	2020.05.29	Initial development	Xie Yiji	

Contents

一、 Product Overview

PB-02 is a BLE 5.0 low-power Bluetooth module based on PHY6212 chip; supports SIGMesh.. PHY6212 is equipped with ARM® Cortex™-M0 32-bit processor, 138KB SRAM, ultra-low power consumption,high performance and wireless multi-mode characteristics,, supports BLE functions of security, applications and wireless updates.

PB-02 module has the function of Bluetooth mesh networking; the communication between devices through peer-to-peer network, using Bluetooth broadcast for communication, can ensure timely response in the case of multiple devices. It is mainly used in intelligent lamp control,wearable smart device, retail payment and other Internet of things fields; it can meet the requirements of low power consumption, low delay, low cost wireless data communication.

Characteristics

- 1.1 mm spacing SMD-20 package
- 6 channels PWM output
- The antenna adopts PCB onboard antenna; at the same time, half hole pad and antenna hole are reserved. The half-hole pad can guide the antenna to the motherboard, and the antenna hole can be directly welded to the spring antenna.
- Brightness (duty cycle) adjustment range 5%-100%
- Factory default cool and warm color 50%
- PWM output frequency 1KHz
- Features with Nightlight
- Switching Color Temperature with Wall Switching

Main parameters

Table 1 main parameter descriptions

Model	PB-02
Dimensions	12.2*18.6*2.3(±0.2) MM
Package	SMD-20
Wireless Standards	Bluetooth 5.0
Frequency range	2400~2483.5 MHz
Maximum transmit power	Maximum dBm 10
Receiving sensitivity	-93±2 dBm
Interface	GPIO/PWM/SPI/ADC
Operating temperature	-40℃ ~ 85 ℃
Storage environment	-40℃~125℃,<90%
Power supply range	Supply voltage 2.7 V ~3.6 V, supply current ≥50 mA
Power consumption	Deep sleep mode :0.7 uA (IO wake-up)
	Dormancy mode :2 uA (RTC wake-up)
	RX mode :7 mA
	TX (10dBm):25mA

二、 Electrical parameters

Electrical characteristics

PB-02 module is electrostatic sensitive equipment, when handling need to take special precautions

Absolute maximum rating

Any more than the following absolute maximum values can cause module damage

Name	Minimum value	Typical values	Maximum value	Units
Supply voltage	2.7	3.3	3.6	V
I/O supply voltage (VCCIO)	-0.3	-	3.6	V
Operating temperature	-40	-	+85	℃
Storage temperature	-40	-	+125	℃

Power consumption

Name	Typical values	Units
Emission power consumption (10 dBm)	25	mA
Receiving Power	7	mA
Light Sleep	2	uA
Deep Sleep	0.7	uA

