H158A-S

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

SDIO Module Datasheet

H158A-S 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	2020/12/23	New version	Lxy	SZS

CONTENTS

1 Overview

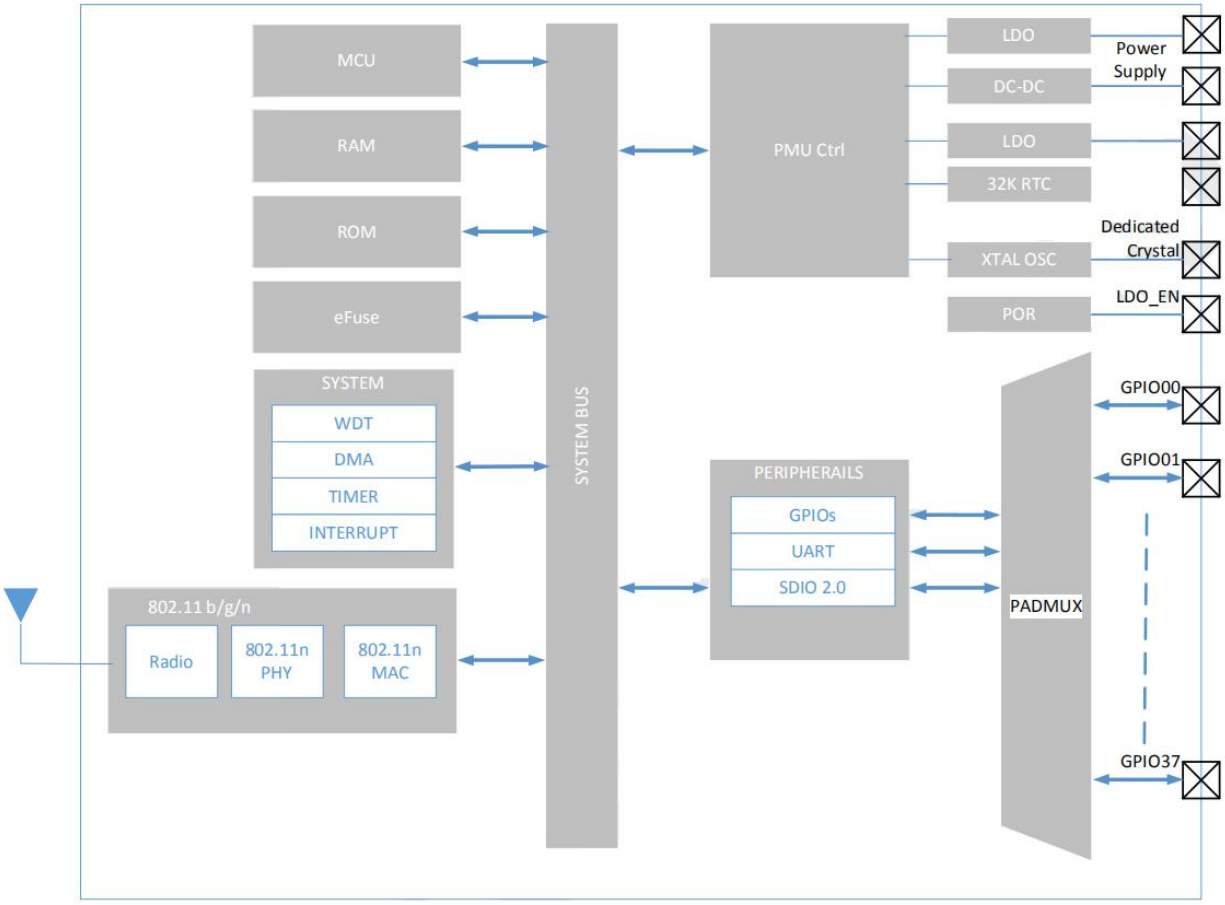
1.1 Introduction

H158A-S is a highly integrated and excellent performance Wireless LAN (WLAN) SDIO2.0 network interface device. Based on iCOMM chipset SV6158P. support 802.11b/g/n standard.

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 T 1 R allow data rates supporting up to 150 Mbps PHY rates
- 1bit/4bits mode supported,clock up to 50Mhz

Block Diagram:



1.3 General Specification

Model Name	H158A-S
Product Description	Support Wi-Fi functionalities
Dimension	L x W x T: 12 x 12 x 2.2 mm (typical)
Wi-Fi Interface	Support SDIO
Operating temperature	-10°C to 70°C
Storage temperature	-40°C to +85°C

1.4 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-10	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 Current informations

Vcc=3.3V, Ta=25° C, unit: mA		
current	Typ.	Max.
802.11b	11Mbps	
TX mode	186.6	
802.11g	54Mbps	
TX mode	158	
802.11n HT20	MCS7	
TX mode	159.4	
802.11n HT40	MCS7	
TX mode	161	
RX mode	35.7	
Saving mode DTIM3	0.21	
BLE TX	90.3	
BLE RX	33	

