

# 6189N-SFC

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

**Module Datasheet**



## 6189N-SFC Module Datasheet

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Title  
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Signature  
\_\_\_\_\_  
Date  
\_\_\_\_\_  
Fn-Link

## Revision History

Version	Date	Revision Content	Draft	Approved
1.0	2019/01/10	New version	Lzm	Lxy
1.1	2019/04/10	Update thickness dimension	Lxy	Szs
1.2	2019/08/06	Update packing information	Lxy	Szs
1.3	2019/11/12	Update module photo	Lxy	Szs
1.4	2020/12/22	Added HSmode timing info.	Lxy	Szs

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# 1 Overview

## 1.1 Introduction

6189N-SFC 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.

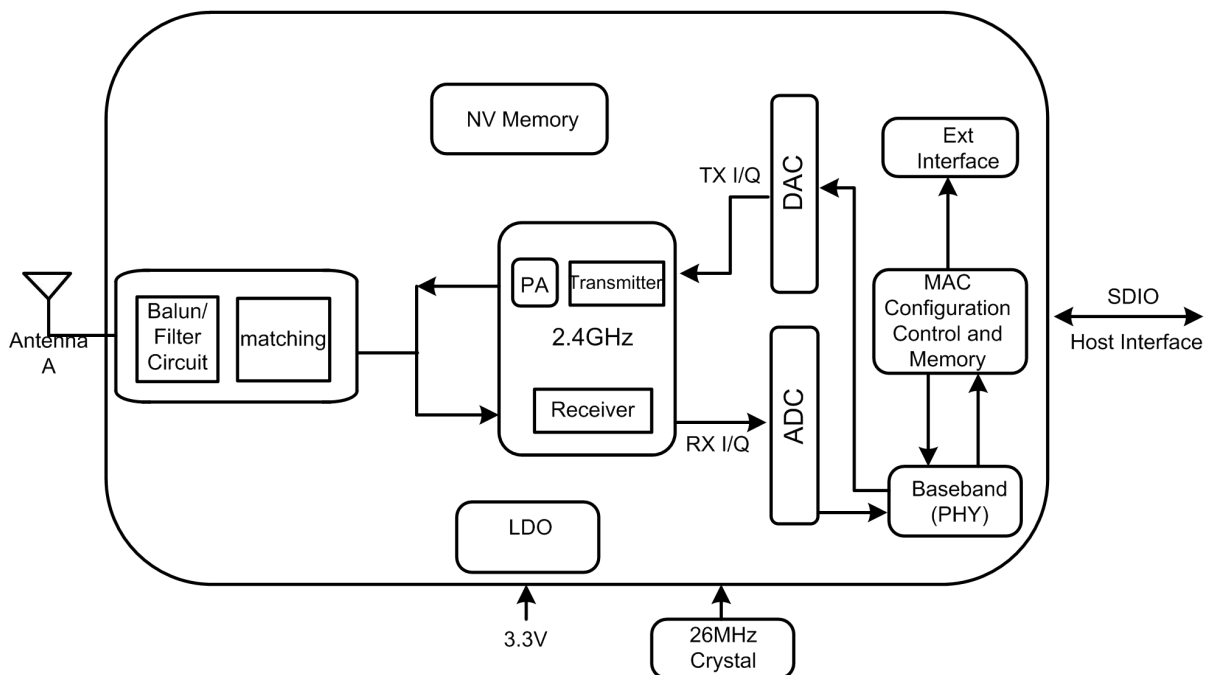
This WLAN Module design is based on Realtek RTL8189FTV-VC-CG. It is a highly integrated single-chip Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent 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	6189N-SFC
Product Description	Support Wi-Fi functionalities
Dimension	L x W x T: 23 x 21 x 4.8 (typical) mm
Wi-Fi Interface	Support SDIO
Operating temperature	0°C to 70°C
Storage temperature	-55°C to +125°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

