PRODUCT SPECIFICATION

H258A-S

Wi-Fi Single-band 1x1 802.11b/g/n/ax + BLE

Combo Module

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

H258A-S Module Datasheet

Ordering Information	Part NO.	Description
	FGH258ASXX-00	SV6358/2.4G/802.11b/g/n/ax/BLE, 1T1R,SDIO,12*12,PCBV 2.0

17/15/14/12

CONTENTS

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2023/04/23	New version	Fc	TZQ	QJP
V1.1	2023/07/06	Add testing standards	TZQ	LXY	QJP

1. General Description

1.1 Introduction

H258A-S is a fully integrated SoC with 2.4GHz band 1T1R 11b/g/n/ax Wi-Fi, Bluetooth Low Energy 5.0, and MCU. A single chip MCU SoC targets for applications requiring optimal RF performance, strong security, low power consumption, and small form-factor with minimal external components, supports BLE Master, Slave, Advertiser, Scanner roles. It supports standard HCI in BLE side. integrated the Balun, T/R switch, LNA, PA with advanced architecture enhancement to achieve great receive sensitivity for noisy home scenarios.

The module features an application processor subsystem based on Andes N10 32-bit RISC which runs at up to 320MHz. The chip includes up to 324KB of embedded SRAM, split among N10s local TCMs and system SRAM.

The H258A-S has a built-in hardware crypto engine, and a 1024b e-fuse block for storing chip-specific information. This combining with high efficiency security middleware library, including Wi-Fi WPA3, the module builds strong secure system products for smart home applications.

1.2 Description

Model Name	H258A-S
Product Description	Support Wi-Fi and BLE
Dimension	L x W x H: 12 x 12 x 1.7 mm (stamp hole type)
Wi-Fi Interface	Support SDIO
OS supported	Android /Linux/ Win CE /iOS /XP/WIN7/WIN10
Operating temperature	0°C to 70°C
Storage temperature	-40°C to +85°C

2. Features

General Features

- IEEE 802.11 b/g/n/ax compliant
- Support 802.11n 20/40MHz up to MCS7 150Mbps
- Support 802.11ax 20/40MHz up to MCS9 229Mbps
- Internal co-existence scheme between Wi-Fi and Bluetooth
- WFA features
  --WEP/WPA/WPA2/WPA3
  --WMM

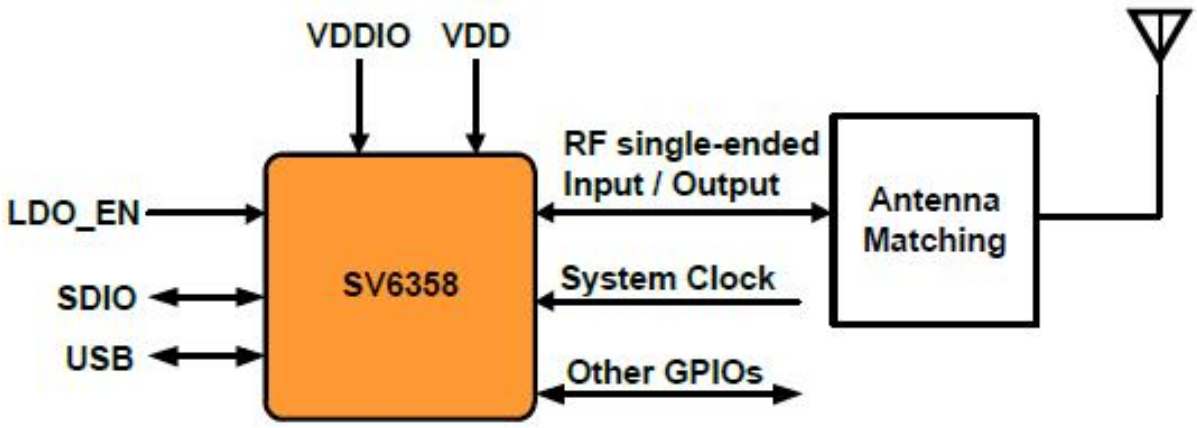
Host Features

- SDIO 2.0
  --1bit/4bits mode supported
  --Support Clock up to 50MHz
- USB 2.0
  --High speed / Full speed / Low speed supported
  --Suspend / Selected suspend supported

