Wi-linktech WLT7150 NFC Module User Guide

Contents

Wi-linktech WLT7150 NFC Module

Specifications

- **Manufacturer:** Wilink-tech Communication Technology(Shanghai) Co., LTD
- **Model:** WLT7150 NFC Module
- **Version**: Latest v1.1
- **Dimensions:** 17x39mm
- **Operating Temperature:** -30°C to +85°C
- **Supply Voltage**: 0V to 3.6V
- **Supported Tags:** ISO14443A/B, ISO15693, NFCIP-1, NFCIP-2, MIFARE Classic 1K/4K, MIFARE Ultralight, FeliCa, etc.
- **Reading Card Distance:** 5-10cm

Product Usage Instructions

Overview

The WLT7150 NFC module is a highly integrated NFC card reader module that supports various transfer modes according to NFCIP-1 and NFCIP-2, ISO/IEC 14443, ISO/IEC15693, MIFARE Classic IC card, and FeliCa card specifications. It consists of a high-performance NFC controller with integrated firmware and a 32-bit MCU circuit.

Product Features

- Supports standards like ISO14443A/B, ISO15693, NFCIP-1, NFCIP-2, MIFARE Classic 1K/4K, MIFARE Ultralight, FeliCa, etc.
- Supports various tags including ISO 14443-4 PICC type A/B, ISO15693 tags, Mifare series (Classic 1K/4K, Ultralight, DESFire), FeliCa, etc.
- I2C bus interface, RF field, internal timer automatic wake up for ultra-low power consumption.
- Small package size (17x39mm) with a reading card distance of 5-10cm.
- Operating temperature range: -30°C to +85°C.

Application Field

The NFC module is suitable for devices requiring NFC functionality in Android and Linux environments. It can be

used in televisions, set-top boxes, home automation systems, wearables, printers, game consoles, and more.

Electrical Specifications

The module operates within a supply voltage range of 0V to 3.6V. Refer to the maximum rated parameters in Table 2-1 for detailed electrical specifications.

Pin Instructions

- **Pin Distribution**
- The pin distribution information can be found in the module documentation provided.
- **Connection Diagram**
- Refer to the connection diagram in the module documentation for proper wiring instructions.
- **Pin Definition**
- Consult the module manual for detailed pin definitions and their functions.

FAQ

- **Q:** What are the supported standards for the WLT7150 NFC module?
- **A:** The module supports standards like ISO14443A/B, ISO15693, NFCIP-1, NFCIP-2, MIFARE Classic 1K/4K, MIFARE Ultralight, FeliCa, etc.
- **Q:** What is the operating temperature range of the WLT7150 NFC module?
- **A:** The operating temperature range of the module is -30°C to +85°C.

About this Manual

The “WLT7150 Module Specification” provides an introduction to the basic functions of the WLT7150 module, including the electrical specifications of the module, pin size, and reference schematic design. Readers can refer to this document for the overall functional parameters of the module have a detailed understanding of the application.\

Version Information Management

Version Number	Time	Updating records	Editor
V1.0	2021.04.26	Initial version	
V1.1	2024.03.11	Update module	Zhang Wei

Overview

- The WLT7150 is a highly integrated NFC card reader module from WLT. The module consists of a high-performance NFC controller with integrated firmware supporting all NFC Forum modes and a high-performance 32-bit MCU circuit.

- The NFC card reader module supports various transfer modes according to NFCIP-1 and NFCIP-2, ISO/IEC 14443, ISO/IEC15693, MIFARE Classic IC card, and FeliCa card specifications.
- The NFC module is external with an antenna, which greatly enhances the flexibility of module use.
- Simple interface, superior performance, and small size, very low cost can make NFC modules more convenient, and more flexible when embedded in a variety of different application systems.

