6189S-SF

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

Module Datasheet

6189S-SF Module Datasheet

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Customer Approval :

_____ Company

_____ Title

_____ Signature

_____ Date

_____ Fn-Link

Revision History

Version	Date	Revision Content	Draft	Approved
1.0	2020/10/30	New version	Lxy	Szs
1.1	2021/6/10	Added antenna area clearance description	Lxy	Lgp
1.2	2022/05/19	Add external antenna operation description	FC	LXY

CONTENTS

1 Overview

1.1 Introduction

6189S-SF is a highly integrated and excellent performance Wireless LAN (WLAN) SDIO network interface device. High-speed wireless connection up to 150 Mbps. It can be easily manufactured on SMT process.

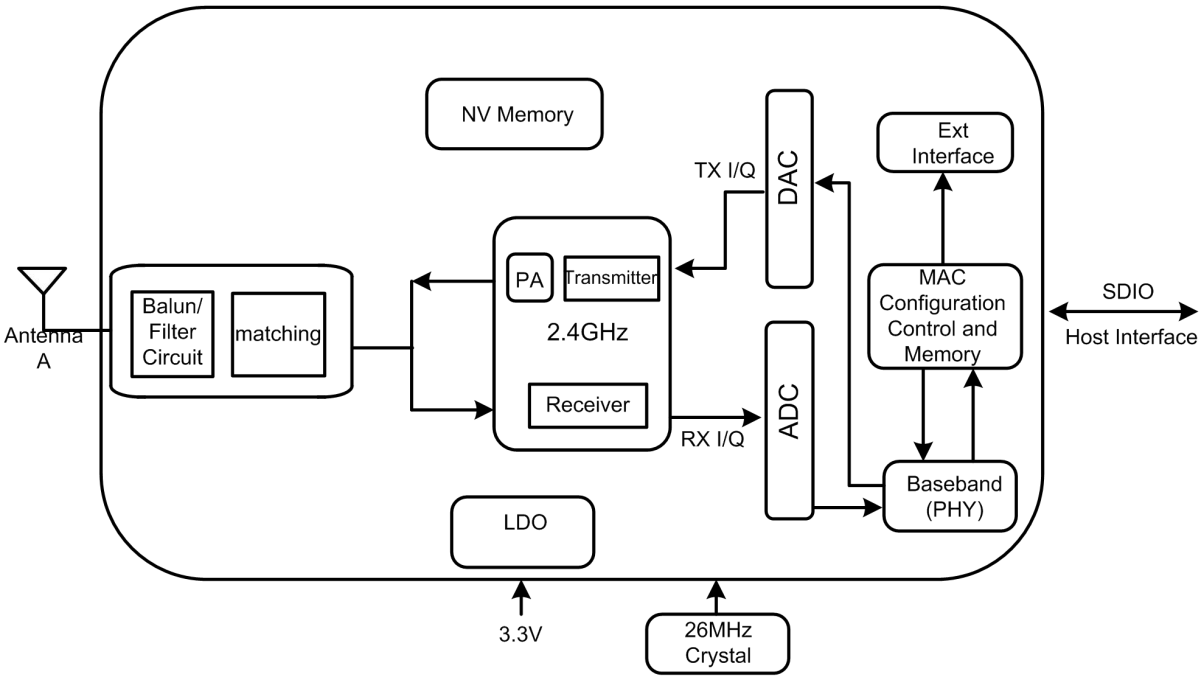
This WLAN Module design is based on Realtek RTL8189FTV-VC-CG. It is a highly integrated single-chip Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent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

This compact module is a total solution for Wi-Fi technology. The module is specifically developed for Smart phones and Portable devices.

1.2 Features

- Operate at ISM frequency bands (2.4GHz)
- CMOS MAC, Baseband PHY, and RF in a single chip for 802.11b/g/n compatible WLAN
- Wi-Fi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

Block Diagram:



1.3 General Specification

Model Name	6189S-SF
Product Description	Support Wi-Fi functionalities
Dimension	L x W x T: 18.2 x 14.8 x 2.2 mm (typical)
Wi-Fi Interface	Support SDIO
Operating temperature	0°C to 70°C
Storage temperature	-40°C to +85°C

1.4 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	0	25	70	deg.C
VBAT	3.0	3.3	3.6	V
VDDIO	1.7	1.8 or 3.3	3.6	V