Bluetooth Features

- Bluetooth 5.0 Low Energy

3. Block Diagram



4. General Specification

4.1 WI-FI Specification

Feature	Description	
WLAN Standard	IEEE 802.11 b/g/n/ax Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz：Ch1 ~ Ch14	
Test Items	**Typical Value**	**EVM**
Output Power	802.11b /11Mbps : 17dBm ± 2 dB	EVM ≤ -9dB
	802.11b /11Mbps/1Mbps/5.5Mbps : 17dBm ± 2 dB	EVM ≤ -5dB
	802.11g /54Mbps : 15dBm ± 2 dB	EVM ≤ -25dB
	802.11g /6Mbps : 18dBm ± 2 dB	EVM ≤ -5dB
	802.11g /24Mbps : 16dBm ± 2 dB	EVM ≤ -8dB
	802.11n HT40/MCS7 : 14dBm ± 2 dB	EVM ≤ -28dB
	802.11n HT40/MCS0 : 17dBm ± 2 dB	EVM ≤ -5dB
	802.11n HT40/MCS3 : 15dBm ± 2 dB	EVM ≤ -16dB
	802.11n HT20/MCS7 : 14dBm ± 2 dB	EVM ≤ -28dB
	802.11n HT20/MCS0 : 17dBm ± 2 dB	EVM ≤ -5dB
	802.11n HT20/MCS3 : 15dBm ± 2 dB	EVM ≤ -16dB
	802.11ax HE20/MCS7 : 14dBm ± 2 dB	EVM ≤ -28dB
	802.11n HE20/MCS0 : 17dBm ± 2 dB	EVM ≤ -5dB
	802.11n HE20/MCS3 : 15dBm ± 2 dB	EVM ≤ -16dB
	802.11ax HE40/MCS7 : 14dBm ± 2 dB	EVM ≤ -28dB
	802.11n HE40/MCS0 : 17dBm ± 2 dB	EVM ≤ -5dB
	802.11n HE40/MCS3 : 15dBm ± 2 dB	EVM ≤ -16dB
	802.11ax HE40/MCS9 : 12dBm ± 2 dB	EVM ≤ -32dB
	802.11ax HE20/MCS9 : 12dBm ± 2 dB	EVM ≤ -32dB
	The power corresponding to other rates is configured by the driver	
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	±20ppm	
Test Items	**TYP Test Value**	**Standard Value**
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -94 dBm	≤-83
	- 2Mbps PER @ -92 dBm	≤-80
	- 5.5Mbps PER @ -91 dBm	≤-79
	- 11Mbps PER @ -88 dBm	≤-76
Receive Sensitivity	- 6Mbps PER @ -89 dBm	≤-85

(11g,20MHz) @10% PER	- 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
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
	- MCS=8	PER @ -67 dBm	≤-64
	- MCS=9	PER @ -65 dBm	≤-62
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
	- MCS=8,	PER @ -67 dBm	≤-63
	- MCS=9,	PER @ -64 dBm	≤-60
Maximum Input Level	802.11b : -10 dBm		
	802.11g/n : -20 dBm		
Antenna Reference	Small antennas with 0~2 dBi peak gain		

4.2 Bluetooth Specification

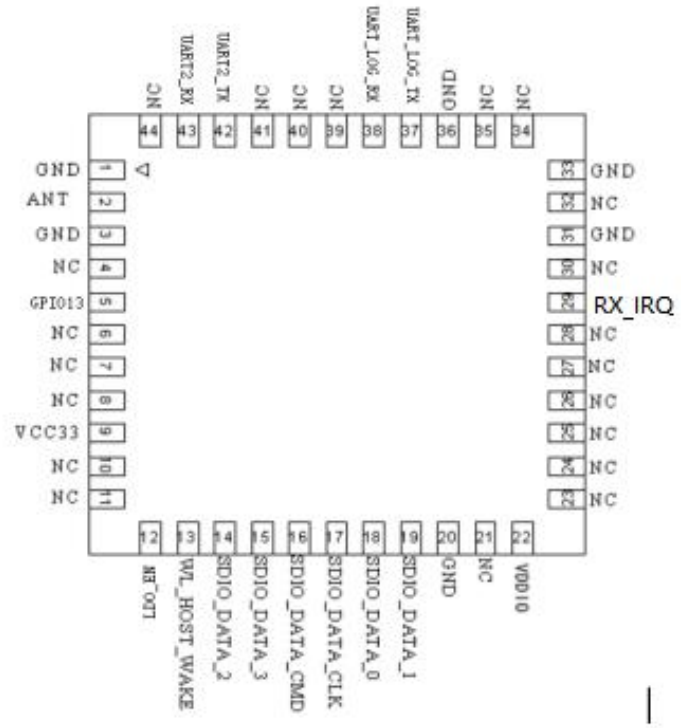
Feature	Description
General Specification	
Bluetooth Standard	Bluetooth V5.0

Host Interface	USB		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2400 MHz ~ 2483.5 MHz		
Number of Channels	40 channels		
Modulation	GFSK, π/4-DQPSK (2Mbps) :-20dBm		
RF Specification			
	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Output Power (BLE)	2	5	8
Sensitivity @ BER=30.8% (BLE)			-89
Maximum Input Level	GFSK (1Mbps):-20dBm		
	π/4-DQPSK (2Mbps) :-20dBm		