※1.6 EEPROM Information

WI-FI

Vendor ID	-
Product ID	-

2 General Specification

2.1 Wi-Fi RF Specifications

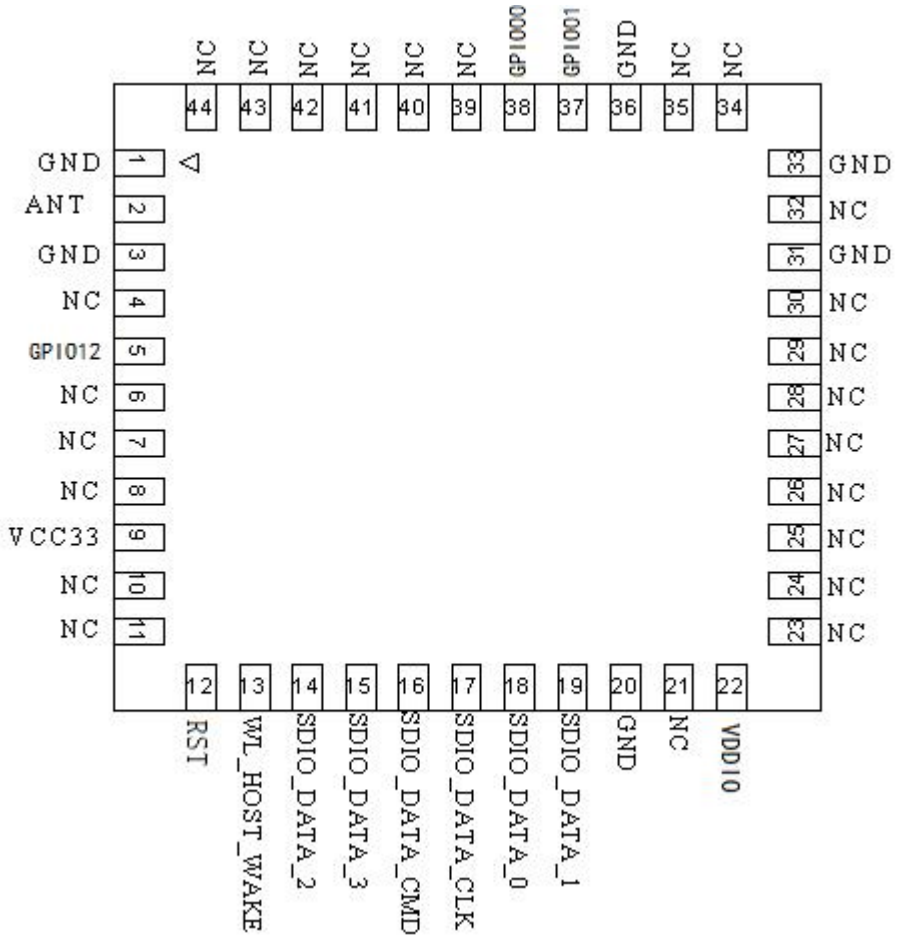
Feature	**Description**			
WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant			
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)			
Number of Channels	2.4GHz：Ch1 ~ Ch14			
Spectrum Mask	Min. b/g/n	Typ. b/g/n	Max. b/g/n	Unit b/g/n
1st side lobes(to fc ± 11MHZ)	-	-43/-30/-40	-	dBr
2st side lobes(to fc ± 22MHZ)	-	-52/-33/-58	-	dBr
Freq. Tolerance	-20/-20/-20	-	20/20/20	ppm
Test Items	**Typical Value**			**EVM**
Output Power	802.11b /11Mbps : 17dBm ± 2 dB			EVM ≤ -9dB
	802.11g /54Mbps : 15dBm ± 2 dB			EVM ≤ -26dB
	802.11n /MCS7 : 15dBm ± 2 dB			EVM ≤ -28dB
Test Items	**TYP Test Value**			**Standard Value**
SISO Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps	PER @ -94 dBm		≤-83
	- 2Mbps	PER @ -92 dBm		≤-80
	- 5.5Mbps	PER @ -91 dBm		≤-79
	- 11Mbps	PER @ -89 dBm		≤-76
SISO Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps	PER @ -89 dBm		≤-85
	- 9Mbps	PER @ -88 dBm		≤-84
	- 12Mbps	PER @ -87 dBm		≤-82
	- 18Mbps	PER @ -84 dBm		≤-80
	- 24Mbps	PER @ -81 dBm		≤-77
	- 36Mbps	PER @ -78 dBm		≤-73
	- 48Mbps	PER @ -73 dBm		≤-69
	- 54Mbps	PER @ -71 dBm		≤-68

SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm	≤-85
	- MCS=1 PER @ -86 dBm	≤-82
	- MCS=2 PER @ -84 dBm	≤-80
	- MCS=3 PER @ -80 dBm	≤-77
	- MCS=4 PER @ -77 dBm	≤-73
	- MCS=5 PER @ -72 dBm	≤-69
	- MCS=6 PER @ -71 dBm	≤-68
	- MCS=7 PER @ -70 dBm	≤-67
SISO Receive Sensitivity (11n ,40MHz) @10% PER	- MCS=0, PER @ -89 dBm	≤-82
	- MCS=1, PER @ -85 dBm	≤-79
	- MCS=2, PER @ -83 dBm	≤-77
	- MCS=3, PER @ -80 dBm	≤-74
	- MCS=4, PER @ -76 dBm	≤-70
	- MCS=5, PER @ -71 dBm	≤-66
	- MCS=6, PER @ -70 dBm	≤-65
	- MCS=7, PER @ -68 dBm	≤-64
Maximum Input Level	802.11b : -10 dBm	
	802.11g/n : -20 dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain	

3 Pin Assignments

3.1 Pin Outline

<TOP>



3.2 Pin Definition

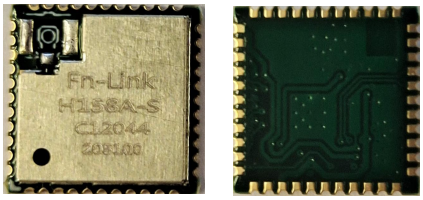
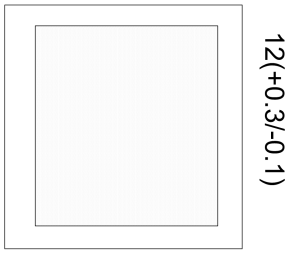
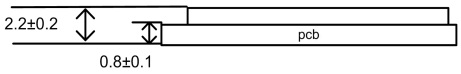
Pin #	Name	Description
1	GND	GND
2	ANT	RF OUTPUT
3	GND	GND
4	NC	NC
5	GPIO12	Default low setting to SDIO mode, pull high into SPI mode
6~8	NC	NC
9	VCC33	3.3V IN
10~11	NC	NC
12	RST	Reset, default pull high,active low
13	WL_HOST_WAKE	WLAN WAKE HOST,GPIO14
14	SDIO_DATA_2	SDIO_D2, GPIO17
15	SDIO_DATA_3	SDIO_D3, GPIO18
16	SDIO_DATA_CMD	SDIO_CMD, GPIO19
17	SDIO_DATA_CLK	SDIO_CLK, GPIO20

18	SDIO_DATA_D0	SDIO_D0, GPIO21
19	SDIO_DATA_D1	SDIO_D1, GPIO22
20	GND	GND
21	NC	NC
22	VDIO	1.8 or 3.3V
23~30	NC	NC
31	GND	GND
32	NC	NC
33	GND	GND
34~35	NC	NC
36	GND	GND
37	GPIO01	UART LOG TX
38	GPIO00	UART LOG RX
39~44	NC	NC

