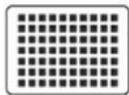


Semiconductor Integrated Fingerprint Module SFM-V1.7 Product Specification

分辨率



508DPI

像素



160×160

指纹容量

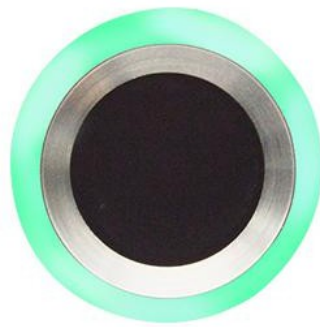


100枚

按压次数



100万次



配套上位机调试



配套完整指令集

七彩呼吸灯



颜色/频率可调

误识率 (FAR)



<0.0001%

1 Product Overview

SFM-V1.7 Integrated Semiconductor Fingerprint Module with Colorful Surrounding Light Strips, mainly consists of integrated fingerprint sensor and fingerprint algorithm. It realizes fingerprint enrollment, comparison and deletion functions. The module has a delicate and thin appearance, with **ring-shaped cool breathing light, fast fingerprint recognition, high security, support 360 degrees any angle recognition, deep self-learning function, high performance, low power consumption. The module adopts standard UART communication.** It can provide customers with efficient and flexible secondary development support. At the same time, the integrated chip also greatly reduces the volume of the fingerprint module. The simple structure of the product and the modularized design improve the stability and consistency of the product.

SFM-V1.7 Semiconductor Fingerprint Module Application **provides a** platform for **external control part (host computer)** realize the function of a fingerprint processing module **through the serial port by** interacting and communicating according to SFM-V1.7 integrated program communication protocol. Convenient for secondary development. Widely used in fingerprint door locks, drawer locks, fingerprint capture devices, identification, authorization, embedded biotouch and other fields.

2 Technical Parameters

2.1 Performance Parameters

pixels	160 x 160
resolution (of a photo)	508DPI
chip package	Ø13.5mm*0.8mm
Module Packaging	Ø21mm*7.13mm
Comparison speed	1:1 < 5ms/fingerprints
activation time	<140ms
recording time	<150ms
Truth Rejection Rate (FRR)	<1%
False Alarm Rate (FAR)	<0.0001%
storage capacity	100 fingerprint data
Number of presses	1,000,000

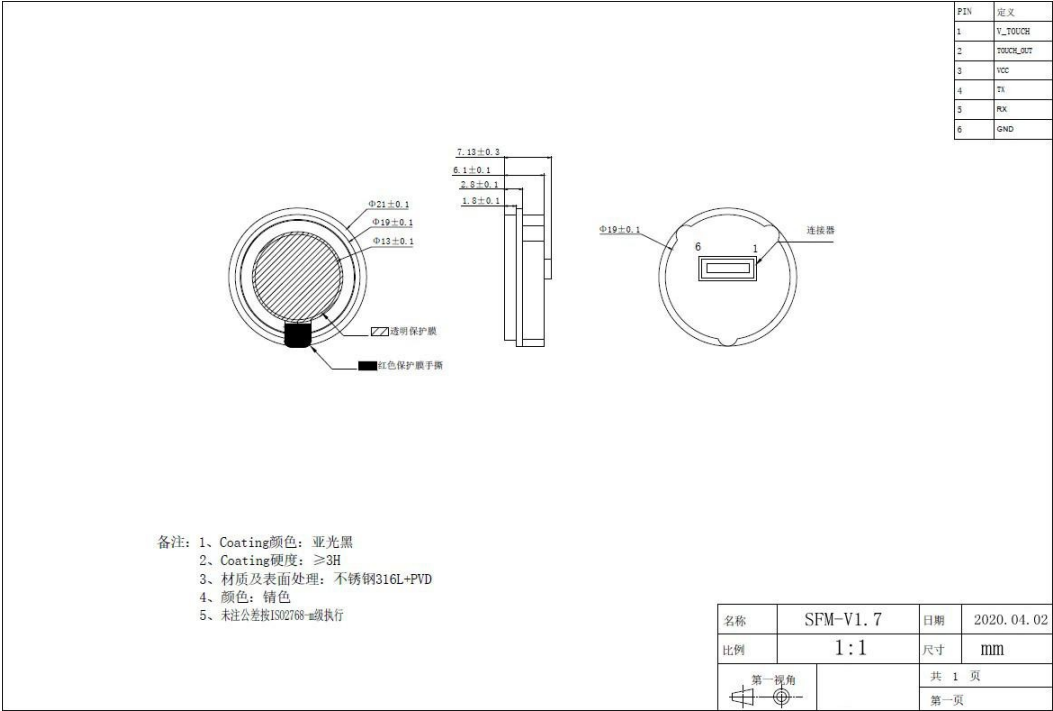
2.2 Electrical parameters

sports event	typical value	unit (of measure)
Touch supply voltage	3.3±5%	V

Fingerprint module supply voltage	3.3±5%	V
Operating Current (without LED)	<40	mA
Peak Operating Current (3.3V supply 25°C)	40	mA
Static power consumption	< 5	μA
operating temperature	-20~+65	°C
Storage temperature	-40~+80	°C
ESD Non-Contact Discharge	±15	KV
ESD Contact Discharge	±8	KV

Description: Operating current: the current when the fingerprint module is in the image acquisition state, such as the enrollment process and the comparison process; Static power consumption: the current when the fingerprint supply voltage of the fingerprint module is 0 and the touch supply voltage is 3.3V; the touch supply voltage is out of the specified range and an abnormal situation may occur.