5. Pin Definition

5.1 Pin Outline

< TOP VIEW >



5.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	GND		GND	
2	ANT	I/O	RF OUTPUT	
3	GND		GND	
4	NC		Floating (NC)	
5	GPIO13	I/O	Default low setting to SDIO mode, pull high into SPI mode	
6~8	NC		Floating (NC)	
9	VCC33	O	3.3V IN	
10~11	NC		Floating (NC)	
12	LDO_EN		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		Floating (NC)	
22	VDIO		1.8 or 3.3V	
23~28	NC		Floating (NC)	
29	GPIO33	I/O	RX_IRQ(out_band)	
30	NC		Floating (NC)	
31	GND		GND	
32	NC		Floating (NC)	
33	GND		GND	
34~35	NC		Floating (NC)	
36	GND		GND	
37	GPIO01	I/O	UART LOG TX	
38	GPIO00	I/O	UART LOG RX	
39~41	NC		Floating (NC)	
42	UART2_TX	I/O	For BLE	
43	UART2_RX	I/O	For BLE	
44	NC			
32	NC		Floating (NC)	

P:POWER I:INPUT O:OUTPUT

6. Electrical Specifications

6.1 Power Supply DC Characteristics

	MIN	TYP	MAX	Unit
Operating Temperature	-20	25	70	deg.C
VDDIO	1.75	1.8or3.3	3.46	V
VCC33	2.10	3.3	3.46	V

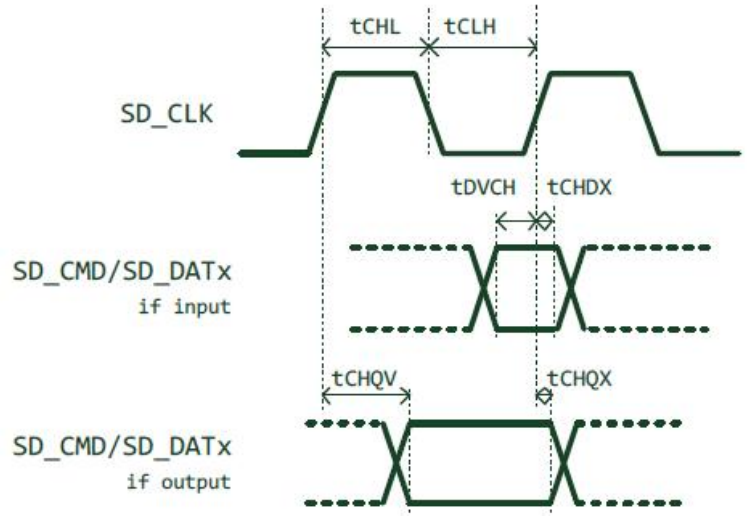
6.2 Power Consumption

Vcc=3.3V, Ta=25° C, unit: mA	
电流	平均值
11b 11Mbps TX mode	
11g 54Mbps TX mode	
11n HT20 MCS0 TX mode	
11n HT20 MCS7 TX mode	

6.3 Interface Circuit time series

6.3.1 SDIO CHARACTERISTICS

SDIO is compliant to SDIO specification version 2.0, supporting 1-bit and 4-bit data transfer mode, and compliant to high speed SD Bus .



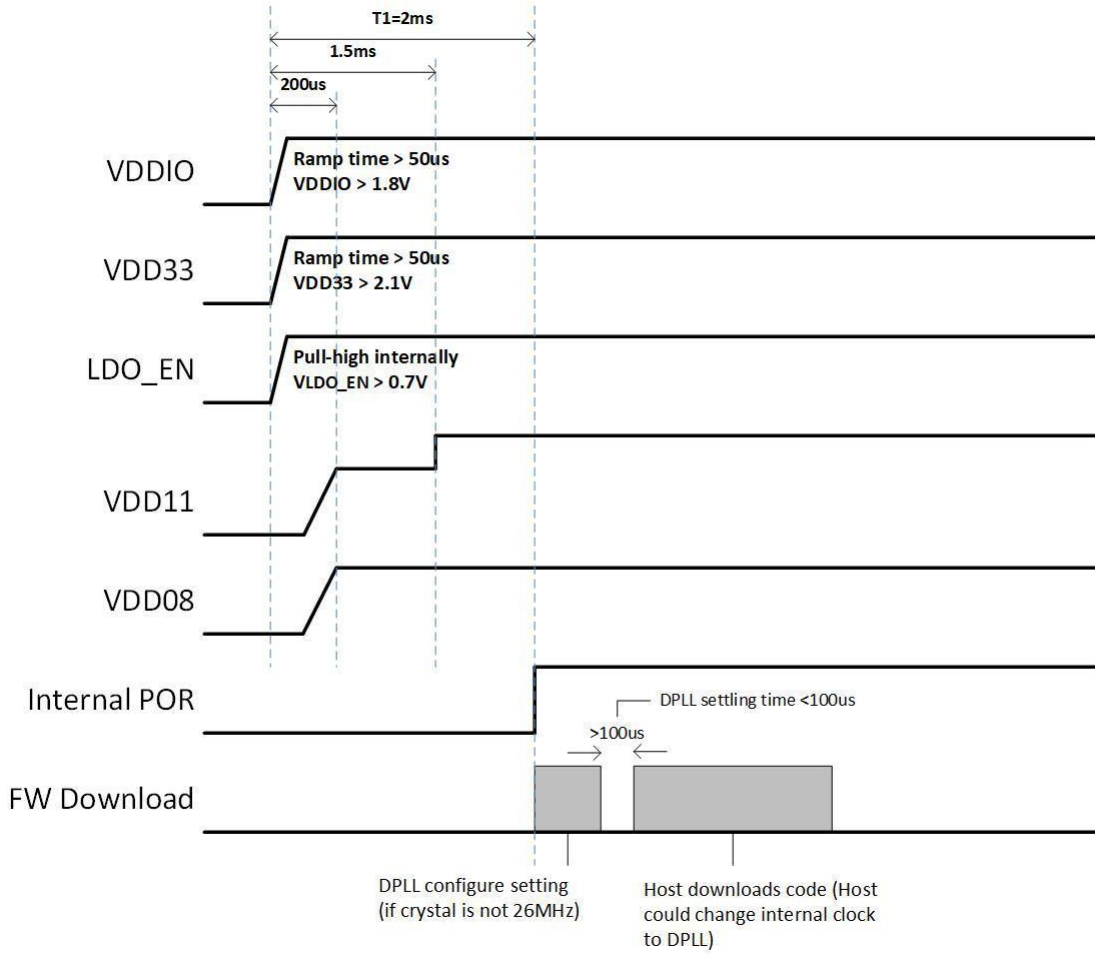
Parameter	Condition/Notes	Min.	Typ.	Max.	Unit
SDIO clock frequency	–	(TBD)		50	MHz
SDIO clock high time	Tchl	7	–	-	ns
SDIO clock low time	Tclh	7	-	-	ns
SDIO input setup time	Tdvch	6	-	-	ns
SDIO input hold time	Tchdx	2	-	-	ns
SDIO output delay	Min.: Tchqx, Max.: Tchqv	2.5	-	14	ns