Product Features

Support standard: ISO14443A/B

- ISO15693
- NFCIP-1, NFCIP-2
- MIFARE Classic 1K/4K
- MIFARE Ultralight, Jewel, Open FeliCa, MIFARE DESFire

Support tags: ISO 14443-4 PICC type A,

- type; ISO15693 tags;
- Mifare series: Classic 1K/4K;
- Ultralight;
- Ultralight C;
- Mifare PLUS;
- DESFire;
- DESFire EV1 2/4/8K;
- FeliCa;
- I2C bus interface, RF field, and internal timer automatic wake-up can achieve ultra-low power
- consumption; Support the I2C interface, through simple instructions to operate the module
- Stamp hole pin, easy and reliable welding
- ultra-small package: 17x39mm
- Reading card distance: 5-10cm, depending on
- the specific antenna and use environment operating temperature: -30℃~+85℃

Application field

- All devices that require NFC functionality, especially those running in Android and Linux environments
- Televisions, set-top boxes, Blu-ray decoders, audio devices
- Home automation, gateways, wireless routers
- Household appliance
- Wearables, remote control, health care, fitness
- Printers, IP phones, game consoles, accessories

Electrical specifications

Table 2-1: Maximum rated parameters

Item	Symbol	Min	Max	Unit
Supply voltage	VDD	0	3.6	V
Pin input voltage	Vin	0.3	VDD + 0.3	V
Pin output voltage	Vout	0	VDD	V
Storage temperature	Tstr	– 55	150	ºC
Welding temperature	Tsld	–	260	ºC

Note

1. The electrical characteristics listed are target specifications and are for reference only. Some data may be updated based on actual test results.
2. The voltage values shown are based on GND in the module. Any voltage that exceeds the “maximum rating” may cause permanent damage to the equipment

Table 2-2: Recommended operating conditions

Item	Symbol	Min	Typ.	Max	Unit
Supply voltage	VDD	1.7	3.3	3.6	V
Supply voltage rise time (1.6V to 2.8V)	TR	–	–	10	ms
Operating temperature range	Topr	– 40	–	85	ºC

Table 2-3: Operating current (VDD=3.3V, T=25 ° C)

Item	Sym.	Min	Typ.	Max	Unit	Condition
Read card	Iread	–	200	–	mA	PCD mode
Stand by		–	1	–	mA	

Table 2-4: Pin input/output characteristics (VDD=3.3V, T=25 ° C)

Item	Sym.	Min	Typ.	Max	Unit	Condition
Enter high	VIH	0.84	VDD	VDD	V	
Enter low	VIL	VSS	VSS	0.36	V	
Output high	VOH	1.88	VDD	VDD	V	
Output low	VOL	VSS	VSS	0.47	V	

