

6189N-SFC

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

Module Datasheet



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Title

Signature

Date

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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
1.5	2021/05/31	Added planeness description	Lxy	Szs
1.6	2021/06/10	Added antenna area description	Lxy	Lgp

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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.

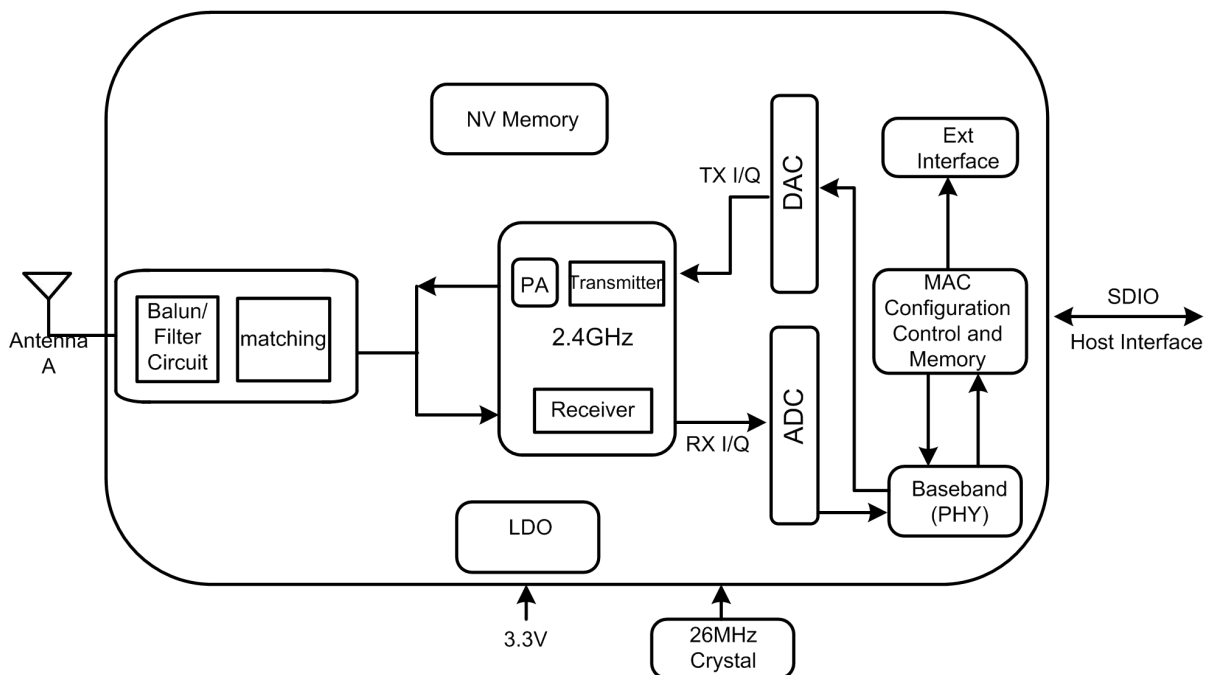
This WLAN Module design is based on Realtek RTL8189FTV-VC-CG. It is a highly integrated single-chip Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent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