3 Product Structure Dimension



4 Communication Interface Definition

Communication interface: Standard UART TTL level

Baud Rate: Default 115200 bps, 1 Start Bit, 1 Stop Bit,

3.3V TTL Level **Connector:** XH-6-1.0: 6Pin Wire Harness

Vertical Strip Connector, 1.0mm Pitch

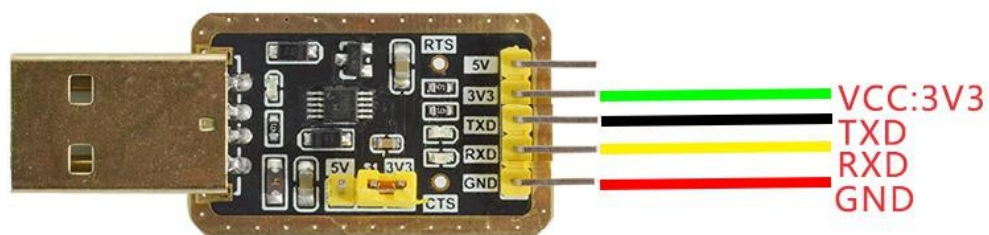
Pin Pin definition:



	Pin	定义	说明
白色	1	V_TOUCH	3.3V 触摸供电（须一直供电）
蓝色	2	TOUCH_OUT	唤醒 IRQ (ture:1, flase:0)
绿色	3	VCC	指纹模组 VCC，额定电压 3.3V
黄色	4	TX	UART_TX（指纹模组->MCU）
黑色	5	RX	UART_RX（MCU->指纹模组）
红色	6	GND	GND

说明：串口为3.3V的TTL电平，接电脑需要电平转换，V_TOUCH 须一直供电
 TOUCH_OUT为触控输出，触控芯片输出为高电平有效，电平值与
 V_TOUCH 保持一致。当手指触摸在金属框表面时TOUCH_OUT输出有效
 电平。

Schematic diagram of connection to the serial port (CH340E):



白色
蓝色
绿色
黄色
黑色
红色

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1	V_TOUCH	3.3V 触摸供电（须一直供电）
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5	RX	UART_RX（MCU->指纹模组）
6	GND	GND

5 Low Power Reference Design

In order to achieve the optimal low-power design, it is recommended to keep the VCC_3V3 of the module in a power-off state, and control the voltage on or off by judging the signal of the TOUCH_OUT pin. When TOUCH_OUT is active, it will enable VCC_3V3, and then the fingerprint module will enter the working state.

6 Reliability Test Program

org ani ze cla ssif ier for len gth or dist anc e (ya rd), ha ppe nin gs etc	Test items	test condition	Basis of determination	Number of samples	note

1	100-gauge test	<p>1、Take 3 samples of each of the test samples that have been tested for resistance to cosmetics and artificial sweat, respectively.</p> <p>2, with a baguette knife, respectively, in the sensor Coating Surface and metal ring surface scratches 10×10 small grids of 1mm×1mm</p> <p>3. Clean the specimen surface from debris with a dust-free cloth.</p> <p>4, with 3M 610 # adhesive paper on the small grid, flattened and left to stand for 5S, and then quickly pull up the adhesive paper</p> <p>5. Repeat the test three times for the same test site.</p> <p>A new adhesive sheet is required for each test.</p>	After testing, the standard is to be greater than 4B (shedding area <5%)	11	
2	Pencil hardness test	<p>1, pencil requirements: choose Mitsubishi 3H pencil and 1000 # sandpaper, so that the pencil's tip and the sandpaper plane at a 90-degree right angle, the pencil will be sharpened into a cylindrical tip.</p> <p>2, test method: the pencil is installed in the pencil hardness testing machine, adjust the balance, add weight 1KgF, with $45 \pm 1^\circ$ angle, in the sensor fingerprint sensing surface of different positions, scratched out 3 5-10mm long lines, and then use an eraser to remove the pencil scratches.</p> <p>Note: After each stroke, the pencil needs to be rotated 90</p>	<p>1. Normal function test after test</p> <p>2. No scratches on the surface after removing pencil marks with an eraser</p>	4	

		degrees to avoid the pencil tip grinding. damaged areas, otherwise the test results are invalid.			
3	RCA Friction Test	1. Weight: 175g 2、Friction times: 350 laps 3, friction position: sensor fingerprint sensing The center area of the face	1. Normal function test after test 2, wear Coating can not have peeling, substrate leakage and other obvious appearance defects	4	
			1. Appearance check: no discoloration, Deformation, blisters, marks,		
4	low temperature operation	Modules are tested immediately after 2 hours at -20°C in working condition	Oxidization, coating peeling, and other anomalies that are different from those before the experiment; 2. Post-test functional test positive Regular;	5	
5	high temperature work	Modules are tested immediately after 2 hours at +65°C in working condition	1, appearance check: no discoloration, deformation, blisters, marks, oxidation, coating off, and other abnormal phenomena different from those before the experiment;	5	

