H-zLink (Nanjing) Electronics Co., Ltd.

H9518Fx Datesheet

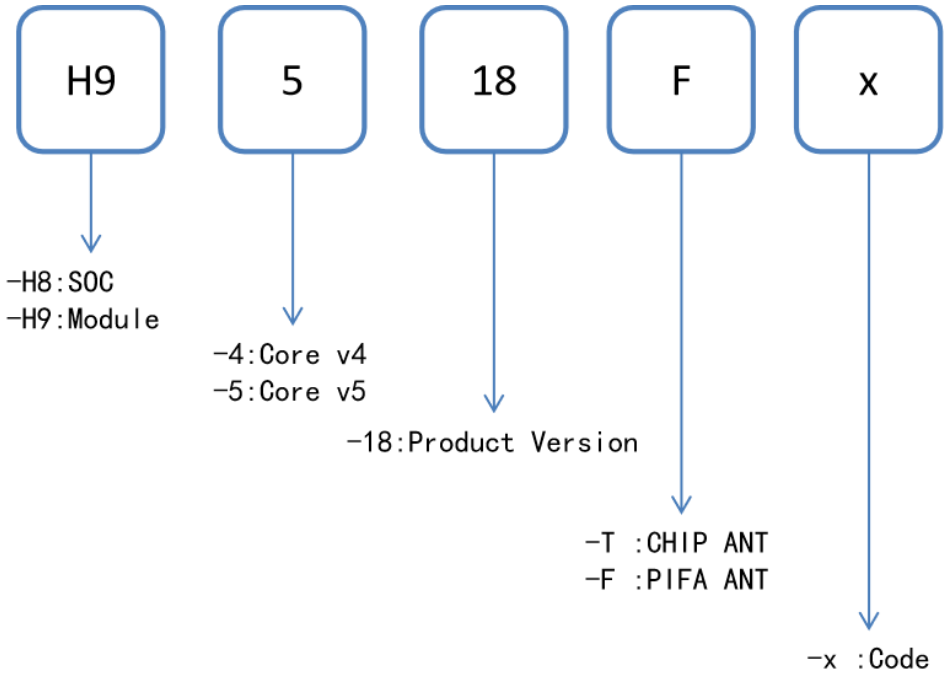
Bluetooth Low Energy Module

Rev2.0 2024.02

ORDERING INFORMATION

Order code	ANT	Power Supply	TX Power	Feature
H9518Fx	PCB	1.8～4.3V	2.30～3.47dBm	Master-Slave Integration Transparent Transmission

NAMING CONVENTIONS



CONTENTS

1. DESCRIPTION

The H9518Fx is a Bluetooth Low Energy module that contains Bluetooth V5.3 (LE Mode) fully compliant system with H-zLink designed firmware and software stack. This product is a Bluetooth standard compliant module based on a universal serial interface, capable of facilitating data transfer between the user's serial port and Bluetooth interface. It also offers a rich array of pins (UART, I2C, SPI, GPIO, ADC, PWM, Audio, etc.), providing flexible and comprehensive software and hardware customization services. This supports seamless client application development, bypassing the complex RF hardware design and manufacturing process. With a complete data transmission software platform, it meets the requirements for rapid development, reduces software investment, and shortens the R&D cycle.

The product features low power consumption, compact size, high cost-effectiveness, strong platform compatibility, high performance, and robust interference resistance.

2. FEATURES

- The ARM Cortex-M3 core MCU operates at 48MHz.
- Based on the Bluetooth Low Energy 5.3 standard protocol stack and additionally supports application layer protocols such as HID.
- It has On-board PCB ANT. Transmission distance can reach 40~100m in open environments, also it supports a reserved external RF interface and can transmit over longer distances.
- The power supply range is wide, from 1.8V to 4.3V, with a typical value of 3.3V. It supports direct power supply from button or lithium batteries for operation in low-power modes.
- It supports a single analog MIC interface and has an in-built Audio voice decoder with a dedicated high-precision ADC for high-fidelity audio effects.
- In low-power mode with RTC wake-up, the power consumption can be as low as 6.1μA, and in power-down sleep mode, the power consumption can reach as low as 2.7μA.
- It allows for custom transmission power and parameters for connection and broadcasting intervals, supporting up to 10dBm transmission power.
- It supports dual-mode operation, allowing for configuration as either a master or a slave device, and it can support up to 2 masters and 18 slaves working simultaneously.
- The module supports OTA (Over-The-Air) firmware upgrades, with air data transmission rates supporting different levels of 2M/1M/500K/125K.
- Operation temperature: -40℃ to +85℃. LxWxH: 16x11.2x1.8mm.