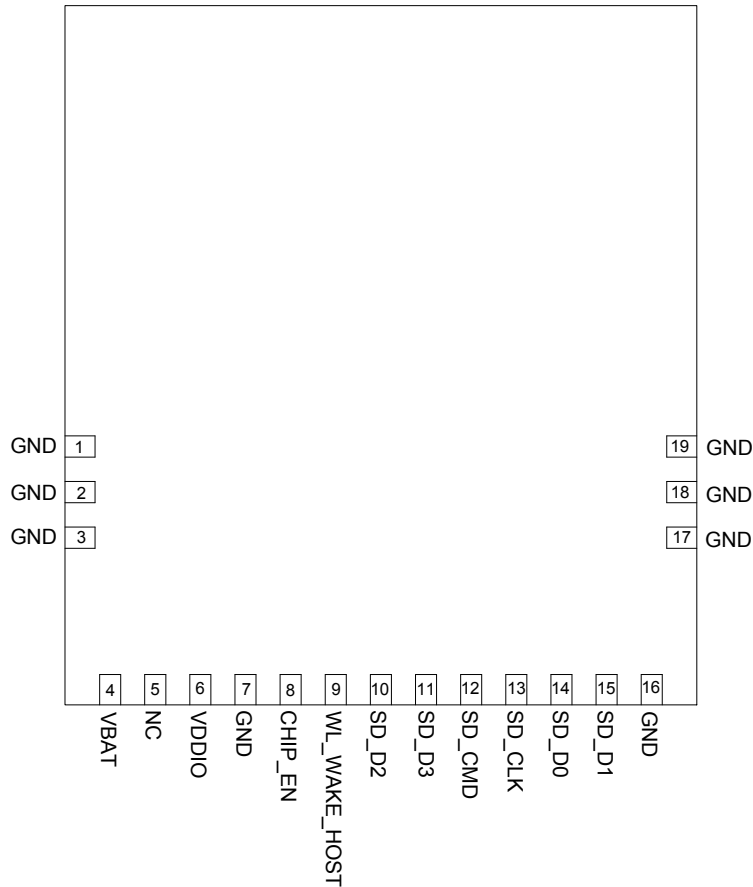
Features	Descriptions
Main Chipset	Realtek RTL8189FTV-VC-CG
Operating Frequency	2.400~2.4835GHz
Operating Voltage	3.3Vdc ± 10% I/O supply voltage
Host Interface	SDIO/GSPI
WIFI Standard	Wi-Fi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
Modulation	Wi-Fi: 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 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 13±2dBm Other rate power control by power by rate.
EVM	802.11b /11Mbps: EVM ≦ -9dB 802.11g /54Mbps: EVM ≦ -25dB 802.11n /65Mbps: EVM ≦ -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: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
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

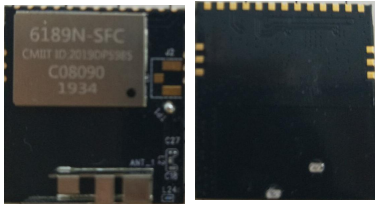
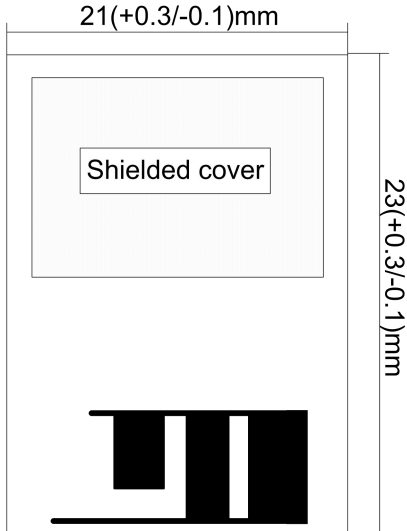

NO.	Name	Type	Description	Voltage
1	GND		Ground connections	
2	GND		Ground connections	
3	GND		Ground connections	
4	VBAT	P	Supply 3.3V	3.3V
5	NC		Floating (Don't connected to ground)	
6	VDDIO	P	I/O Voltage supply input 1.8V to 3.3V	1.8V ~ 3.3V
7	GND		Ground connections	
8	CHIP_EN	I	Wi-Fi enable pin,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

