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Product Specification

IEEE 802.11 b/g/n 2.4GHz 1T1R SDIO LGA Module

Model NO	F89FTSM13
Version	-W3
Product Description	12.0X12.0mm, 3.3V SDIO Interface, 1T1R WiFi,with shielding
Remark	
Customer	
Customer's Part NO	

Feedback of customer's Confirmation

We accept the specification after Confirmed.

Customer	Customer signature	Approved Date

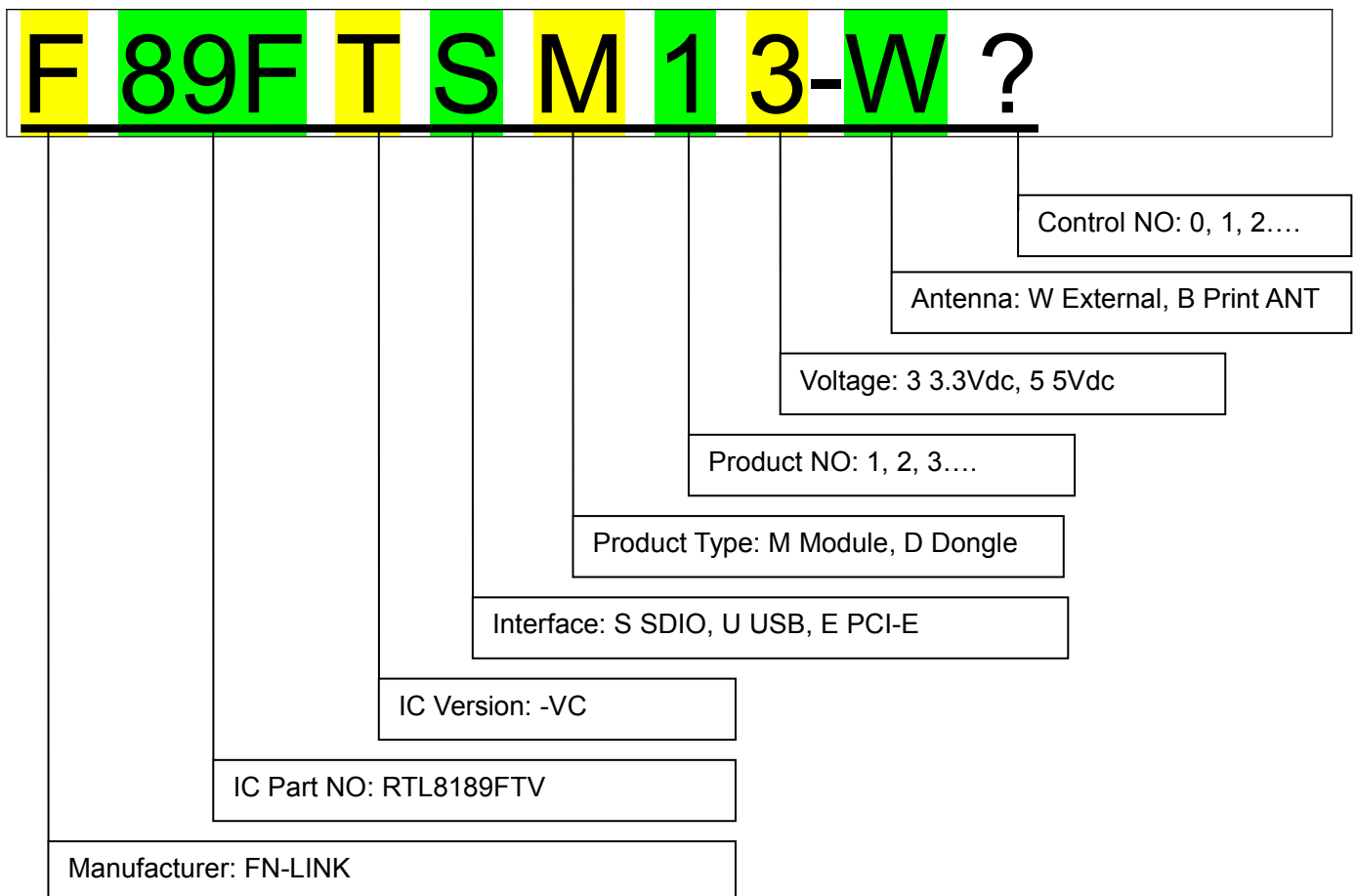
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0. Revision History

REV NO	Date	Modifications	Draft	Approved
Rev.1.0	2016-5-31	First Released	Allen Hu	
Rev.1.1	2017-9-12	Modified thickness of module	William Tan	
V1.2	2018-05-26	Change Company Address	HJ	
V1.3	2018-09-14	Modified module picture	Lzm	
V1.4	2020-12-22	修改格式	LXY	SZS

0.1. Model No Definition

Example: F89FTSM13-W?
Version: -W?



