

PRODUCT SPECIFICATION

Customer	
Project	
Part No.	Z50006-P50-839C-Y1
Remarks	<input type="checkbox"/> APPOVAL FOR SPECIFICATION ONLY <input checked="" type="checkbox"/> APPOVAL FOR SPECIFICATION AND SAMPLE

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Revision Record

Rev. No.	Date	Description
V1.0	2023-04-18	Preliminary Specification Release.

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1. General Specifications

General Information Items	Specification	UniSt	Note
	Main Panel		
Display area(AA)	127.008(H)*127.008(V)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1080(RGB)*1080	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1176(H)*0.1176(V)	mm	-
Viewing angle	ALL	o'clock	-
Controller IC	HX8399	-	-
LCM Interface	1/2/3/4-LANE MIPI	-	-
Display mode	Transmissive/Normally Black	-	-
Operating temperature	-20~+60	C	-
Storage temperature	-30~+75	C	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		136.531		mm	-
	Vertical(V)		132.208		mm	-
	Depth(D)		1.98		mm	-
Weight			70		g	-

2. Interface Definition Description

NOTE: 1. Connector Model Number: DF40C-50DP-0.4V

2. Manufacturer: Hirose

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	GND	Ground.	P
3	LAN2_P	Disp MIPI lane2+.	I
4	LEDK	LED cathode.	P
5	LAN2_N	Disp MIPI lane2-.	I
6	LEDK	LED cathode.	P
7.	GND	Ground.	P
8	GND	Ground.	P
9	LAN1_P	Disp MIPI Blane 1+.	I
10	LEDA	LED Anode.	P
11	LAN1_N	Disp MIPI lane 1-.	I
12	LEDA	LED Anode.	P
13	GND	Ground.	P
14	GND	Ground.	P
15	CLK_P	Disp MIPICLK+.	I
16	ID_PIN2	ID pu to1.8V(LCM). If not used open.	P
17	CLK_N	Disp MIPICLK-.	I
18	ID_PIN1	ID pd to GND(LCM). If not used open.	P
19	GND	Ground.	P
20	GND	Ground.	P
21	LAN0_P	Disp MIPI lane 0+.	I
22	IOVCC	Disp digital power(1.8V).	P
23	LAN0_N	Disp MIPI lane0-.	I
24	IOVCC	Disp digital power(1.8V).	P

25	GND	Ground.	P
26	GND	Ground.	P
27	LAN3_P	Disp MIPI lane 3+.	I
28	NC	NC	
29	LAN3_N	Disp MIPI lane 3-.	I
30	VSN/VDD-	Display -5V analog rail.	P
31	GND	Ground.	P
32	VSN/VDD-	Display -5V analog rail.	P
33	NC	NC	
34	NC	NC	
35	NC	NC	
36	VSP/VDD+	Disp +5V analog rail.	P
37	GND	Ground.	P
38	VSP/VDD+	Disp +5V analog rail .	P
39	NC	NC	
40	NC	NC	
41	NC	NC	
42	GND	Ground.	P
43	NC		
44	LEDPWM	Backlight pwm output, If not used open.	O
45	NC	NC	
46	TE	Disp tearing effect out, If not used open.	O
47	GND	Ground.	P
48	RESET	Disp reset.	I
49	GND	Ground.	P
50	GND	Ground.	P

4. Electrical Specifications

4.1. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Logic Power Supply Voltage	IOVCC	-0.3	3.6	V	Note1
Analog Positive Power Supply	VDD+/VSP	-0.3	+6.6	V	
Analog Negative Power Supply	VDD-/VSN	0	-6.6	V	
Operating temperature	TOP	-20	+60	°C	
Storage temperature	TST	-30	+75	°C	

NOTE1: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values

exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

4.2.

DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Input Voltage	IOVCC	1.65	1.8	3.3	V	
Analog Positive Power Supply	VDD+/VSP	4.8	5.0	6.0	V	
Analog Negative Power Supply	VDD-/VSN	-6.0	-5.0	-4.8	V	--
Normal mode Current	IOIDD	--	17	34	mA	
Low Level Input Voltage	VIL	0	--	0.3*IOVCC	V	
High Level Input Voltage	V _{IH}	0.7*IOVCC	--	IOVCC	V	

4.3.

