6189M-SEM

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

SDIO Module Datasheet

Version: V1.1

Customer: _____

Customer P/N:_____

Signature:_____

Date:_____

Office: 14th floor, Block B, phoenix zhigu, Xixiang Street, Baoan District, Shenzhen

Factory: NO.8, Litong RD., Liuyang Economic & Technical Development Zone, Changsha, CHINA

TEL:+86-755-2955-8186 Website:www.fn-link.com

6189M-SEM Module Datasheet

	Part NO.	Description
Ordering Information	FG6189MSEM-V0	RTL8189EM-VI-CG,b/g/n,Wi-Fi,1T1R,12.5X14mm,SDIO3.0,邮票孔

Target power:

2.4G：17/14/13

Revision History

Version	Date	Contents of Revision Change	Preparde	Checked	Approved
V1.0	2023/01/09	Initial Release	LXY	LXY	QJP
V1.1	2023/03/13	Update TX spec.	FC	LXY	QJP

CONTENTS

1 Overview

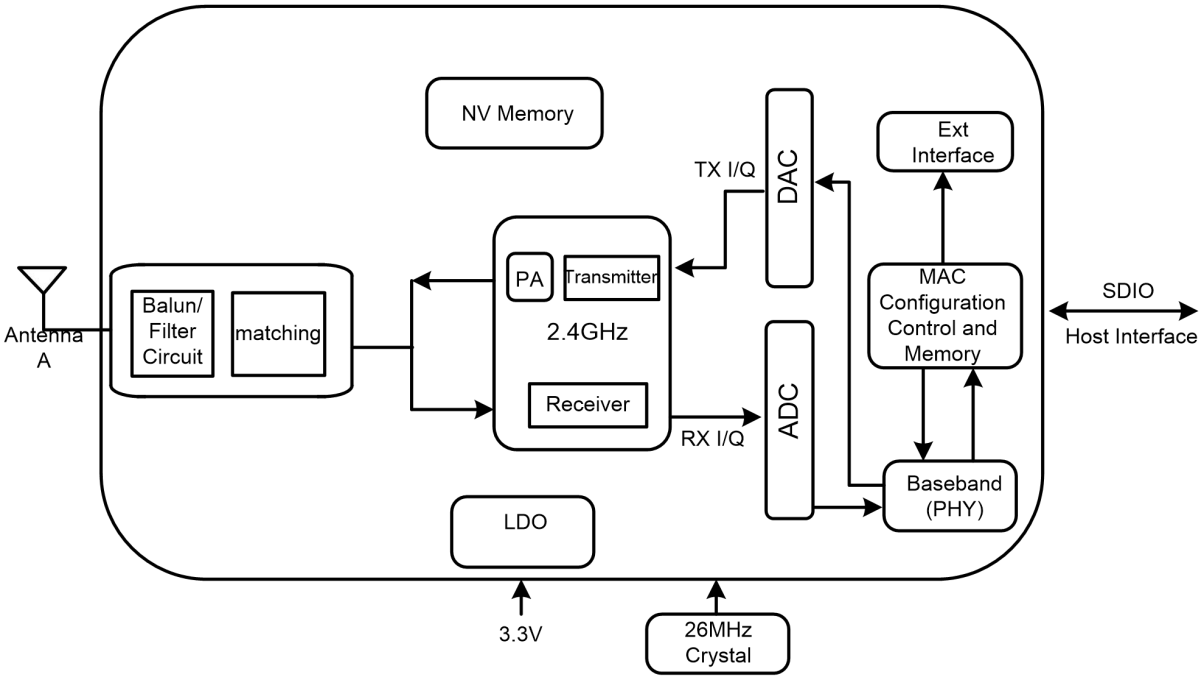
1.1 Introduction

6189M-SEM is a highly integrated single-chip 802.11n WLAN network SDIO interface (SDIO 1.1/ 2.0/ 3.0 compliant) module. WLAN baseband implements OFDM with 1T1R path and is compatible with the IEEE 802.11n specification.support 20M/40MHZ bandwidth.provide higher data rates of 54Mbps and 150Mbps for IEEE 802.11g and 802.11n OFDM respectively.