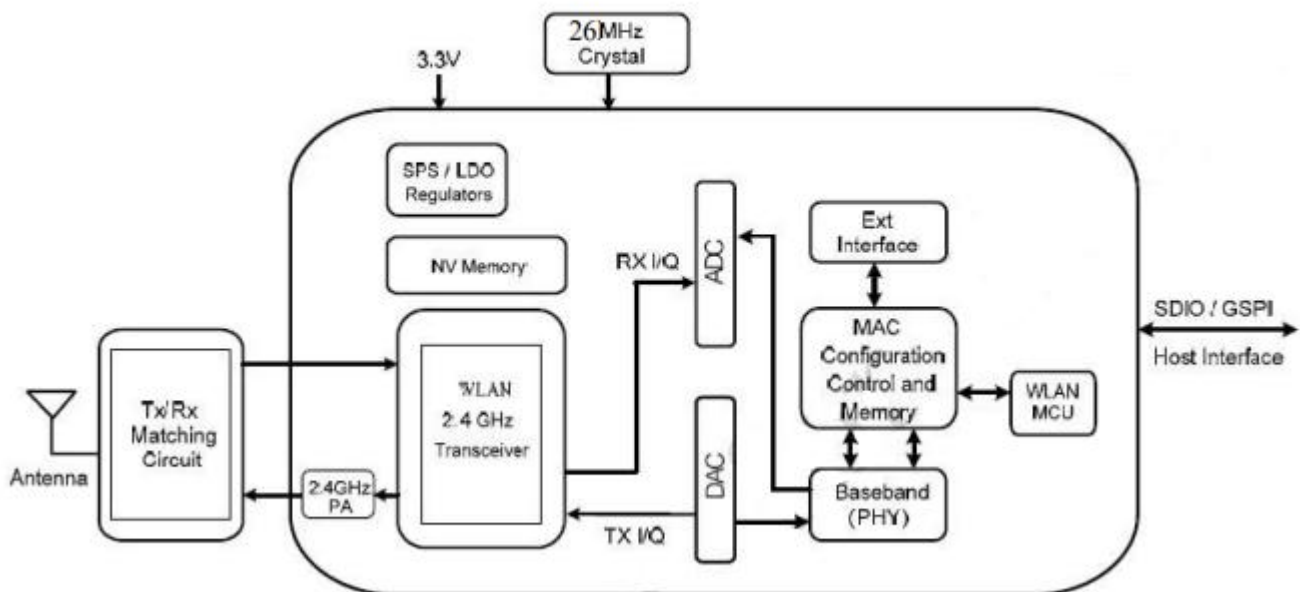
1. Introduction

1.1 Overview

F89FTSM13 is a highly integrated and excellent performance Wireless LAN (WLAN) SDIO network interface device. High-speed wireless connection up to 150 Mbps.

The general hardware for the module is shown in Figure 1. This WLAN Module design is based on Realtek RTL8189FTV. It is a highly integrated single-chip 1*1 SISO Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent performance with low power Consumption and enhance the advantages of robust system and cost-effective.

Single-Band 11n (1x1) Solution



1.2 Product Features

- Operate at ISM frequency bands (2.4GHz)
- SDIO Interface for WiFi
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
- Enterprise level security which can apply WPA/WPA2 certification for WiFi.
- WiFi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

