

E-LINTER loquat md Wi-Fi + BLE Communication Module

ECM6-01& ECM8-01& ECM8-02 datasheet

V251106-R



Revision History

Date	Author	Version	Description
2025/08/22	WAN YUE	V250820R	Initial version
2025/10/22	Zhuqiuju	V251022R	Add CE and FCC regulatory statements.
2025/11/06	Zhuqiuju	V251106R	Delete antenna interface information



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1. Introduction

The Loquat md module is an industrial-grade embedded Wi-Fi + BLE / Wi-Fi Mesh + BLE communication module developed and designed by E-LINTER. It supports the standard IEEE 802.11 b/g/n protocol. This module enables seamless UART-to-Wi-Fi data transmission, allowing users to effortlessly add Wi-Fi and Bluetooth functionality to existing devices.

The module supports Wi-Fi Mesh networking, allowing it to form a mesh network with other company products equipped with Wi-Fi Mesh functionality. This expands Wi-Fi coverage and eliminates dead zones.

The Bluetooth communication feature of this module simplifies Wi-Fi network configuration and enables local device maintenance, such as setting local parameters and performing local firmware upgrades. Additionally, it provides Bluetooth communication SDKs for both Android and iOS platforms, allowing users to seamlessly integrate Bluetooth functionality into their own mobile applications.



2. Features

- Support standard IEEE 802.11 b/g/n protocols
- Support BLE 5.3
- Support WPA, WPA2 encryption methods
- Support Wi-Fi mesh networking protocol
- Supports Wi-Fi protocol
- Supports E-Touch functionality (Android and iOS devices) with SDK provided
- Receive/Transmit double buffering
- Support remote upgrades
- Wide operating temperature range: -40°C ~ 85°C



3. Coding rules

3.1. Serial number encoding rules

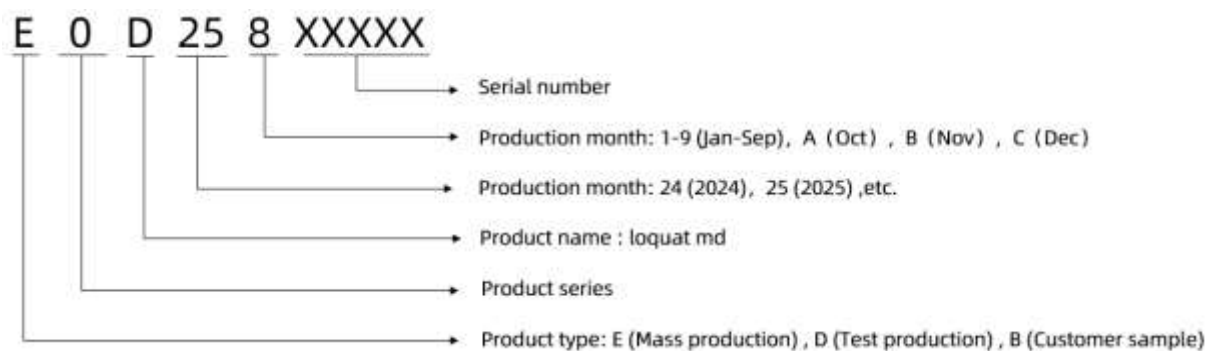


Figure 4-1 Serial number coding diagram



4. Pin and dimension

4.1. Pin layout

The loquat md Communication Module Pinout is shown in the figure below. The pin layout diagram indicates the physical position of pins on the module. The Keep out Zone area is reserved for the PCB antenna, which is a prohibited wiring area on the bottom board.

