HF-LPB125

Low Power Wi-Fi Module User Manual

V 1.0

Overview of Characteristic

- ✧ **Support IEEE802.11b/g/n Wireless Standards**
- ✧ **Based on Self-developed High Cost SOC**
- ✧ **Ultra-Low-Power for Battery Applications with Excellent Power Save Scheme**
- ✧ **Support UART/GPIO Data Communication Interface**
- ✧ **Support Work As STA/APMode**
- ✧ **Support Smart Link Function (APP program provide)**
- ✧ **Support Wireless and Remote Firmware Upgrade Function**
- ✧ **Support Internal Antenna Option**
- ✧ **Single +5V Power Supply, +5V UART Voltage.**
- ✧ **Smallest Size: 41.3mm x 24.1mm x 6mm, 2x4 Pin 2.54mm pin header or 4 Pin 2.5mm Header**
- ✧ **FCC/CE Certificated**

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

HISTORY

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1. PRODUCT OVERVIEW

1.1. General Description

The HF-LPB125 is a fully self-contained small form-factor, single stream, 802.11b/g/n Wi-Fi module, which provide a wireless interface to any equipment with a Serial/SPI interface for data transfer.HF-LPB125 integrate MAC, baseband processor, RF transceiver with power amplifier in hardware and all Wi-Fi protocol and configuration functionality and networking stack, in embedded firmware to make a fully self-contained 802.11b/g/n Wi-Fi solution for a variety of applications.

The HF-LPB125 employs the world's lowest power consumption embedded architecture. It has been optimized for all kinds of client applications in the home automation, smart grid, handheld device, personal medical application and industrial control that have lower data rates, and transmit or receive data on an infrequent basis.

The HF-LPB125 integrates all Wi-Fi functionality into a low-profile, 41.3mm x 24.1mm x 6mm SMT module package that can be easily mounted on main PCB with application specific circuits. Also, module provides built-in antenna option.

1.1.1 Device Features

- Single stream Wi-Fi @ 2.4 GHz with support for WEP security mode as well as WPA/WPA2
- Based on Self-developed High Cost Performance MCU
- Ultra-low-power operation with all kinds of power-save modes.
- Includes all the protocol and configuration functions for Wi-Fi connectivity.
- Support STA/AP Mode
- Support Smart Link Function
- Support Wireless and Remote Firmware Upgrade Function
- Integrated PCB antenna or I-PEX antenna connector options.
- Compact surface mount module 41.3mm x 24.1mm x 6mm.
- Full IPv4 stack.
- Low power RTOS and drivers.
- CE/FCC Certified.
- RoHS compliant.
- Single supply – 5V operation.

1.1.2 Device Paremeters

Table 1 HF-LPB125 Module Technical Specifications

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.462GHz
	Transmit Power	802.11b: +16 +/-2dBm (@11Mbps)
		802.11g: +14 +/-2dBm (@54Mbps)
		802.11n: +13 +/-2dBm (@HT20, MCS7)
	Receiver Sensitivity	802.11b: -93 dBm (@11Mbps ,CCK)
		802.11g: -85 dBm (@54Mbps, OFDM)
		802.11n: -82 dBm (@HT20, MCS7)
	Antenna Option	Internal:On-board PCB antenna
Hardware Parameters	Data Interface	UART
		GPIO
	Operating Voltage	4.75~6V
	Operating Current	Peak [Continuous TX]: ~300mA Normal [WiFi ON/OFF, DTIM=100ms]: Average. ~12mA, Peak: 300mA
	Operating Temp.	-20℃- 85℃
	Storage Temp.	-40℃- 125℃
	Dimensions and Size	41.3mm x 24.1mm x 6mm
	External Interface	2x4 pin 2.54mm PIN or 4pin 2.5mm header
Software Parameters	Network Type	STA /AP
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Update Firmware	Local Wireless, Remote
	Customization	Support SDK for application develop
	Network Protocol	IPv4, TCP/UDP/HTTP
	User Configuration	AT+instruction set. Android/ iOS Smart Link APP tools

1.1.3 Key Application

- Remote equipment monitoring
- Asset tracking and telemetry
- Security
- Industrial sensors and controls
- Home automation
- Medical devices

