深圳市勋瑞光电科技有限公司

Xunrui photoelectric technology (shenzhen) CO,.LTD.

CERT. No. QAC0946535 (ISO9001)

CERT. No. HKG002005 (ISO14001)

Product Specification

Customer: _____

Model Name: H035SHV40I3505

Date: _____

Version: _____

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2020/11/24	First Release.	Rich liang

2. General Specifications

Feature		Spec
Characteristics	Size	3.5inch
	Resolution	320(horizontal)*480(Vertical)
	Interface	MCU interface
	Connect type	connector
	Color Depth	262K
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.153x 0.153
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Driver IC	ILI9488
	Surface Treatment	HC
	Viewing Direction	ALL
Mechanical	LCM (W x H x D) (mm)	54.94*85.5*2.2
	Active Area(mm)	48.96 x 73.44
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	6 LEDs

Note 1: Viewing direction is follow the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

3. Input/Output Terminals

No.	Symbol	Description
1	GND	System Ground
2	DB0	Data bus
3	DB1	Data bus
4	DB2	Data bus
5	DB3	Data bus
6	GND	System Ground
7	VDD	Digital power supply. 2.8V
8	CS	Chip select pin
9	RS	A register select signal.
10	WR	Write signal pin
11	RD	Read signal pin
12	NC	
13	YU	Touch panel signal
14	XL	Touch panel signal
15	YD	Touch panel signal
16	XR	Touch panel signal
17	LEDA	Backlight LED Anode.
18	LEDK	Backlight LED Cathode
19	LEDK	Backlight LED Cathode
20	LEDK	Backlight LED Cathode
21	LEDK	Backlight LED Cathode
22	NC	/
23	DB4	Data bus
24	DB8	Data bus
25	DB9	Data bus
26	DB10	Data bus
27	DB11	Data bus
28	DB12	Data bus
29	DB13	Data bus
30	DB14	Data bus
31	DB15	Data bus
32	RESET	Reset signal pin
33	VDD	Digital power supply. 2.8V

34	VDD	Digital power supply. 2.8V
35	GND	System Ground
36	DB5	Data bus
37	DB6	Data bus
38	DB7	Data bus
39	GND	System Ground
40	GND	System Ground

4. Absolute Maximum Ratings

4.1 Driving TFT LCD Panel

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.3	5	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

5. Electrical Characteristics

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	120	-	mA	
Forward Voltage	V_F	3.0	3.2	3.4	V	
Backlight Power consumption	W_{BL}	-	TBD	-	nW	

Note 1: Each LED : IF =20 mA, VF =3.2V.
Note 2: Optical performance should be evaluated at Ta=25℃ only.
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced.Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

Figure : LED connection of backlight

5.3 Block Diagram

6. Interface Timing

6.1 16-bit Data Bus for 16-bit/pixel (RGB 5-6-5 Bits Input), 65K-color

Figure 115: 16-bit Data Bus for 16-bit/pixel (RGB 5-6-5 Bits Input), 65K-color

Notes:

1. The data order is as follows: MSB = DB15, LSB = DB0, and picture data is MSB = Bit 5, LSB = Bit 0 for Green data, and MSB = Bit 4, LSB = Bit0 for Red and Blue data.
2. 1-time transfer is used to transmit 1 pixel data to the 16-bit color depth information.
3. '-' = void

6.2 . Power ON/OFF Sequence

IOVCC and VCI can be applied or powered down in any order. During the Power Off sequence, if the LCD is in the Sleep Out mode, VCI and IOVCC must be powered down with a minimum of 120msec. If the LCD is in the Sleep In mode, VCI and IOVCC can be powered down with a minimum of 0msec after the RESX has been released.
CSX can be applied at any time or can be permanently grounded. RESX has high priority over CSX.

Notes:

1. There will be no damage to the ILI9488 if the power sequences are not met.
2. There will be no abnormal visible effects on the display panel during the Power On/Off Sequence.
3. There will be no abnormal visible effects on the display between the end of the Power On Sequence and before receiving the Sleep Out command, and also between receiving the Sleep In command and the Power Off Sequence.
4. If the RESX line is not steadily held by the host during the Power On Sequence as defined in Sections 11.1 and 11.2, then it will be necessary to apply the Hardware Reset (RESX) after the completion of the Host Power On Sequence to ensure correct operations. Otherwise, all the functions are not guaranteed.
5. When the power is turned on, the climb period timing(T_{rise}) must be greater than 10us.

7. Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10	-	85	-	Degree.	Note2
		θ_B		-	85	-		
		θ_L		-	85	-		
		θ_R		-	85	-		
Contrast Ratio		CR	Θ =0	--	500	-	-	Note1, Note3
Response Time		T_{ON}	25°C	14	20	-	ms	Note1, Note4
		T_{OFF}		16	20			
Chromaticity	White	X_W	Backlight is on	0.280	0.300	0.320	-	Note1, Note5
		Y_W		0.320	0.340	0.360	-	
	Red	X_R		0.617	0.637	0.657	-	
		Y_R		0.318	0.338	0.358	-	
	Green	X_G		0.269	0.289	0.309	-	
		Y_G		0.569	0.589	0.619	-	
	Blue	X_B		0.116	0.136	0.156	-	
		Y_B		0.123	0.143	0.163	-	
Luminance		L			300			Note1, Note7

Test Conditions:

1. IF= 20mA(one channel),the ambient temperature is 25.
2. The test systems refer to Note 1 and Note 2.

Note 1:Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.
Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

Note 4: Definition of Response time
The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity(U) = Lmin/ Lmax

L-------Active area length W----- Active area width

Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

Measure the luminance of white state at center point.

8. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

9. Mechanical Drawing

10. Packing

Packing Method

1. Put module into tray cavity:
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

11.Precautions For Use of LCD modules

11.1 Handling Precautions

11.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

11.1.7. If the logic circuit power is off, do not apply the input signals.

11.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1. Be sure to ground the body when handling the LCD Modules.

11.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

11.2 Storage Precautions

11.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

11.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.