

6189S-SF

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

Module Datasheet



6189S-SF Module Datasheet

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

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

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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.

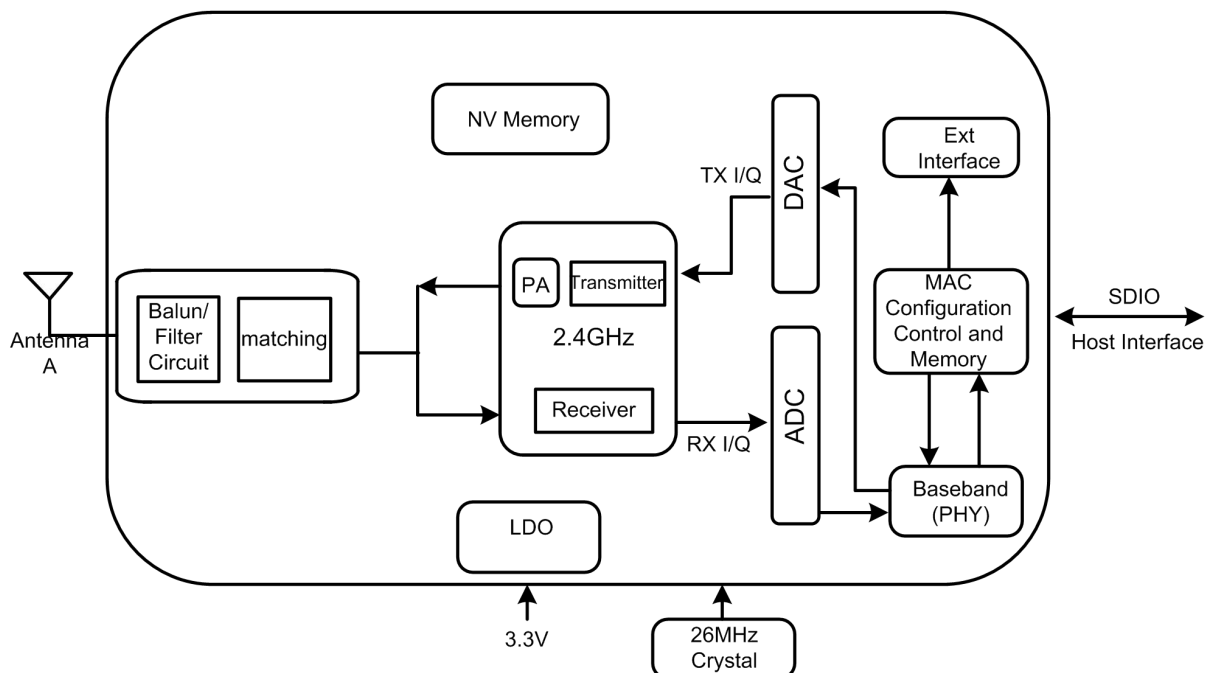
This WLAN Module design is based on Realtek RTL8189FTV-VC-CG. It is a highly integrated single-chip Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent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