LED Backlight Characteristics

The back-light system is edge-lighting type with 12 chips LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	IF	15	20	--	mA	
Forward Voltage	VF	--	37.2	38.4	V	
LCM Luminance	LV	400	500	--	cd/m ²	Note3
LED life time	Hr	--	30000	--	Hour	Note1,2
Uniformity	Avg	70	--	--	%	Note3

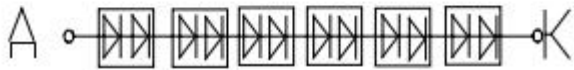
Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

$T_a=25\pm 3\text{ }^\circ\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at

$T_a=25\text{C}$ and $I_L=20\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 20mA.

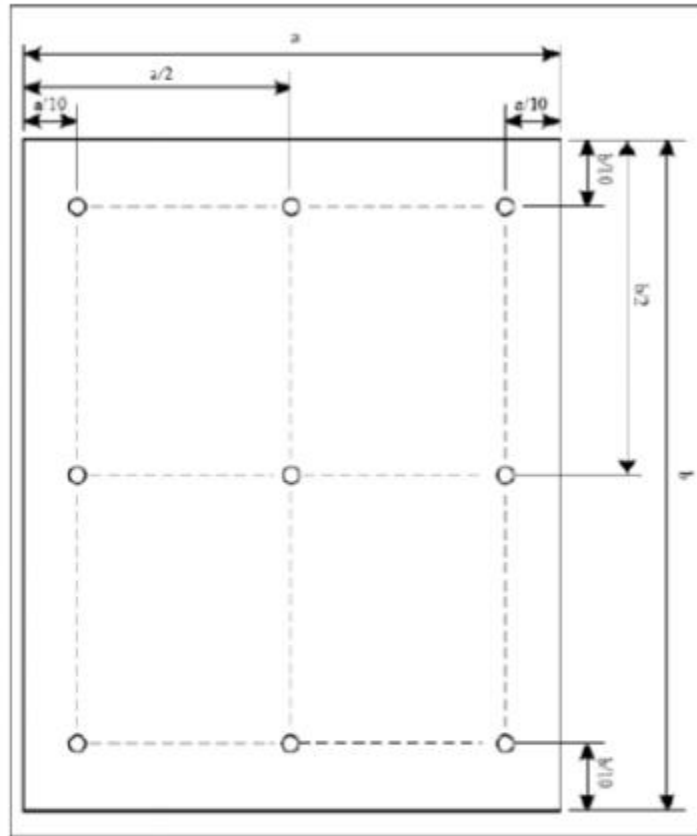
The constant current driving method is suggested.



BACKLIGHT CIRCUIT

T

Note (3) Luminance Uniformity of these 9 points is defined as below:

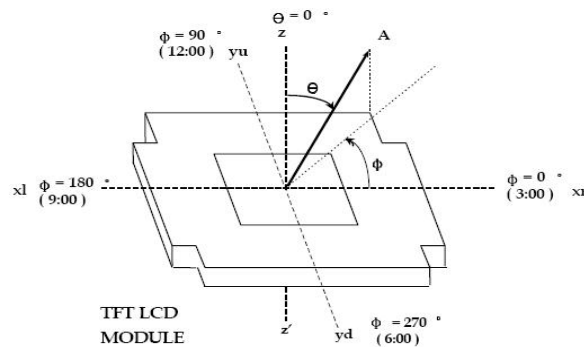


$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

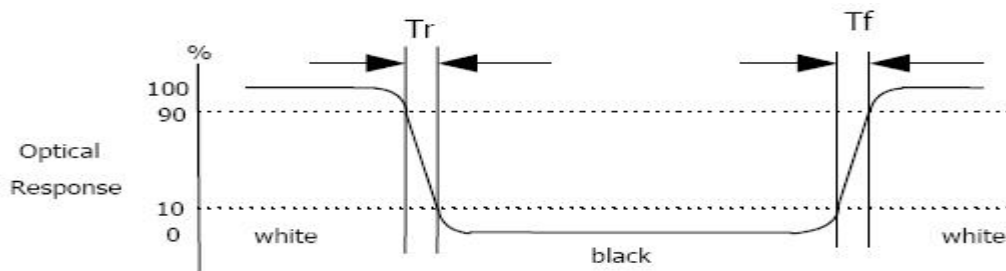
4.4. Measuring System

4.4.1. LCM Viewing Angle



Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

4.4.2. Response Time



Response time is the time required for the display to transition from white to black (Rising time, T_r) and from black to white (Falling time, T_f) for additional information.