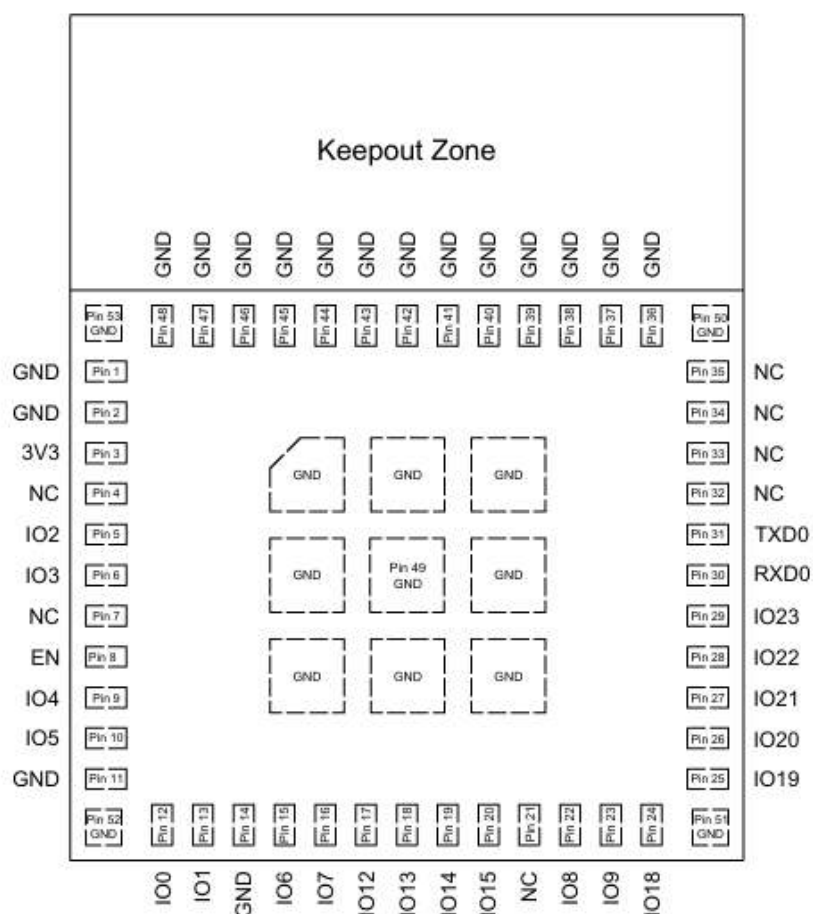


Figure 5-1 Pin Layout (Top View)

4.2. Pin definition

The pin information of this communication module is as follows:

Table 5-2 Pin Description

Name	Pin	Function
3V3	3	Power Supply
EN	8	High: Chip enable; Low: Chip disable, Note: EN pin must not be left floating.

-3-2. All

he module are illustrated in Figure 5-3-1 and Figure 5-3-2. All

1 Dimension Information (Units: mm)

5. Electrical Characteristics

5.1. Absolute Maximum Ratings

Note: Exceeding the absolute maximum ratings may cause permanent damage to the module. Prolonged exposure to these maximum limits may affect the module's reliability.

Table 6-1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Units
VDD33	Power Pin Voltage	-0.3	3.6	V
T _{STORE}	Storage Temperature	-40	105	°C

5.2. Recommended Operating Conditions

To ensure optimal performance, operate the product under the following recommended conditions:

Table 6-2 Recommended Operating Conditions

Symbol	Parameter	Min	Max	Units
VDD33	Power Pin Voltage	3.0	3.6	V
I _{VDD}	External Power Supply Current	0.5	--	A
T _A	Ambient Temperature	-40	85	°C
Humidity	Humidity	--	85	%RH

5.3. DC Electrical Characteristics

Table 6-3 DC Electrical Characteristics (3.3 V, 25°C)

Symbol	Parameter	Min	Max	Units
C _{IN}	Pin Capacitance	—	—	pF
V _{IH}	High-Level Input Voltage	0.75 × VDD ¹	VDD+ 0.3	V
V _{IL}	Low-Level Input Voltage	-0.3	0.25 × VDD	V
I _{IH}	High-Level Input Current	—	50	nA
I _{IL}	Low-Level Input Current	—	50	nA
V _{OH} ²	High-Level Output Voltage	0.8 × VDD	—	V
V _{OL} ³	Low-Level Output Voltage	—	0.1 × VDD	V
I _{OH}	High-Level Sourcing Current (VDD1 = 3.3 V, V _{OH} ≥ 2.64 V, PAD_DRIVER = 3)	—	—	mA