※1.5 EEPROM Information

WI-FI

Vendor ID	024C
Product ID	F179

2 General Specification

2.1 Wi-Fi RF Specifications

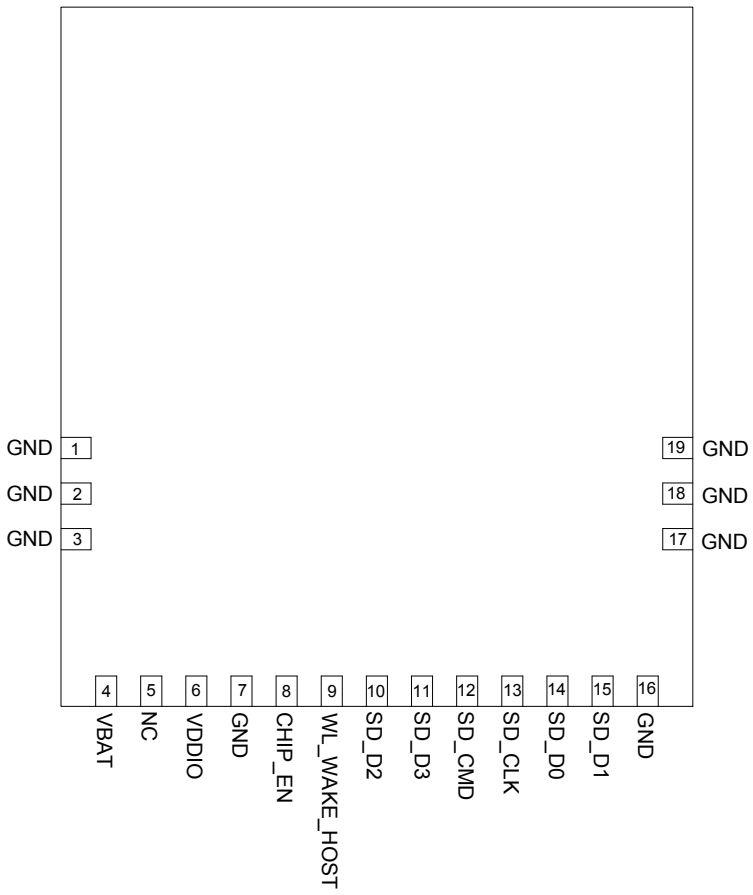
Feature	Description			
WLAN Standard	IEEE 802.11b/g/n, Wi-Fi compliant			
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)			
Number of Channels	2.4GHz：Ch1 ~ Ch14			
Modulation	DBPSK/DQPSK/CCK(DSSS)、BPSK/QPSK/16QAM/64QAM(OFDM)			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	-41/-32/-42	-	dBr
2st side lobes(to fc ±	-	-50/-31/-52	-	dBr

22MHZ)				
Freq. Tolerance	-20/-20/-20	-	20/20/20	ppm
Output Power	802.11b /11Mbps : 16 dBm ± 1.5 dB @ EVM ≤ -9dB			
	802.11g /54Mbps : 14 dBm ± 1.5 dB @ EVM ≤ -25dB			
	802.11n /MCS7(HT 20) : 13 dBm ± 1.5 dB @ EVM ≤ -28dB			
	802.11n /MCS7(HT 40) : 13 dBm ± 1.5 dB @ EVM ≤ -28dB			
Test Items	**Typical Value**		**Standard Value**	
Receive Sensitivity (11b) @8% PER	- 1Mbps	PER @ -94 dBm	≤-83	
	- 2Mbps	PER @ -88 dBm	≤-80	
	- 5.5Mbps	PER @ -86 dBm	≤-79	
	- 11Mbps	PER @ -85 dBm	≤-76	
Receive Sensitivity (11g) @10% PER	- 6Mbps	PER @ -88 dBm	≤-85	
	- 9Mbps	PER @ -86 dBm	≤-84	
	- 12Mbps	PER @ -85 dBm	≤-82	
	- 18Mbps	PER @ -83 dBm	≤-80	
	- 24Mbps	PER @ -81 dBm	≤-77	
	- 36Mbps	PER @ -78 dBm	≤-73	
	- 48Mbps	PER @ -74 dBm	≤-69	
	- 54Mbps	PER @ -72 dBm	≤-68	
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -87 dBm	≤-85	
	- MCS=1	PER @ -83 dBm	≤-82	
	- MCS=2	PER @ -82 dBm	≤-80	
	- MCS=3	PER @ -78 dBm	≤-77	
	- MCS=4	PER @ -75 dBml	≤-73	
	- MCS=5	PER @ -73 dBm	≤-69	
	- MCS=6	PER @ -70 dBm	≤-68	
	- MCS=7	PER @ -69 dBm	≤-67	
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -87 dBm	≤-82	
	- MCS=1	PER @ -83 dBm	≤-79	
	- MCS=2	PER @ -82 dBm	≤-77	
	- MCS=3	PER @ -78 dBm	≤-74	
	- MCS=4	PER @ -74 dBm	≤-70	
	- MCS=5	PER @ -70 dBm	≤-66	
	- MCS=6	PER @ -68 dBm	≤-65	
	- MCS=7	PER @ -67 dBm	≤-64	