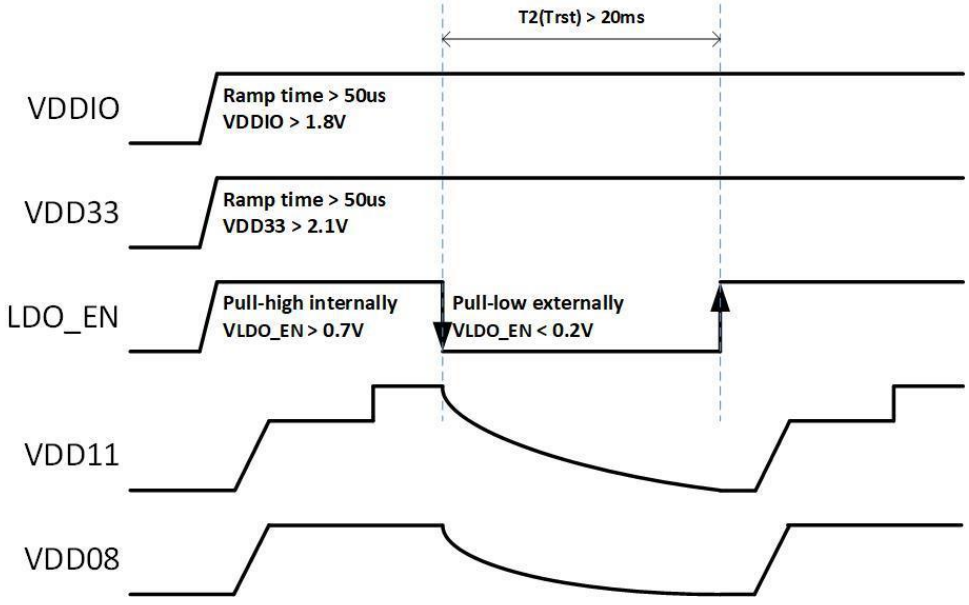
6.3.3 SDIO Power-on sequence

shows the power-on sequence of the SV6358 from power-up to firmware download, including the initial device power-on reset evoked by internal LDO_EN signal. After initial power-on, the LDO_EN signal can be held low to turn off the SV6358 or pulsed low to induce a subsequent reset.

After LDO_EN is asserted, the host starts the power-on sequence of the SV6358. From that point, the typical SV6358 power-on sequence is shown below:

1. Within T1, 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.

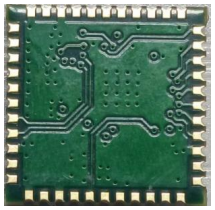
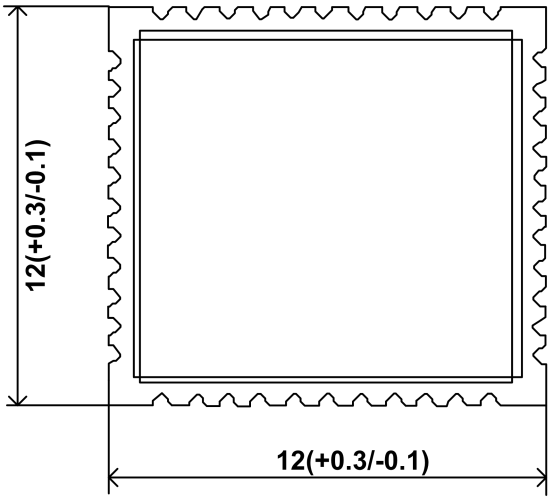
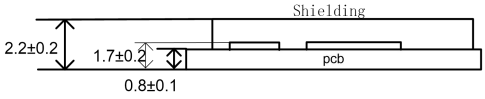