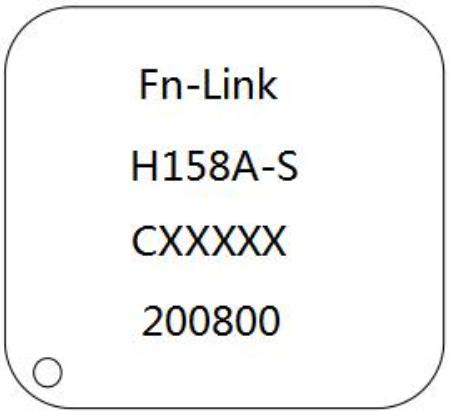
P:POWER I:INPUT O:OUTPUT

4 Dimensions

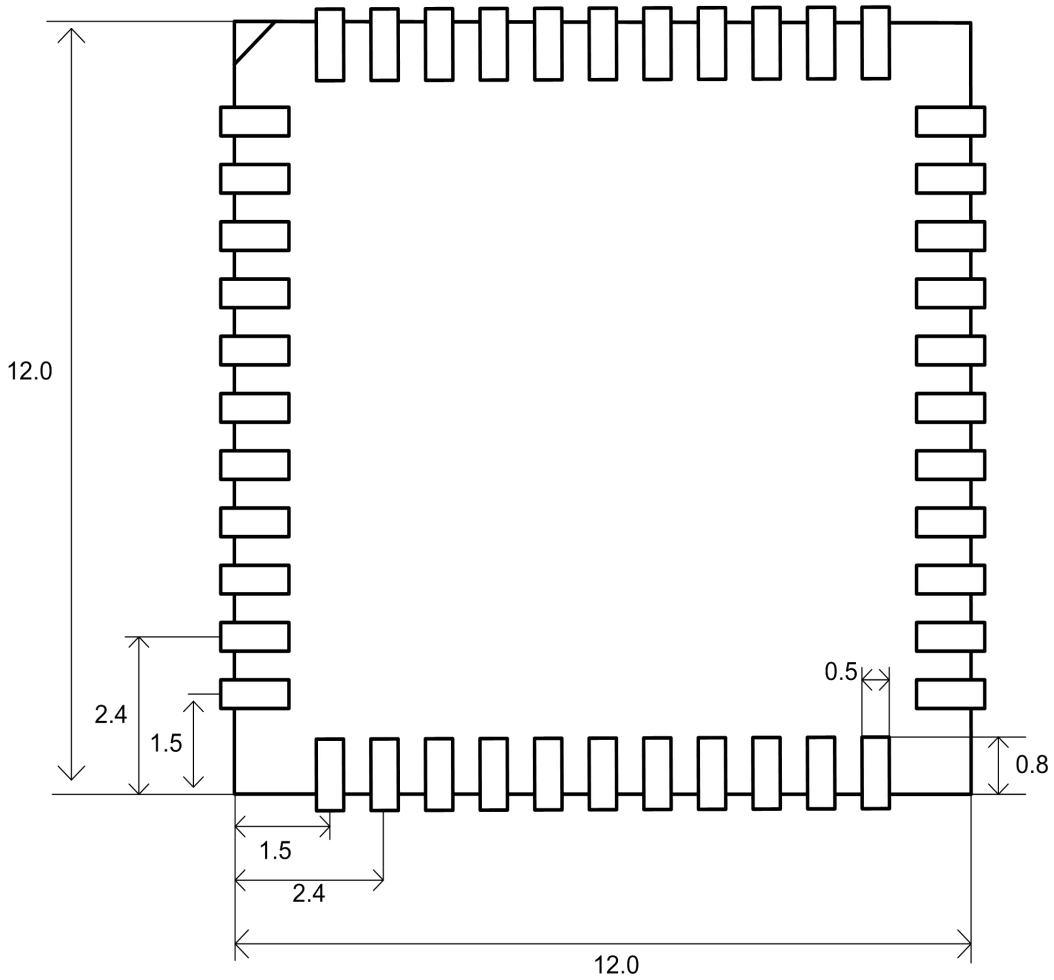
4.1 Module Picture

L x W : 12 x 12 (+0.3/-0.1) mm 	
H: 2.2 (±0.2) mm	
Weight	0.55g

4.2 Marking Description

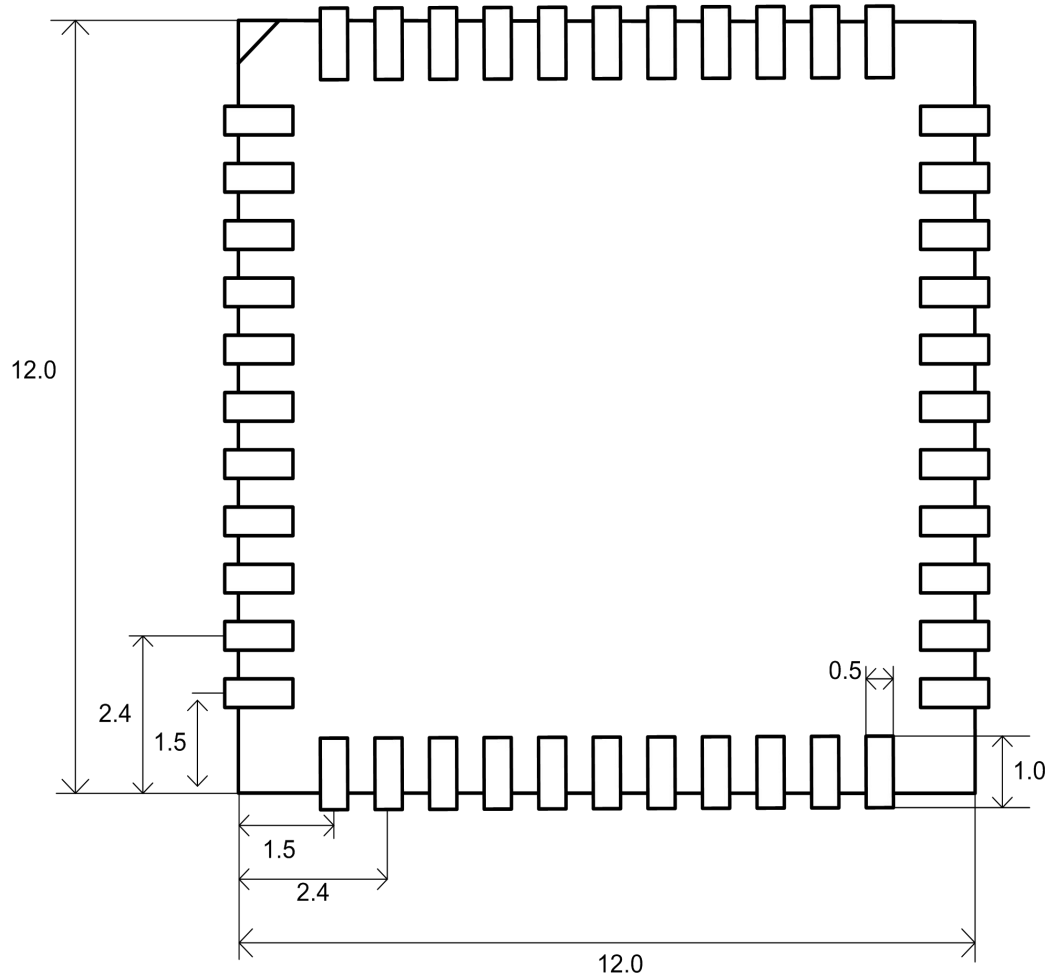


4.3 Module Physical Dimensions



4.4 Layout Reference

(unit: mm)