RF parameters

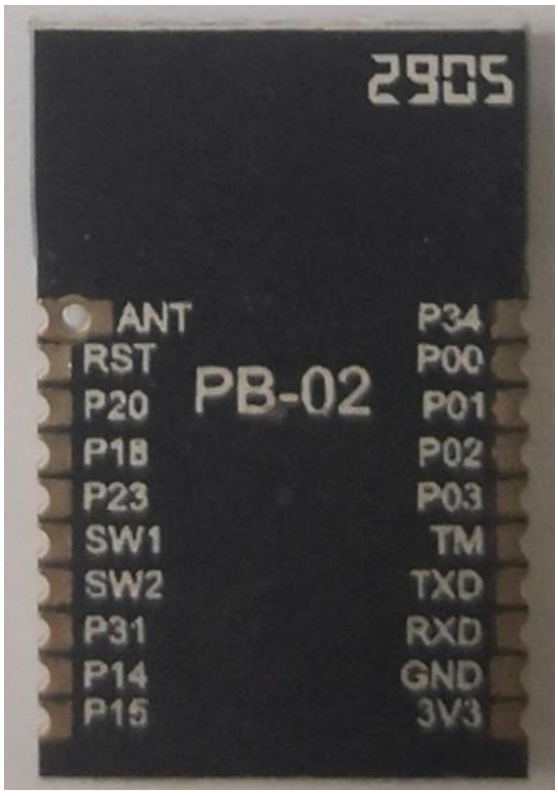
Transmission power

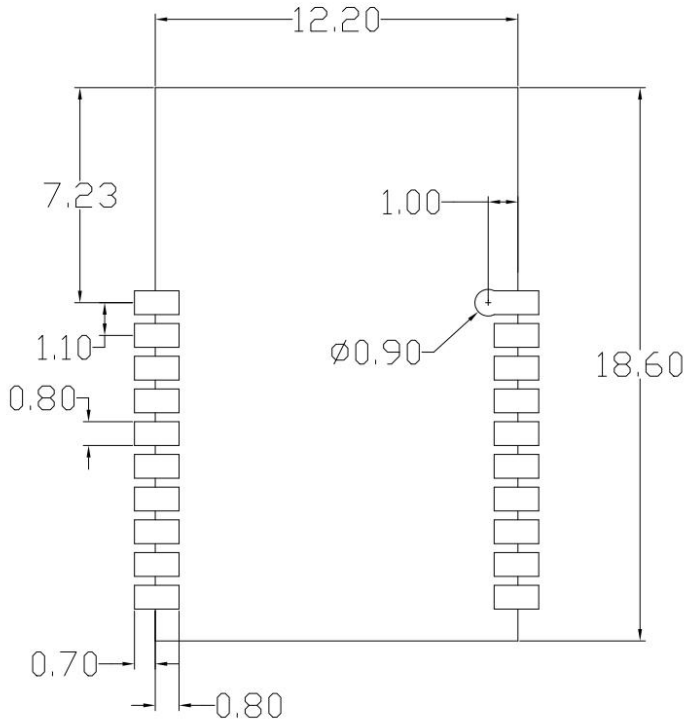
Name	Minimum value	Typical values	Maximum value	Units
Average power	-	8.5	10	dBm

Receiving sensitivity

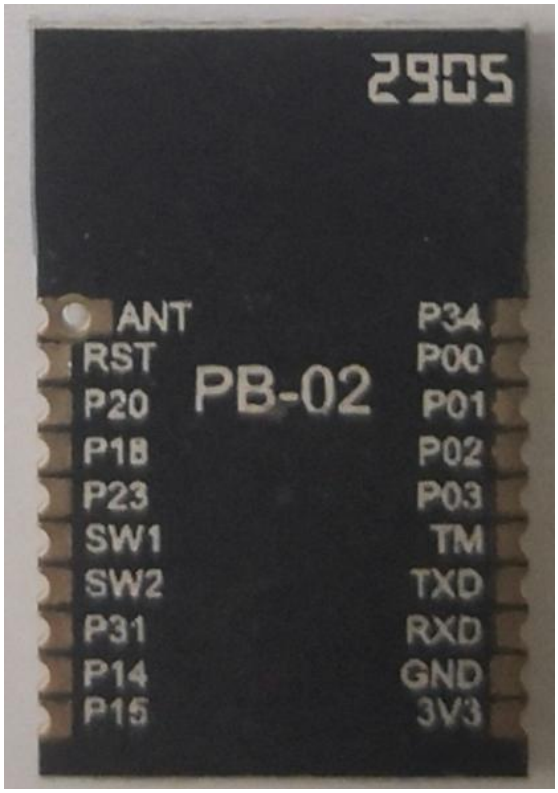
Name	Minimum value	Typical values	Maximum value	Units
Receiving sensitivity	-95	-93	-	dBm