3 Pin Assignments

3.1 Pin Outline

<TOP>



3.2 Pin Definition

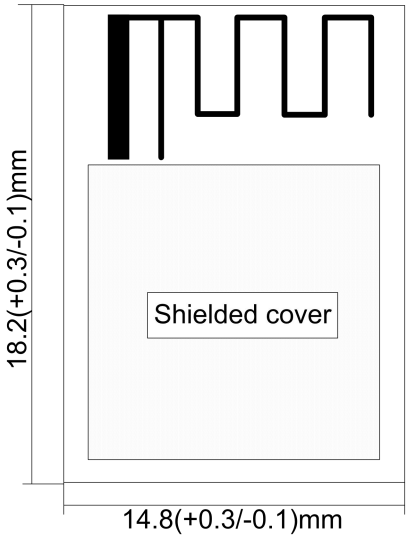
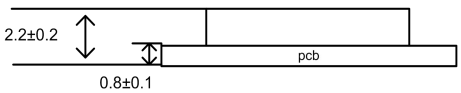
NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	GND		Ground connections	
3	GND		Ground connections	
4	VBAT	P	Supply 3.3V	3.3V
5	NC		Floating (Don't connected to ground)	
6	VDDIO	P	I/O Voltage supply input 1.8V to	1.8V ~ 3.3V

			3.3V	
7	GND		Ground connections	
8	CHIP_EN	I	Wi-Fi enable pin, default pull high	3.3V
9	WL_WAKE_HOST	I/O	WLAN to wake-up HOST	1.8V ~ 3.3V
10	SD_D2	I/O	SDIO Data line 2	1.8V ~ 3.3V
11	SD_D3	I/O	SDIO Data line 3	1.8V ~ 3.3V
12	SD_CMD	I/O	SDIO Command Input	1.8V ~ 3.3V
13	SD_CLK	I	SDIO Clock Input	1.8V ~ 3.3V
14	SD_D0	I/O	SDIO Data line 0	1.8V ~ 3.3V
15	SD_D1	I/O	SDIO Data line 1	1.8V ~ 3.3V
16	GND		Ground connections	
17	GND		Ground connections	
18	GND		Ground connections	
19	GND		Ground connections	

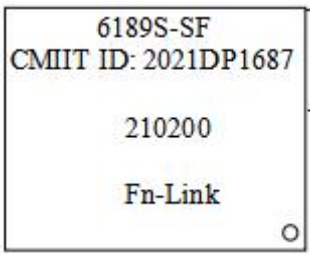
P:POWER I:INPUT O:OUTPUT

4 Dimensions

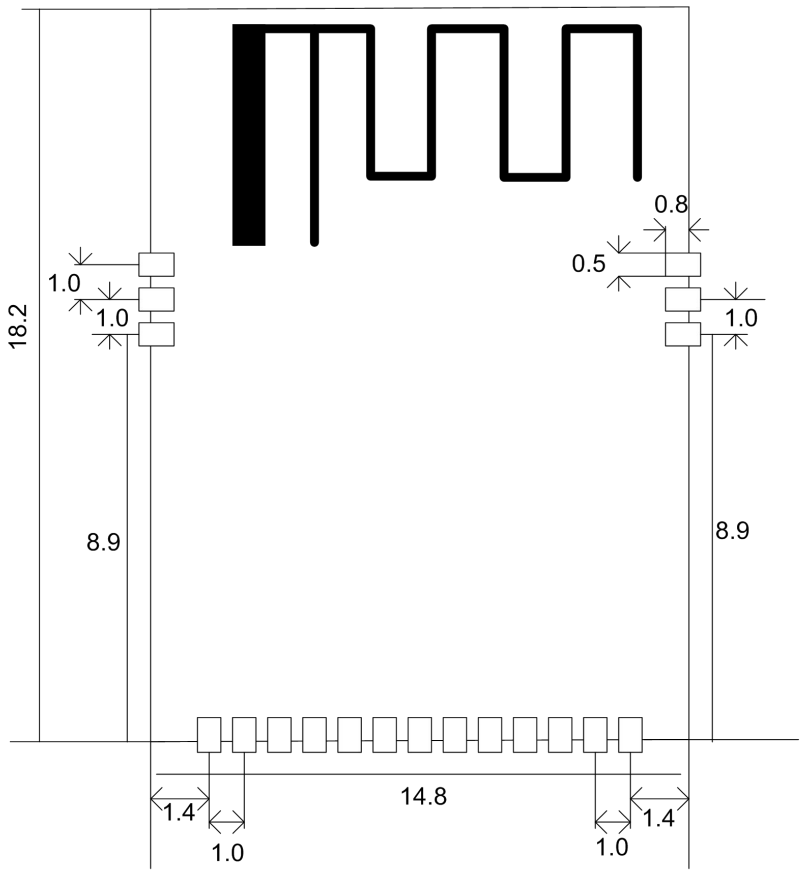
4.1 Module Picture

<table>
<tr><td>L x W: 18.2x 14.8(+0.3/-0.1) mm
  </td><td>  </td></tr>
<tr><td>H: 2.2 (±0.2) mm</td><td>  </td></tr>
<tr><td>Weight</td><td>0.8g</td></tr>
</table>