3. TYPICAL APPLICATIONS

H9518Fx can be widely used in the following application scenarios

- 2.4GHz Bluetooth Low Energy systems；
- IoT devices with support for local voice announcements；
- Low-power peripheral devices for PCs, tablets, and smartphones (such as HID devices, remote controllers, etc.) ；
- Smart sports, medical healthcare, and other consumer electronic products；
- Smart meters, data acquisition, and other wireless sensor networks.

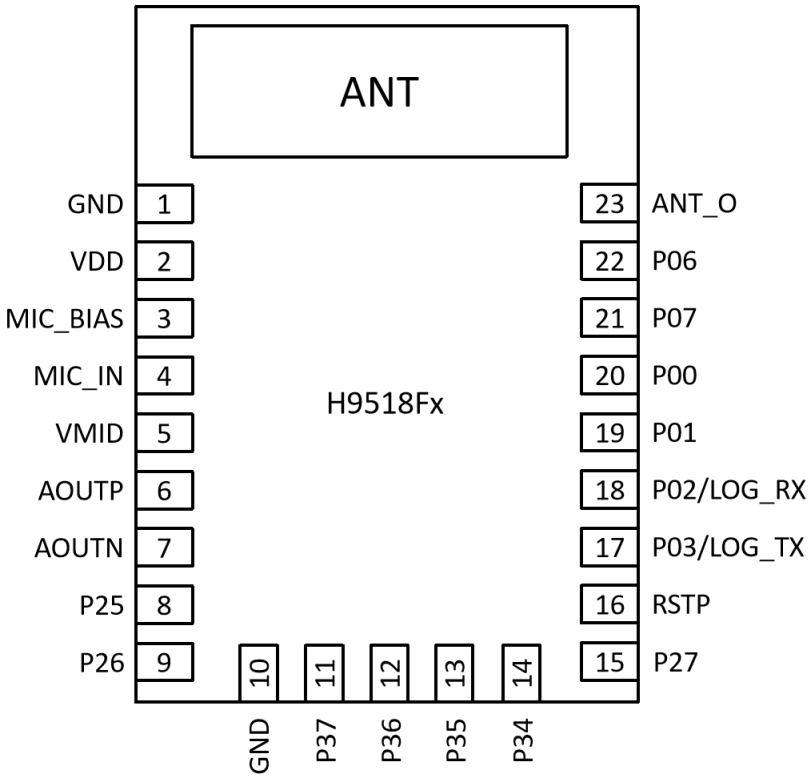
4. BASE SPECIFICATION

Sheet 1 Specification

Content	Specification	
Core Specification	V5.3 (LE Mode)	
Supply Voltage	1.8~4.3V（Typ 3.3V）	
Frequency range	2.400~2.4835GHz	
TDP	Tx peek current	8mA@0dB
	Rx peek current	9.7mA
	Deep sleep current (include 48K retention RAM)	6.1uA
	Power off	2.7uA
Tx Power	-16~+10 dBm	
Operating Temp	-40~+85℃	
Storage Temp	-40~+125℃	
Channel	40（3 ADV+37 DATA）	
Modulation	GFSK（Supports adaptive frequency hopping）	
IO control voltage	0~VCC	
Airborne baud rate	2M/1M（Unit：bps）	
Connected Mode	2 master 18 slave connection	
Distance	40～100m（On-board ANT in open environments）	
Interface	1.27 Spacing stamp holes（SMD）	
SW Update	OTA	
ESD	±2kV（HBM/CDM）	
SIZE	16*11.2*1.8mm	

PS：The aforementioned electrical parameters are all tested in an environment of 25℃ ± 3℃.
【Distance】Subject to influence from the surrounding environment, air humidity, and other factors, for reference only.