Parameters	Description	Min.	Typ.	Unit
T1	Duration of the internal power-on reset	1.8	2	ms
T2	Duration of LDO_EN signal level < VIL_Nrst(refer to its value in Table 11: Recommended Operating Conditions and DC Characteristics) to reset the chip	10	20	ms

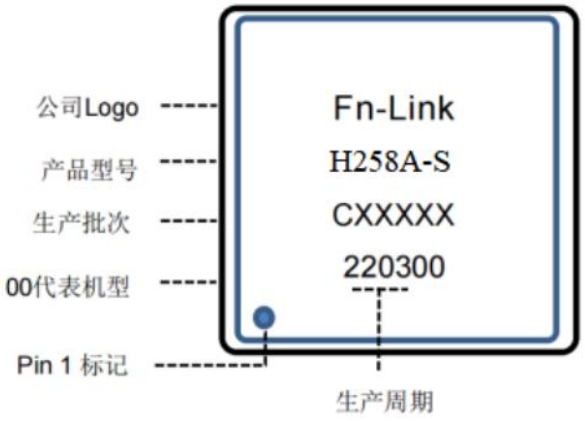
7. Size reference

7.1 Module Picture

L x W : 12 x 12 (+0.3/-0.1) mm  	
H: 2.2(±0.2) mm	
Weight	0.54g

7.2 Marking Description