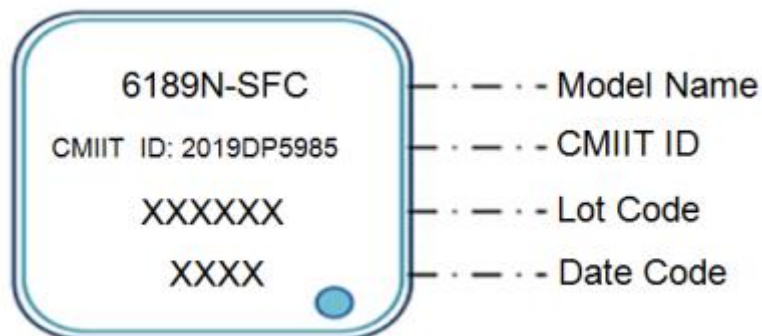
P:POWER I:INPUT O:OUTPUT

4 Dimensions

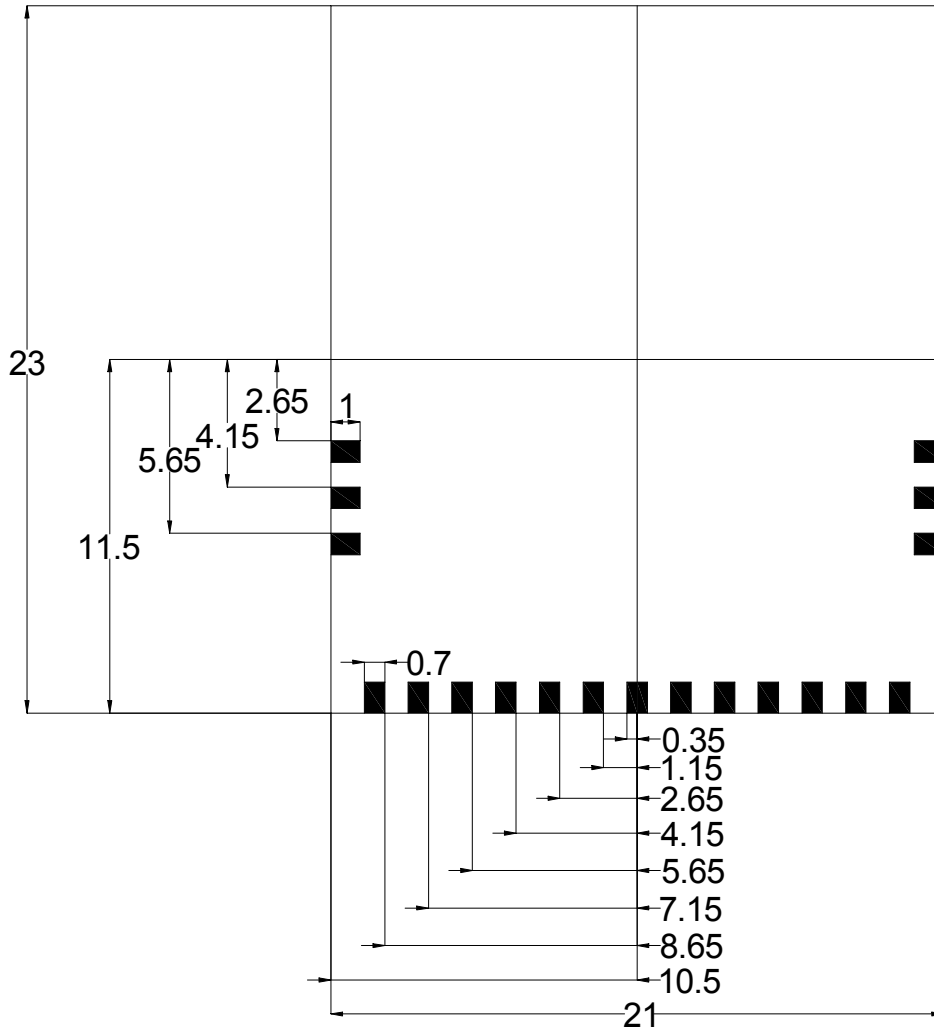
4.1 Module Picture

<p>L x W : 23 x 21 (+0.3/-0.1) mm</p> 	
<p>H: 4.8 (±0.2) mm</p>	
<p>planeness</p>	<p>≤0.5% (对角)</p>
<p>Weight</p>	<p>1.65g</p>