4.2 Marking Description

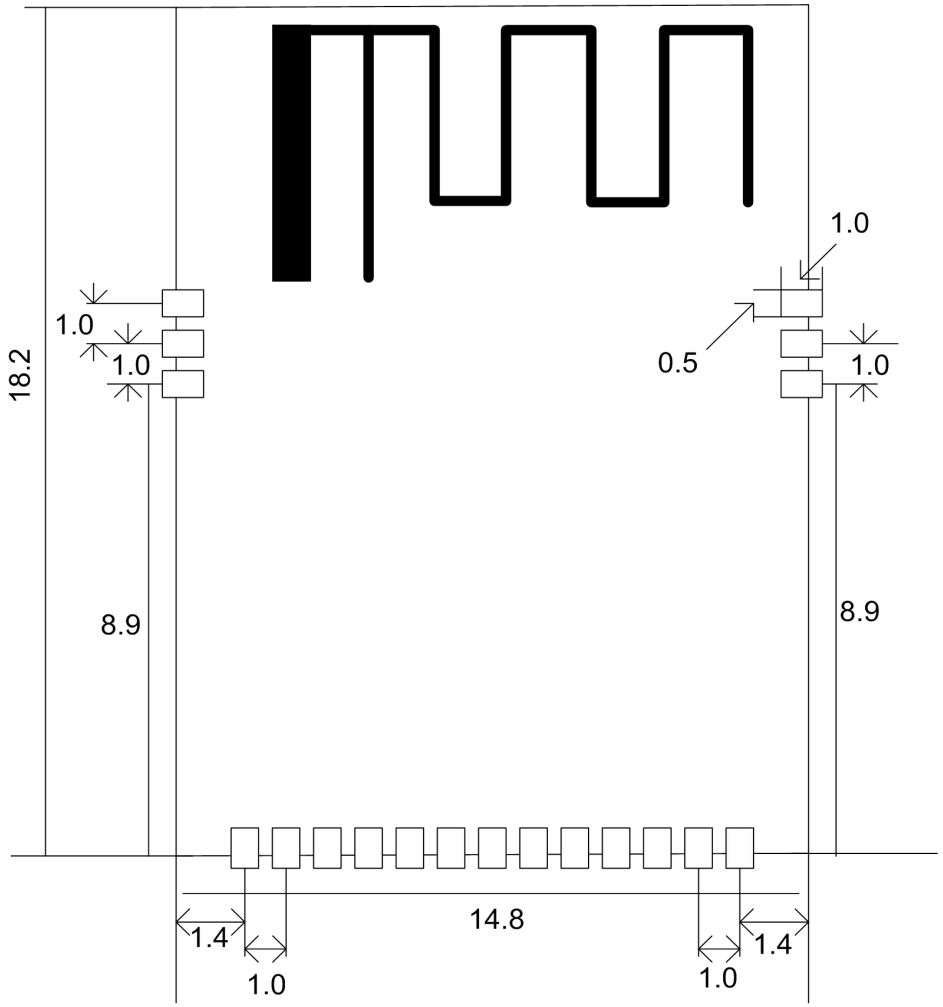


4.3 Module Physical Dimensions



4.4 Layout Reference

(unit: mm)



6 Host Interface Timing Diagram

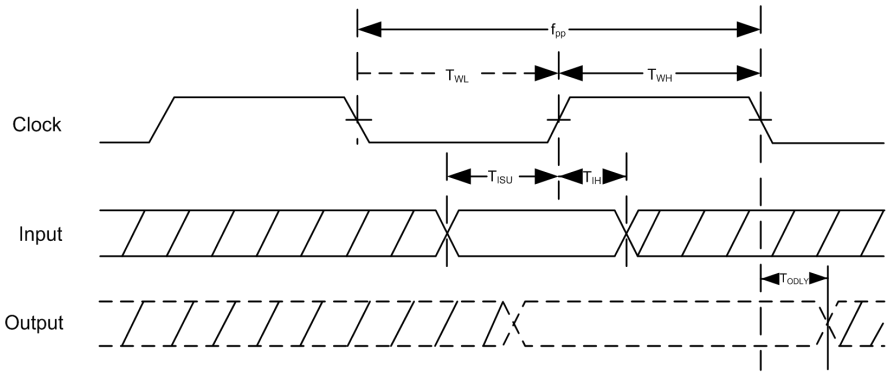
6.1 SDIO Pin Description

The module supports SDIO version 2.0 for all 1.8V 4-bit UHSI speeds: SDR12(25 Mbps), and SDR25(50Mbps) in addition to the 3.3V default speed(25MHz) and high speed (50 MHz).