2. GENERAL SPECIFICATION

2.1 WiFi RF Specifications

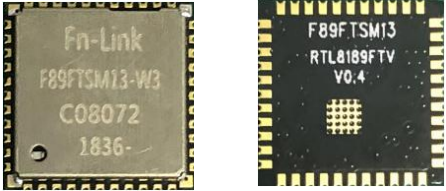
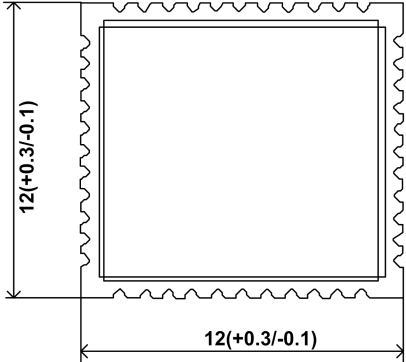
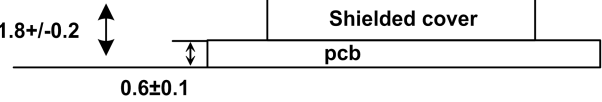
Main Chipset	RTL8189FTV-VB
Operating Frequency	2.400~2.4835GHz
Standards	WiFi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
Modulation	WiFi: 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 802.11 g/n: OFDM
PHY Data rates	WiFi: 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps
Transmit Output Power (Tolerance: ±1.5dBm)	WiFi: 802.11b@11Mbps 17dBm EVM≤ -9dB 802.11g@54Mbps 15dBm EVM≤-25dB 802.11n@MCS7 HT20 14dBm EVM≤-28dB 802.11n@MCS7 HT40 14dBm EVM≤-28dB
Receiver Sensitivity	802.11b@11Mbps -86dBm, typical 802.11g@54Mbps -72dBm, typical 802.11n@MCS7 HT20 -69dBm, typical 802.11n@MCS7 HT40 -67dBm, typical
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
Media Access Control	WiFi: CSMA/CA with ACK
Antenna	External Antenna
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software AP WiFi Direct
Security	WiFi: WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit,
OS Supported	Android /Linux
Host Interface	WiFi: SDIO/GPIO
Operating Voltage	3.3Vdc ±10% I/O supply voltage
Dimension	Typical 12.0*12.0mm

2.2 Power Consumption

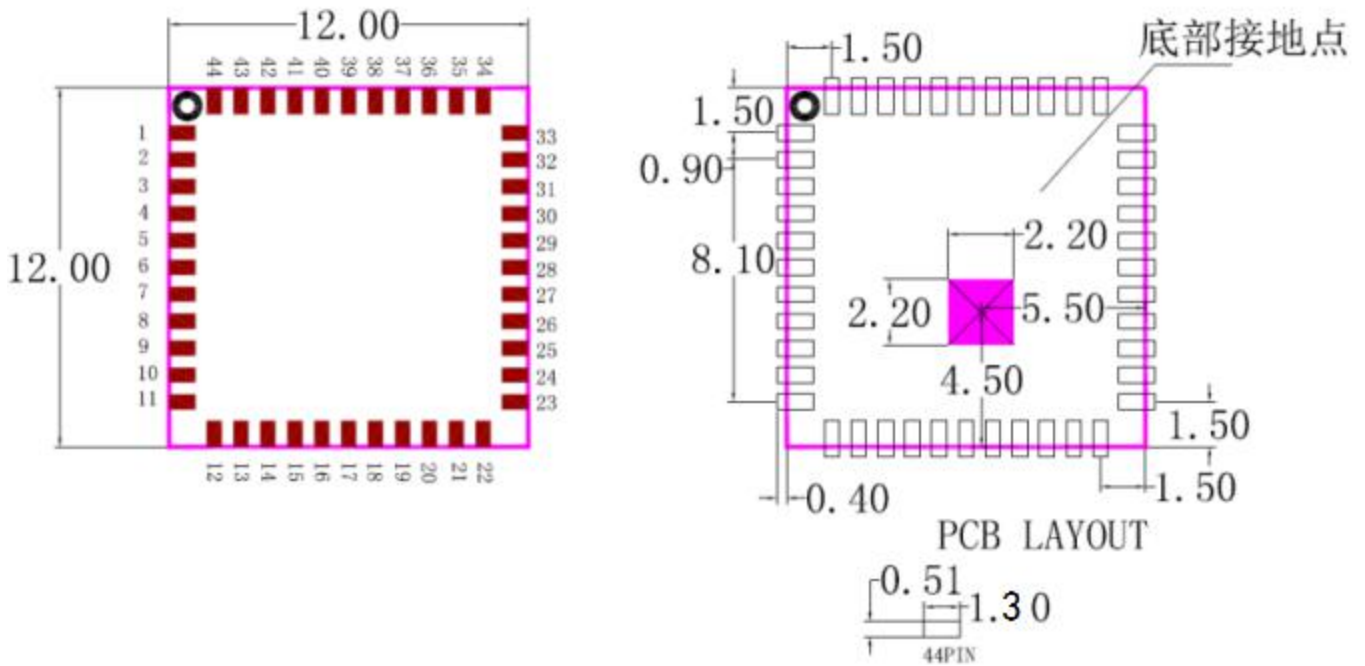
Mode	Status	Power(mA)	Note
OS Windows XP	Link	130	
	RX	130	20M
	TX	190	20M(MCS7)
		175	40M(MCS7)