4.2 Marking Description

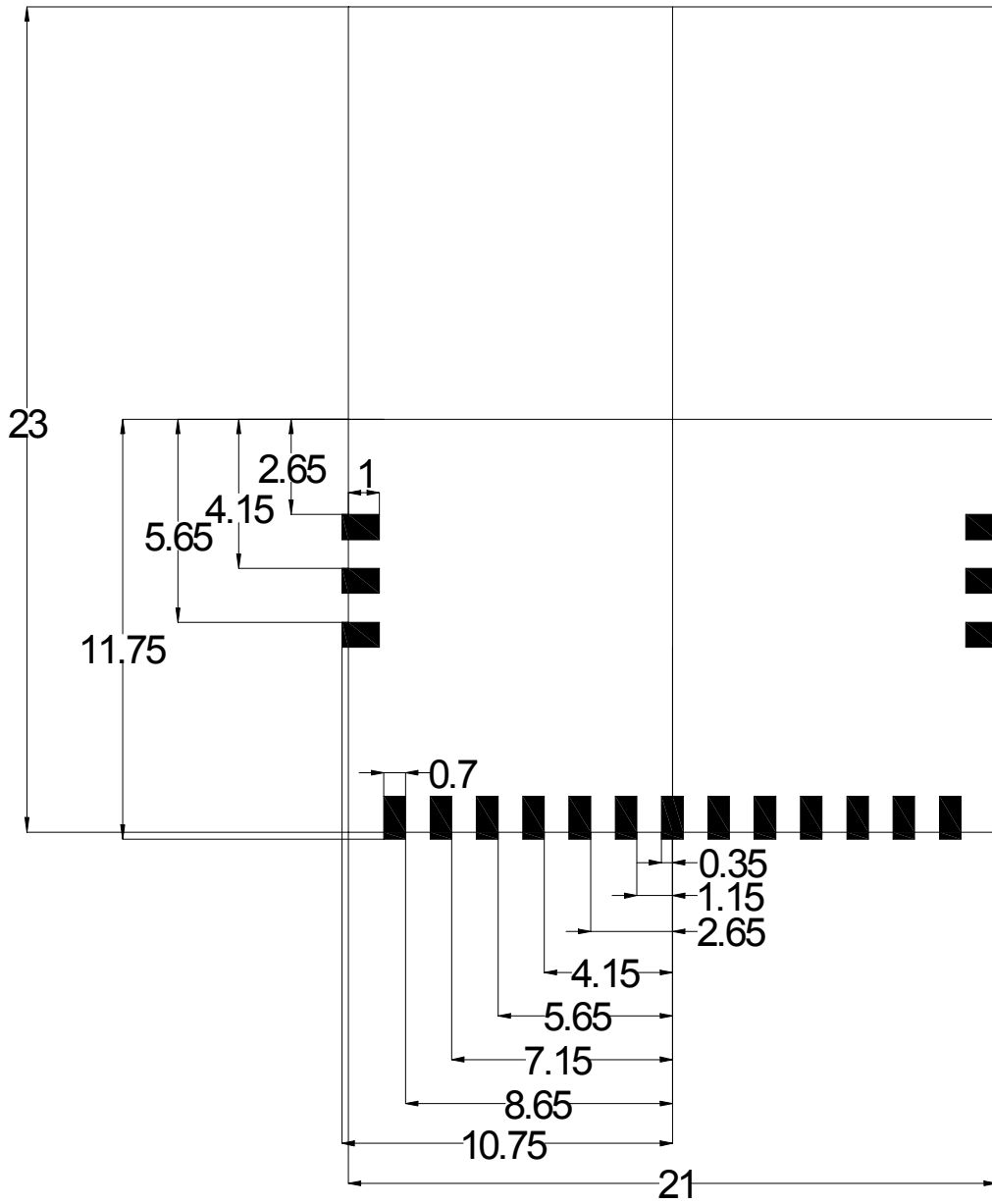


4.3 Module Physical Dimensions



4.4 Layout Reference

(unit: mm)