1.2. Hardware Introduction

1.2.1. Pins Definition

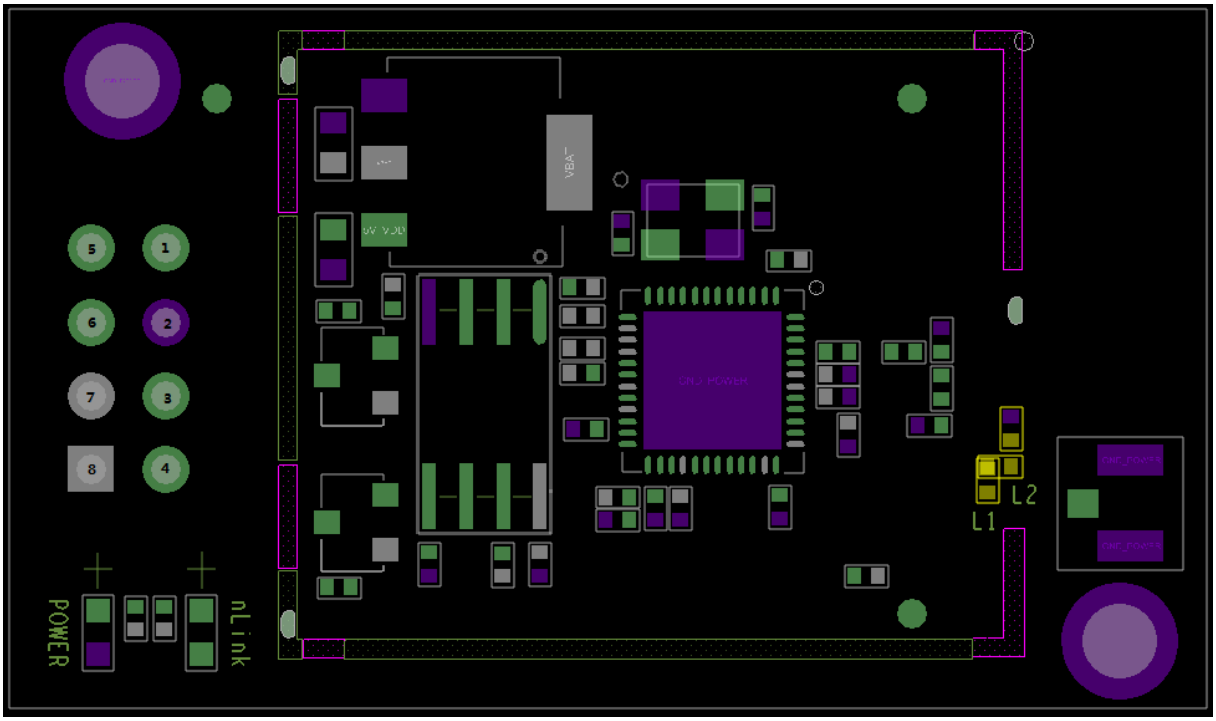

Figure 1. HF-LPB125 Pins Map

Table 2 HF-LPB125 Pins Definition

Pin	Describtion	Net Name	Signal Type	Comments
1	+5V Power	DVDD	Power	5V@250mA
2	Ground	GND	Power	
3	UART0	UART0_RX	I,PU	5V, GPIO19. No connect if not use.
4	UART0	UART0_TX	O,PU	5V, GPIO20. No connect if not use.
5	Multi-Function	nReload	I,PU	**3.3V, GPIO2. Detailed functions see <Notes>**
6	Module Reset	EXT_RESETn	I,PU	3.3V, “Low” effective reset input.
7	GPIO	GPIO5	I/O	3.3V I/O, UART1_TXD debug output No connect if not use.
8	GPIO	GPIO6	I/O	3.3V I/O, UART1_RXD debug input No connect if not use.

<Notes>

Module Pin4 must be high when bootup.

nReload Pin (Button) function：

1. **When this pin is set to "low" during module boot up, the module will enter wireless firmware and config upgrade mode. This mode is used for customer manufacture. (See Appendix D to download software tools for customer batch configuration and upgrade firmware during mass production)**
2. **After module is powered up, short press this button ("Low" < = 2s) to make the module go into "Smart Link " config mode, waiting for APP to set password and other information. (See Appendix D to download SmartLink APP)**
3. **After module is powered up, long press this button ("Low" >= 4s) to make the module recover to factory setting.**

High-Flying strongly suggest customer fan out this pin to connector or button for "Manufacture" and " Smart Link" application.