6 Host Interface Timing Diagram

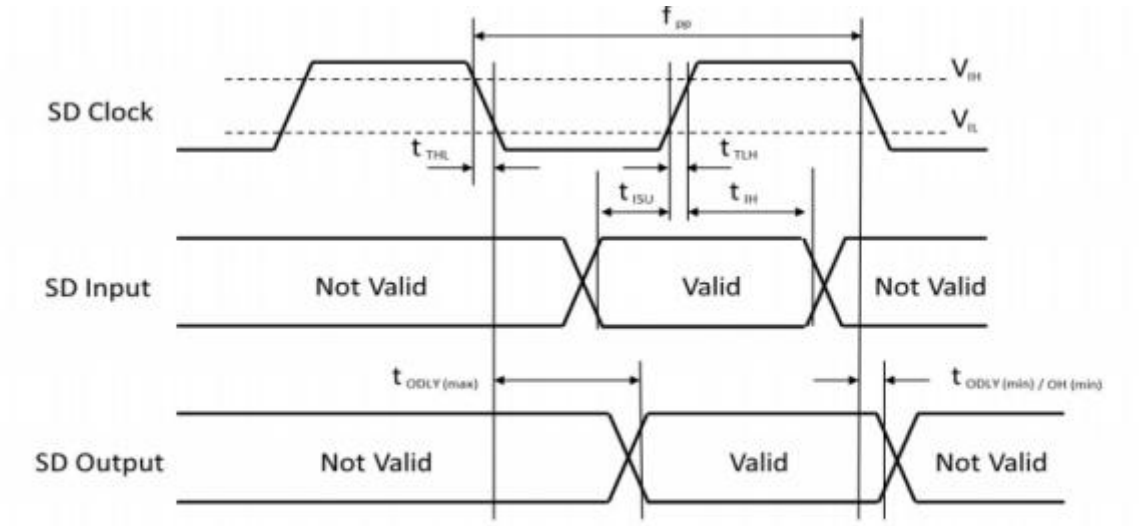
6.1 SDIO Pin Description

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 TIMING WAVEFORM

SDIO version 2.0 Timing Specifications

Symbol	Parameter	Min.	Typ.	Max.	Unit
Clock CLK (All values are referred to min(V_{IH}) and max (V_{IL}).					
f_{PP}	Clock frequency Data Transfer Mode	0		50	MHz
t_{TLH}	Clock rise time			3	ns
t_{THL}	Clock fall time			3	ns
Inputs CMD, DAT (reference to CLK)					
t_{ISU}	Input set-up time	6			ns
t_{IH}	Input hold time	2			ns
Outputs CMD, DAT (reference to CLK)					
t_{ODLY}	Output Delay time during Data Transfer Mode			14	ns
t_{OH}	Output Hold time	2.5			Ns

6.3 SDIO Power-on sequence

Figure 4 shows the power-on sequence of the SV615XP from power-up to firmware

download, including the initial device power-on reset evoked by LDO_EN signal. The LDO_EN input level must be kept the same as VDDIO voltage level. After initial power-on, the LDO_EN signal can be held low to turn off the SV615XP or pulsed low to induce a subsequent reset. After LDO_EN is assert and host starts the power-on sequence of the SV615XP. From that point, the typical SV615XP power-on sequence is shown below:

1. Within 1.3 millisecond, the internal power-on reset (POR) will be done. And host could download firmware code of DPLL setting if the crystal is not default setting, 26MHz. The internal running clock is crystal frequency.
2. After 100us of DPLL settling time, host could set internal clock to full speed and finish all the downloading of firmware code.