4.4.3. Contrast Ratio (CR)

Contrast Ratio (CR) is defined mathematically as:

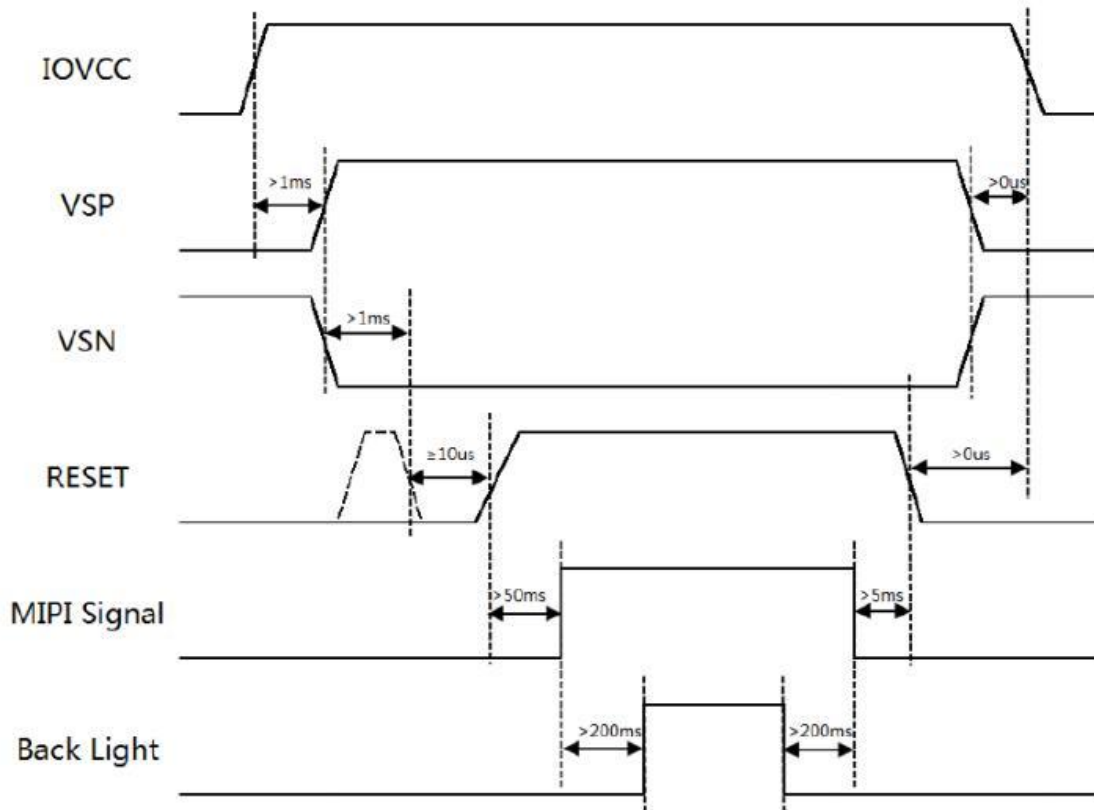
$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

4.5. Power On / Power Off

4.5.1. Power On/Off

Power on/off Sequence



The uncontrolled power-off means a situation which removed a battery without the controlled power off sequence. It will neither damage the module or the host interface.

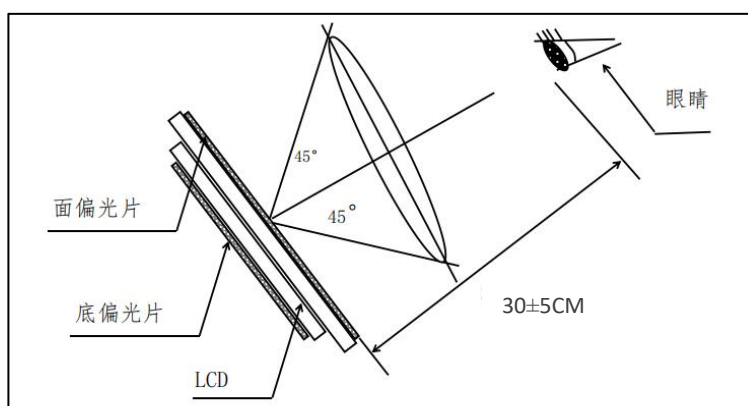
If uncontrolled power-off happened, the display will go blank and there will not any visible effect on the display (blank display) and remains blank until "Power On Sequence" powers it up.

5. Delivery Inspection

5.1. Quality Inspection Environmental Conditions

5.1.1. Viewing distance: the normal viewing distance between the screen and the inspector is $30\pm 5\text{cm}$; Inspection Angle: $90^\circ\pm 45^\circ$ (90° indicates that the inspector's perspective is perpendicular to the product to be inspected).

5.1.2. Visual inspection illumination: $1000\pm 200\text{LUX}$; Electrical inspection illumination: $200\pm 100\text{LUX}$; Ambient temperature $25\pm 5^\circ\text{C}$, ambient humidity $55\pm 15\%\text{RH}$.