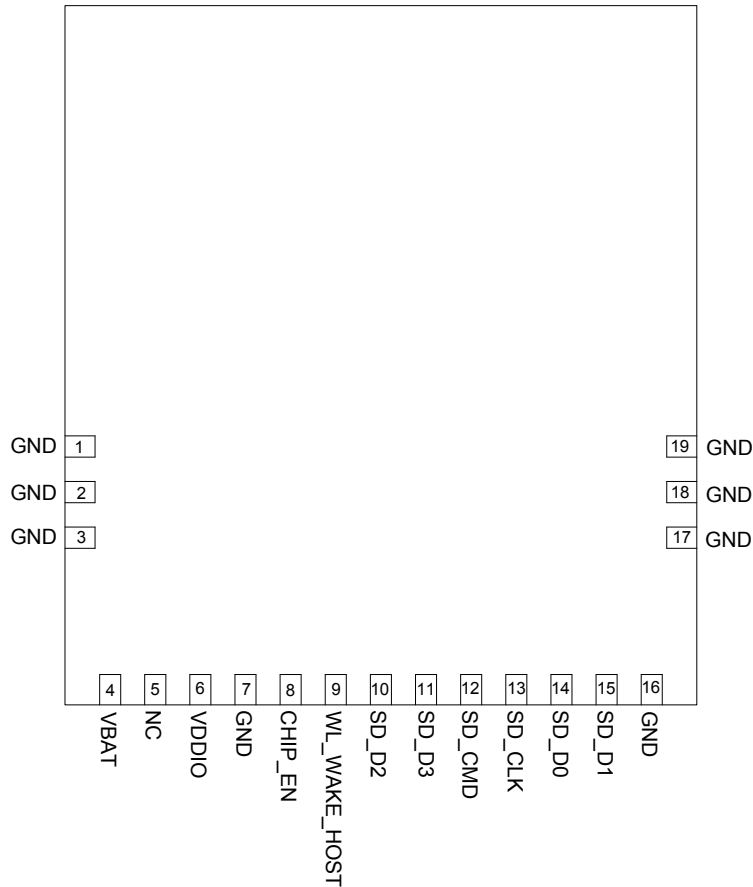
Features	Descriptions
Main Chipset	Realtek RTL8189FTV-VC-CG
Operating Frequency	2.412~2.462GHz
Operating Voltage	3.3Vdc ± 10% I/O supply voltage
Host Interface	SDIO/GSPI
WIFI Standard	Wi-Fi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
Modulation	Wi-Fi: 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 802.11 g/n: OFDM

PHY Data rates	Wi-Fi: 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	Wi-Fi: 802.11b@11Mbps 16±2dBm 802.11g@54Mbps 14±2dBm 802.11n@65Mbps 12±2dBm Other rate power control by power by rate.
EVM	802.11b /11Mbps: EVM $\leq$ -9dB 802.11g /54Mbps: EVM $\leq$ -25dB 802.11n /65Mbps: EVM $\leq$ -28dB
Receiver Sensitivity (HT20)	802.11b@8% PER 11Mbps < -82dBm
	802.11g@10% PER 54Mbps < -71dBm
	802.11n@10% PER MCS 7 < -67dBm
Operating Channel	Wi-Fi 2.4GHz:
Media Access Control	Wi-Fi: CSMA/CA with ACK
Network Architecture	Wi-Fi: Ad-hoc mode (Peer-to-Peer ) Infrastructure mode Software AP Wi-Fi Direct
Security	Wi-Fi: WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit,
Antenna	On Board antenna
OS Supported	Android /Linux/ Win CE /iOS /XP/WIN7
Dimension	Typical L x W x H 23x21x4.8mm

## 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 3.3V	1.8V ~ 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

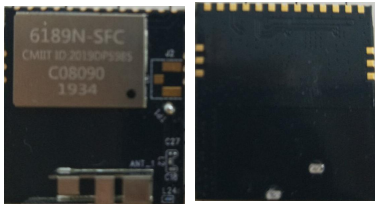
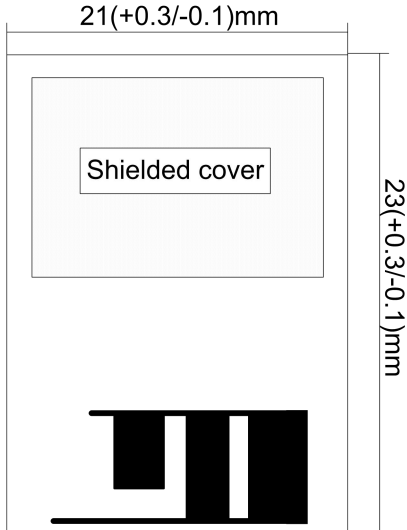
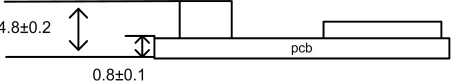