¹ VDD is the I/O power supply

² V_{OH} is measured under high-impedance load conditions

³ V_{OL} is measured under high-impedance load conditions

I_{OL}	Low-Level Sinking Current ($V_{DD1} = 3.3\text{ V}$, $V_{OL} = 0.495\text{ V}$, $PAD_DRIVER = 3$)	—	—	mA
R_{PU}	Pull-up Resistance	—	—	k Ω
R_{PD}	Pull-down Resistance	—	—	k Ω
V_{IH_nRST}	Chip Reset Release Voltage	$0.75 \times V_{DD}$	$V_{DD} + 0.3$	V
V_{IL_nRST}	Chip Reset Voltage	-0.3	$0.25 \times V_{DD}$	V

5.4. Timing Requirements

After the module is powered on, the power supply requires a brief stabilization period. Then the EN pin must be pulled high to activate the module. For details on the EN, power-on, and enable timing, refer to Figure 6-4 and Table 6-4:

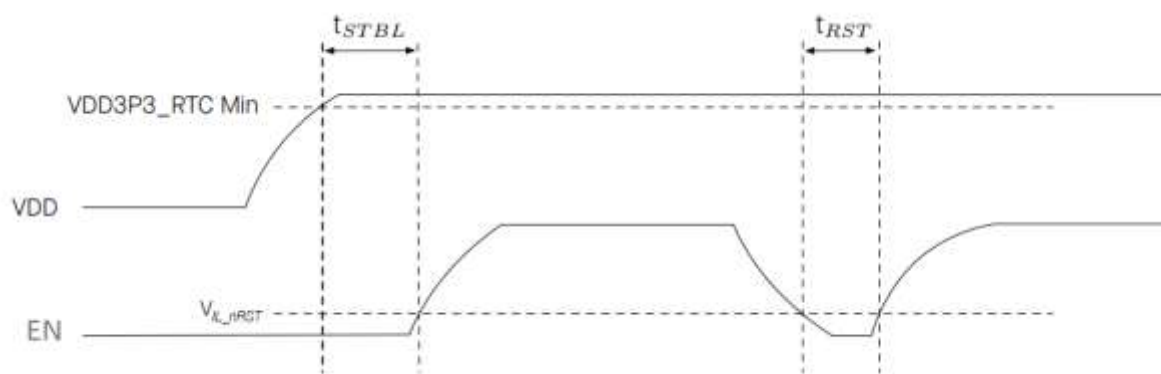


Figure 6-4 Power-On and Reset Timing Parameter Diagram

Table 6-4 Power-On and Reset Timing Parameter Description

Parameter	Description	Minimum Value (μs)
t_{STBL}	Time required for the 3.3V system power to stabilize before pulling EN pin high to activate the module	50
t_{RST}	Time duration for which EN stays below V_{IL_Nrst} to reset the module (refer to Table 6-3 for specific value)	50

5.5. Wi-Fi Characteristics

Table 6-5-1 Wi-Fi RF Specification

Parameter	Condition	Unit
Frequency range	--	2412 - 2484 MHz
Wi-Fi protocol	--	IEEE 802.11 b/g/n
Data rate	20 MHz	11b: 1, 2, 5.5 and 11 Mbps 11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 11n: MCS0 - 7, 72.2Mbps(Max)
	40 MHz	11n: MCS0 - 7, 150Mbps(Max)
Antenna	--	Build-in antenna

Table 6-5-2 Wi-Fi Transmitter Characteristics

Parameter	Condition	Min.	Typ.	Max.	Unit
Transmit power	802.11b, 1Mbps	--	20.5	--	dBm
	802.11b, 11Mbps	--	20.5	--	dBm
	802.11g, 6Mbps	--	20.0	--	dBm
	802.11g, 54Mbps	--	19.0	--	dBm
	802.11n, HT20, MCS0	--	19.0	--	dBm
	802.11n, HT20, MCS7	--	18.0	--	dBm
	802.11n, HT40, MCS0	--	18.5	--	dBm
	802.11n, HT40, MCS7	--	17.5	--	dBm

Table 6-5-3 Wi-Fi receiver characteristics

Parameter	Condition	Min.	Typ.	Max.	Unit
Receive sensitivity	802.11b, 1Mbps	--	-99.2	--	dBm
	802.11b, 11 Mbps	--	-90.0	--	dBm
	802.11g, 6 Mbps	--	-94.0	--	dBm
	802.11g, 54 Mbps	--	-77.6	--	dBm
	802.11n, HT20, MCS0	--	-93.6	--	dBm
	802.11n, HT20, MCS7	--	-75.4	--	dBm
	802.11n, HT40, MCS0	--	-91.0	--	dBm
	802.11n, HT40, MCS7	--	-73.2	--	dBm