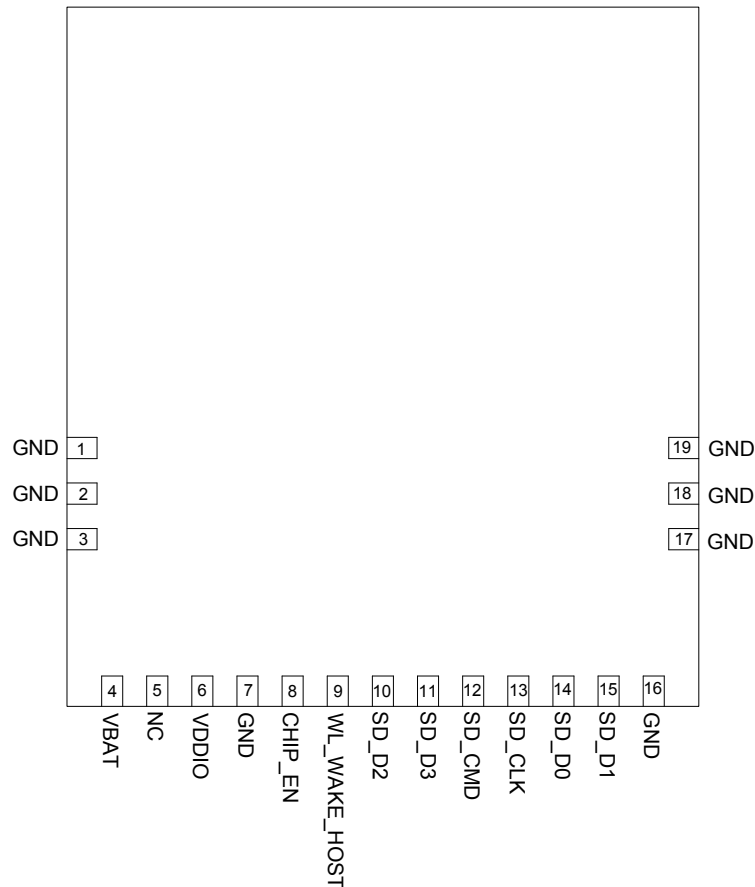
Feature	Description			
WLAN Standard	IEEE 802.11b/g/n, Wi-Fi compliant			
Frequency Range	2.412 GHz ~ 2.462 GHz (2.4 GHz ISM Band)			
Number of Channels	2.4GHz: Ch1 ~ Ch11			
Modulation	DBPSK/DQPSK/CCK(DSSS)、BPSK/QPSK/16QAM/64QAM(OFDM)			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st 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 : 13 dBm ± 1.5 dB @ EVM ≤-9dB			
	802.11g /54Mbps : 13 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 dBm		≤-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

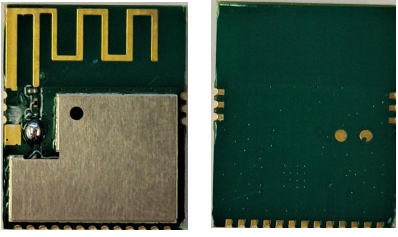
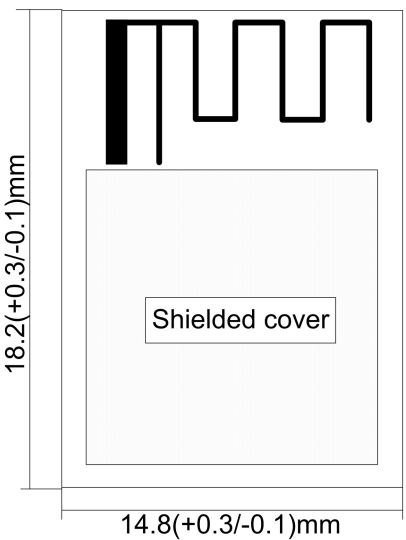
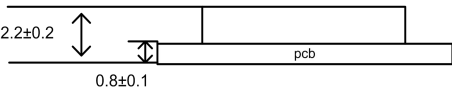
L x W: 18.2x 14.8(+0.3/-0.1) mm 	
H: 2.2 (±0.2) mm	
Weight	0.8g

Diagram illustrating the label structure and its corresponding fields:

- Fn-Link
- 6189S-SF
- XXXXXX
- XXXX

Fields and their corresponding labels:

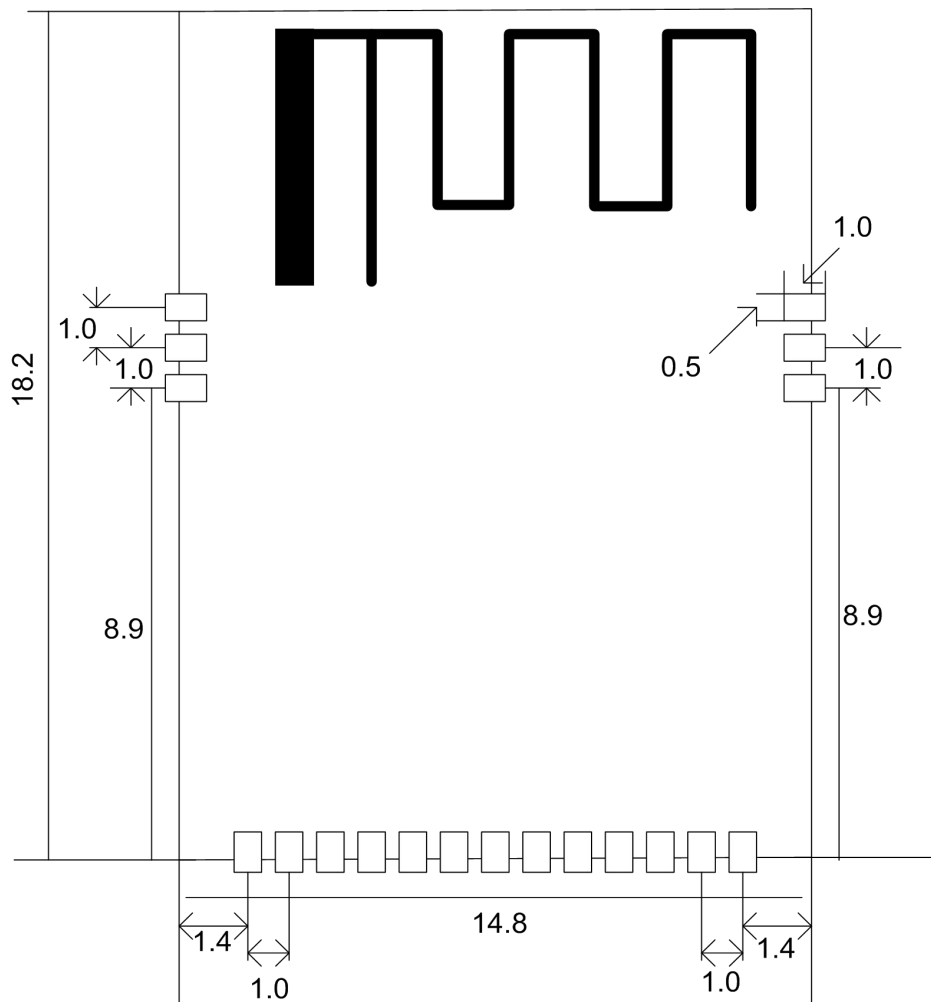
- Model Name
- CMIIT ID
- Lot Code
- Date Code

Technical drawing of a rectangular building footprint. The overall dimensions are 18.2 (width) by 27.1 (depth). The drawing includes the following details and dimensions:

- Left Wall:** A vertical wall with a height of 18.2. It features three rectangular windows stacked vertically, each with a height of 1.0 and a width of 1.0. The distance from the bottom of the wall to the bottom window is 8.9.
- Right Wall:** A vertical wall with a height of 18.2. It features three rectangular windows stacked vertically, each with a height of 1.0 and a width of 1.0. The distance from the bottom of the wall to the bottom window is 8.9. The top window is offset to the right by 0.8.
- Front Wall:** A horizontal wall with a width of 14.8. It features a row of ten rectangular windows, each with a height of 1.0 and a width of 1.4. The distance from the left corner to the first window is 1.4, and the distance from the last window to the right corner is 1.4.
- Back Wall:** A horizontal wall with a width of 14.8. It features a row of ten rectangular windows, each with a height of 1.0 and a width of 1.4. The distance from the left corner to the first window is 1.4, and the distance from the last window to the right corner is 1.4.
- Roof:** A thick black line representing the roof profile, showing a series of rectangular and trapezoidal shapes.

4.4 Layout Reference

(unit: mm)