6 Host Interface Timing Diagram

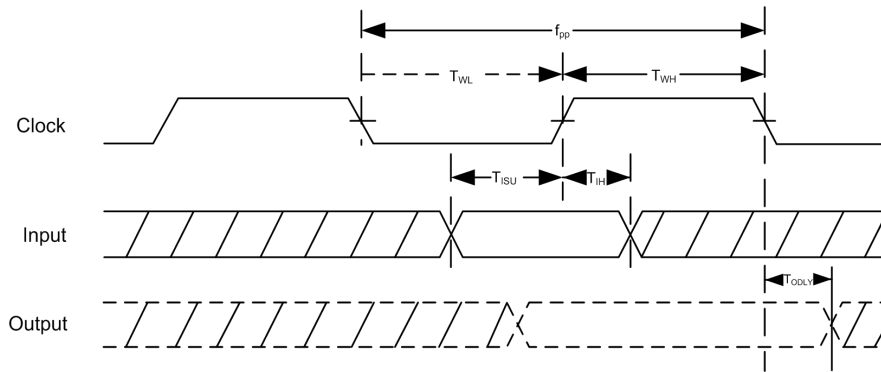
6.1 SDIO Pin Description

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

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 DEF/HS Mode Timing Diagram

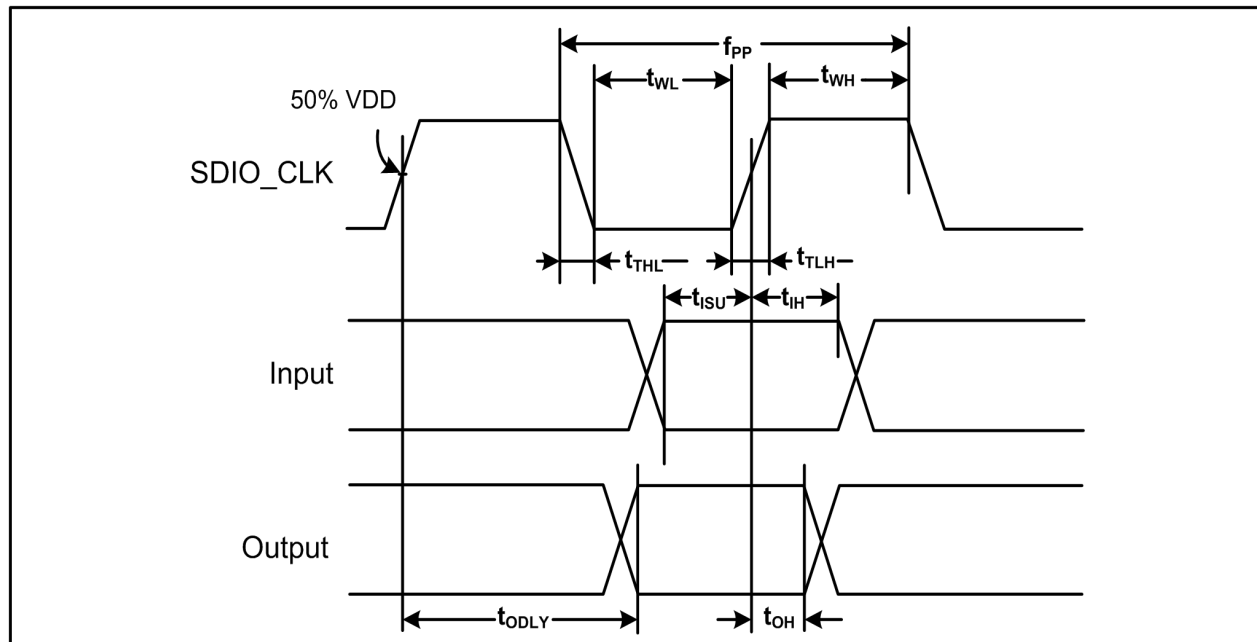


SDIO Interface Timing

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

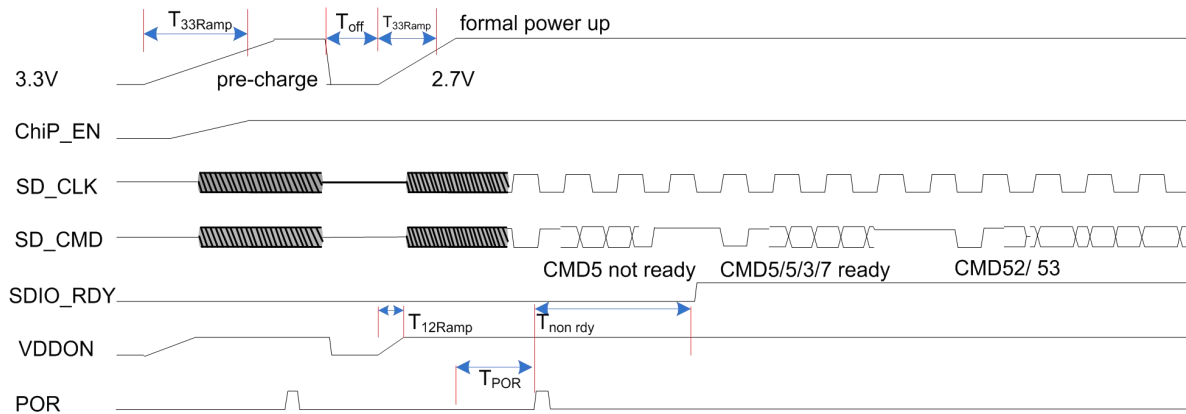
SDIO High Speed Mode Timing Diagram



Parameter	Symbol	Minimum	Typical	Maximum	Unit
SDIO CLK(all values are referred to minimum VIH and maximum VIL^b)					
Frequency - Data Transfer mode	f _{PP}	0	-	50	MHz
Frequency - Identification mode	f _{OD}	0	-	400	kHz
Clock low time	t _{WL}	7	-	-	ns
Clock high time	t _{WH}	7	-	-	ns
Clock rise time	t _{TLH}	-	-	3	ns
Clock low time	t _{THL}	-	-	3	ns
Inputs:CMD, DAT(referenced to CLK)					
Input setup time	t _{ISU}	6	-	-	ns
Input hold time	t _{IH}	2	-	-	ns
Outputs:CMD, DAT(referenced to CLK)					
Output delay time - Data Transfer mode	t _{ODLY}	-	-	14	ns
Output delay time - Identification mode	t _{ODLY}	2.5	-	-	ns
Total system capacitance(each line)	CL	-	-	40	pF