1.2 Features

- Operate at ISM frequency bands (2.4GHz)
- Support 20/40MHz Bandwidth, IEEE 802.11b/g/n
- Complies with SDIO 1.1/ 2.0/ 3.0 for WLAN with clock rate up to 80MHz
- 150Mbps PHY rate using 40MHz bandwidth
- IEEE 802.11e,i

Block Diagram:



1.3 General Specification

Model Name	6189M-SEM

Product Description	Support Wi-Fi functionalities
Dimension	L x W x T: 14 x 12.5 x 2.2 mm (typical)
Wi-Fi Interface	Support SDIO
Operating temperature	-30°C to 85°C
Storage temperature	-40°C to +85°C

1.4 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-30	25	85	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	8179

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 ~ 2.4835 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	Meet IEEE802.11 SPEC.	
Freq. Tolerance	±20ppm	
Output Power[1]	802.11b /11M: 17 dBm ± 2 dB @ EVM ≤ -9dB	
	802.11g /54M: 14 dBm ± 2 dB @ EVM ≤ -25dB	
	802.11n /MCS7: 13 dBm ± 2 dB @ EVM ≤ -28dB	
Test Items	**Typical Value**	**Standard Value**
Receive Sensitivity (11b) @8% PER	- 1Mbps PER @ -94 dBm	≤-83
	- 11Mbps PER @ -85 dBm	≤-76

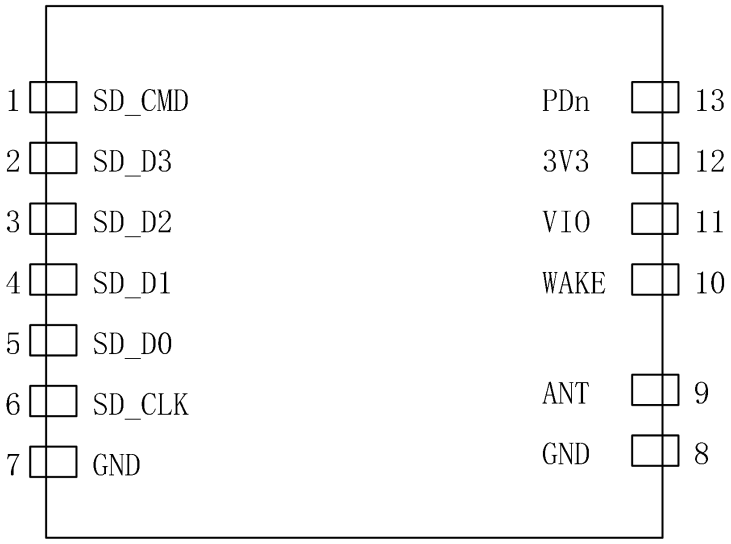
Receive Sensitivity (11g) @10% PER	- 6Mbps	PER @ -90 dBm	≤-85
	- 54Mbps	PER @ -71 dBm	≤-68
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0	PER @ -89 dBm	≤-85
	- MCS=7	PER @ -69 dBm	≤-67
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0	PER @ -87 dBm	≤-82
	- MCS=7	PER @ -66 dBm	≤-64

Note:1. 11M ,11n MCS7 mode power is calibrated, and other rate control by firmware dirver.

3 Pin Assignments

3.1 Pin Outline

<TOP>



3.2 Pin Definition

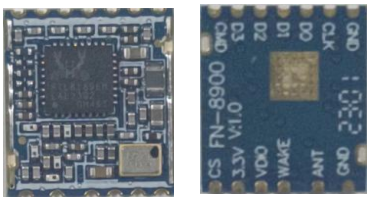
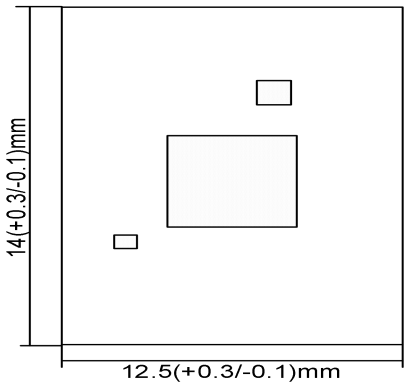
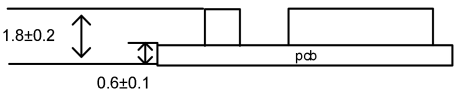
NO.	Name	Type	Description	Voltage
1	SD CMD	I/O	SDIO CMD	

2	SD D3	I/O	SDIO D3	
3	SD D2	I/O	SDIO D2	
4	SD D1	I/O	SDIO D1	
5	SD D0	I/O	SDIO D0	
6	SD CLK	I/O	SDIO CLOCK	
7	GND	-	Ground connections	
8	GND	-	Ground connections	
9	ANT	I/O	RF PORT	
10	WAKE	I/O	WLAN WAKE HOST	VIO
11	VIO	P	Supply 1.8V/3.3V	1.8/3.3V
12	3V3	P	Supply 3.3V	3.3V
13	PDn	I/O	Internal pull high,external pull low shutdown module	VIO