SDIO Pin Description

SD 4-Bit Mode	
DATA0	Data Line 0
DATA1	Data Line 1 or Interrupt
DATA2	Data Line 2 or Read Wait
DATA3	Data Line 3
CLK	Clock
CMD	Command Line

6.2 SDIO Default Mode Timing Diagram

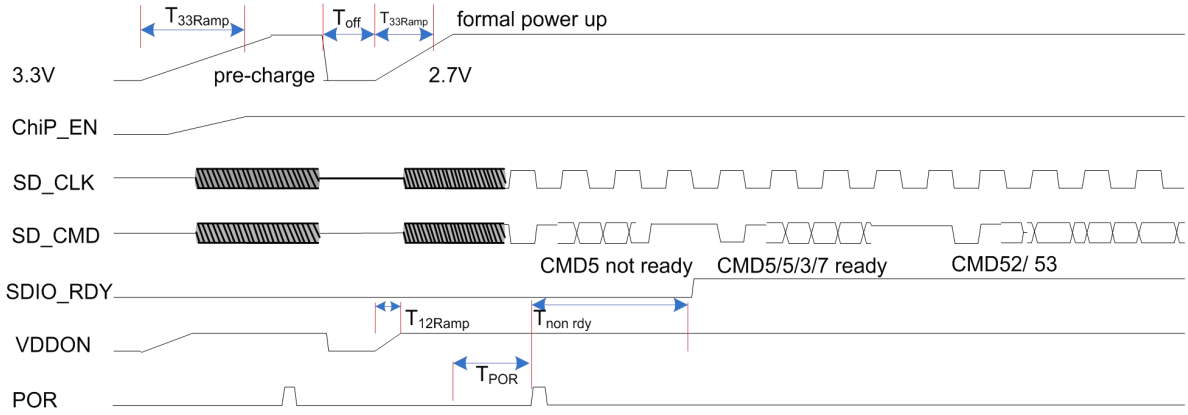


SDIO Interface Timing

SDIO Interface Timing Parameters

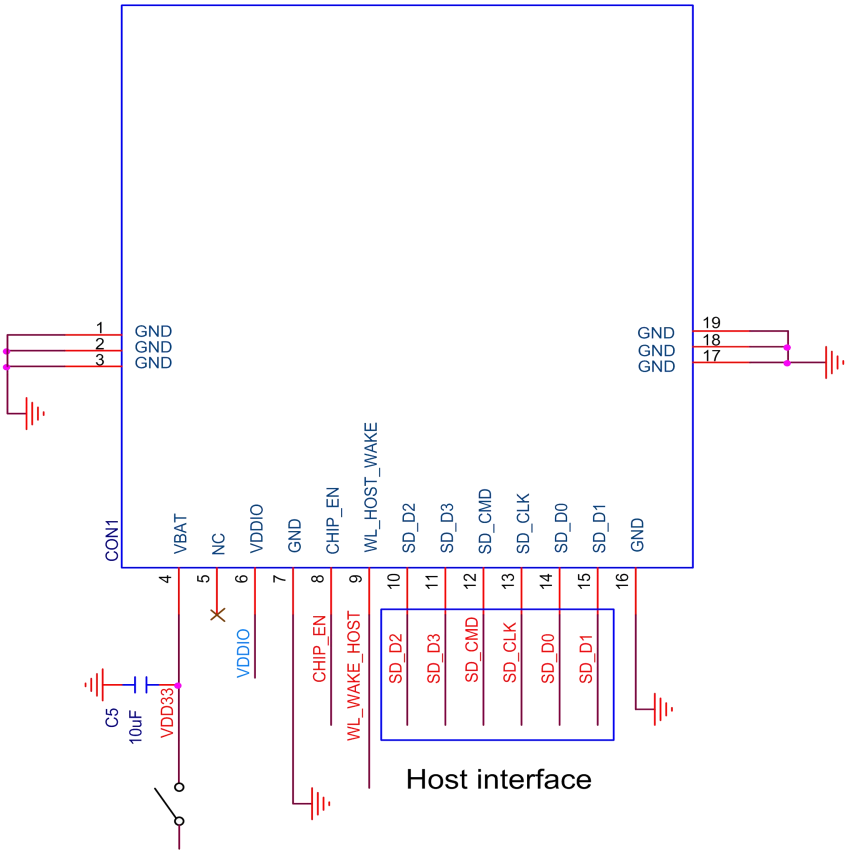
NO	Parameter	Mode	MIN	MAX	Unit
f_{pp}	Clock Frequency	Default	0	25	MHz
		HS	0	50	MHz
T_{WL}	Clock Low Time	DEF	10	-	ns
		HS	7	-	ns
T_{WH}	Clock High Time	DEF	10	-	ns
		HS	7	-	ns
T_{ISU}	Input Setup Time	DEF	5	-	ns
		HS	6	-	ns
T_{IH}	Input Hold Time	DEF	5	-	ns
		HS	2	-	ns
T_{ODLY}	Output Delay Time	DEF	-	14	ns
		HS	-	14	ns

6.3 SDIO Power-on sequence



Symbol	Min	Typical	Max	Unit
T_{33ramp}	0.2	-	No Limit	ms
T_{off}	250	500	1000	ms
T_{33ramp}	0.2	0.5	2.5	ms
T_{12ramp}	0.1	0.5	1.5	ms
T_{POR}	2	2	8	ms
T_{non_rdy}	1	2	10	ms