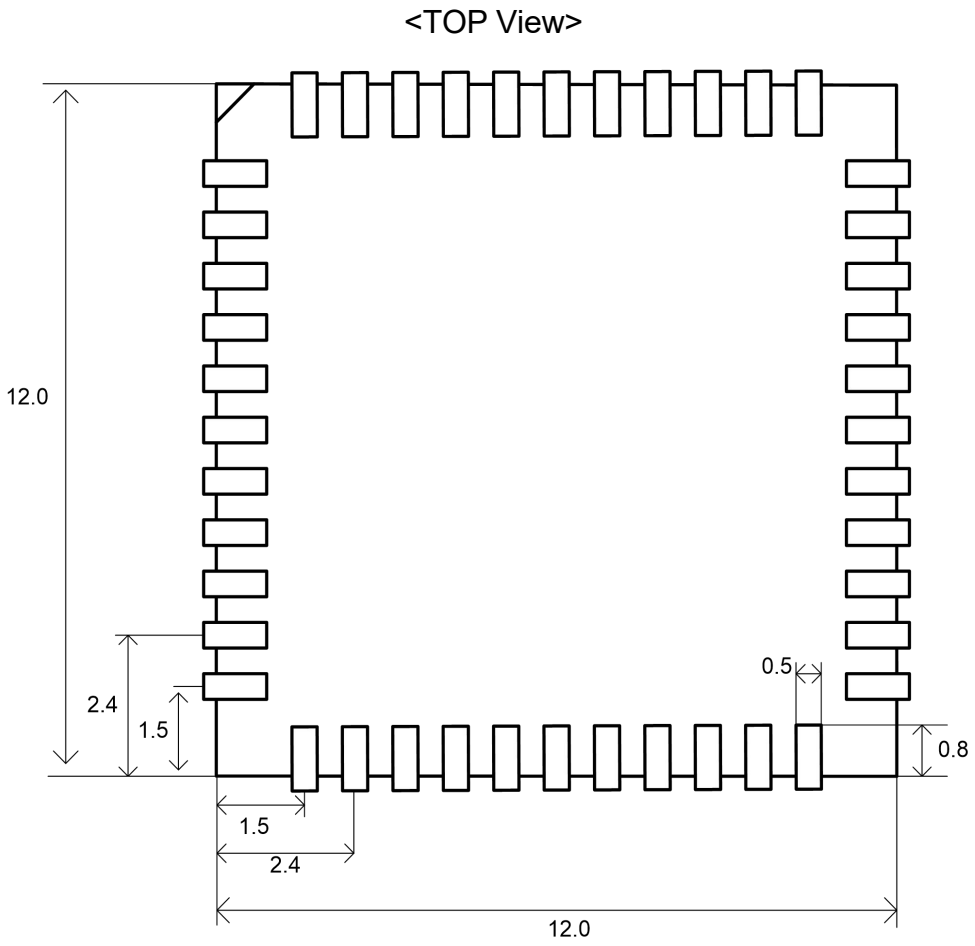
< TOP VIEW >



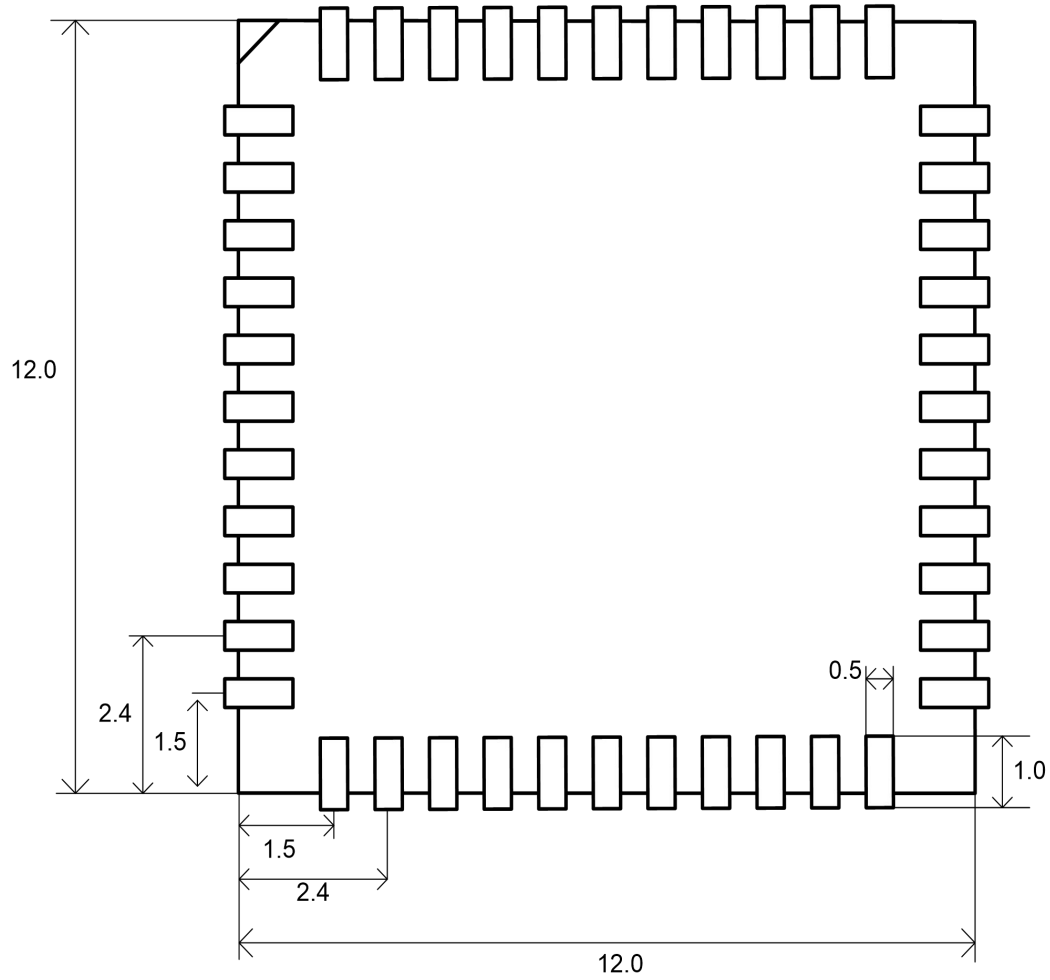
模组尺寸：12x12mm
屏蔽盖尺寸：10.35x10.33mm

Date code last 2number means: model type

7.3 Physical Dimensions



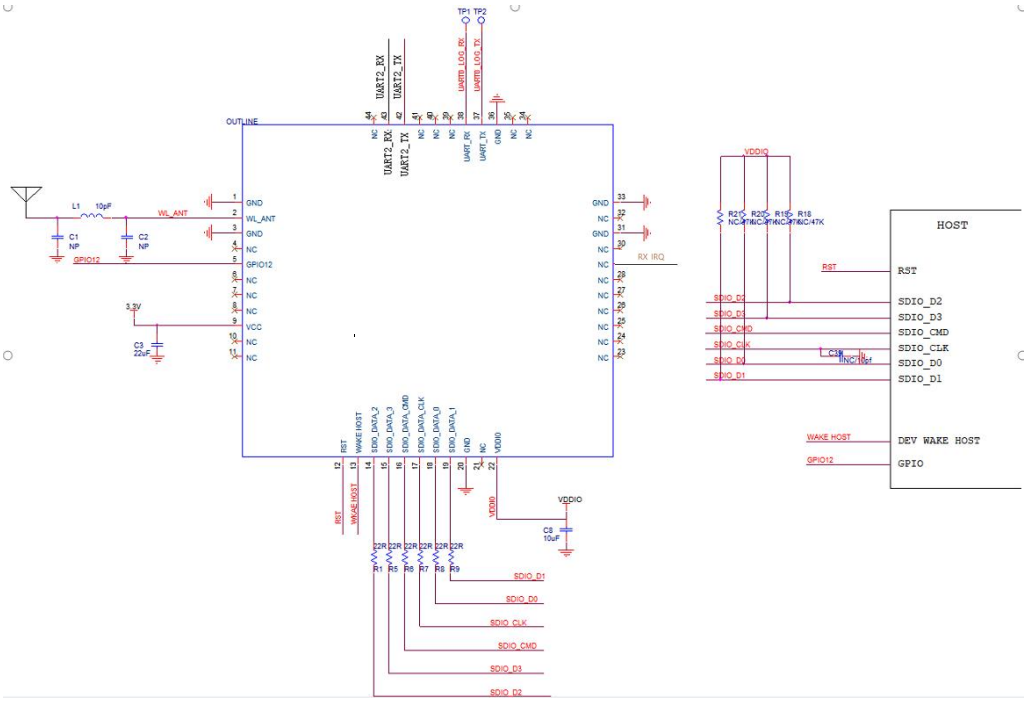
7.4 Layout Recommendation



8. The Key Material List

Item	Part Name	Description	Manufacturer
1	Crystal	2016 24MHz, 8pF, ±10PPM	ECEC,HOSONIC,TKD,JWT