三、 Appearance dimensions





四. Definition of pins



PB-02 Foot Schemes

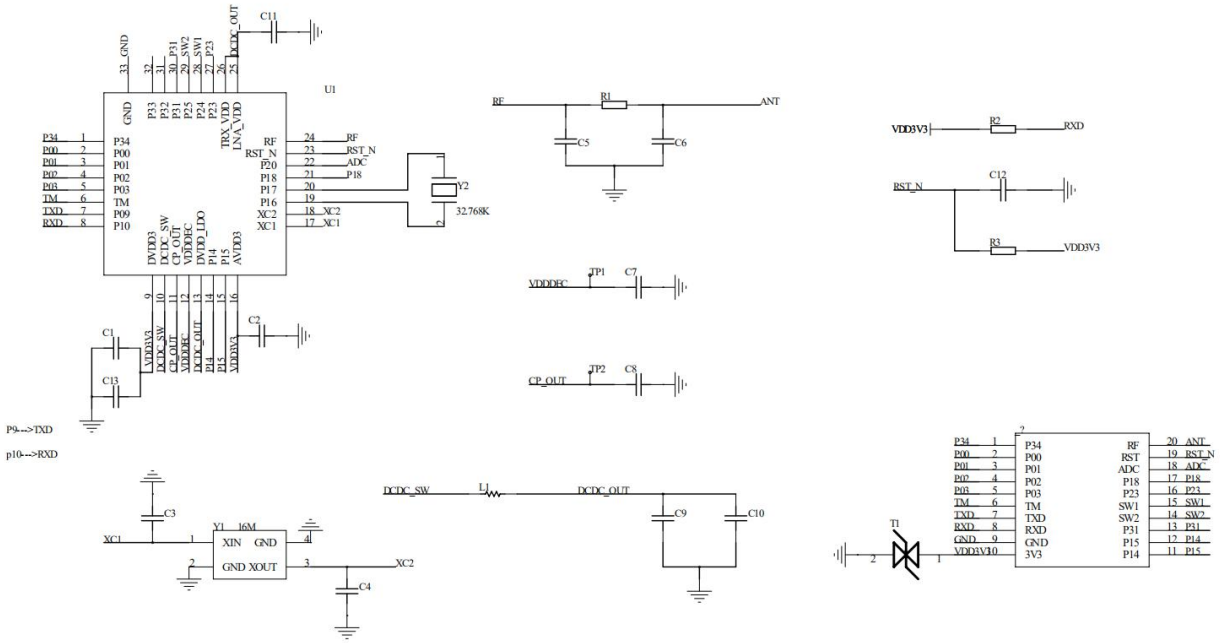
The PB-02 module has a total of 20 interfaces. As shown in the pin diagram, the pin function definition table is the interface definition.

Foot function definition table

No.	Name	Functional Description
1	P34	GPIO34, all features are configurable *Note: Interrupt and ADC functions are not supported
2	P00	GPIO00, all functions are configurable/ JTAG_TDO *Note: ADC functionality not supported
3	P01	GPIO01, all functions are configurable/ JTAG_TDI *Note: ADC functionality not supported
4	P02	GPIO02, all functions are configurable/ JTAG_TMS *Note: ADC functionality not supported
5	P03	GPIO03, all functions are configurable/ JTAG_TCK *Note: ADC functionality not supported
6	TM	Flash mode selection, this pin pull-up to high level , boot start into flash mode