			2. Post-test functional test positive Regular;		
6	Waterproof test	1. When the module is in working condition, drop water on the fingerprint collection surface and keep it for 2 hours, then dry it with a dry cotton cloth; 2、Stands for more than 10min	Functionality and appearance test of the module is normal after the test	5	
7	resistant to artificial sweat	1、According to the "Artificial Sweat Configuration Guidelines" configure acidic artificial sweat solution, PH value $=4.6 \pm 0.1$ 2. Wrap the BTB connector with waterproof adhesive paper for protection. Wrap the test specimen tightly with a dust-free cloth soaked in artificial sweat solution, seal it with a sealing tape bag, and store it in a constant temperature and humidity box at $55 \pm 3^{\circ}\text{C}$, 90-95%RH for 96H. 3、Wipe the solution on the surface of the product dry after taking it out.	1. Normal function test after test 2, Coating shall not have decolorization, shedding, exposed substrate and other defects. 3. The surface of the metal parts shall not be oxidized, rusted, discolored, or plating flaking and other bad.	5	
8	Boiled Bagel Test	1. Boil the sensor in 100°C water for 30 minutes. 2, the specimen can not touch the wall of the boiling water dissolver 3, dry with a dust-free cloth at room temperature recovery at least 0.5h, check the sensing area of the paint and the appearance of the metal ring surface, if there is no paint, then use a hundred	After boiling, the paint in the sensing area and the plating on the exterior surface of the metal ring should not lose paint, and the BAG test should be 3B or more.	5	

		grid knife in the appearance of the metal ring surface scratch a hundred grid, and then use 3M610 adhesive paper pasted on the surface and flattened with a finger, let stand for 5 seconds, 90° angle to quickly pull up the adhesive paper vertically, testing 3 times.			
		<p>1. Wrap the BTB connector with waterproof tape to protect it;</p> <p>2. First wipe the surface of the product clean with a cotton cloth;</p> <p>3. Place NIVEA Sunscreen (SPF 30) NIVEA Hand Cream is spread evenly over the surface of the sample.</p> <p>The samples were homogenized and 3 samples of each cosmetic were applied;</p>	<p>1. Normal function test after test</p> <p>2. After the test, the surface of the sample is allowed to be slightly discolored, whitened, and the diameter is not more than 0.5mm. Pockets of numbness.</p>		
9	Resistant Cosmetics	<p>4. Place the sample at $55 \pm 3^{\circ}\text{C}$,</p> <p>Storage in a constant temperature and humidity chamber at 90-95%RH 48H</p>	<p>3. The surface of the sample is not allowed to be blistered (which can be picked off with fingers) peeled off, cracked, or divided.</p> <p>Away from the obvious anomalies such as.</p>	6	

10	eraser	<p>1. Weight: 500g</p> <p>2. Apply 2 drops of artificial sweat to the area to be ground;</p> <p>3, the use of special rubber, in the sensor metal ring appearance of the surface of the back and forth grinding 200 cycles (100 cycles of a drop of sweat) 4, 40-60 times per minute, stroke 10mm (rubber cannot be detached from the specimen)</p> <p>Note: When the specimen area is small and the stroke cannot reach 10mm, the engineer will confirm the maximum stroke that can be achieved.</p> <p>The test was carried out.</p>	<p>1. Normal function test after test</p> <p>2, wear-resistant at the plating can not have peeling, substrate leakage and other obvious appearance defects</p>	4	
11	ESD Testing	<p>Contacts in accordance with IEC 61000-4-2</p> <p>±8KV, 10 shots per polarity; Air</p> <p>±15KV, 10 shots per polarity. Requires power-up test.</p> <p>Test Methods:</p> <p>1、Module requires power up, only need to connect VDD and GND is sufficient;</p> <p>2, the module should be placed in the simulation of the whole machine chassis ESD fixture test (or directly in the whole machine chassis test)</p> <p>3, contact discharge to metal contact discharge; with a metal ring module, contact with the metal ring discharge, without a metal ring module, contact with the ESD fixture or the case of the conductive</p>	<p>Module function test is normal after the test</p>	5	

		<p>part of the discharge;</p> <p>4, air discharge, the electrostatic gun placed above the module sensor area, press the discharge switch, the electrostatic gun discharge head slowly downward movement, when the electrostatic breakdown air (sparks) to complete a discharge;</p> <p>5, each discharge mode positive and negative each playing 10 times, discharging the battery with each hit, between each Interval > 1s.</p>			
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