2	PCB	H118A-S green, 4L, 12X12X0.8mm	XY-PCB,KX-PCB,SL-PCB,Sunlord, Truly
3	Chipset	SV6358,QFN32L	iCOMMSEMI
4	Shielding	H158A-S shielding	信太，精力通，卓益

9. Reference Design



Note:

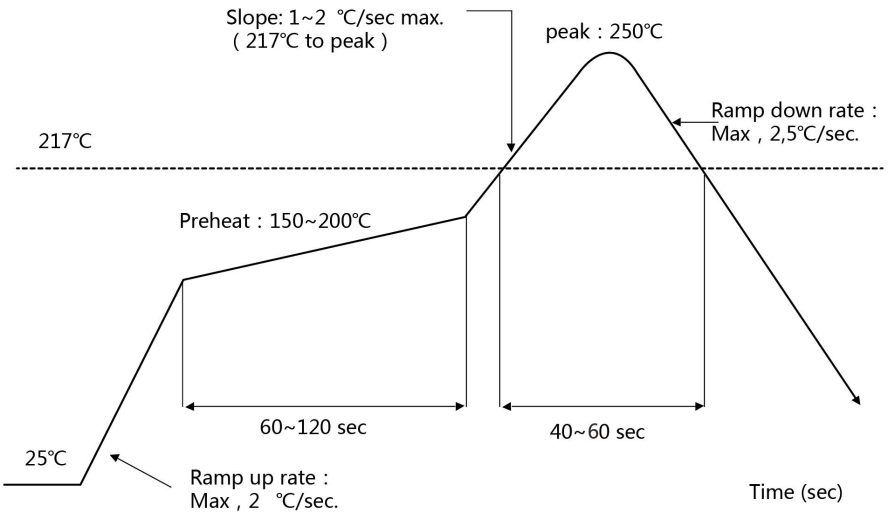
RF trace as short as possible .

10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



11. RoHS compliance

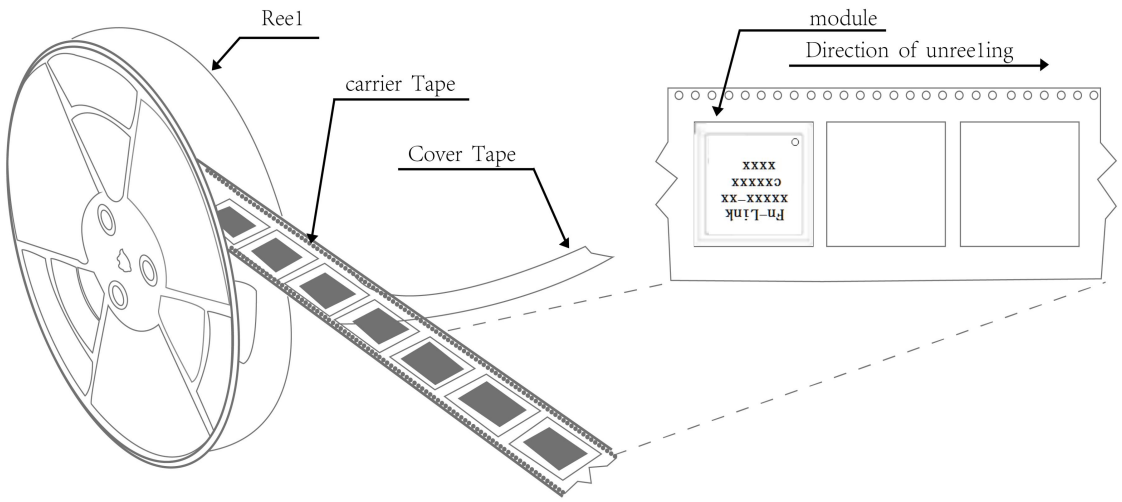
All hardware components are fully compliant with EU RoHS directive