Pin instructions

Pin distribution

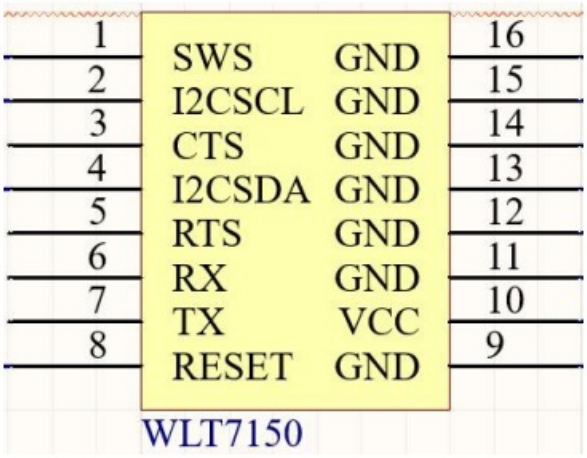


Figure 3-1: Module pin diagram

Connection diagram

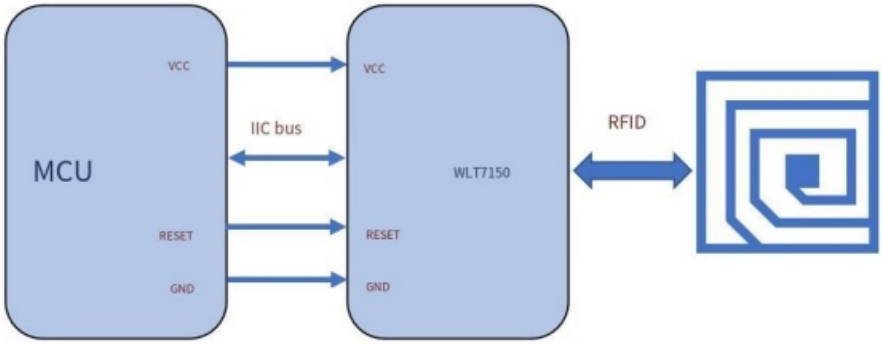


Figure 3-2: I2C communication

Pin definition

PIN #	Pin name	Type	Description
1	SWS	Digital I/O	Debug
2	I2CSCL	Digital I/O	I/O
3	CTS	Digital I/O	I/O
4	I2CSDA	Digital I/O	I/O
5	RTS	ANALOG	I/O
6	RX	ANALOG	I/O
7	TX	ANALOG	I/O
8	RESET	Digital I/O	Reset
9	GND	GND	Ground
10	VCC	POWER	Power supply for Module(1.7 to 3.6V)
11	GND	GND	Ground
12	GND	GND	Ground
13	GND	GND	Ground
14	GND	GND	Ground
15	GND	GND	Ground
16	GND	GND	Ground

Reference the design

Refer to schematics

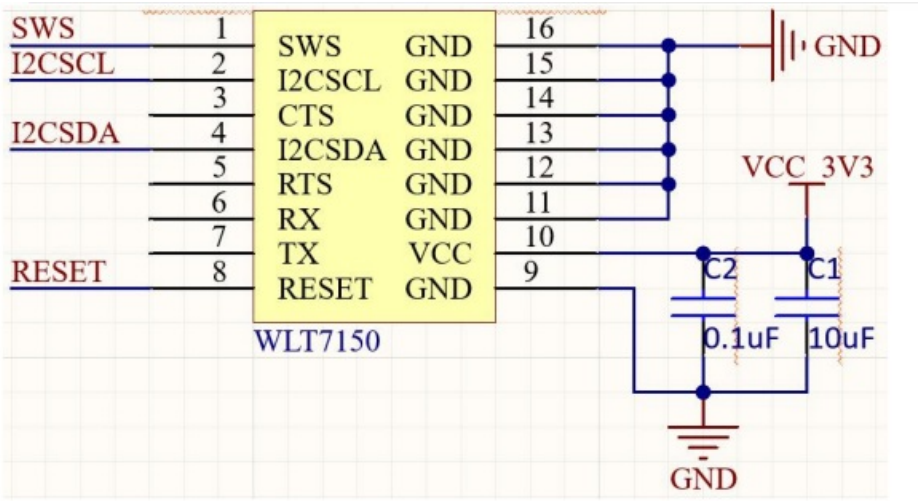


Figure 4-1: Reference schematic

Module dimensions

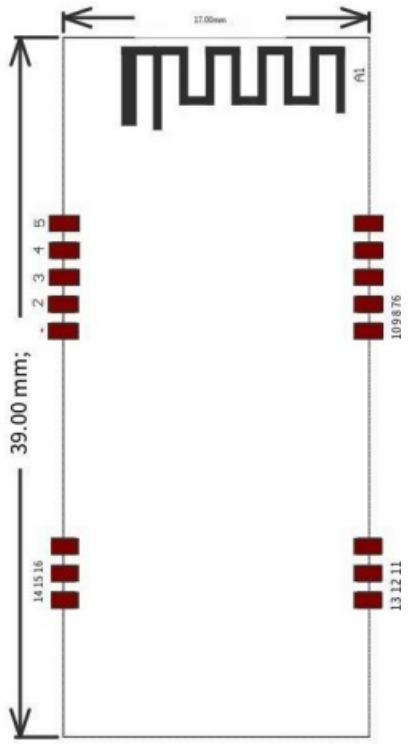


Figure 4-2: Top View (Seen from Top) Bottom View (Seen from Bottom)