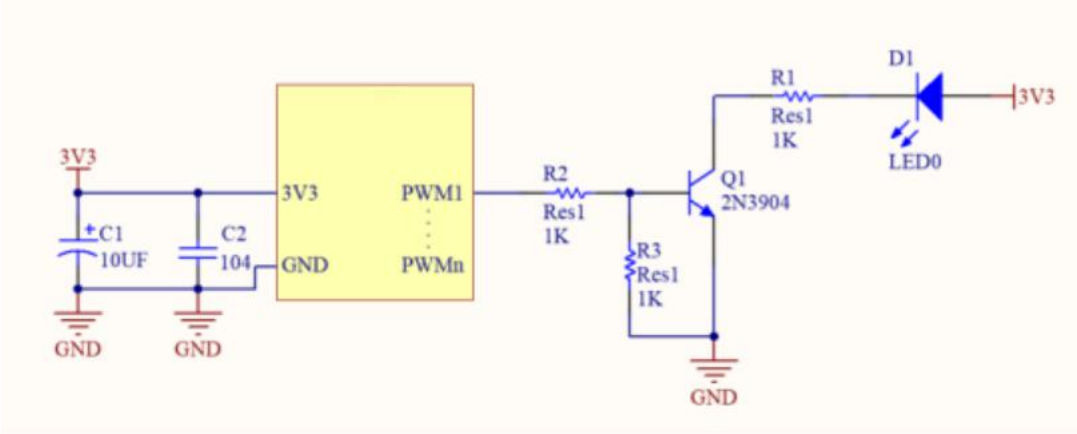
7	TXD	Serial URAT_TXD
8	RXD	Serial URAT_RXD
9	GND	Ground
10	3V3	Power supply, typical value 3.3 V
11	P15	GPIO15, all features configurable/ AIO <4>
12	P14	GPIO14, all features are configurable/ AIO <3>
13	P31	GPIO31, all features are configurable *Note: Interrupt and ADC functions are not supported
14	SW2	GPIO25, all functions configurable/test mode start configuration [1], this pin pull-up to high level , boot start into test mode
15	SW1	GPIO24, all features configurable/test mode start configuration [0]
16	P23	GPIO23, all features are configurable *Note: Interrupt and ADC functions are not supported
17	P18	GPIO18, all functions are configurable/ AIO <7>/ PGA differential positive input *Note: Interrupt functionality not supported
18	P20	GPIO20, all functions are configurable/ AIO <9>/ microphone bias output *Note: Interrupt functionality not supported
19	RST	Reset pin
20	ANT	Antenna interface

五. Schematic diagrams

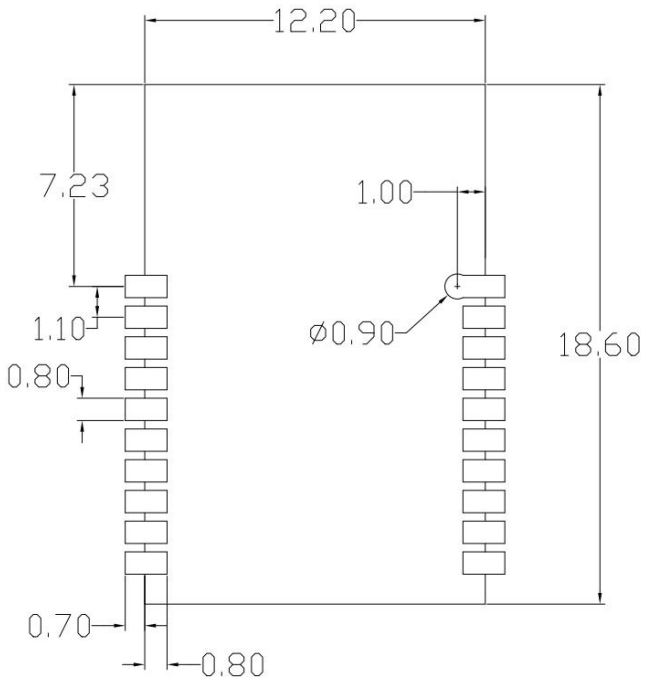


六. Design guidance

1、Application circuit



2. recommended module package design dimensions



Note: This is the PB-02 module package diagram, It is recommended to design the PCB board according to this diagram, so that the module can work normally on the PCB board; and when designing the pads, please pay attention to the design of the pads on the PCB. The pad is retracted and offset, and the PCB pad is expanded from the module pad do not affect the use of the module.

3. antenna layout requirements

(1)、For the installation position on the motherboard, the following two methods are recommended:

(2) Solution 1: Put the module on the edge of the motherboard, and the antenna area extends out of the edge of the motherboard.

(3) Solution 2: Put the module on the edge of the motherboard, and hollow out an area at the antenna position on the edge of the motherboard.