6 Host Interface Timing Diagram

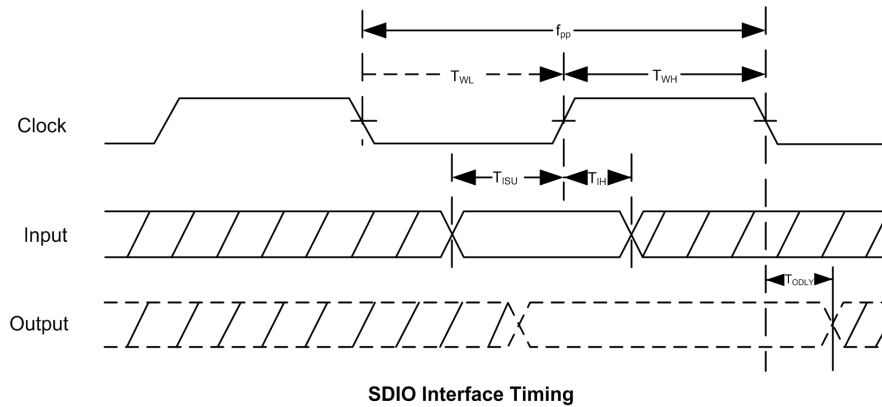
6.1 SDIO Pin Description

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

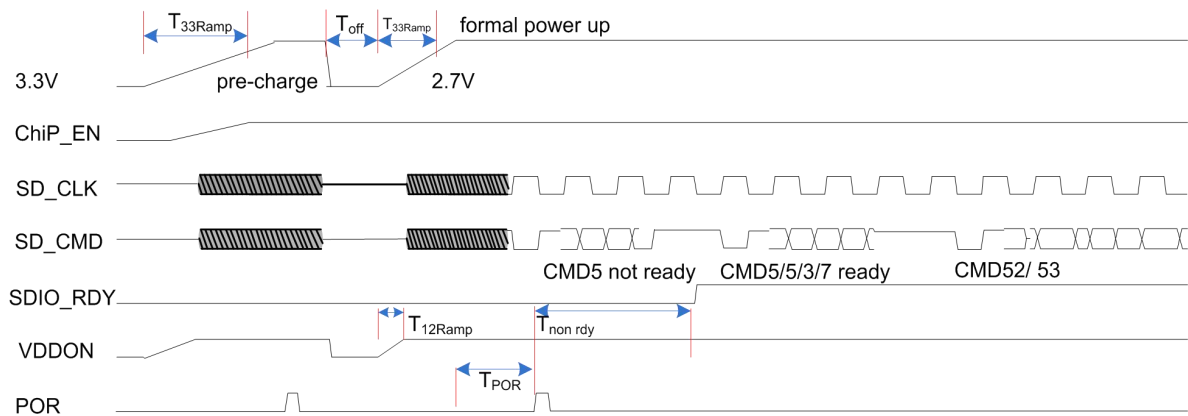
6.2 SDIO Default Mode Timing Diagram



SDIO Interface Timing Parameters

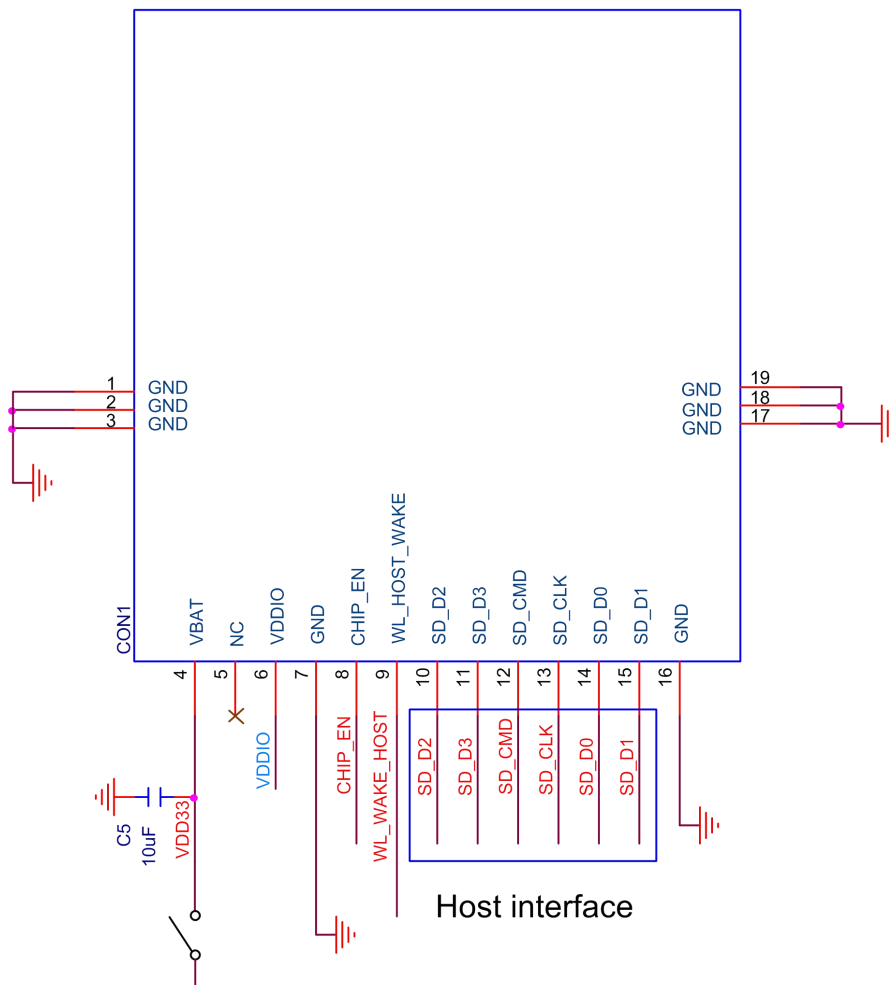
NO	Parameter	Mode	MIN	MAX	Unit
f_{pp}	Clock Frequency	Default	0	25	MHz
		HS	0	50	MHz
T_{WL}	Clock Low Time	DEF	10	-	ns
		HS	7	-	ns
T_{WH}	Clock High Time	DEF	10	-	ns
		HS	7	-	ns
T_{ISU}	Input Setup Time	DEF	5	-	ns
		HS	6	-	ns
T_{IH}	Input Hold Time	DEF	5	-	ns
		HS	2	-	ns
T_{ODLY}	Output Delay Time	DEF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