5. PACKAGE



Picture 1 Pin diagram

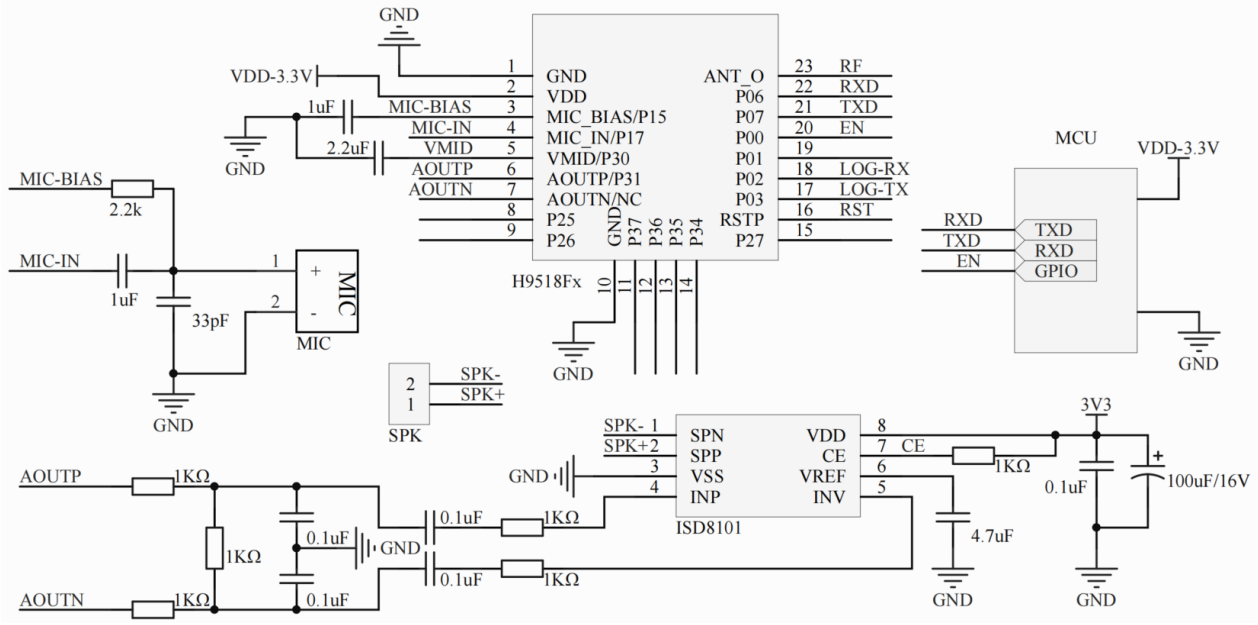
6. PINS DESCRIPTION

Sheet 3 Pin definition

Pin#	Pin name	Type	Definition	Description
1	GND	PWR	GND	All GND connections need to be connected.
2	VDD	PWR	VBAT	Positive power supply for DC/DC
3	MIC_BIAS	AO	MIC	MIC BIAS output
4	MIC_IN	AI	MIC	Voice positive input
5	VMID	AI	MIC	Common mode voltage
6	AOUTP	AO	SPK	The audio right channel positive output
7	AOUTN	AO	SPK	The audio right channel negative output