(4) In order to meet the performance of the onboard antenna, it is forbidden to place metal parts around the antenna, away from high-frequency components.

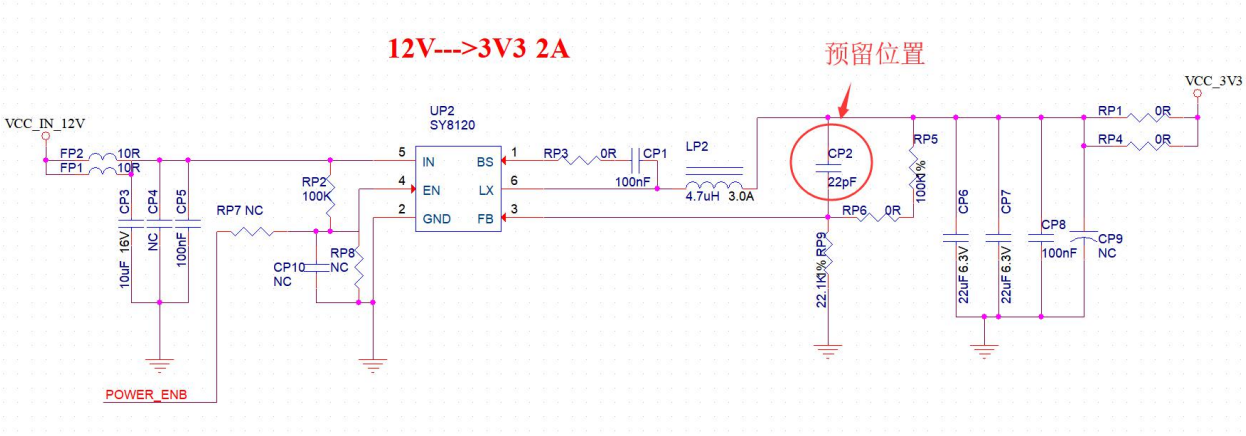
4. power supply

(1)、 Recommend 3.3V voltage, peak current above 50mA

(2)、 It is recommended to use LDO for power supply; if DC-DC is used, the ripple is recommended to be controlled within 30mV.

(3)、It is recommended to reserve the position of the dynamic response capacitor for the DC-DC power supply circuit, which can optimize the output ripple when the load changes greatly.

(4),It is recommended to add ESD devices to the 3.3V power interface



5. Design description of PWM dimming scheme

For lamps that require dimming function, only require to connect the PWM pin of the corresponding color to the control end of the subsequent drive circuit; PWM independent output is a digital signal with 100 levels of adjustable duty cycle, and the subsequent circuit can be voltage drive type or a current drive type.