1.2.2. Electrical Characteristics

Absolute Maximum Ratings:

Parameter	Condition	Min.	Typ.	Max.	Unit
Storage temperature range		-40		125	°C
Maximum soldering temperature	IPC/JEDEC J-STD-020			260	°C
Supply voltage		4.75		6	V
Voltage on any I/O pin		0		5/3.3	V
ESD (Human Body Model HBM)	TAMB=25°C			2.5	KV
ESD (MM)	TAMB=25°C			0.25	KV

Power Supply & Power Consumption:

Parameter	Condition	Min.	Typ.	Max.	Unit
Operating Supply voltage		4.75	5	6	V
Supply current, peak	Continuous Tx		280		mA
Supply current, IEEE PS	DTIM=100ms		20		mA

1.2.3. Mechanical Size

HF-LPB125 modules physical size （Unit: mm） as follows:

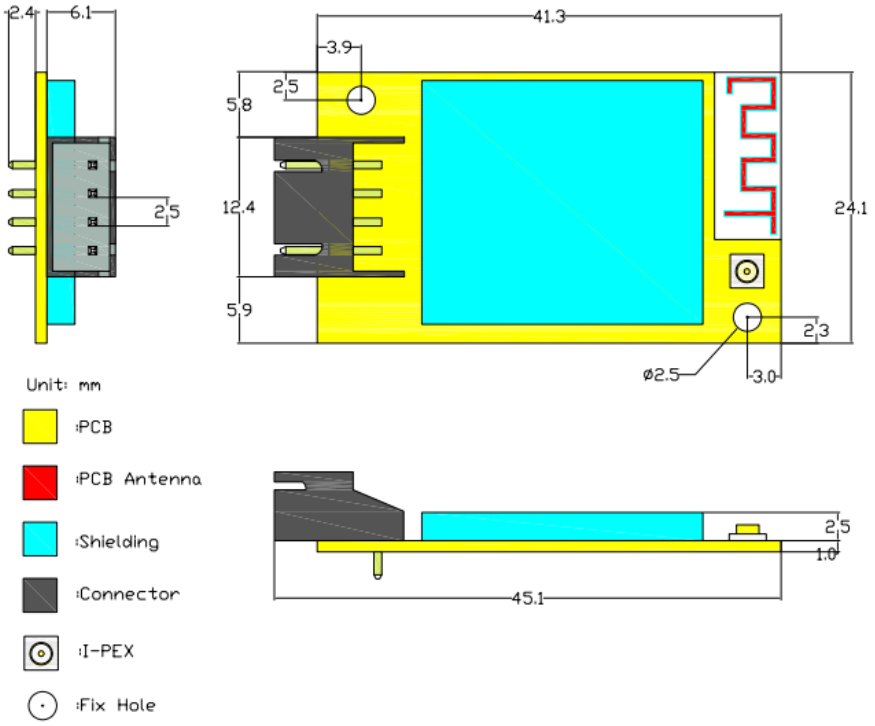

Figure 2. HF-LPB125 Mechanical Dimension

1.2.4. Order Information

Base on customer detailed requirement, HF-LPB125 series modules provide different variants and physical type for detailed application.