12. Package

12.1 Reel

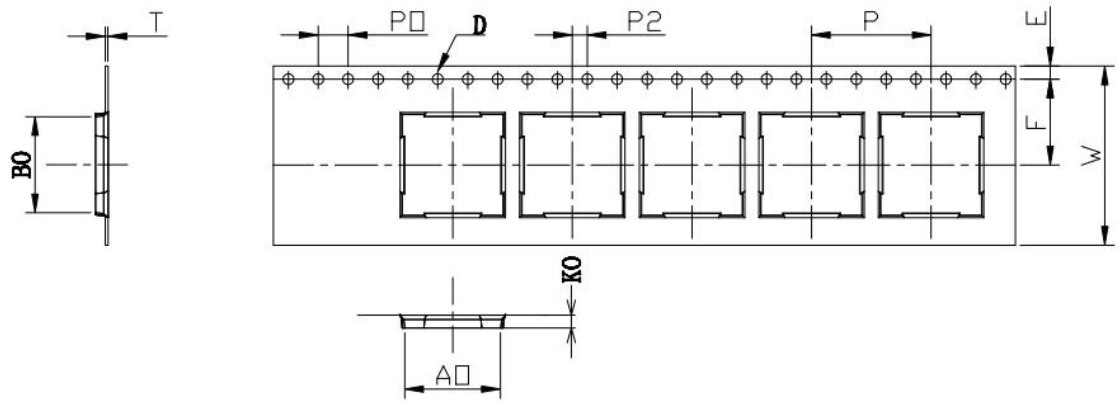
A roll of 1500pcs

Use pallet packaging for less than 300 pieces



12.2 Carrier Tape Detail

ITEM	W	AO	BO	D	F	E	KO	PO	P2	P	T
DIM	24	12.45	12.45	1.50	11.5	1.75	2.60	4.0	2.0	16.0	0.30
TOLE	+0.3 -0.3	±0.10	±0.10	+0.1 -0.0	+0.1 -0.1	±0.1	±0.10	±0.1	±0.1	±0.1	±0.05



12.3 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

NY bag size: 450mm*415mm

size ： 350*350*35mm

The packing case size: 360*210*370mm

13. 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

d) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected

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

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

The Module is designed to comply with the FCC statement. when the host system using this module, with same antenna, same antenna connector, and same PCB wire beteeen module's TX pin to antenna connector, it should have label indicated it contain modular's FCC ID: 2AATL-H258AS. This radio module must not installed to collocate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio. The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.

The modular must be installed in the host that assign by Company name: FN-LINK TECHNOLOGY LIMITED, Model no.: H258A-S if other host types used would need further evaluation and possible C2PC if they are not significantly similar to the one tested The WIFI Module is designed for a compact PCB design. It should be installed and operated with host or other minimum distance of 20 centimeters between the radiator and your body." To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 2.98 dBi in the 2.4G band. The module uses IPEX antenna interface and ping angle interface antenna, this antenna is sold with the module.

Notice to OEM integrator The end user manual shall include all required regulatory information/warning as show in this manual. The OEM integrator is responsible for testing their end-product for any additional compliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts, the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed The intended use is generally not for the general public. It is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required, the user has no access to the connector. Installation must be controlled. Installation requires special training. This device complies with Part 15 of the FCC Rules. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

EU Declaration of Conformity

for

(RED) 2014/53/EU

We, FN-LINK TECHNOLOGY LIMITED

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hereby, declare that the essential requirements set out in the (RED) 2014/53/EU have been fully fulfilled on our product with indication below:

Product Name: module

Model / Brand Name: H258A-S / FN-LINK

Hardware version: V2.0

Software version: L.FWB.23Q1.0000.00.r3295

Manufacturer: FN-LINK TECHNOLOGY LIMITED

Address: No.8, Litong Road, Liuyang Economic & Technical Development Zone, Changsha, Hunan, China

Operation Frequency:

BLE/2LE: 2400 MHz to 2483.5 MHz
2.4G WIFI: 2400 MHz to 2483.5 MHz

Transmit Power:
BLE/2LE: 9.06 dBm
2.4G WIFI: 16.81 dBm

The following standards have been applied for the investigation of compliance:

ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-17 V3.2.4 (2020-09)

ETSI EN 300 328 V2.2.2 (2019-07)

EN IEC 62311:2020
EN 50665:2017

EN 55032:2015/A1:2020
EN 55035:2017/A11:2020

IEC 62368-1:2018
62368-1:2020+A11:2020

And apply notified body assessment:

Notified Body number 0980

Eurofins Electrical and Electronic Testing NA, Inc.

914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND

21230

Furthermore, the ISO requirement for the in-process quality control procedure as well as the manufacturing process has been reached. The technical document as well as the test reports will be kept for a period at least 10 years after the last product has been manufactured at the disposal of the relevant national authorities of any Member State for inspection.
Detail contact information for this declaration has been listed below as the window of any issues relevant for this declaration.

Manufacturer Contact

Name (in print): Jim Hu

Title: Manager

Company name: FN-LINK TECHNOLOGY LIMITED
Tel: +8613538178944

Email: jim@fn-link.com

2024-05-16 Jim Hu

Signature Date