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

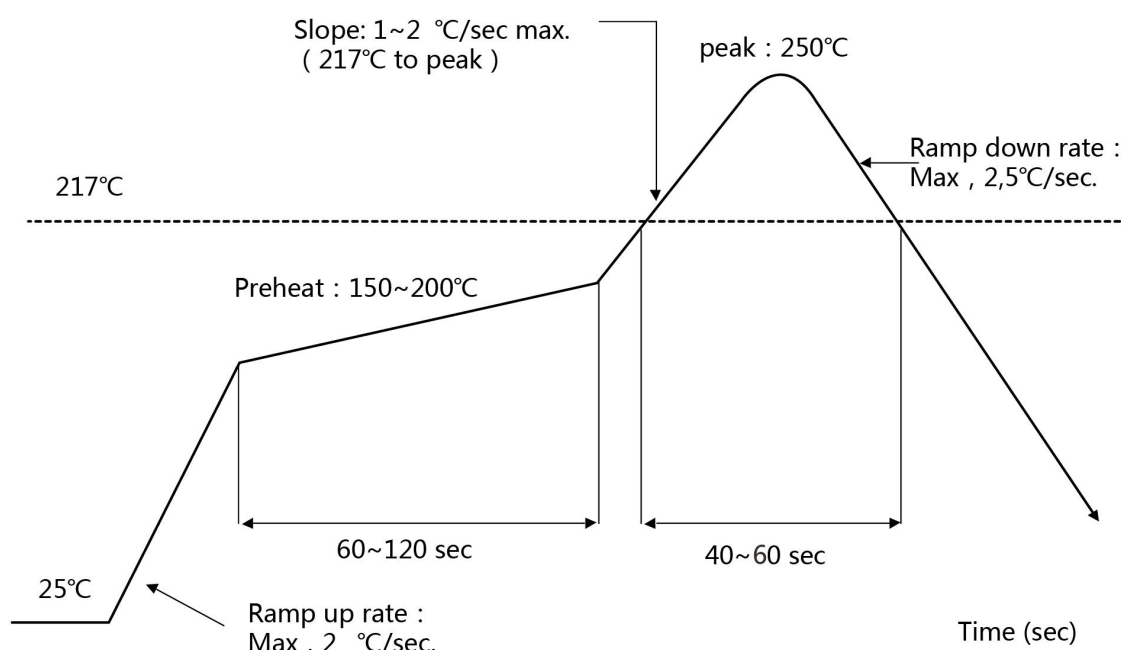
10 Environmental Requirements

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 °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:

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 °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.