14	SD_D0	I/O	SDIO Data line 0	1.8V ~ 3.3V
15	SD_D1	I/O	SDIO Data line 1	1.8V ~ 3.3V
16	GND		Ground connections	
17	GND		Ground connections	
18	GND		Ground connections	
19	GND		Ground connections	

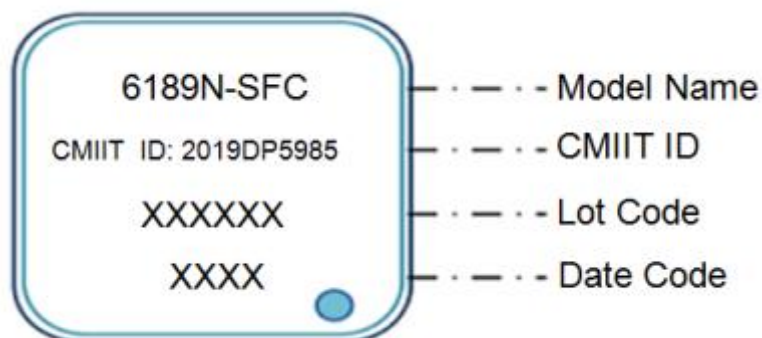
P:POWER I:INPUT O:OUTPUT

## 4 Dimensions

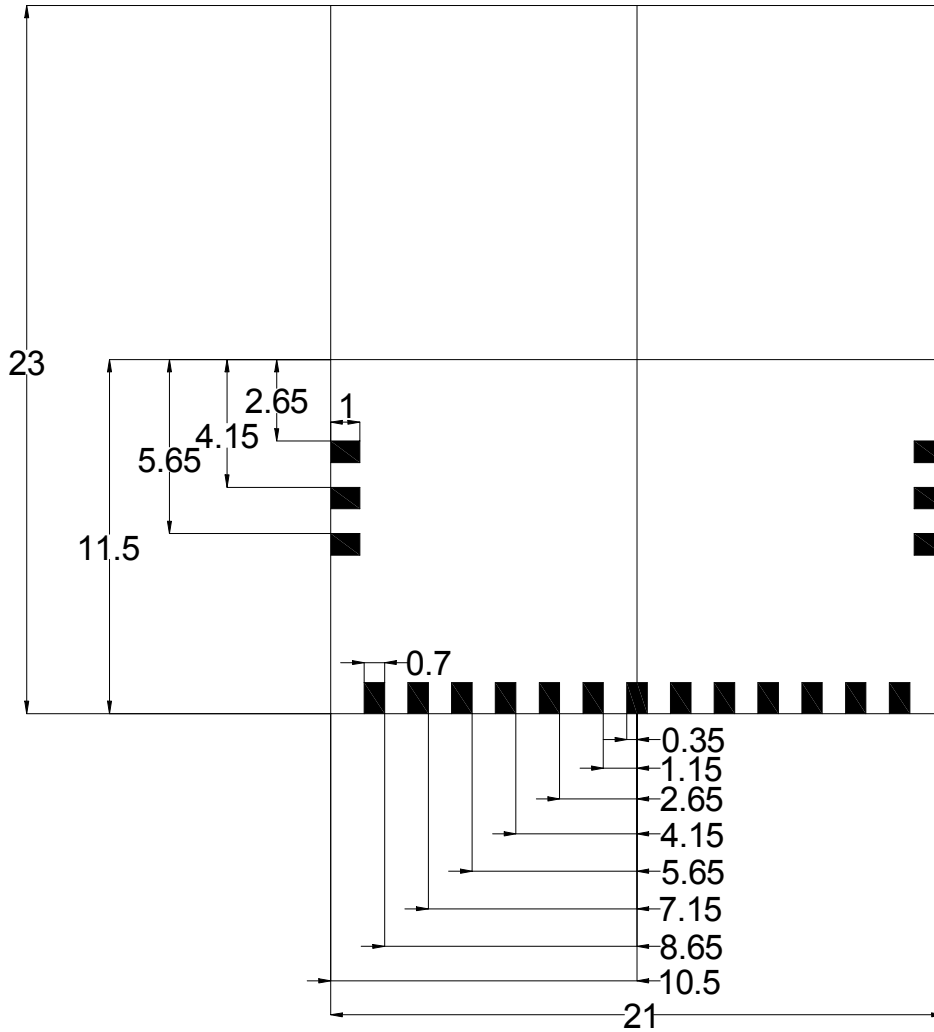
### 4.1 Module Picture

<p>L x W : 23 x 21 (+0.3/-0.1) mm</p> 	
<p>H: 4.8 (±0.2) mm</p>	
<p><b>Weight</b></p>	<p>1.65g</p>