7 Reference Design

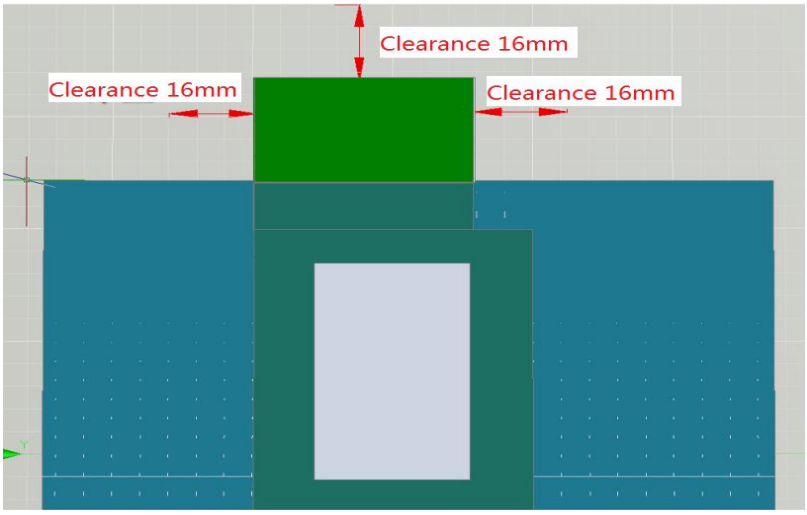


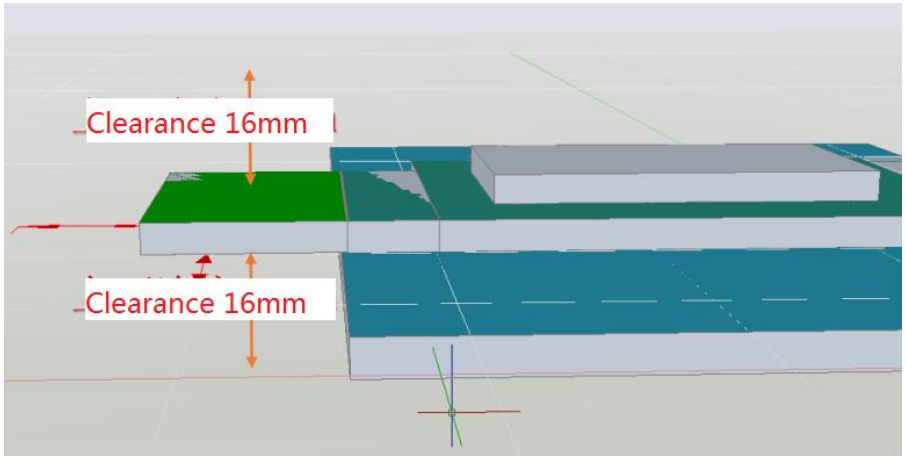
Note:

1. chip_EN could not use for module power off, please switch the 3.3V power for module on/off.

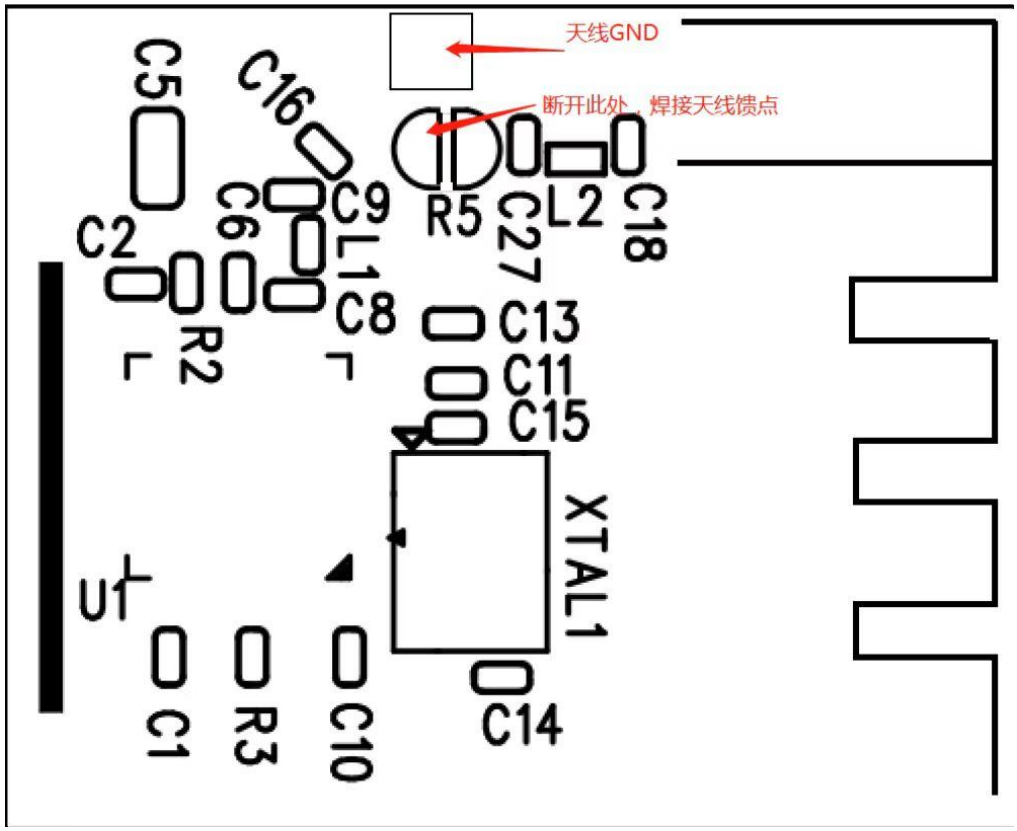
2. please keep the antenna on no metal area.