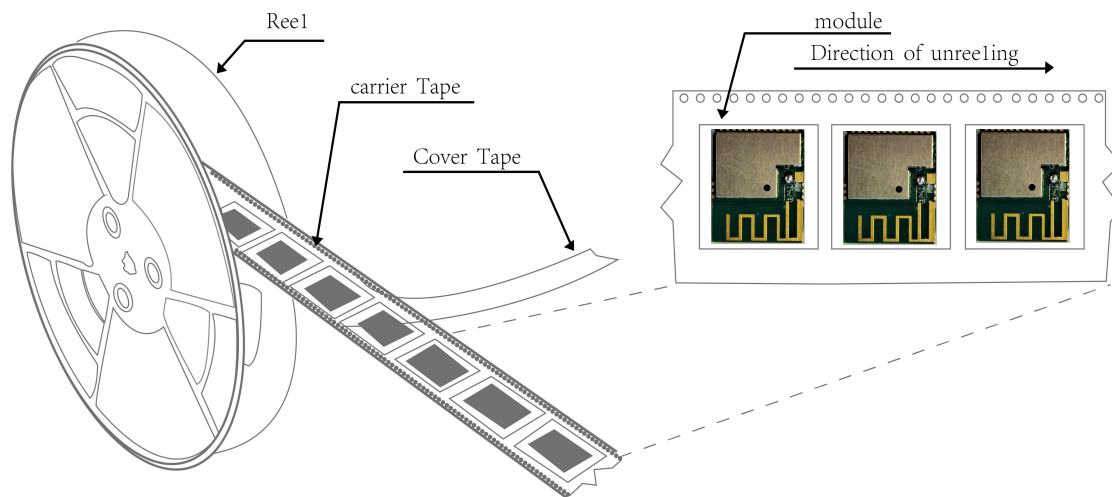
2). The baking temperature: 125 °C, 8 hours.

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

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*20.8mm the cover tape : 25.5mm*30m

Color of plastic disc: blue

A roll of 1000pcs



NY bag size:415mm*450mm



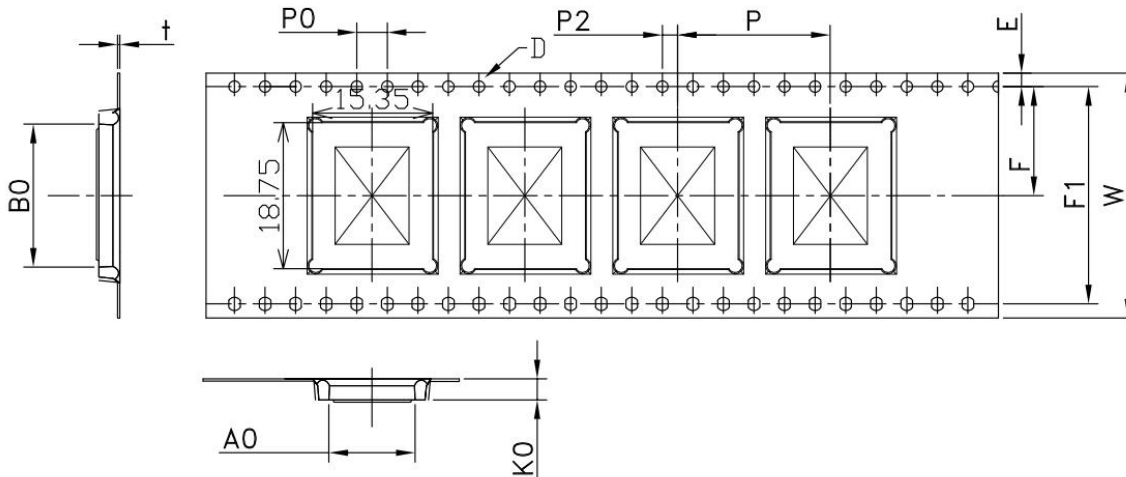
size : 350*350*35mm



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	$\begin{smallmatrix} +0.3 \\ -0.3 \end{smallmatrix}$	± 0.18	± 0.18	$\begin{smallmatrix} +0.1 \\ -0.0 \end{smallmatrix}$	± 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:

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

FCC Statement

FCC standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Integral antenna with antenna gain 2dBi

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device if without further certify for example C2PC with SAR. This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: 2AATL-6189S-SF Or Contains FCC ID: 2AATL-6189S-SF”

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference;
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with modular approval should perform the test of radiated & conducted emission and spurious emission, etc. according to FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 & 15.207 ,15B Class B requirement, then the host can be sold legally.