3. Mechanical Specification

3.1 Outline Drawing

<p>L x W : 12 x 12 (+0.3/-0.1) mm</p> 	
<p>H: 1.8 (+/-0.2) mm</p>	
<p>Weight</p>	<p>0.5g</p>

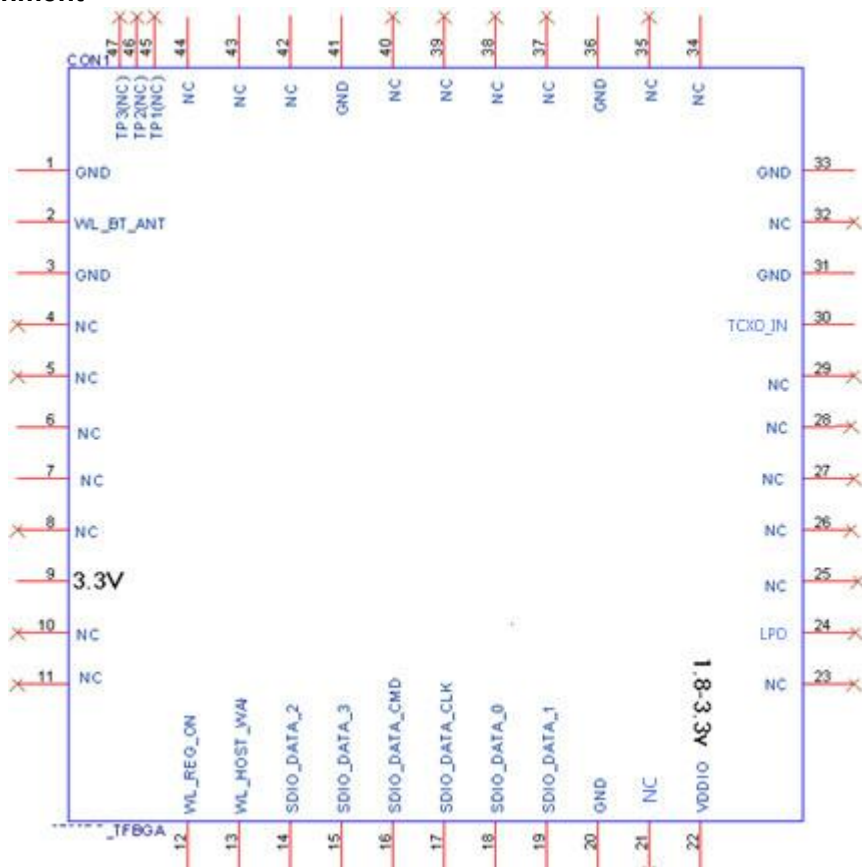
3.2 PCB LAYOUT (Unit: mm)



Note:

1. 客户板 PAD 请与模组 PAD 里面重合，勿往板内延伸；
2. 客户板 PAD 与铺铜间隔距离保持》0.3mm；

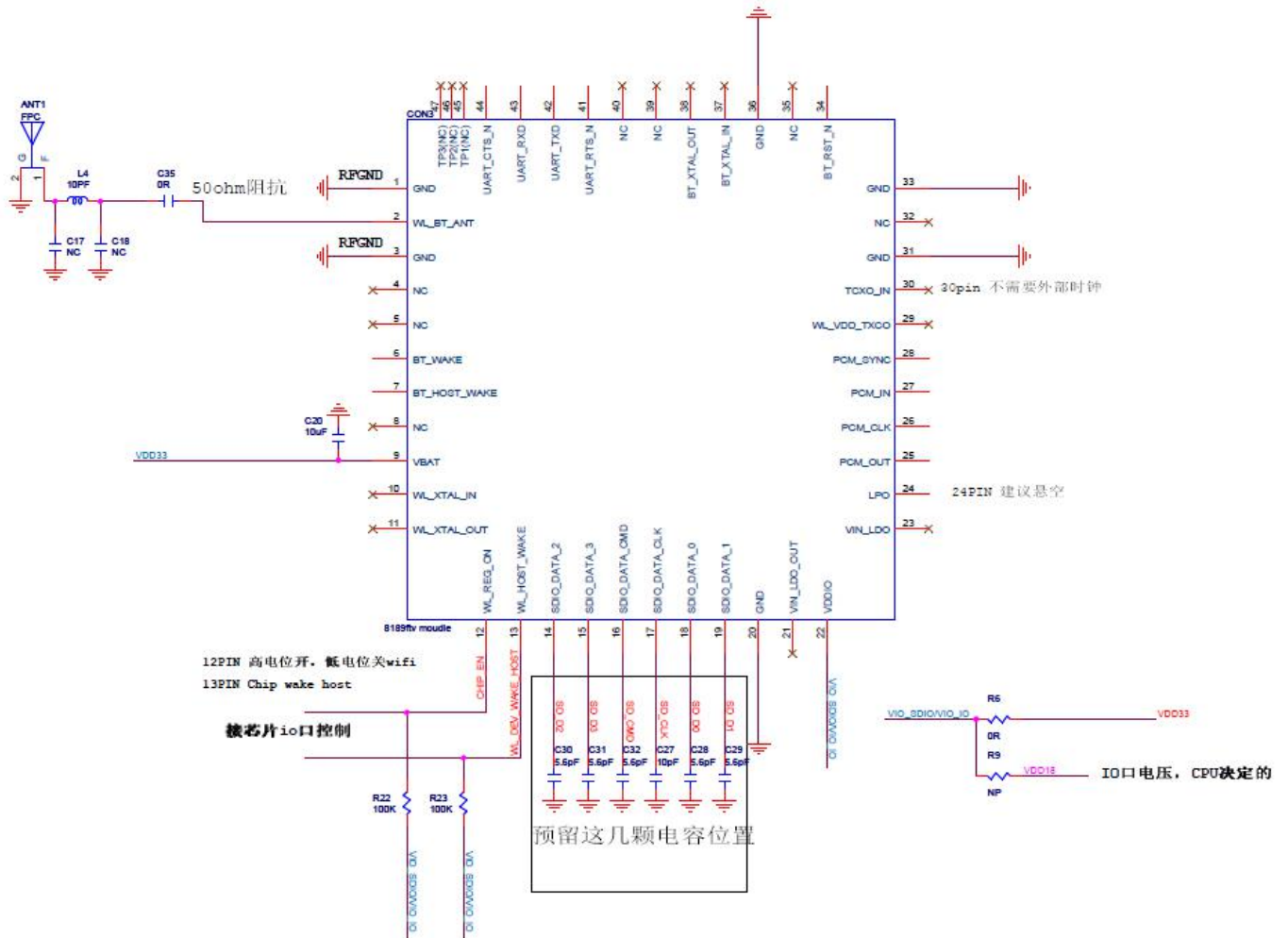
3.3 PIN Assignment



Pin #	Name	Description
1	GND	GND
2	RF	RF OUTPUT
3	GND	GND
4~8	NC	NC
9	VBAT	3.3V Optional
10	NC	NC
11	NC	NC
12	WL_REG_ON	WL_REG_ON
13	WL_HOST_WAKE	WAKE UP
14	SDIO_DATA_2	SDIO_D2
15	SDIO_DATA_3	SDIO_D3

16	SDIO_DATA_CMD	SDIO_CMD
17	SDIO_DATA_CLK	SDIO_CLK
18	SDIO_DATA_D0	SDIO_D0
19	SDIO_DATA_D1	SDIO_D1
20	GND	GND
21	NC	NC
22	VDIO	1.8~3.3V
23	NC	NC
24	LPO	CLK_REQ, Not used please NC
25~29	NC	NC
30	TCXO_IN	26MHz_IN, Not used please NC
31	GND	GND
32	NC	NC
33	GND	GND
34~35	NC	NC
36	GND	GND
37~40	NC	NC
41	GND	GND
42~44	NC	NC

3.4 Application Circuit



3.5 Ordering Information

Ordering No.	Description
FG89FTSM13-W3	RTL8189FTV-VB,b/g/n,Wi-Fi,1T1R,12X12mm,SDIO,with shielding

3.6 Material list

Crystal	3225, 26Mhz ±10ppm,10.5pF	ECEC,HOSONIC,TKD,JWT
ESD	0201 0.05pF 15KV TVS	Murata,Sunlord
Chipset	RTL8189FTV-VB-CG	Realtek
PCB	F89FTSM13-V04 12X12 4L	XY-PCB,KX-PCB,Sunlord