3. 为保证天线的性能，请按照下图选取模组贴装位置，模组安装到整机后，天线匹配需要微调，请寄整机给我们确认。





If using external antenna please soldering external antenna as shown below



8 Ordering Information

Part No.	Description
FG6189SSFX-00	RTL8189FTV-VC-CG b/g/n, Wi-Fi, 1T1R, 18.2X14.8mm, SDIO, PCB V1.0 with antenna

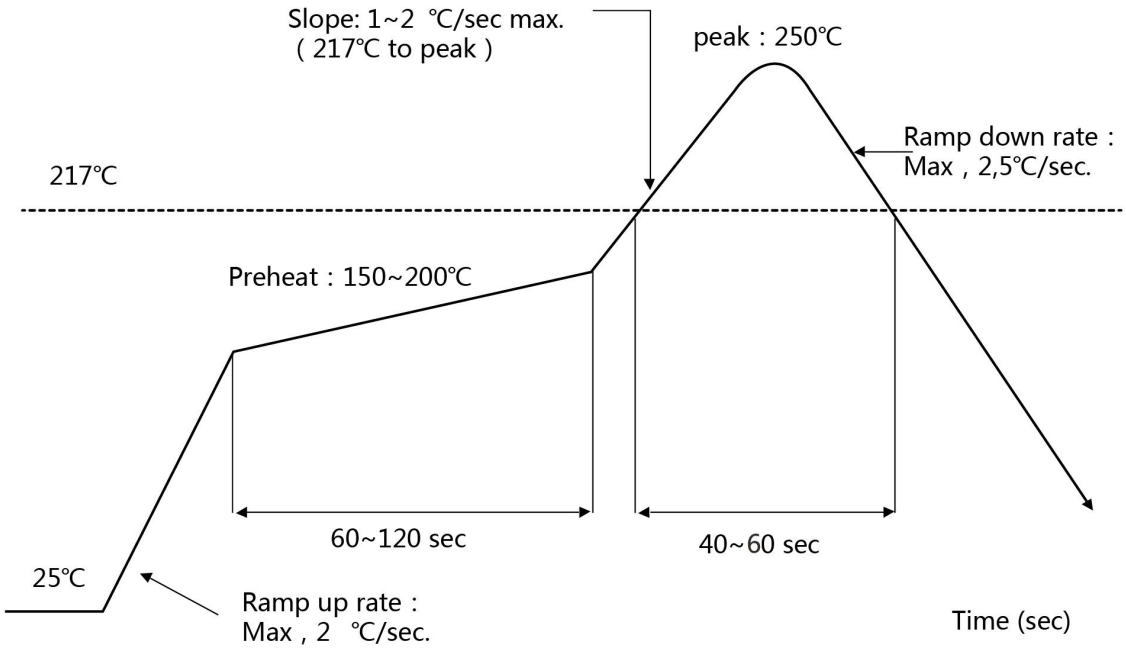
9 The Key Material List

Shielding cover	6189S-SF V1.0 Shielding cover	信太,精力通
Crystal	3225，26Mhz ±10ppm,10.5pF	ECEC,HOSONIC,TKD,JWT
ESD	0201 0.05pF 15KV TVS	Murata,Sunlord
Chipset	RTL8189FTV-VC-CG	Realtek
PCB	6189S-SF-V1.0 Green,18.2x14.8x0.8mm	XY-PCB,KX-PCB,Sunlord

10 Environmental Requirements

10.1 Recommended Reflow Profile

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



10.2 Patch Wi-Fi modules installed before the notice

Wi-Fi 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 ℃ 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 ℃, 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: ≦ -30 ℃, ≦ 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.