P:POWER I:INPUT O:OUTPUT

4 Dimensions

4.1 Module Picture

<table>
<tr><td>L x W: 14x 12.5(+0.3/-0.1) mm
  </td><td> 
</td></tr>
<tr><td>H: 1.8 (±0.2) mm</td><td> 
</td></tr>
<tr><td>Weight</td><td>0.5 g</td></tr>
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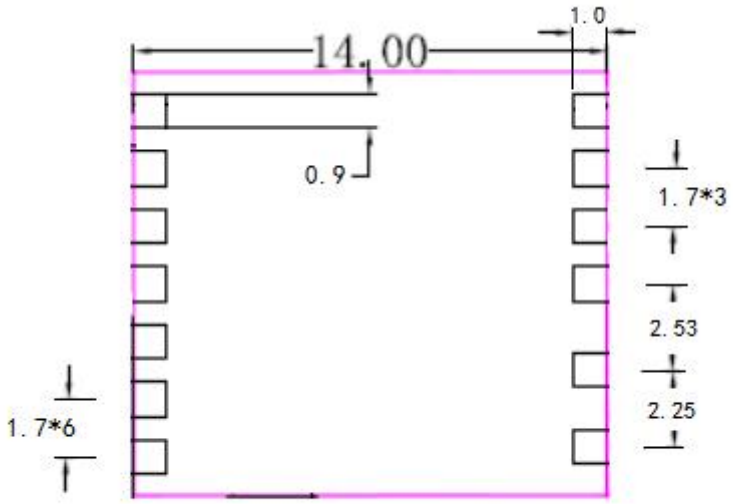
4.2 Marking Description

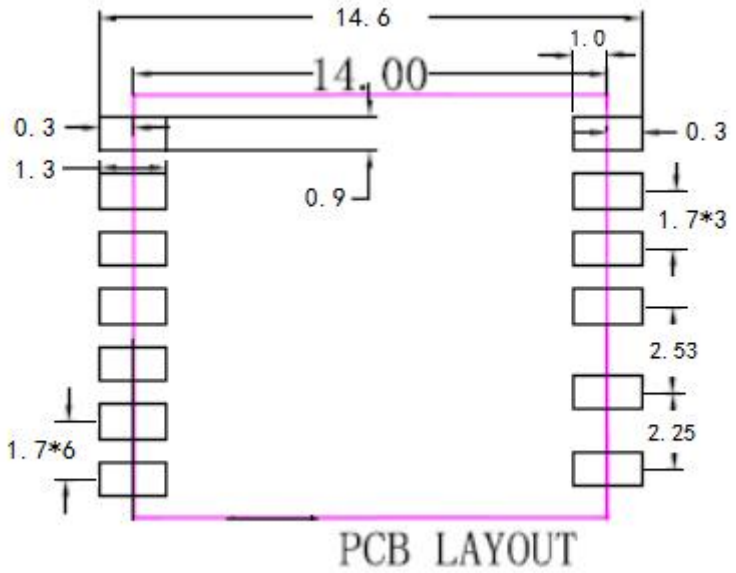
NA

4.3 Module Physical Dimensions



4.4 Layout Reference

(unit: mm)



5 Host Interface Timing Diagram

5.1 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).