4. Environmental Requirements

4.1 Operating & storage temperature

Recommended Operating	Temperature: 0°C ¹ to 70°C
	Relative Humidity: 10-90% (non-condensing)
Storage	Temperature: -40°C to +80°C (non-operating)
	Relative Humidity: 5-90% (non-condensing)
MTBF (Mean Time Between Failures)	Over 150,000hours

1. Chip set spec recommended at 0° C, but module actually test passed at -10° C.

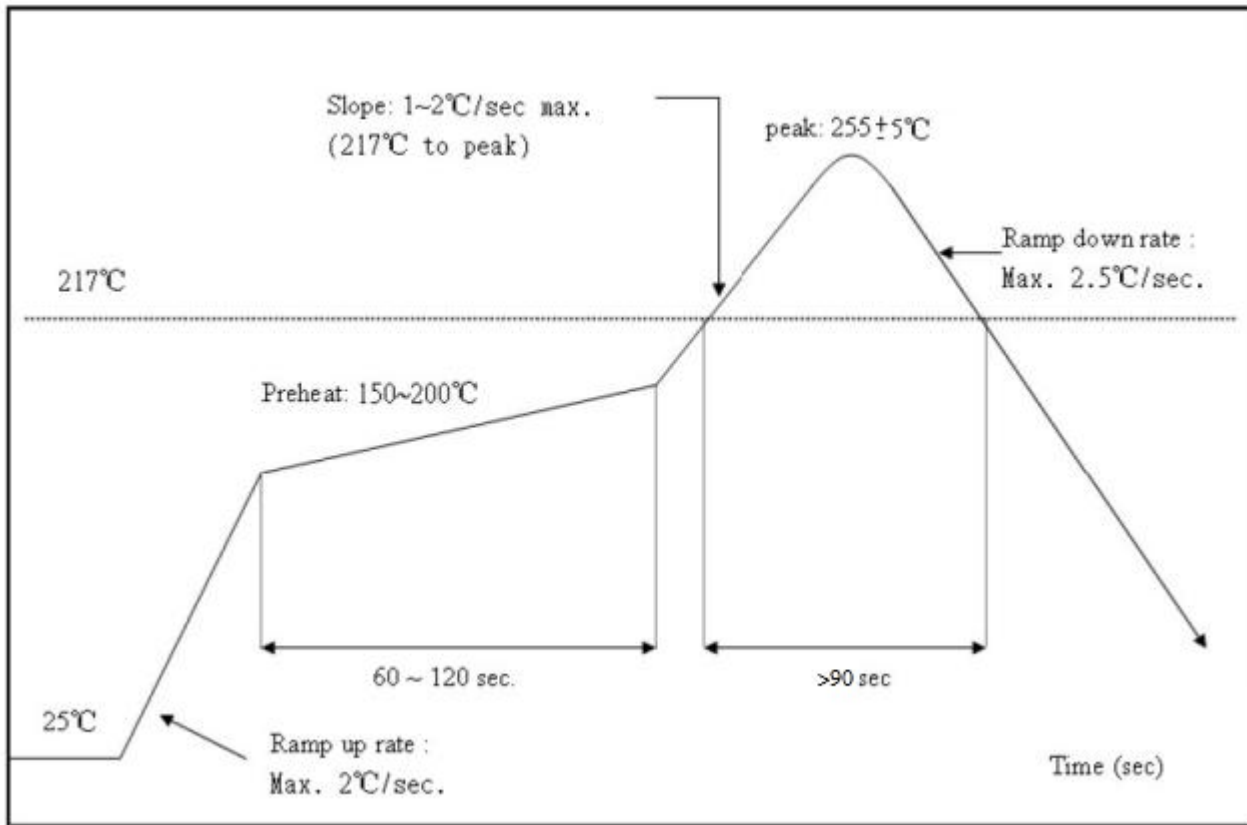
4.2 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <260°C

Reflow 260° C and holding time at least 10seconds

Number of Times : ≤2 times



4.3 Patch WIFI modules installed before the notice:

WIFI module installed note:

1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 °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 °C, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly:
 - 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: $\leq -30^{\circ}\text{C}$, $\leq 60\%$ 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 °C, 8 hours.
 - 3.) After baking, put the right amount of desiccant to seal packages.

5. PACKING INFORMATION

5.1 Blister packaging



A piece of 100 PCS

5.2 Coiling Packaging



A roll of 2000pcs

