



Shenzhen Hi-Link Electronics Co., Ltd.

HLK-ZW0901 Specification
Circular fingerprint module with light



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1. Product introduction

Consumers use fingerprint recognition modules to determine user identity. When the user touches the fingerprint recognition module with his finger, the fingerprint recognition module will scan the user's fingerprint, and the algorithm chip can obtain the fingerprint image data for registration and comparison.

2. Parameter

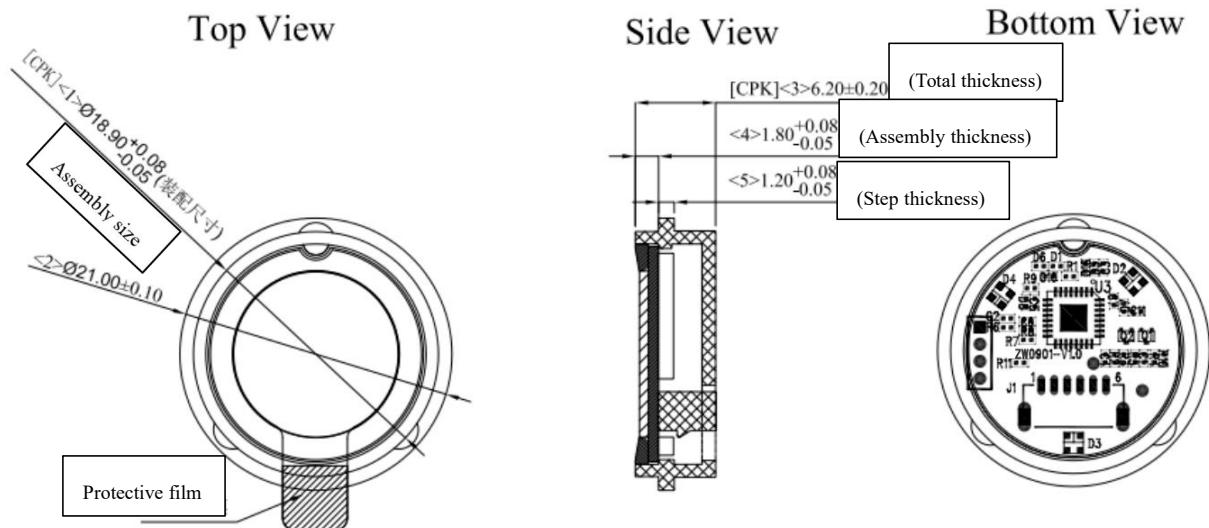
2.1. Technical indicators

Item	Parameter
Storage	50 fingerprint data is standard
Sensor type	Capacitive touch sensor
Resolution	508DPI
FRR.	<3%
FAR.	<0.001%
Fingerprint sensor shape	Round
Image gray level	8-bit grayscale
Service life	A million times
Static electricity test	Contact discharge $\pm 8\text{KV}$ /air discharge $\pm 15\text{KV}$
Data interface	UART (TTL level)
Sensor surface hardness	3H
Working temperature and humidity range	$-30^{\circ}\text{C}\sim+70^{\circ}\text{C}$; 45%~85%RH
Storage temperature and humidity range	$-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$; 45%~95%RH

2.2. Mechanical characteristics

Item	Description	Unit
Dimensions	$\Phi 12.8\text{mm}$	mm
Ribbon	5.6*4.8	mm
sensor size	112*96	

2.3. Dimensions



备注:

Note:

1. Unmarked tolerance: ± 20 ;
2. The key control size with <n> serial number;
3. The CPK size with [CPK], $CPK \geq 1.33$.