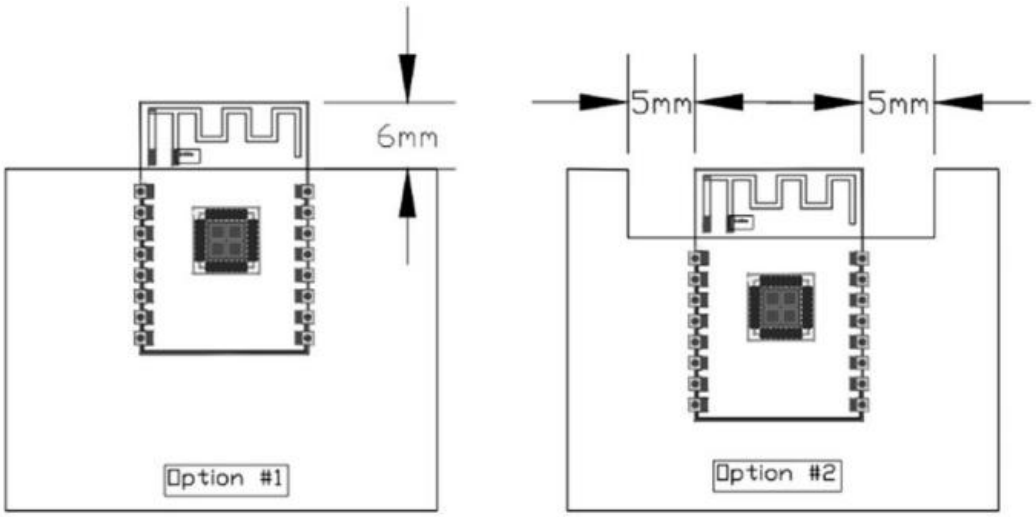
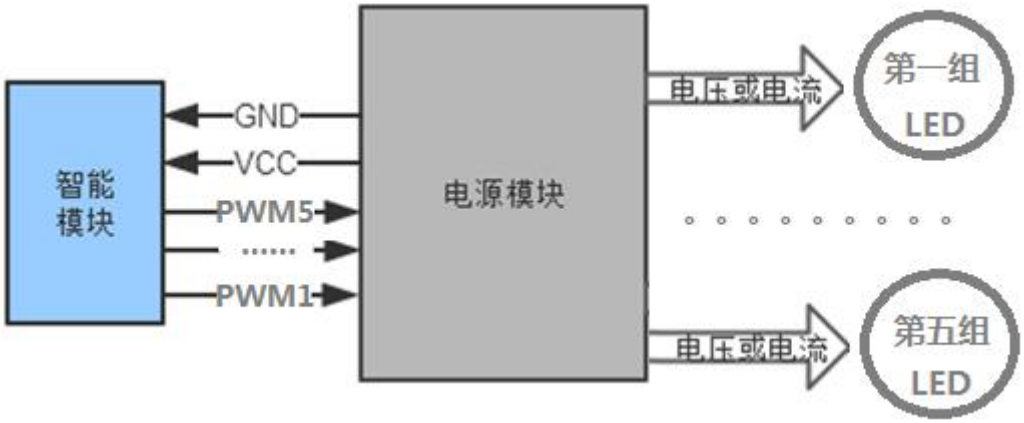
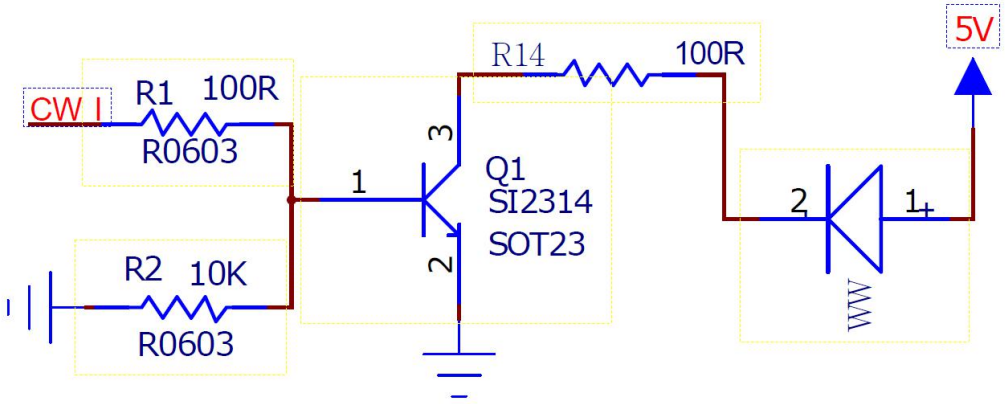