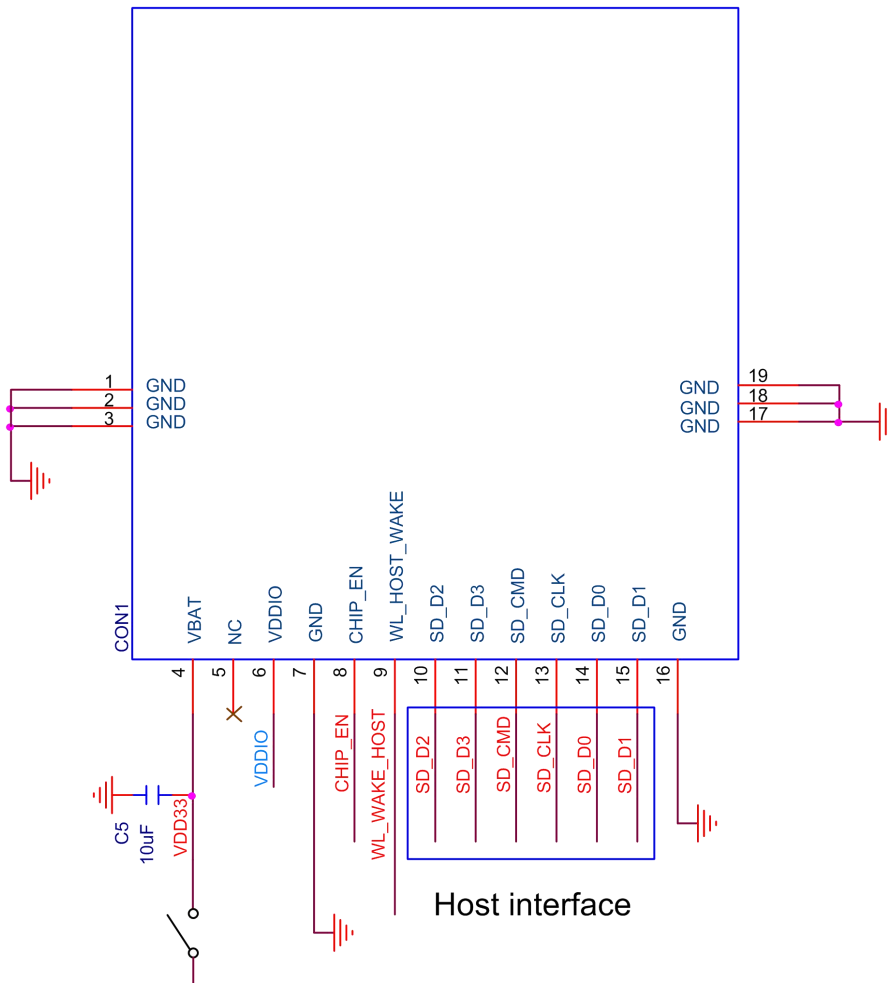
- Timing is based on $CL \leq 40$ pF load on CMD and Data.
- $\text{Min}(V_{ih}) = 0.7 \times V_{DDIO}$ and $\text{max}(V_{il}) = 0.2 \times V_{DDIO}$.