3. Electrical parameters

Item	Min	Typical	Max	Unit	
Supply voltage	3.0	3.3	3.6	V	
Standby current (sensor)	-	10	12	μ A	
Operating current (algorithm MCU)	16	30	40	mA	
Picture collection time	36	45	70	ms	
Generate feature value time	50	65	80	ms	
Comparison time	20	150	600	ms	
Power-on start time	-	100	180	ms	
ESD rating	non-contact discharge	-	15	-	KV
	contact discharge	-	8	-	KV

4. Interface definition

4.1. Communication Interface

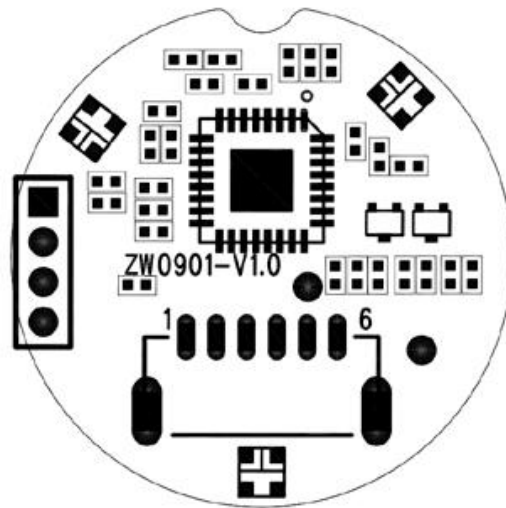
The standard UART default baud rate is 57600 bps, 1 start bit, 1 stop bit, 8 data bits, no parity bit, 3.3V TTL level.

4.2. Connector type

XH-1.00-6P: 6-pin vertical connector, pitch 1.00mm.

4.3. Pin description

PIN	Define
1	GND
2	RXD
3	TxD
4	VDD_3.3V
5	Detect
6	SENSOR_3.3V



Pin number	Name	Definition	Type	Remark
1	GND	Ground	P	Ground signal
2	RXD	Serial port receiving terminal RXD	I	Serial data input
3	TxD	Serial port transmitter TXD	O	Serial data output
4	VDD_3.3V	Used for overall power supply of fingerprint module	P	Used for the overall power supply of the fingerprint module (please make sure to turn off the power supply in standby mode)
5	Detect	Interrupt wake-up signal	O	Interrupt wake-up signal (output high level when finger touches fingerprint sensor)

6	SENSOR_3.3V	SENSOR module power supply	P	SENSOR module power supply
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Illustration:

- The serial port is a TTL level of 3.3V. If you need to connect to the serial port of a PC, you need to connect the TTL-USB adapter board before communication.
- **Pin 6 (SENSOR module circuit power supply) needs to be powered at all times.** Please ensure that the power supply has small ripple and is not interfered by other power supplies.

4.4. Actual photos



4.5. Fingerprint module internal circuit description

- Directly using the fingerprint sensor FD mode, the SENSOR wake-up is highly reliable and reduces the risk of false triggering.
- When there is no finger touch, the Detect signal line is low level. When the finger touches the fingerprint sensor, the signal is triggered to high level, and then changes to low level when the finger leaves.
- **Fingerprint module workflow description:**

When the fingerprint module is in sleep state, Detect is used as a wake-up signal. When the finger touches the fingerprint sensor, the interrupt signal is triggered, and then wakes up the system. The main control MCU controls the power-on of MCU_3.3V. After the fingerprint module algorithm chip is powered on and initialized, the main control MCU controls the

fingerprint module through serial port commands to complete image collection and registration. , comparison task. After the task is completed, the main control chip controls the fingerprint module to sleep and controls the MCU_3.3V to power off. The system enters sleep and waits for the next round of work. After the system wakes up, the main control MCU can mask the interrupt signal, and turn on interrupt detection again before going to sleep after the task is completed.

➤ **Fingerprint sensor chip power supply requirements:**

The characteristics of the fingerprint chip itself: in FD (FingerDetect) mode, that is, when the fingerprint sensor periodically scans and detects fingerprints, a peak current of about 200mA will appear for 4us. Therefore, there are strict requirements for the power supply of the fingerprint chip. sensor_3.3V needs to control the power supply ripple within 200mV to avoid excessive power supply ripple causing the fingerprint sensor to reset at low voltage, causing the fingerprint sensor to fail to work properly.