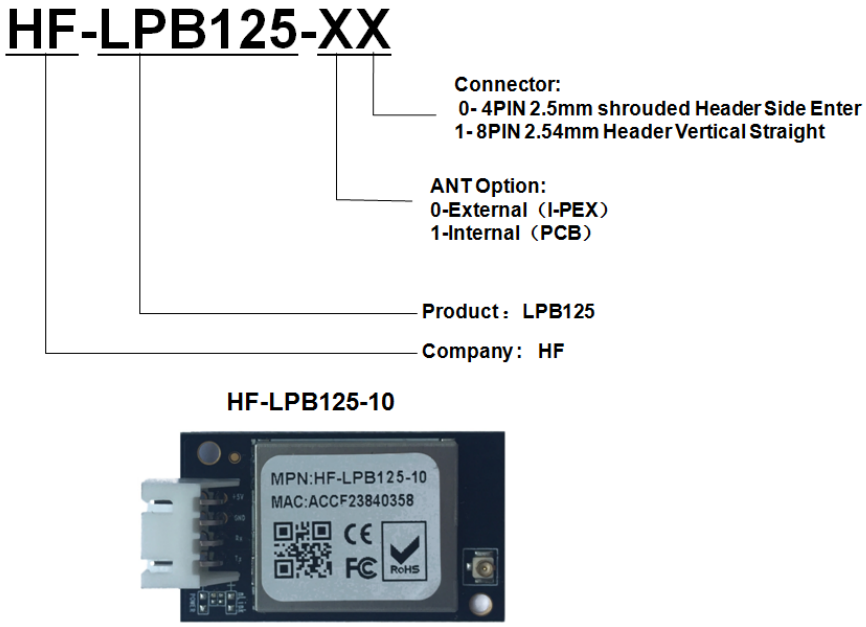

Figure 3. HF-LPB125 Order Information

1.3. Typical Application

Refer to HF-LPB120 user manual for detailed application and module usage.

2. PACKAGE INFORMATION

2.1. Recommended Reflow Profile

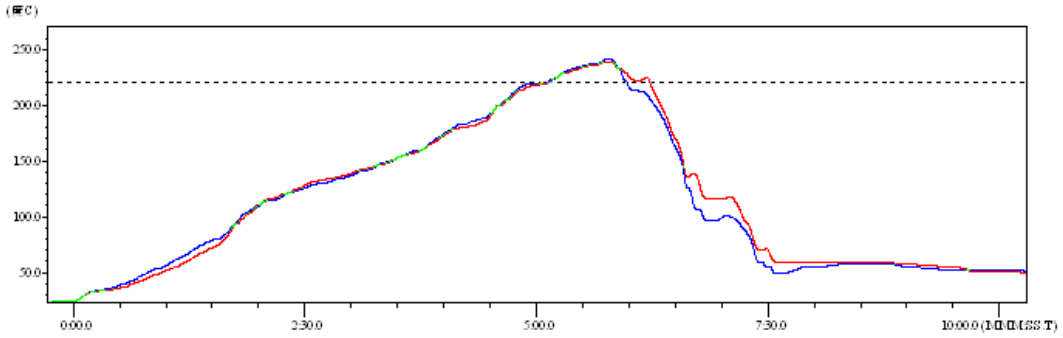

Figure 4. Reflow Soldering Profile

Table 11 Reflow Soldering Parameter

NO.	Item	Temperature (Degree)	Time(Sec)
1	Reflow Time	Time of above 220	35~55 sec
2	Peak-Temp	260 max	

Note: 1. Recommend to supply N2 for reflow oven.
2. N2 atmosphere during reflow (O2<300ppm)

2.2. Device Handling Instruction (Module IC SMT Preparation)

1. Shelf life in sealed bag: 12 months, at <30℃ and <60% relative humidity (RH)
2. After bag is opened, devices that will be re-baked required after last baked with window time 168 hours.
3. Recommend to oven bake with N2 supplied
4. Recommend end to reflow oven with N2 supplied
5. Baked required with 24 hours at 125+-5℃ before rework process for two modules, one is new module and two is board with module
6. Recommend to store at ≦10% RH with vacuum packing
7. If SMT process needs twice reflow:
   (1) Top side SMT and reflow (2) Bottom side SMT and reflow
   Case 1: Wifi module mounted on top side. Need to bake when bottom side process over 168 hours window time, no need to bake within 168 hours
   Case 2: Wifi module mounted on bottom side, follow normal bake rule before process

Note: Window time means from last bake end to next reflow start that has 168 hours space.

2.3. Shipping Information(TBD)

TAPE

Size: 340*340*70 mm

BOX

Size: 340*340*350 mm (inside)

Figure 5. Shipping Information

Note:

1 tape = 500pcs

1 box = 5 tapes = 5 * 500 pcs = 2500pcs

FCC STATEMENT:

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.

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

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.

FCC Radiation Exposure Statement:

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.

FCC INFORMATION (additional)

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions: The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:

The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2ACSVHF-LPB125”.

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Antenna Specification:
Type: PCB Antenna
Model: HF-LPB125
Brand: High-Flying
Gain: 3dBi

APPENDIX E: CONTACT INFORMATION

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Web: www.hi-flying.com
Service Online: 400-189-3108/18616078755
Sales Contact: sales@hi-flying.com

For more information about High-Flying modules, applications, and solutions, please visit our web site http://www.hi-flying.com/en/

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