5.2. Quality Inspection Standard

No.	Defect	Standard		Defect Grade	Result		
1	Spot Defect (including bright spot / color spot / bubble / dark spot, etc.)	< 7 inches	$\Phi \leq 0.10\text{mm}$	Ignore	OK		
			$0.10\text{mm} < \Phi \leq 0.20\text{mm}$ $DS \geq 10\text{mm}$	Minor Defect	OK		
			$\Phi > 0.20\text{mm}$	Serious Defect	NG		
		$\cong 7$ inches	$\Phi \leq 0.15\text{mm}$	Ignore	OK		
			$0.15\text{mm} < \Phi \leq 0.25\text{mm}$ $DS \geq 10\text{mm}$	Minor Defect	OK		
			$\Phi > 0.25\text{mm}$	Serious Defect	NG		
		Φ : defect diameter. DS: spacing.					
		2	Linear Defect (scratches, filaments, etc.)	< 7 inches	$W \leq 0.02\text{mm}$, L: unlimited	Ignore	OK
					$0.02\text{mm} < W \leq 0.03\text{mm}$ L $\leq 5\text{mm}$	Minor Defect	OK
$W > 0.03\text{mm}$	Serious Defect				NG		
$\cong 7$ inches	$W \leq 0.03\text{mm}$ L: unlimited			Ignore	OK		
	$0.03\text{mm} < W \leq 0.05\text{mm}$ L $\leq 5\text{mm}$			Minor Defect	OK		
	$W > 0.05\text{mm}$			Serious Defect	NG		
W: defect width. L: defect length. DS: spacing.							
3	Polarizer Bubble			Display Area	Judge by Spot Defect		
				Black Edge Area	The distance from the edge of the display area is greater than 0.5mm.	Minor defect	OK
		The distance from the edge of the display area is less than 0.5mm.	Judge by Spot Defect				

4	Polarizer Bump (Mark)	Display Area / Black Edge Area	Invisible when the touch screen or cover plate is assembled.		Minor Defect	OK
5	Color and Luminance	Item	Method	Instrument	Median	Tolerance Range
		Color	x, y Color Coordinate	Optical Instrument BM-7	According to the actual test on the sample confirmed by the customer.	± 0.04
		Luminance	Average the brightness EV at 9 points	Optical Instrument BM-7	According to the actual test on the sample confirmed by the customer.	± 20%
6	Other Standards	Subject to the negotiation by both parties.				
7	Warranty Period	One year after sale.				
8	Guarantee	ROHS、REACH				
9	Websites	Official Web: www.zhunyikeyi.com English Web: www.zhunyikeyi.com / www.zhunyikeyi.com				

6. Reliability Test

Item	Condition	Inspection after test
High Temperature Operating	60°C, 96H	
Low Temperature Operating	-20°C , 96HR	
High Temperature Storage	75°C , 96HR	
Low Temperature Storage	-30°C , 96HR	

High Temperature & High Humidity Operating	+60°C , 90% RH ,96 hours.	Inspection after 2~4hours
Thermal Shock (Non-operation)	-10°C,30 min ↔ +60°C,30 min, Change time:5min 20CYC.	storage at room temperature, the sample
ESD test	C=150pF, R=330,5points/panel Air:±6KV, 5times; Contact:±4KV, 5 times; (Environment: 15 °C~35 °C , 30%~60%).	shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line;
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	4.Glass crack; 5.Current IDD is twice
Box Drop Test	1 Corner 3 Edges 6 faces,80 cm (MEDIUM BOX)	higher than initial value.

Remark:

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 5~10pcs.
- 3.For Damp Proof Test, Pure water(Resistance>10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- 5.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.
6. The color fading mura of polarizing filter should not care.

7. Precautions

- 7.1. The display screen consists of glass and polarizer. Since the glass is fragile, the user must pay special attention to the edge area, and protect it from falling, vibration, or mechanical impact.
- 7.2. If the display screen is damaged and the liquid crystal material leaks, be sure not to get any in the mouth. If the liquid crystal material contacts the skin or clothes, flush off with soap and water.
- 7.3. Do not apply excessive force to the display screen or the joint part, or the color will change. Do not touch the display screen with bare hands, which will stain the display area and degraded insulation between terminals (some of the appearance is determined by the polarizer).
- 7.4. The polarizer covering the display panel of the LCD module is soft and easy to be scratched, be sure

to handle carefully. Do not touch, impact, press, or rub the exposed polarizers with anything harder than an HB pencil lead (e.g.: glass, tweezers, etc.). Do not place or attach anything onto the display area to avoid leaving marks. The condensed material on the surface or terminals due to cold will damage or stain the polarizer. After the test in low temperature environment, the product must be warmed up in a container before put into the room temperature environment.