### 4.2 Marking Description

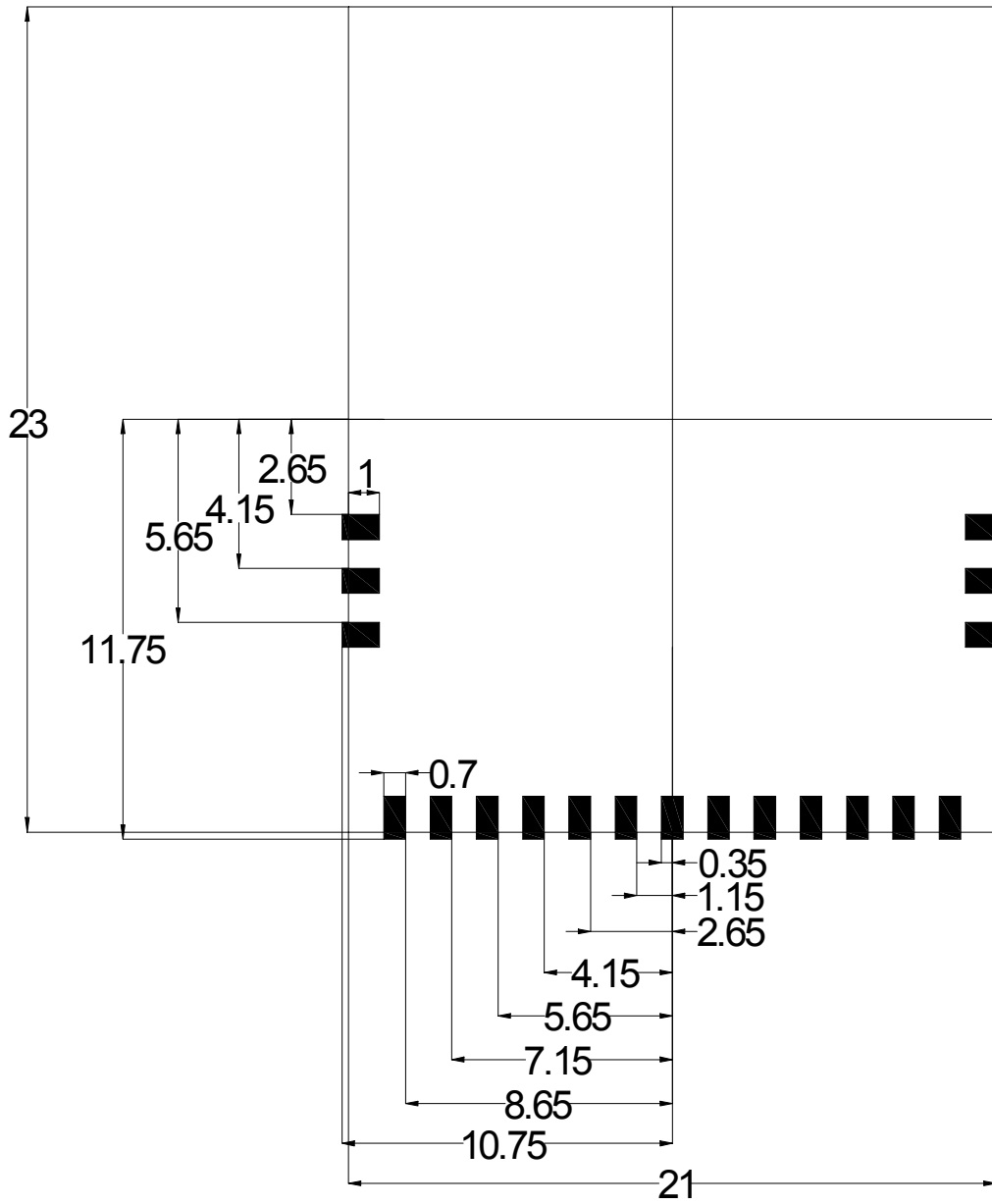


### 4.3 Module Physical Dimensions



## 4.4 Layout Reference

(unit: mm )



## 6 Host Interface Timing Diagram

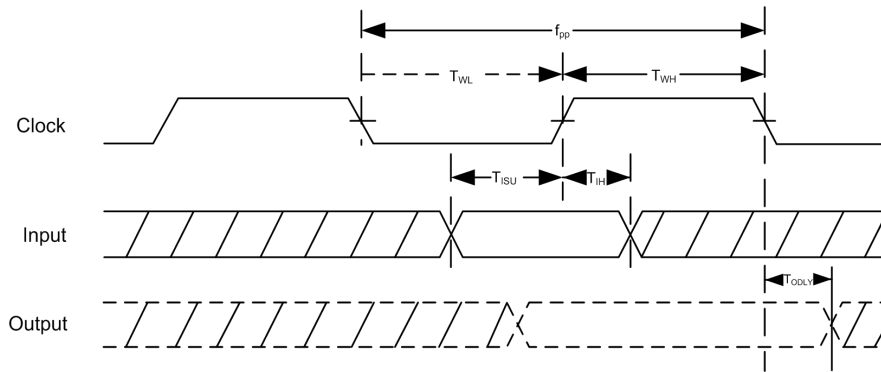
### 6.1 SDIO Pin Description

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). It has the ability to stop the SDIO clock and map the interrupt signal into a GPIO pin. This 'out-of-band' interrupt signal notifies the host when the WLAN device wants to turn on the SDIO interface. The ability to force the control of the gated clocks from within the WLAN chip is also provided.

SDIO Pin Description

<b>SD 4-Bit Mode</b>	
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 DEF/HS Mode Timing Diagram