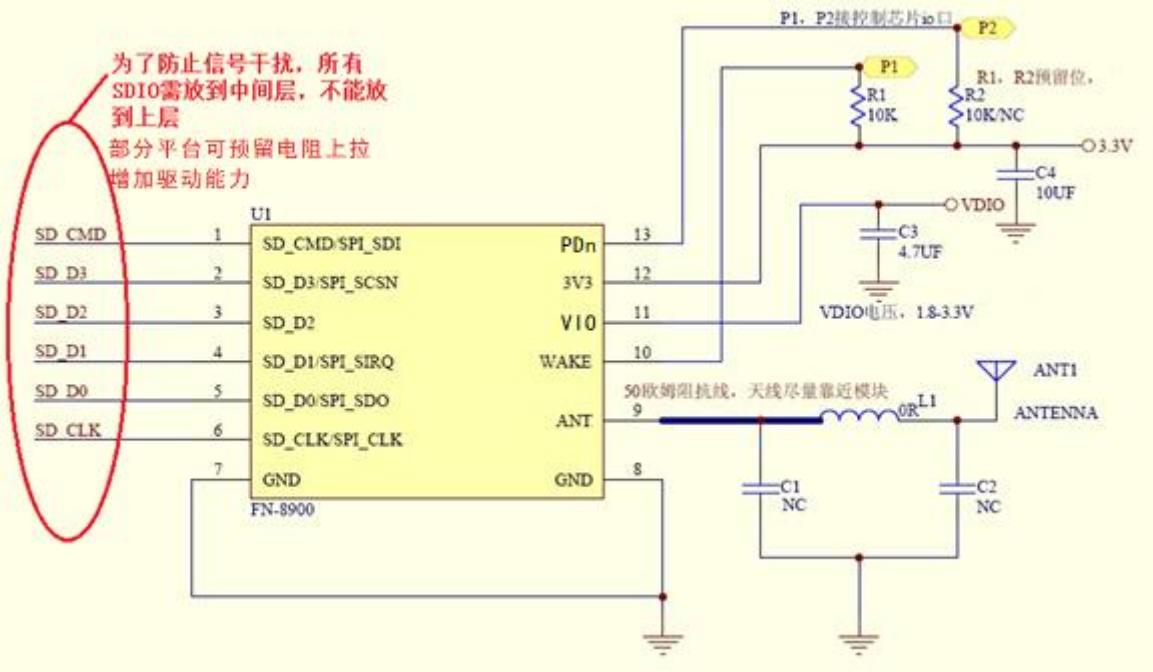
SDIO Pin Description

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

5.2 SDIO Timing Diagram

For timing criteria, please check specification in “SD specification Part1 Physical Layer Specification Version 3.01”

6 Reference Design



Note:

1.WAKE 唤醒功能如设置为低电平唤醒，推荐外部 10K 上拉；

7 The Key Material List

Crystal	3225,40Mhz,±10ppm,15pF	ECEC,HOSONIC,TKD,JWT
Chipset	RTL8189EM-VI-CG	Realtek
Inductor	0805, 4.7uH,±20%,800mA	Sunlord,INPAQ,Chilisin,ceaiya ,Microgate
PCB	FN-8900-V1.0,Blue,4L,FR4,TG150,AU,14X12.5X0.6mm	XY-PCB,KX-PCB,Sunlord,SL-PCB,Truly