6.3 SDIO Power-on sequence



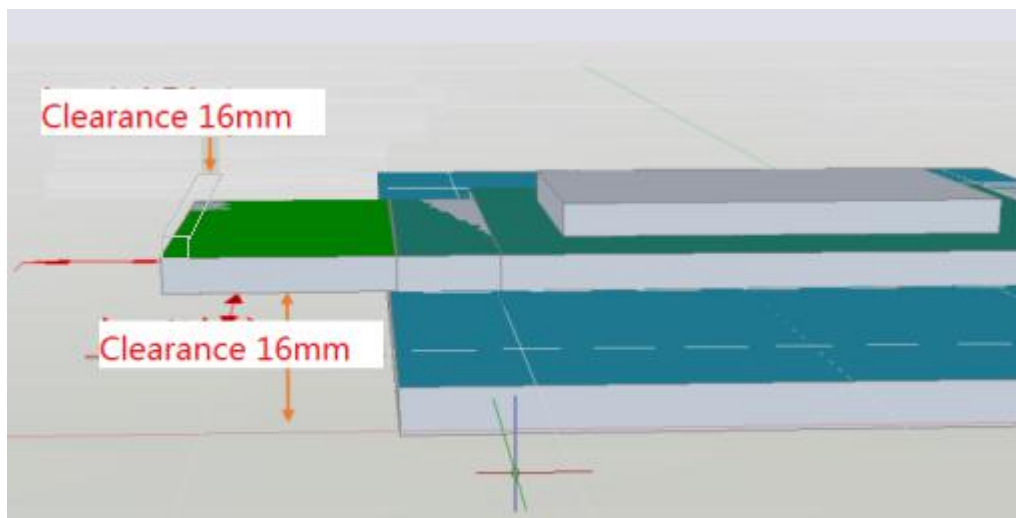
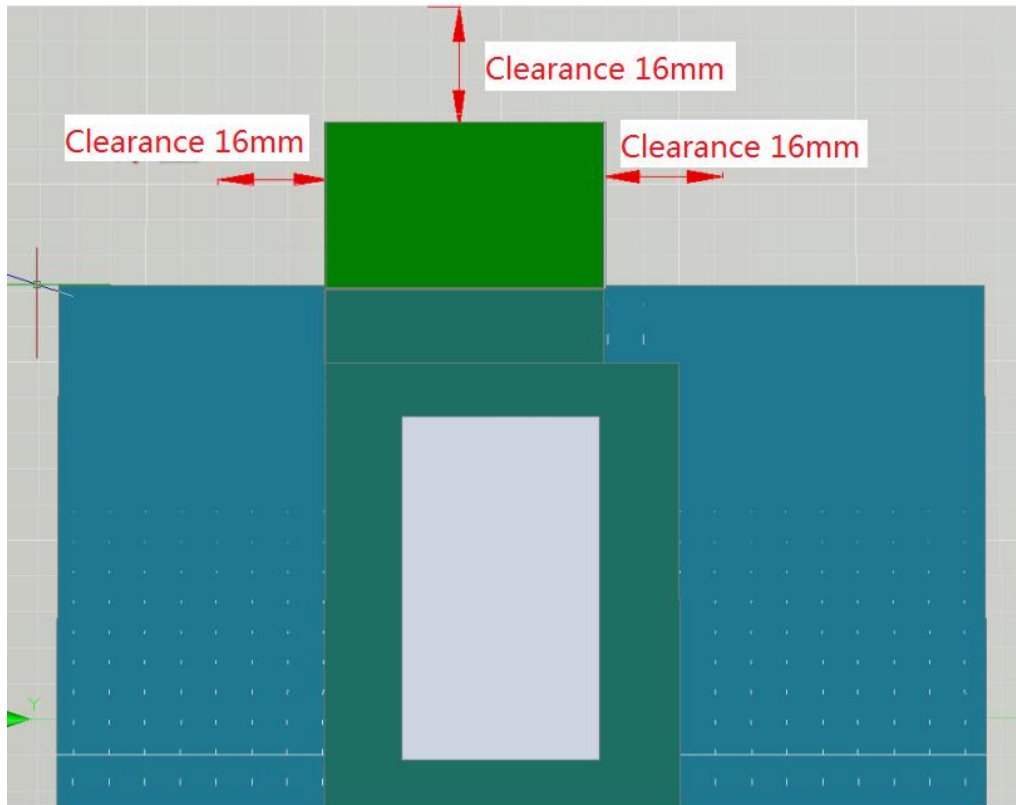
Symbol	Min	Typical	Max	Unit
T_{33ramp}	0.2	-	No Limit	ms
T_{off}	250	500	1000	ms
T_{33ramp}	0.2	0.5	2.5	ms
T_{12ramp}	0.1	0.5	1.5	ms
T_{POR}	2	2	8	ms
T_{non_rdy}	1	2	10	ms

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. Keep clearance as below shown.
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	suntech, Jlitong
Crystal	26mhz 3225 ±10ppm, 10.5pF	HOSONIC,ECEC,TKD,JWT
ESD	0402 5.5V 0.1pF	Sunlord,Murata,Wayon
Chipset	RTL8189FTV-VC-CG	Realtek
PCB	6189N-SFC V3.0 black, 23x21-0.8mm	XY-pcb,Sunlord,KX-pcb,SL-PCB