5.6. BLE characteristics

Table 6-6-1 BLE receiver characteristics

Parameter	Condition	Min.	Typ.	Max.	Unit
Sensitivity	@30.8% PER 1M	--	-98.0	--	dBm
	@30.8% PER 125K	--	-105.5	--	dBm
	@30.8% PER 500K	--	-101.5	--	dBm
Maximum received signal	@30.8% PER 1M	--	8	--	dBm
	@30.8% PER 125K	--	8	--	dBm
	@30.8% PER 500K	--	8	--	dBm

Table 6-6-2 BLE transmitter characteristics

Parameter	Condition	Min.	Typ.	Max.	Unit
RF transmit power	--	--	0	--	dBm
Gain control step	--	--	3	--	dBm
RF power control range	--	-27	--	18	dBm



6. Reference Design

6.1. Schematic design

The reference design for this product is shown below. J1 and J2 are NC (Not Connected) by default and are used only during development, debugging, or wireless certification testing. Alternatively, J1 and J2 can be omitted, and Pins 23, 30, and 31 can be routed out as test points. Be sure not to completely remove this functionality.

Option 1: External MCU Reset. The MCU's I/O pin controls the EN pin to reset the module. This option is suitable for industries such as PV(photovoltaics), where power supply instability may lead to frequent rapid power cycling, which can violate power-on timing requirements. Therefore, an external MCU reset is needed.

Option 2: RC Reset Circuit. This option is suitable for scenarios with stable power supplies and no frequent rapid power cycling. An RC reset circuit is sufficient to meet the module's power-on timing requirements.

6.2. Layout design

Because uses a PCB antenna, the layout should minimize any impact the baseboard might have on the performance of the module's antenna. It is recommended to place the module as close to the edge of the baseboard as possible. If conditions feasible, the PCB antenna area should extend beyond the baseboard edge, with the antenna feed point as close to the board edge as possible.

◦

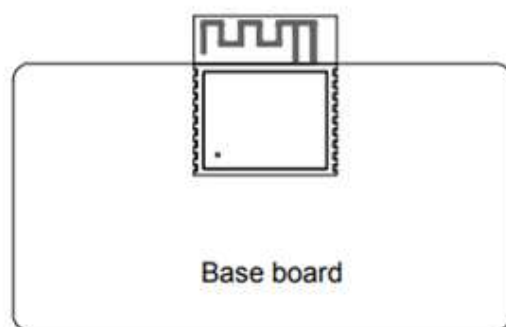


Figure 7-2 Module Placement on Baseboard

If this layout approach cannot be used due to design constraints, an alternative is to ensure at least 15 mm of clearance around the module's PCB antenna area. No copper, signal traces, or components should be placed in this region, as shown in Figure 7-3:

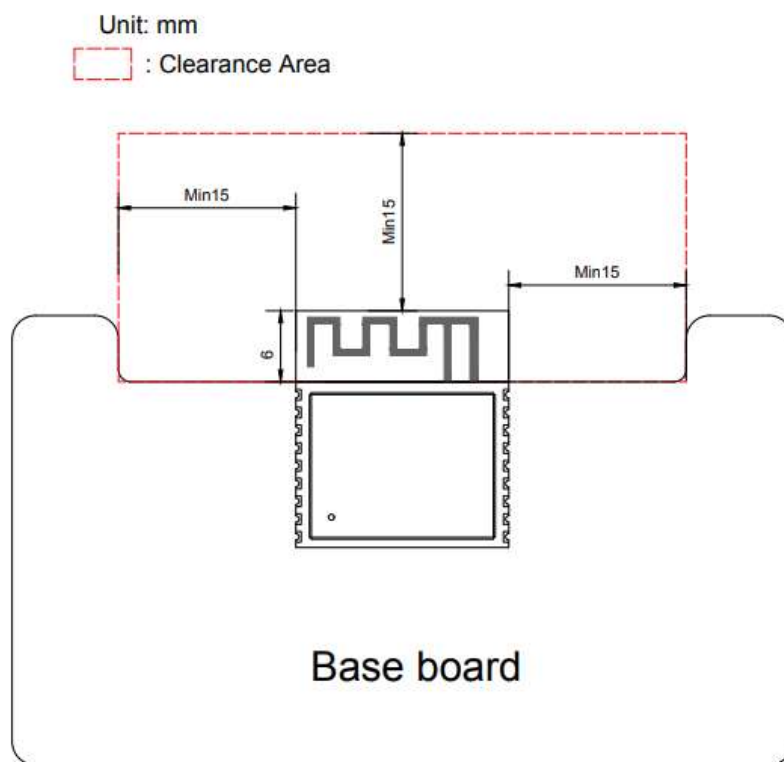


Figure 7-3 PCB Antenna Keep-Out Zone



7. Packaging

7.1. Packaging

Shipment is provided in tape-and-reel packaging. Each reel contains 650 modules. The tape is sealed in a vacuum anti-static bag, as shown in Figure 9-1-1:



Figure 9-1-1 Vacuum Anti-Static Bag Packaging

Each reel is placed inside an inner carton box, as shown in Figure 9-1-2:



Figure 9-1-2 Inner Carton Packaging

Each master carton contains 5 reels, totaling 3250 modules. The approximate weight is 7.5kg. Outer carton dimensions: 390.0 × 390.0 × 370.0 mm, as shown in Figure 9-1-3:

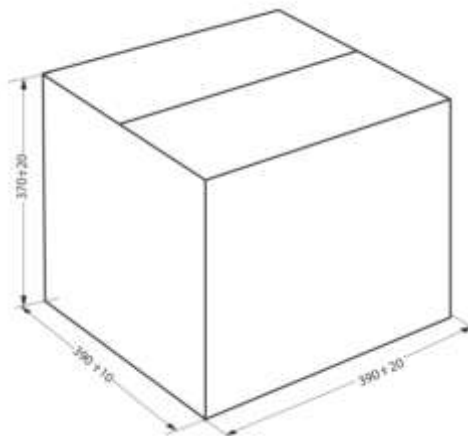


Figure 9-1-3 Outer Carton Dimensions:

7.2. Outer carton label

The outermost shipping carton carries a label including: Customer Name, Order Number, Product Name, Customer P/N (Part Number), Product P/N (Part Number), Quantity per Carton, Carton Number, and Production Date. Carton number is displayed in a numerator/denominator format—for example, "2/5" indicates that this is carton 2 of a total of 5. Label content is subject to the actual shipment; the following is for reference only, as shown in Figure 9-2:



Figure 9-2 Outer carton label diagram



8. Declaration of conformity

This product complies with the radio interference requirements of the European community. Hereby, Chengdu E-LINTER Information Technology Co., Ltd. declares that the product is in compliance with the essential requirements and other relevant provisions of RE Directive 2014/53/EU. You can find the Declaration of Conformity on www.e-linter.com.

RF frequency:

2.4G WIFI: 2412 MHz to 2472 MHz

BLE: 2402 MHz to 2480 MHz

RF power:

2.4G WIFI: 12.71 dBm

BLE: 1.98 dBm

Manufacturer Name: Chengdu E-LINTER Information Technology Co., Ltd.

Address: No. 505, Building 6, Zone D, Tianfu Software Park, No. 599, Century City South Road, CDHT, Chengdu, Sichuan, China



9. 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. (2) This device must accept any interference received, including interference that may cause undesired operation.

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.

The device has been evaluated to meet general RF exposure requirements. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

The Module is designed to comply with the FCC statement. FCC ID is 2BAGJ-ECM6-01. The host system using the Module should have a label indicating it



contains the modular' s FCC ID is 2BAGJ-ECM6-01. This radio module must not 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. 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 is assigned by Company name: Chengdu E-LINTER Information Technology Co., Ltd., Model no.: ECM6-01, ECM6-00, ECM8-00, ECM8-01, ECM8-02, ECM8-04. If other host types used would need further evaluation and possible C2PC if they are not significantly similar to the one tested. The 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 3.75dBi in the 2.4G band. The module uses Internal antenna, this antenna is sold with the module.

9.1. Notice to OEM integrator

The end user manual shall include all required regulatory information/warning as shown 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.

ⁱ Designed for devices with integrated Wi-Fi mesh capability.