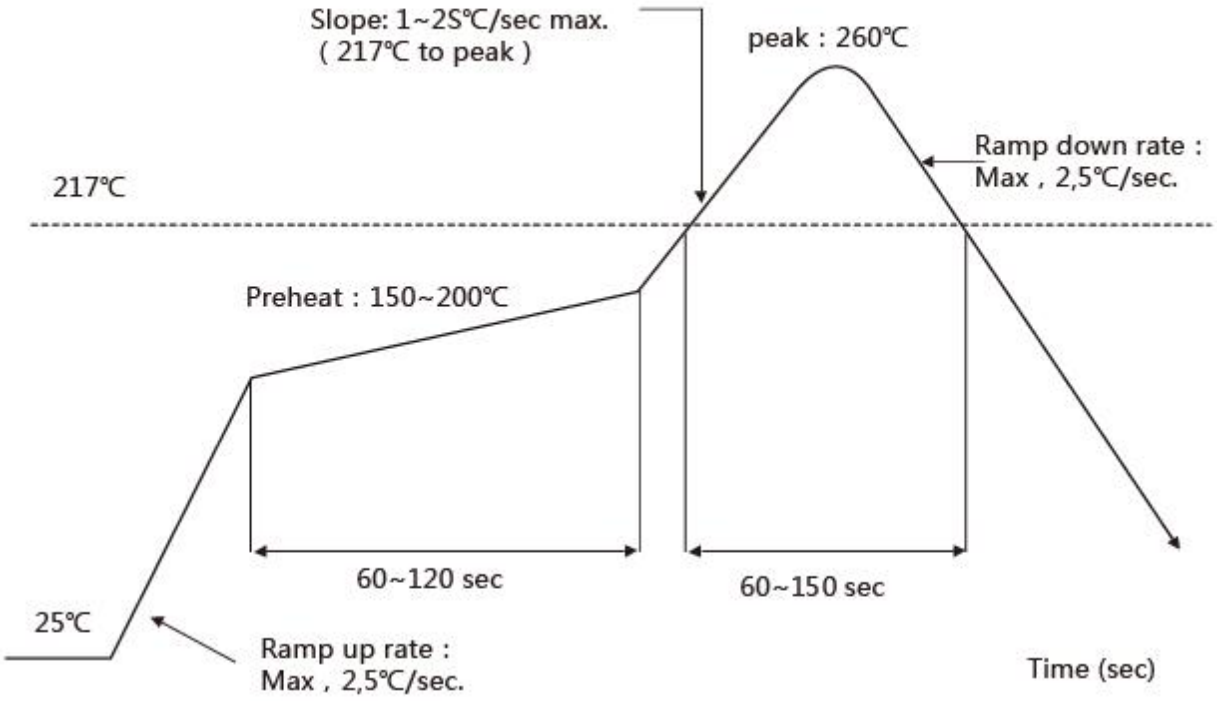
8 Environmental Requirements

8.1 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <260°C

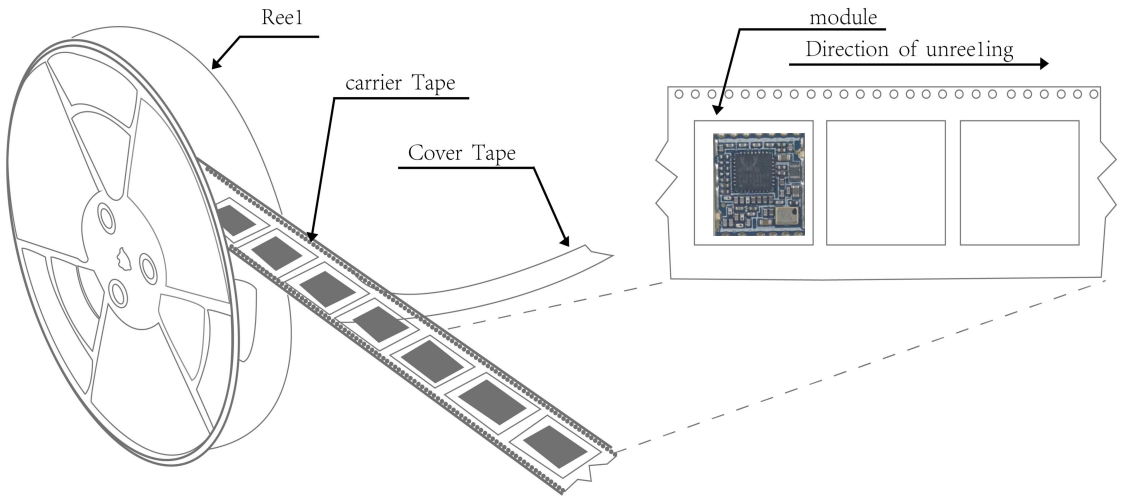
Number of Times : ≤2 times



9 Package

9.1 Reel

A roll of 1500pcs



9.2 Packaging Detail

the take-up package

Using self-adhesive tape

Size of black tape:24mm*32.6m the cover tape :21.3mm*32.6m

Color of plastic disc:blue

A roll of 2000pcs

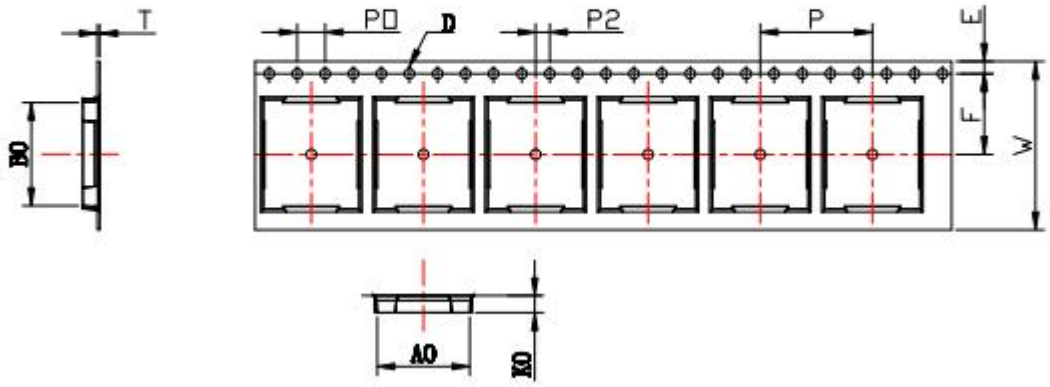
NY bag size:415mm*450mm

size ： 350*350*35mm

The packing case size:350*210*370mm

9.3 Carrier Tape Detail

ITEM	W	A0	B0	D	F	E	K0	P0	P2	P	T
DIM	24	12.85	14.35	1.50	11.5	1.75	2.45	4.0	2.0	16.0	0.30
TOLE		±0.15	±0.15			±0.1	±0.10	±0.1	±0.1	±0.1	±0.05



10 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