Diagram of connection



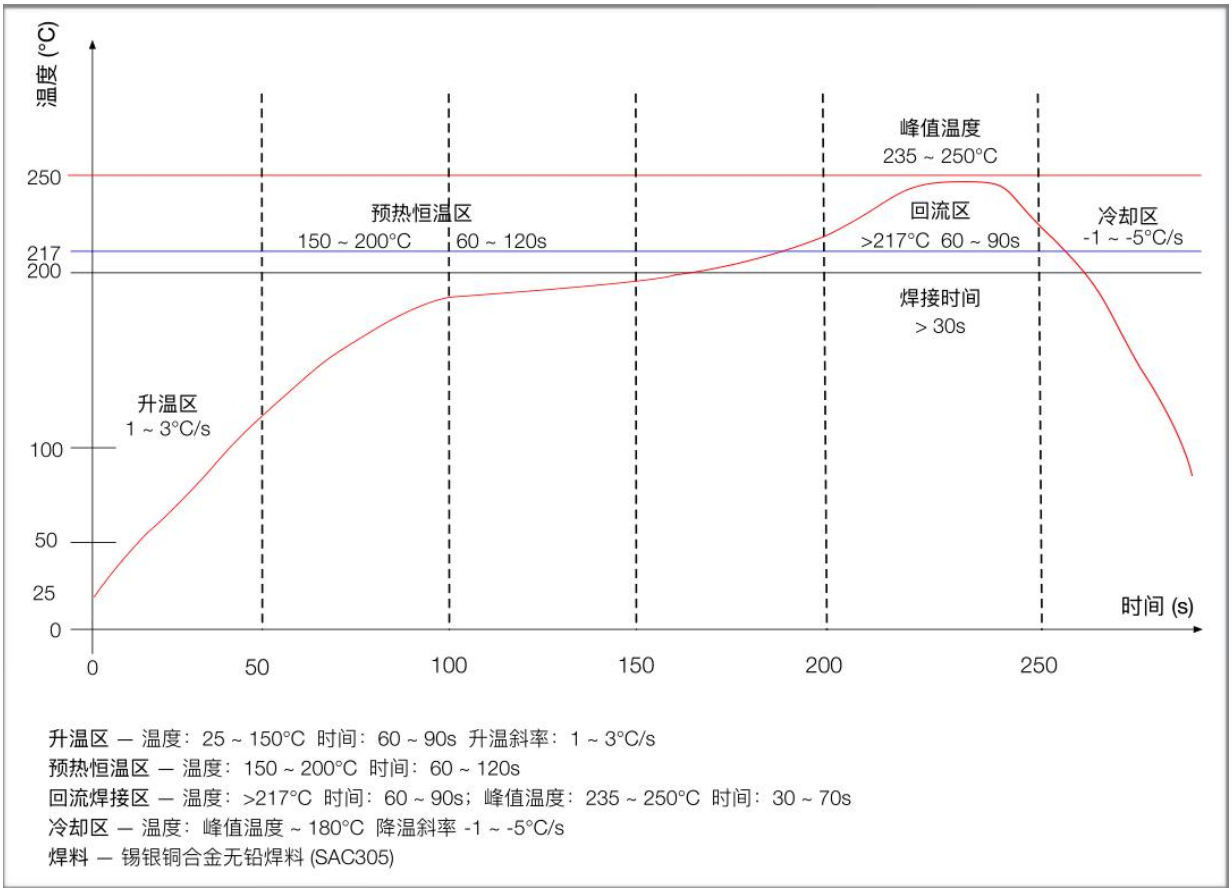
6.LED Drive Reference Design

The PB-02 module application only requires 3.3V power supply and a simple drive circuit to realize smart light control. Take the MOS tube driving a positive white light as an example. The design refers to the following figure; CW_I is the PWM output pin of the positive white light of the module , Q1 is a MOS tube, WW is an LED lamp bead, and the design method of the other 4-way lamp driving circuit is the same as this



way.

七. Reflow soldering



升温区 — 温度：25 ~ 150°C 时间：60 ~ 90s 升温斜率：1 ~ 3°C/s
预热恒温区 — 温度：150 ~ 200°C 时间：60 ~ 120s
回流焊接区 — 温度：>217°C 时间：60 ~ 90s；峰值温度：235 ~ 250°C 时间：30 ~ 70s
冷却区 — 温度：峰值温度 ~ 180°C 降温斜率 -1 ~ -5°C/s
焊料 — 锡银铜合金无铅焊料 (SAC305)

八.Packaging information

as shown below, the PB-02 packing is tape packing.

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