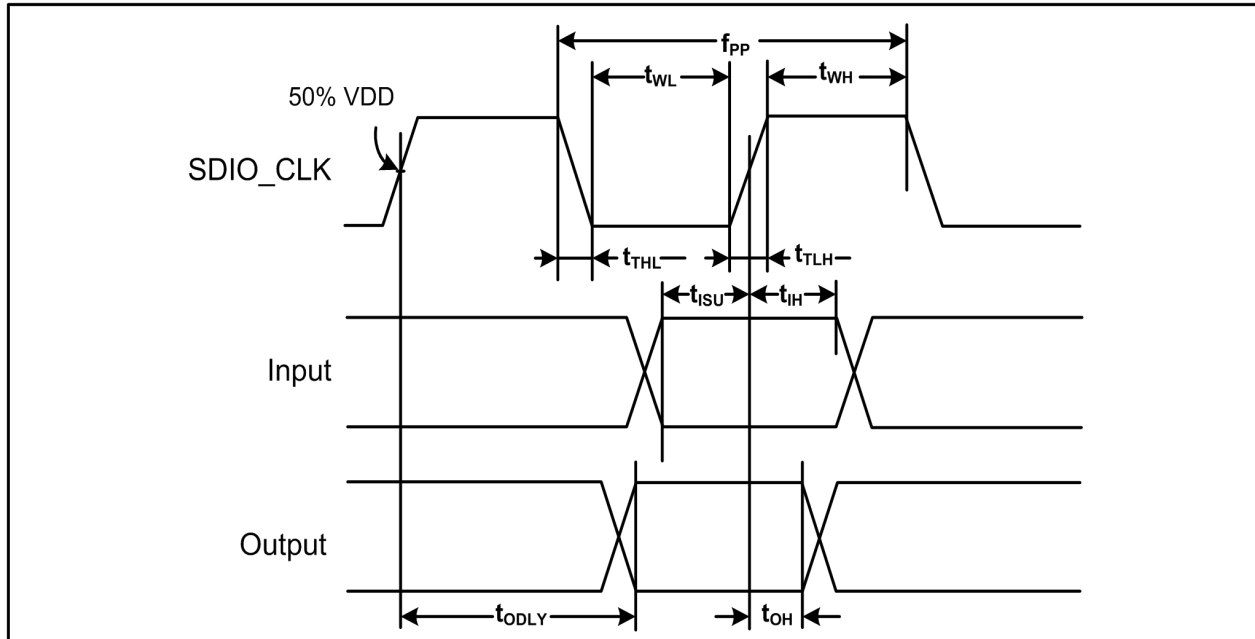


SDIO Interface Timing

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

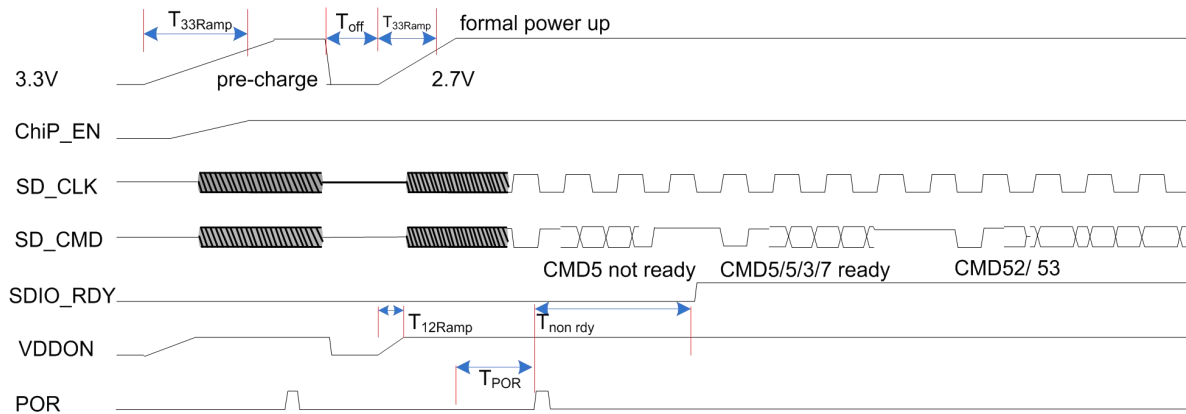
## SDIO High Speed Mode Timing Diagram



Parameter	Symbol	Minimum	Typical	Maximum	Unit
<b>SDIO CLK(all values are referred to minimum VIH and maximum VIL<sup>b</sup>)</b>					
Frequency - Data Transfer mode	fPP	0	-	50	MHz
Frequency - Identification mode	fOD	0	-	400	kHz
Clock low time	tWL	7	-	-	ns
Clock high time	tWH	7	-	-	ns
Clock rise time	tTLH	-	-	3	ns
Clock low time	tTHL	-	-	3	ns
<b>Inputs:CMD, DAT(referenced to CLK)</b>					
Input setup time	tISU	6	-	-	ns
Input hold time	tIH	2	-	-	ns
<b>Outputs:CMD, DAT(referenced to CLK)</b>					
Output delay time - Data Transfer mode	tODLY	-	-	14	ns
Output delay time - Identification mode	tODLY	2.5	-	-	ns
Total system capacitance(each line)	CL	-	-	40	pF