- 7.5. If the display panel is stained, blow warm air onto the surface and gently wipe it with a soft and dry cloth. If it is seriously contaminated, wipe it with a wet cloth dipped in one of the following solvents:
- glycerol
 - ethyl Alcohol

Do not scrub, and avoid damaging the display panel.

- 7.6. Solvents other than those mentioned above may damage the polarizer. In particular, never use any of the following solvents:
- water
 - ketone
 - arene

Wipe off saliva or water drop immediately, the contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil or grease.

- 7.7. Special note: minimize electrode corrosion. Because electrode corrosion can be accelerated by water droplets, condensation of humidity, or electrification in a high humidity environment.
- 7.8. Assemble the LCD Module by the mounting holes. Make sure the LCD module make sure there is no bending, distortion, or deformation. Do not forcibly pull or bend the transmission wire or the backlight wire.
- 7.9. Do not disassemble the LCD module.
- 7.10. NC terminal should be disconnected. Do not connect any device.
- 7.11. If the logic circuit power supply is off, do not send the input signal.
- 7.12. Since the LCD module is integrated with CMOS, pay special attention to the modules. To prevent electrostatic damage, be careful to maintain an suitable work environment.
- Make sure the module has the same potential as the human body before take the LCD module out of the packing box for assembly. The reliable grounding is necessary during module processing.
 - The required tool, such as the electric soldering iron, must be reliably grounded. Make sure the it is connected to AC power supply, and no electric leakage. When fixing the module with electric

screwdriver, it must be grounded, to reduce the electromagnetic wave generated by the electric commutator spark as much as possible.

- Do not assemble or operate under dry condition to reduce the static electricity. To reduce static electricity, the workplace must not be too dry. The recommended relative humidity is 50 - 60%.

Keep your work clothes and work table grounded as much as possible

- The LCD module is coated with a film to protect the display surface. Be careful when peeling off the film to reduce the generated static electricity.

7.13. Since the LCD module has high precision assembly and regulation, try to avoid excessive impact on the module or making any changes:

- Do not change the shape of the tab on the metal frame.
- Do not drill any extra hole, modify the shape, or change the position of component on the printed circuit board.
- Do not change or damage the pattern on the printed circuit board.
- Never modify the zebra strip (conductive rubber) or heat seal connector.
- Do not make any change with the electric soldering iron except for the joint.
- Do not throw, bend or twist.

8. Packing and Storage

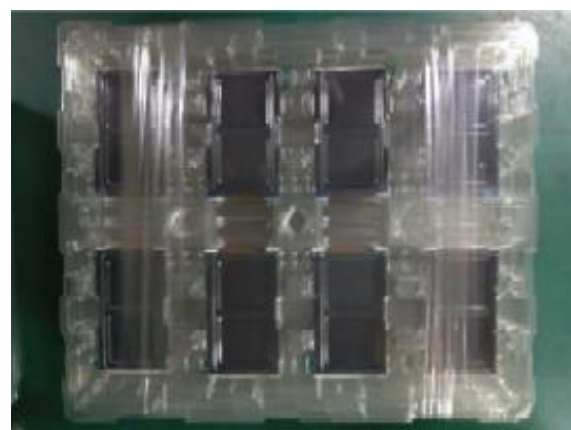
8.1. Packing Method

Step 1



Take 1pcs of the product, put it into a anti-static bag.

Step 2



Take 2 bags of product to place into the carton, make sure they are surface to surface. Put a piece of EPE pad between the carton and the separator to protect the products.

Step 3



Put the products into cartons one by one, each carton contains 60 pieces of products.

Step 4



The cartons should be taped and shipped with labels.




8.2. Storage Method

Store in an ambient temperature of $23\pm 5^{\circ}\text{C}$, and in a relative humidity of $60\pm 15\%$. The storage period should not exceed 12 months. Do not expose to the sun for a long period of time.

8.2.1. Store in clean environment, free from dust, active gas, or solvent.

8.2.2. Store in anti-static environment.

8.3. Label

Shenzhen Zhunyi Technology Co., Ltd.		
Product:	Display Screen	LEVEL:3
Spec.:		
P/N:		
Lot:	  	
D/C		
Qty.:		
Supplier Code:		

PO

R/K



Version: A

XXXXXXXX, YYYY-0000000000000000, KKKK, WWW,
AAAAA.