Module outline dimensions (including process edges)	Length (X)	39.0±0.3mm
	Width (Y)	17.0±0.3mm
PCB thickness	Height (H)	1.60±0.05mm
The total thickness of the module	Height (H)	3.00±0.1mm

Table 4-1: Module design dimensions

Note: WLT reserves the right to select components from different suppliers to realize the functions of the module. At the same time, ensure that all mechanical and electrical specifications and module certifications are maintained. The design should be carried out within the scope of the physical dimensions of the machinery as shown in Figure 4-2. All measurements are in millimeters (mm).

Precautions

The module uses an external antenna, which is far away from metal devices as far as possible. Module reading distance is closely related to antenna size and card size, please adjust accordingly according to actual needs; Try to avoid touching the electronic components on the module without protective measures to reduce the possibility of electrostatic damage to the module.

Refer to PCB packaging

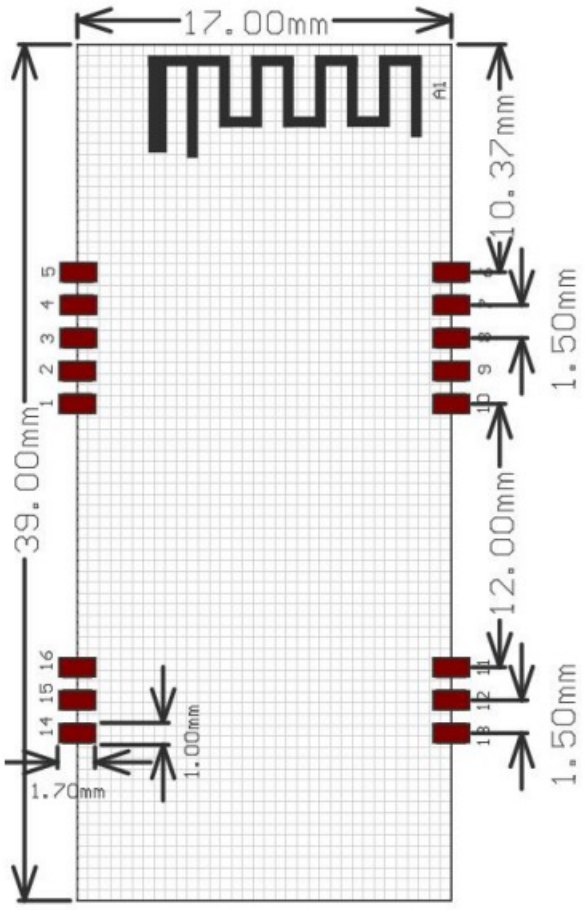


Figure 4-3: Reference package dimensions

Figure 4-3: Reference package dimensions

Reflux parameters are recommended