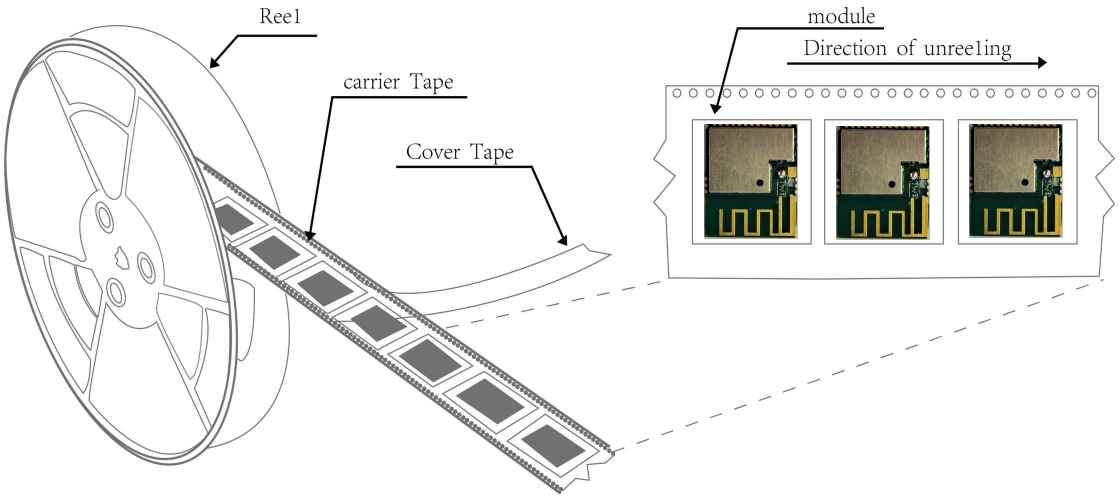
2). The baking temperature: 125 ℃, 8 hours.

3). After baking, put the right amount of desiccant to seal packages.

11 Package

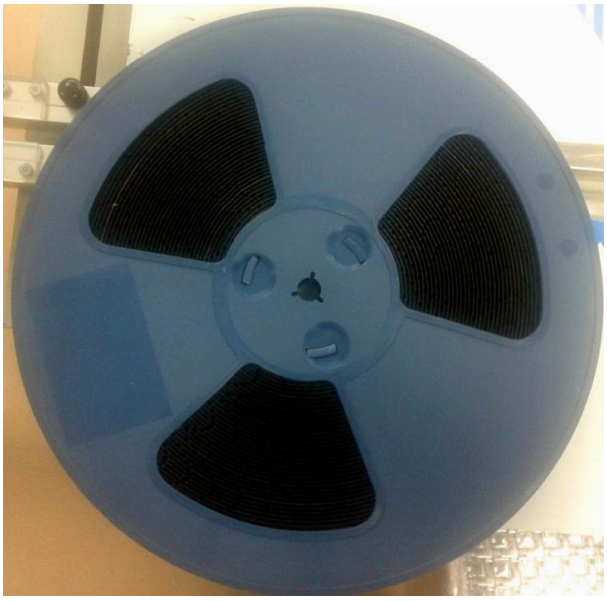
11.1 Reel

A roll of 1000pcs



11.2 Packaging Detail

the take-up package



Using self-adhesive tape
Size of black tape:32mm*20.8m the cover tape :25.5mm*30m
Color of plastic disc:blue
A roll of 1000pcs

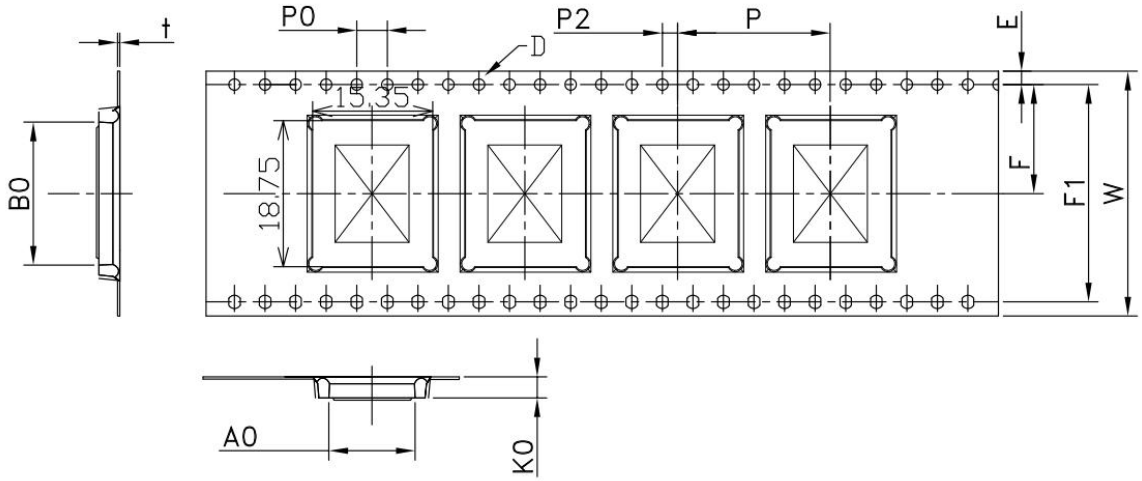
NY bag size:415mm*450mm

size ： 350*350*35mm

The packing case size:360*210*370mm

11.3 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	32	15.35	18.75	1.5	1.75	14.20	28.4	2.10	4.0	2.0	8.0	0.30
TOLE	+0.3 −0.3	±0.18	±0.18	+0.1 −0.0	±0.1	±0.15	±0.10	±0.10	±0.1	±0.15	±0.1	±0.05



11.4 Moisture sensitivity

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