Working current of fingerprint chip in FD mode

- It is necessary to use an LDO module with fast transient response to power the fingerprint chip; it is recommended that the LDO output current for Sensor power supply be $\geq 250\text{mA}$, ripple $< 100\text{mV}$, and $\text{PSRR} > 60\text{dB}$.

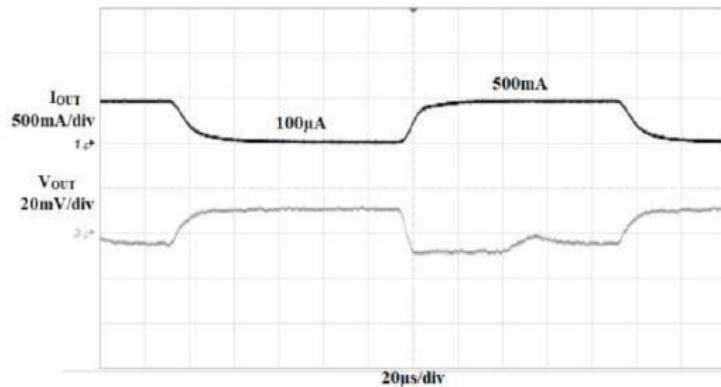
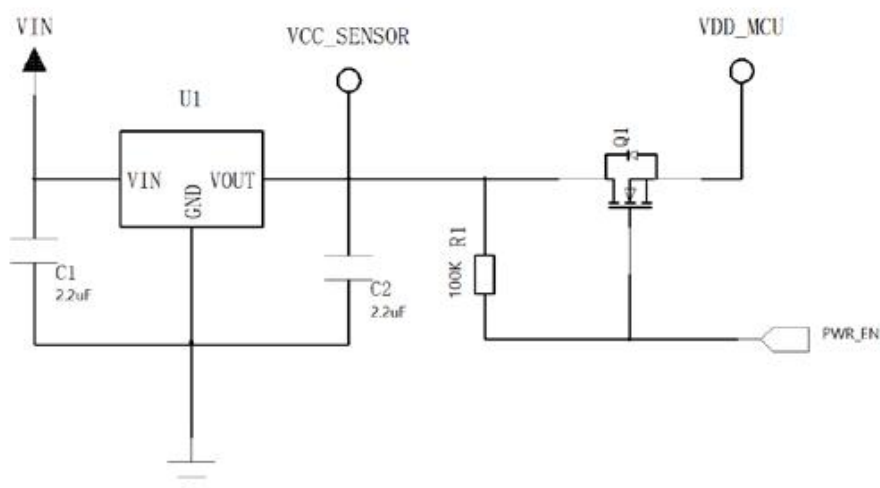
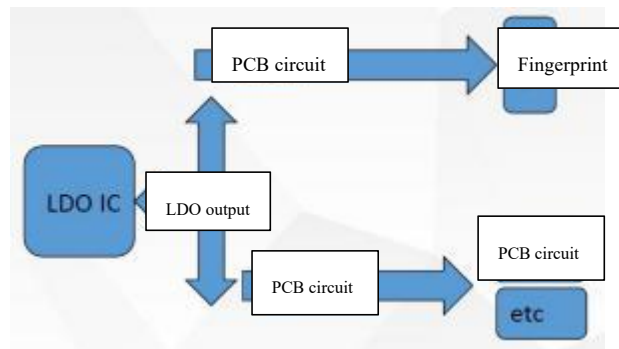


Figure 2.14 Load transient response waveform

- It is recommended to use a separate LDO to power the fingerprint module. The LDO output line supplies power to the fingerprint chip all the way, and a separate line is controlled by a MOS switch to power the fingerprint module algorithm MCU.



- When the fingerprint module shares the LDO power supply with other modules, the fingerprint module power supply needs to be routed separately from the LDO output on the PCB Layout.



5. Version revision history

Version	Revision Notes	Date	Revised by
V1.0	first draft	2024-1-26	Chrales



Shenzhen Hi-Link Electronic Co., Ltd

Address: 17F,Building E, Xinghe WORLD, Minzhi Street, Long Hua district,
Shenzhen 51813

Email: sales@hlktech.com

Website: www.hlktech.net