Reflux parameters can refer to the following Settings

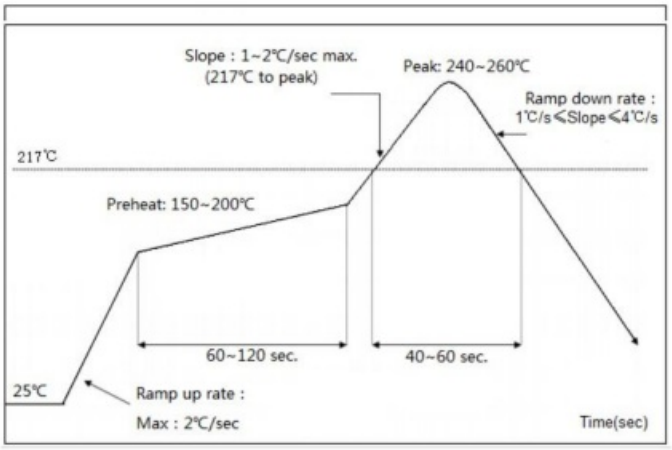


Figure 5-1: Backflow
recommendation curve

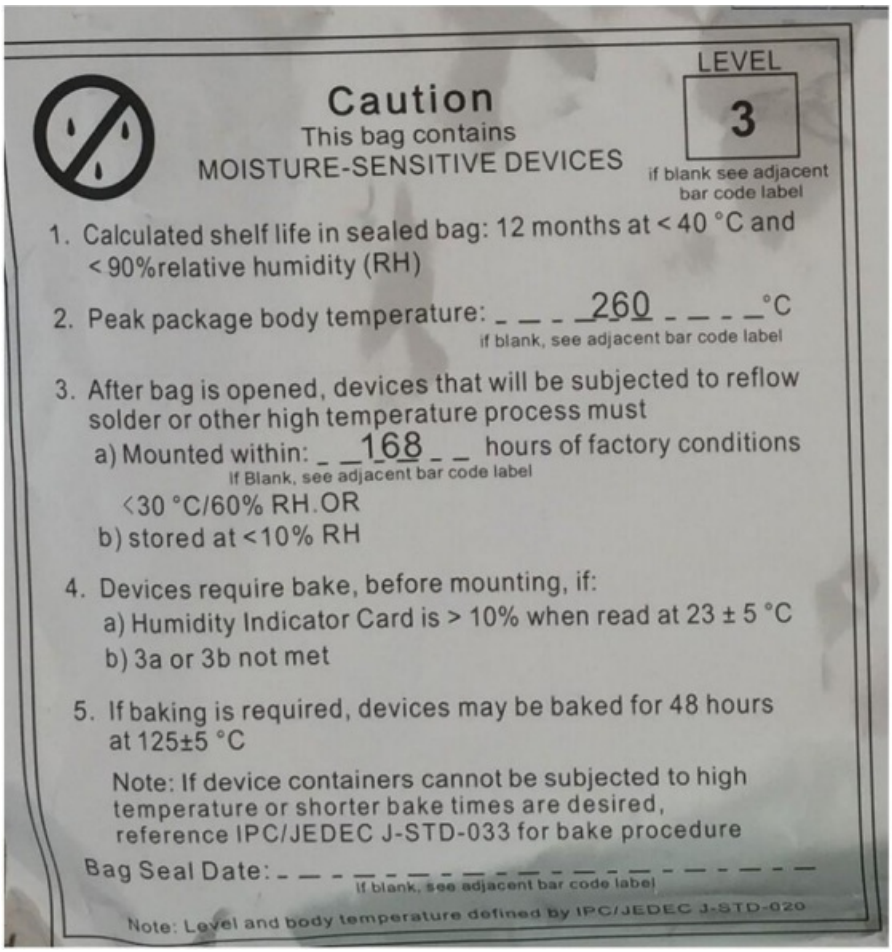
Temperature range	Time	Key parameters
Preheat zone(<150℃)	60-120S	Ramp up rate:≤2S
Uniform temperature zone(150- 200℃)	60-120S	Ramp up rate:<1S
Recirculation zone(>217℃)	40-60S	Peak:240-260℃
Cooling zone	Ramp down rate:1℃/s≤Slope≤4℃/s	

Table 5-1: Recommended parameters for reflux

Package size

The WLT7150 module uses a sealed vacuum bag by default. The packing instructions are as follows:

- Sealed vacuum package Shelf life: The shelf life is 12 months. The temperature is <40℃ and the relative humidity is <90% R.H. After unpacking, the installation shall be completed within 168 hours under the environment of <30℃ and <60% R.H. d relative humidity.
- If it does not meet the requirements of 5.2, the module needs to be baked before
- use, and the baking condition is 125±℃ for 8 hours.
- Product handling, storage and processing shall comply with IPC/JEDEC J-STD-033.
- Please refer to “Caution” on the vacuum bag for the above information



Software application

- WLT7150 supports customer customization, please contact our company for details.