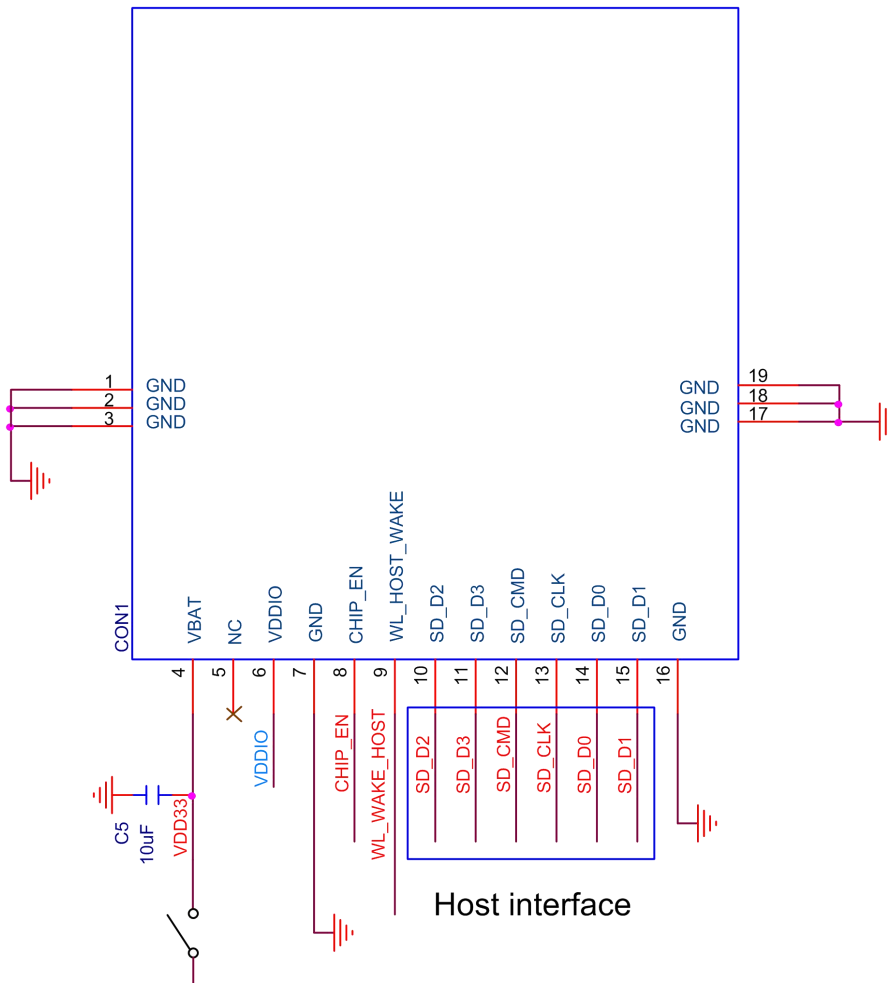
- Timing is based on  $CL \leq 40$  pF load on CMD and Data.
- $\text{Min}(V_{ih}) = 0.7 \times V_{DDIO}$  and  $\text{max}(V_{il}) = 0.2 \times V_{DDIO}$ .

### 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. 天线性能务必在整机安装后进行暗室测试确认。



## 8 Ordering Information

Part No.	Description
FG6189NSFC-00	RTL8189FTV-VC-CG b/g/n, Wi-Fi, 1T1R, 23X21mm, SDIO, PCB V3.0 with antenna

## 9 The Key Material List

Shielding cover	6189N-SFC V1.0 Shielding cover,height=1.4 mm	信太, 精力通
Crystal	26mhz 3225 ±10ppm, 10.5pF	HOSONIC, ECEC
ESD	0402 5.5V 0.1pF	Sunlord,Murata
Chipset	RTL8189FTV-VC-CG	Realtek
PCB	6189N-SFC V3.0 black, 23x21-0.8mm	XY-pcb , Sunlord , KX-pcb