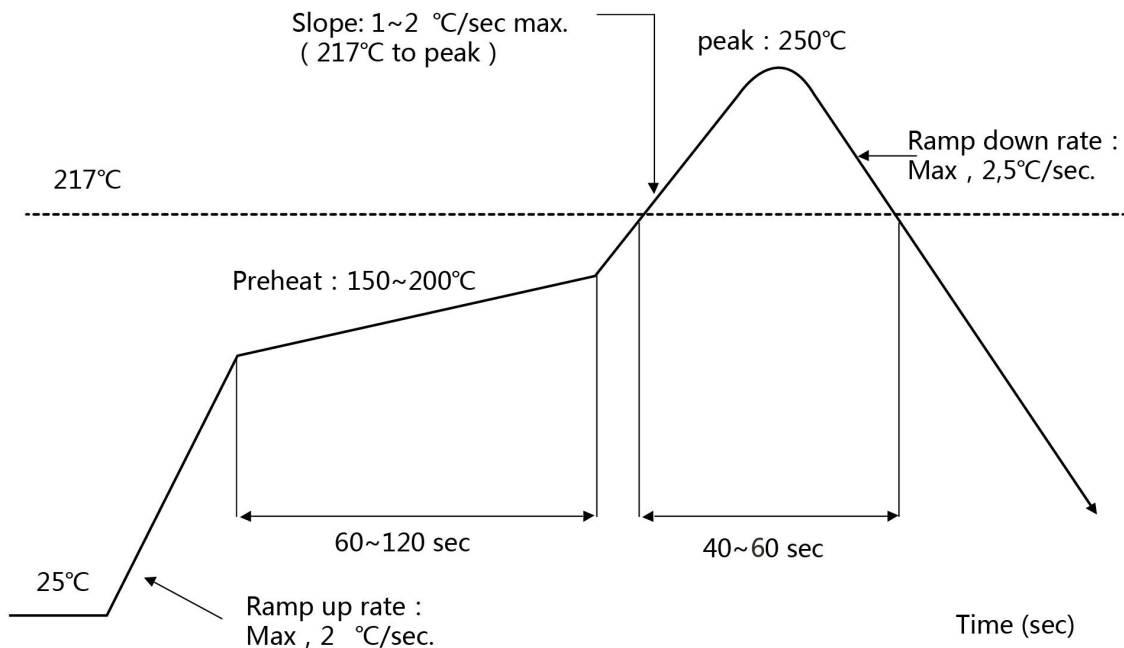
10 Environmental Requirements

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: ≤ -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.

10.3 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

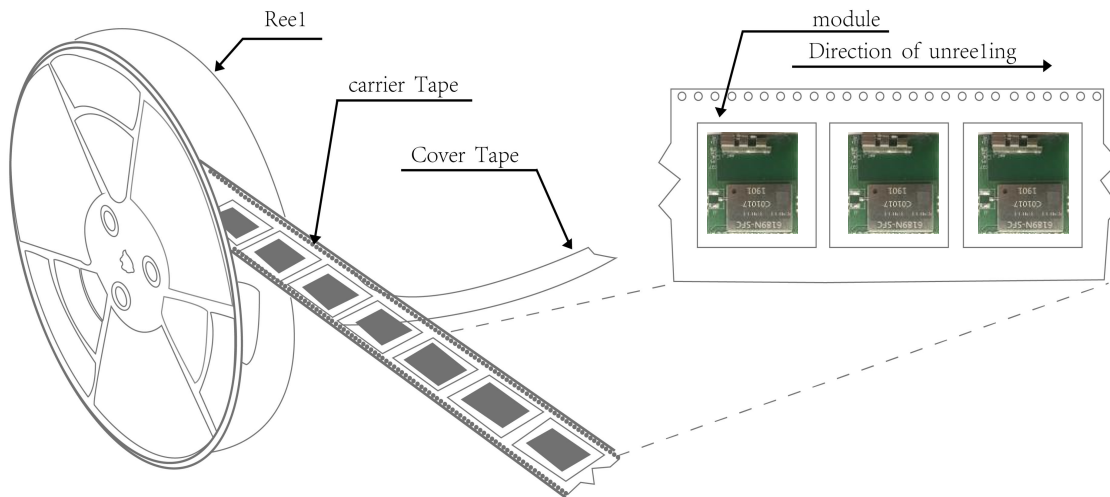
d) Baking is required if conditions b) or c) are not respected

e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more

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