FCC STATEMENT

Regulatory Module Integration Instructions

List of applicable FCC rules
This device complies with part 15 of the FCC Rules. Limited module procedures
Not applicable
Summarize the specific operational use conditions
This module can be applied in Wearable, mouse and keyboard, remote-controlled toys, and Electronic shelf labels, and cold chain transport input voltage to the module should be nominally 1.7-3.6V DC typical value of 3.3V DC, and the ambient temperature of the module should not exceed 85℃
.**RF exposure considerations**
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 5mm between the radiator& your body. If the device is built into a host as a portable usage the additional RF exposure evaluation may be required as specified by 2.1093.
FCC Radiation Exposure Statement
This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
Label and compliance information
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. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: 2AOO6-WLT7150 Or Contains FCC ID:2AOO6-WLT7150”

When the module is installed inside another device, the user manual of the host must contain below warning statements:

1. 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

   The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product

Additional testing Part 15 subpart B disclaimer
The final host/module combination needs to be evaluated against
the FCC Part 15B criteria for unintentional radiators in order to be
properly authorized for operation as a Part 15 digital device.
The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules including the transmitter operation and should refer to guidance in KDB 996369.

Frequency spectrum to be investigated

- For host products with certified modular transmitters the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a(1 through (a(3 or the range applicable to the digital device as shown in Section 15.33(b(1 whichever is the higher frequency range of investigation.

FCC Statement
Any Changes or modifications 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 thefollowing 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

For Canada
Canada Statement
This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. this device may not cause interference, and
2. this device must accept any interference, including interference that may cause undesired operation of the device.

Caution Exposure:
This device meets the exemption from the routine evaluation limits in section 2.5 of RSS102 and users can obtain Canadian information on RF exposure and compliance. Le dispositif répond à l'exemption des limites d'évaluation de routine dans la section 2.5 de RSS102 et les utilisateurs peuvent obtenir des renseignements canadiens sur l'exposition aux RF et le respect. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

The final end product must be labeled in a visible area with the following

- The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise, the host device must be labeled to display the Industry
- Canada certification number of the module, preceded by the words “Contains transmitter module”, or the word “Contains”, or similar wording expressing the same meaning, as follows:
- Contains transmitter module IC: X26141-WLT7150

The module must be installed in System name. This End equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. The end user manual shall include all required regulatory information/warnings as shown in this manual

About us

- Founded in 2011, Wilink-tech Communication Technology(Shanghai) Co., Ltd. is a fast-growing Internet of Things wireless communication technology company located in the core area of Zhangjiang High-tech Development Zone in Pudong, Shanghai.
- The company focuses on providing the world’s leading wireless connectivity solutions for the Internet of Things (WiFi/ Blue tooth /BLE/Lora/NB-IOT, etc.), including self-developed and self-branded communication chips, communication modules,
- communication boards, communication protocol software, mobile phone apps, cloud computing and other parts.
- The company mainly serves large and medium-sized customers in the industrial Internet of Things, automotive, medical and fitness, financial payment and security, high-end consumer electronics, professional Musical Instruments, office equipment, and other industries, including more than 40 deeply customized global industry-leading customers in China, the United States, Europe, South Korea
- and other regions, as well as more than 200 large and medium-sized customers with close cooperation.
- Adhering to the concept of people-oriented, integrity, responsibility and innovation, the company is committed to becoming a high-tech company with talent and technology as its core competitiveness and sustainable development.
- The company’s core team has more than 10 years of management and technical experience in top 500 US-funded high-tech enterprises, emphasizes sustainable win-win cooperation with customers, combines the company’s wireless connectivity and Cloud technology with in-depth
- customization of customer industry applications, and provides reliable wireless connectivity technical support for continuous product innovation and service innovation for large and medium-sized customers in the era of the Internet of Things.

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Documents / Resources

	Wi-linktech WLT7150 NFC Module [pdf] User Guide WLT7150, WLT7150 NFC Module, NFC Module, Module

References

- linktech.com
- - -
- User Manual