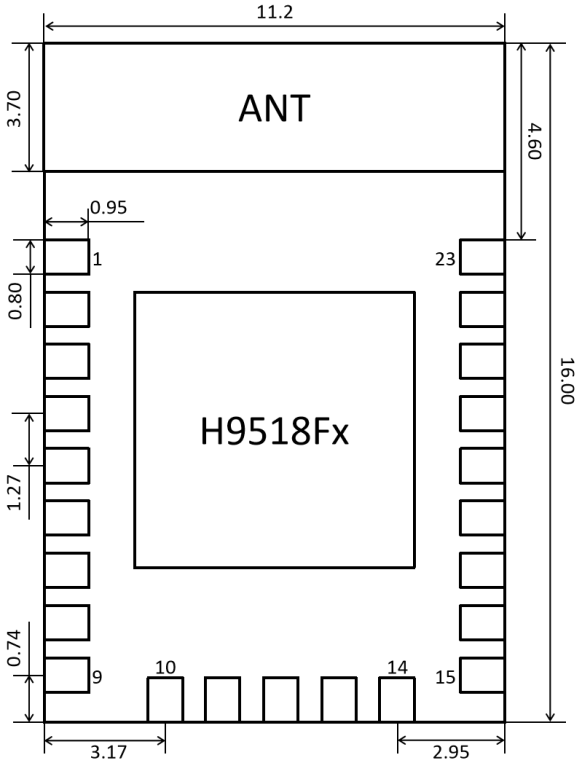
8	P25	I/O	I/O	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/SWV/PDMDAT/PWM4
9	P26	I/O	I/O	SCL1/I2SDOUT/PWM4/SSPDOUT/URXD0/URXD1/SWTCK/PDMCLK/PWM5
10	GND	PWR	GND	All GND connections need to be connected.
11	P37	I/O	I/O	SDA1/I2SDIN/PWM1/SSPDIN/UTXD0/UTXD1/ANTCTL1/PDMDAT/PWM0/ADC3
12	P36	I/O	I/O	SCL1/I2SDOUT/PWM0/SSPDOUT/URXD0/URXD1/CLKOUT/PDMCLK/PWM1/ADC2
13	P35	I/O	I/O	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/ANTCTL0/PDMDAT/PWM4/ADC1
14	P34	I/O	I/O	SCL0/I2SCLK/PWM4/SSPCLK/URXD0/URXD1/ANTCTL0/PDMCLK/PWM5/ADC0
15	P27	I/O	I/O	SDA1/I2SDIN/PWM5/SSPDIN/UTXD0/UTXD1/SWDIO/PDMDAT/PWM4
16	RSTP	AI	RST	Reset
17	P03	I/O	LOG_TX	JTAG（Debug）
18	P02	I/O	LOG_RX	JTAG（Debug）
19	P01	I/O	I/O	SDA1/I2SDIN/PWM3/SSPDIN/UTXD0/UTXD1/ANTCTL1/PDMDAT/PWM2
20	P00	I/O	EN	Module enable control line: Level-triggered mode, active low with internal pull-up. 0：The module starts broadcasting until it connects to a host device. 1：Regardless of the current state of the module, it immediately enters full sleep mode.
21	P07	I/O	UART_TXD	Default UART_TXD
22	P06	I/O	UART_RXD	Default UART_RXD
23	ANT_O	RF	ANT	Default is unconnected (floating), unless an external antenna is attached.

7. APPLICATION CIRCUIT



Picture 2 Typical application diagram

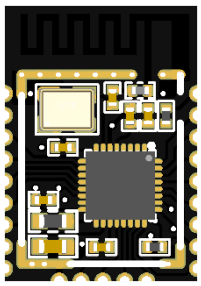
8. PACKAGE PHYSICAL DIMENSIONS



Picture 3 Product size（Unit: mm）

PS：Unmarked dimensional tolerances are in accordance with the GB/T1804-m standard.

9. GRNWE-PICTURE



Picture 4

10. PACKING INFORMATION

1. Palletizing pattern

11. REVISION HISTORY

Reversion Number	Reversion Date	Description
V1.0	2022.05.21	Initial Draft
V1.1	2022.06.01	Modify partial definition
V1.2	2022.06.25	Add Typical application diagram
V1.3	2023.11.13	Modify the associated pin name
V2.0	2024.02.28	Added Audio and some IO pins, modified definitions and positions of certain pins.

12. IMPORTANT NOTICE

Products are not designed, intended, authorized or warranted for use as components in systems or equipment intended for surgical implantation, atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, or for other applications intended to support or sustain life. Furthermore, Products are not intended for applications wherein failure of Products could result or lead to a situation where personal injury, death or severe property or environmental damage could occur.

Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify for any damages resulting from such improper use or sales.

Please note that all data and specifications are subject to change without notice. All the trademarks of products and companies mentioned in this datasheet belong to their respective owners.

13. FCC warning

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

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

14. Antenna used

Antenna Type	Brand/ Manufacturer	Model No.	Max. Antenna Gain
PCB	H-zLink	None	0dBi

Notice to Host Product Manufacturer:

Any deviation(s) from the defined parameters of the antenna trace, as described by this instruction, host product manufacturer must notify us that you wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

15. FCC regulatory compliance statement

§15.19

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.

§15.21 Information to user

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure compliance statement

This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Labelling Instruction for Host Product Integrator

Please notice that 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. For FCC, this exterior label should follow "Contains FCC ID: 2BG9R-H010". In accordance with FCC KDB guidance 784748 Labeling Guidelines.

§ 15.19 Labelling requirements shall be complied on end user device.

Labelling rules for special device, please refer to *§2.925, § 15.19 (a)(5)* and relevant KDB publications. For E-label, please refer to *§2.935*.

Installation Notice to Host Product Manufacturer

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to §*2.1093* and difference antenna configurations.

Antenna Change Notice to Host manufacturer

If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

FCC other Parts, Part 15B Compliance Requirements for Host product manufacturer

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in *§15.105 Information to the user* or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:

For Class B

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.

For Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against

harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.