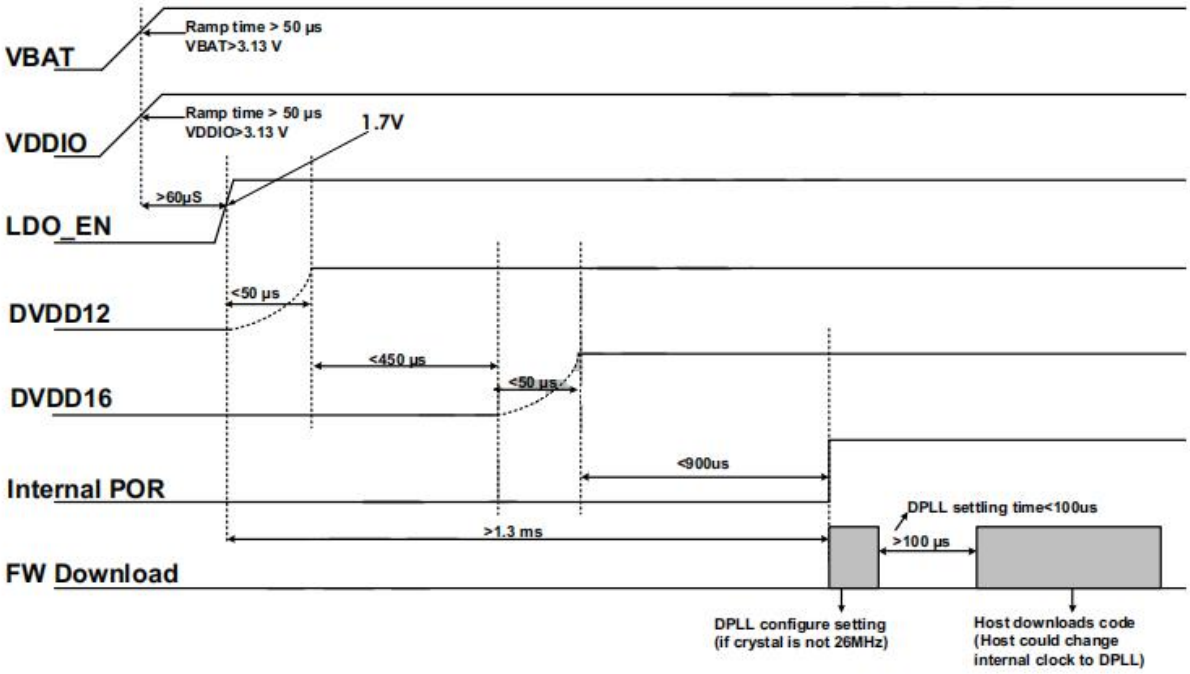


Figure 4 : Power-on sequence

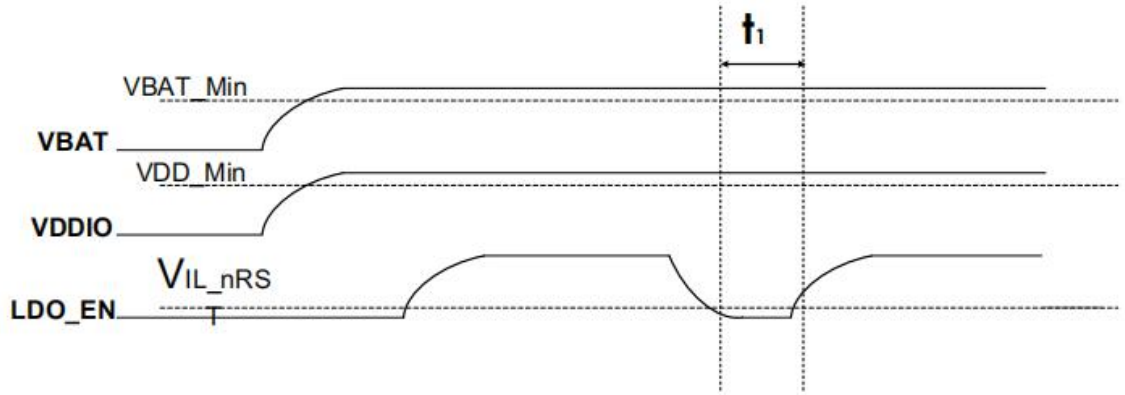


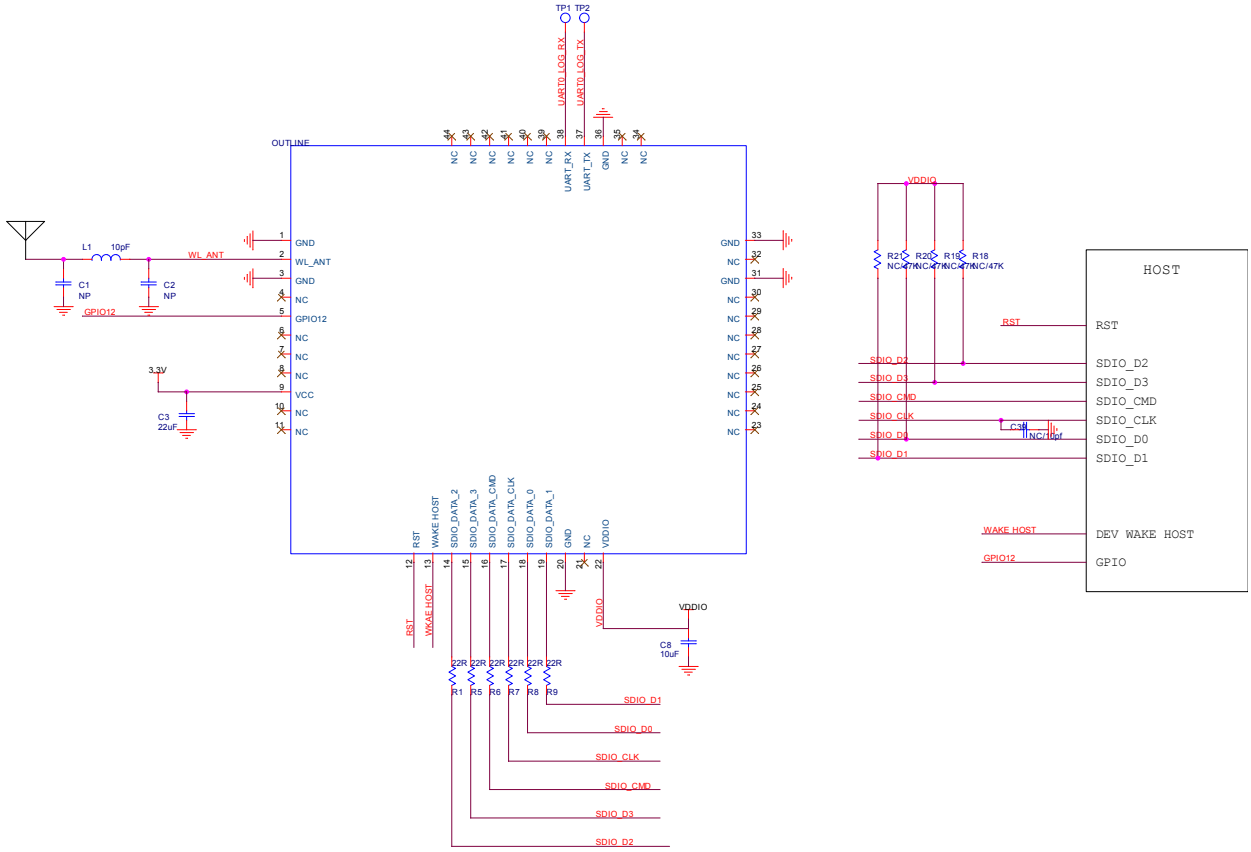
Figure 5 : Reset Timing

Table 2 : Reset Timing Parameters

Parameters	Description	Min.	Unit
t_1	Duration of LDO_EN signal level < V_{IL}_nRST to reset the chip	30	us

The SV615XP LDO_EN pin can be used to completely reset the entire chip. After this signal has been de-asserted, the SV615XP is in off mode waits for host communication. Until then, the MAC, BB, and SOC blocks are powered off and all modules are held in reset. Once the host has initiated communication, the SV615XP turns on its crystal and later on DPLL. After all clocks are stable and running, the resets to all blocks are automatically de-asserted.

7 Reference Design



Note:

1. RF trace as short as possible .

8 Ordering Information

Part No.	Description

FGH158ASXX-00	SV6158P,b/g/n,WiFi 2.4G,1T1R,SDIO,单天线,带屏蔽盖

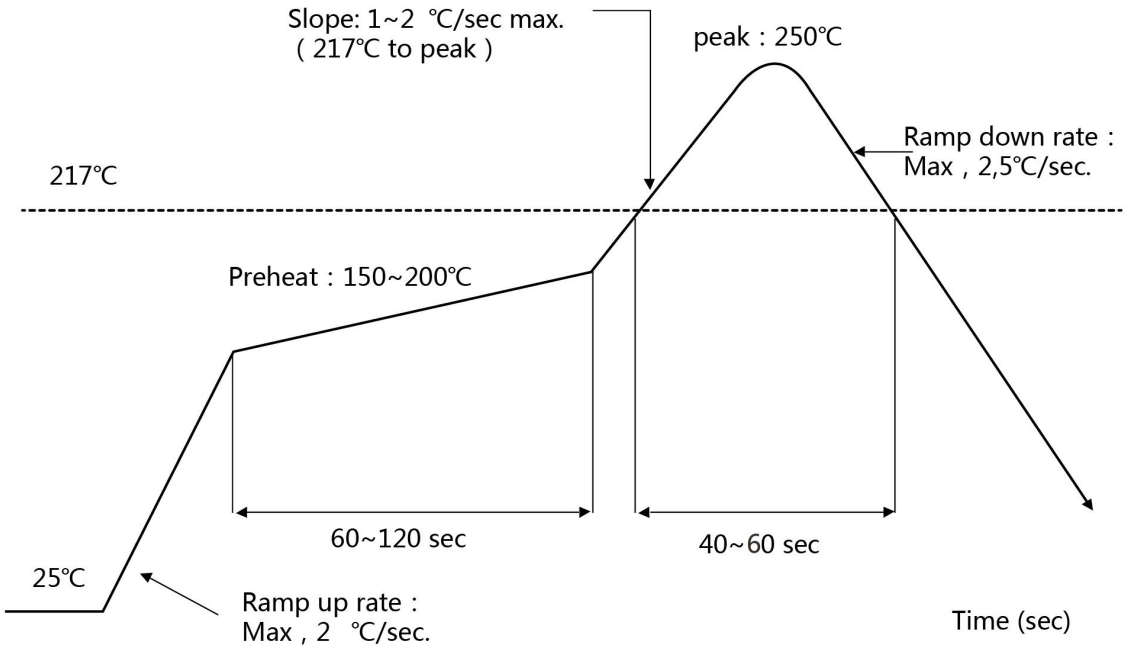
9 The Key Material List

Crystal	3225 24MHZ CL=12pF,10ppm	ECEC,HOSONIC,TKD,JWT
PCB	H158A-S-V1.0 green, 4L, 12X12X0.8mm	XY-PCB,LX-PCB,SL-PCB, Sunlord
Chipset	SV6158,11b/g/n, SDIO WiFi, 4x4mm,QFN32	iCOMMSEMI
Inductor	0603 4.7uH,20%,400mA	Sunlord，cenke，ceaiya
Shielding	H158A-S-V1.0 屏蔽盖	信太，精力通

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.

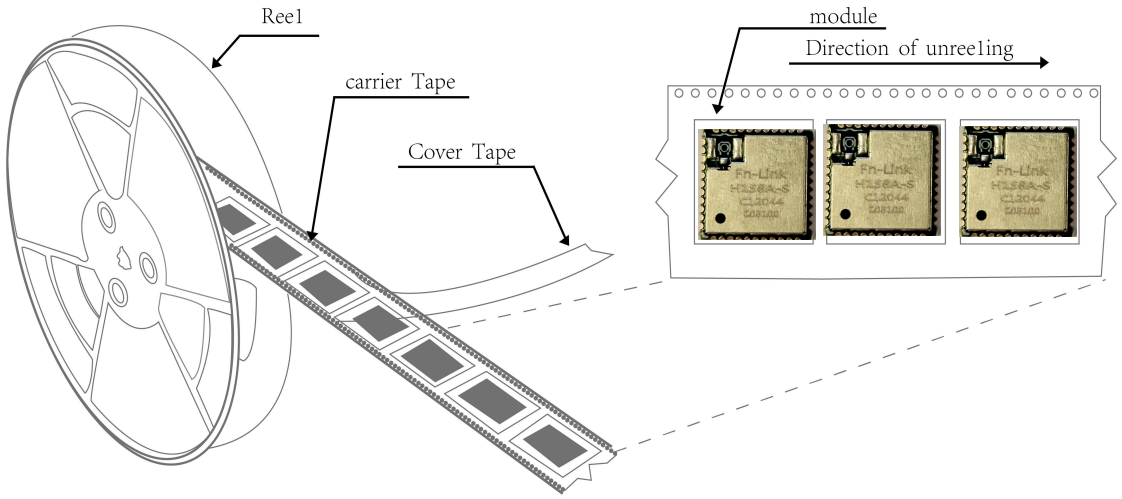
2). The baking temperature: 125 ℃, 8 hours.

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

11 Package

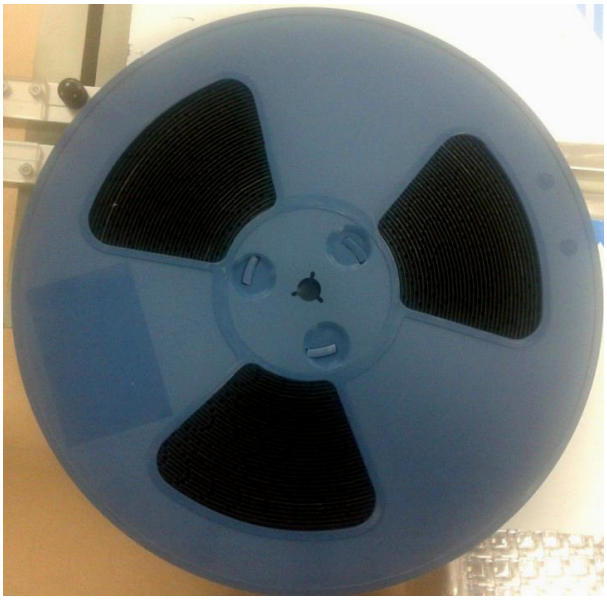
11.1 Reel

A roll of 2000pcs



11.2 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:420mm*450mm

size ： 335*335*55mm

The packing case size:335*255*360mm

12.3 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

Federal Communications Commission (FCC) Declaration of Conformity

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. (15.247) 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. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user. (b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Radiation Exposure Statement: This equipment complies with FCC radiation expo-sure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The availability of some specific channels and/or operational frequency bands is country dependent and firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

The final end product must be labeled in a visible area with the following: "Contains Transmitter Module FCC ID: 2AATL-H158A-S" This radio module must not be installed to co-locate and operating simultaneously with other radios in host system, additional testing and equipment authorization may be required to operating simultaneously with other radio.

This Module have RF shielding and is tested and approved as standalone configuration, additional evaluation may be required for any system integrated this radio module.