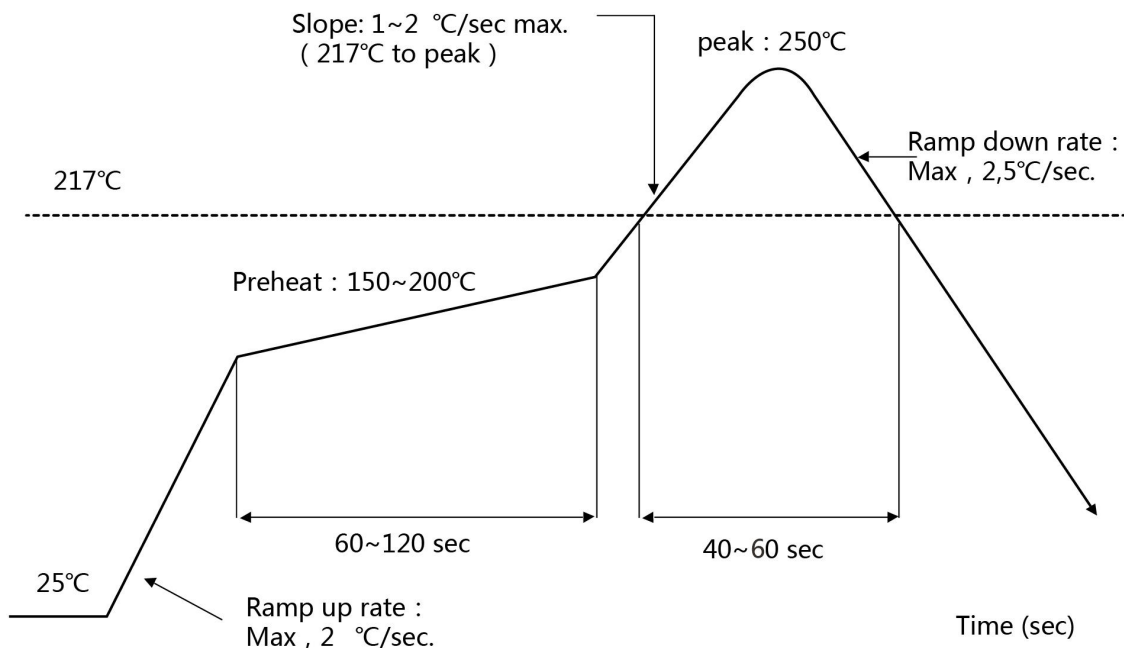
## 10 Environmental Requirements

### 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:  $\cong$  -30 °C,  $\cong$  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.

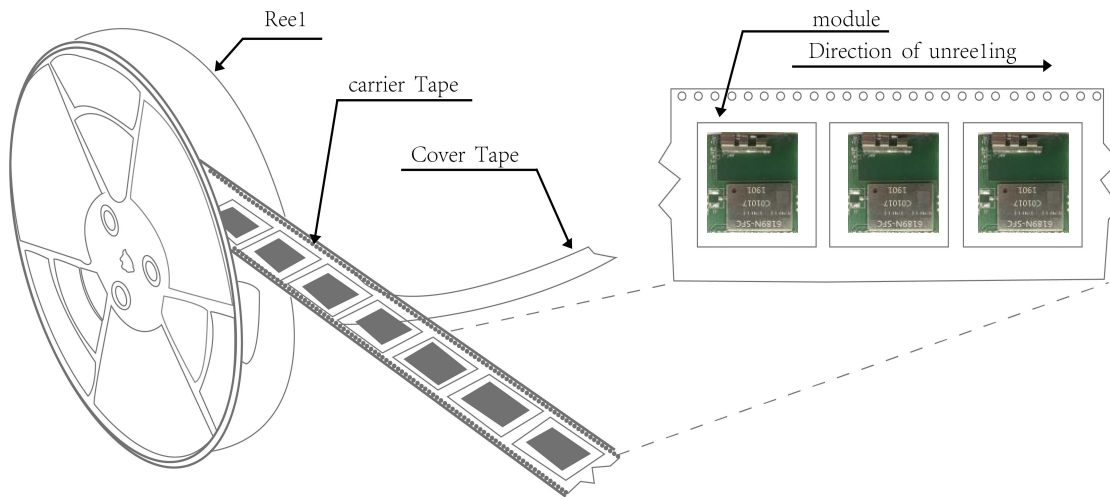
2). The baking temperature: 125 °C, 8 hours.

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

## 11 Package

### 11.1 Reel

A roll of 350pcs



### 11.2 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape:44mm\*12.48m the cover tape :37.5mm\*12.48m

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

## 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. 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-6189N-SFC Or Contains FCC ID: 2AATL-6189N-SFC"

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.

## IC STATEMENT

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes :

- (1) Cet appareil ne doit pas causer d'interférences.
- (2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

### IC 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 .

This modular complies with IC 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. Cette modulaire doit être installé et utilisé à une distance minimum de 20 cm entre le radiateur et le corps de l'utilisateur.

If the IC 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 IC: 24844-6189NSFC”

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

1. This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

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