深圳市勋瑞光电科技有限公司
Xunrui photoelectric technology （shenzhen）CO,.LTD.

Product Specification

Customer: _____

Model Name: H101BWS50I8001

Date: 2023-06-08

Version: A0

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

深圳市勋瑞光电科技有限公司
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1. Record of Revision

Rev	Issued Date	Description	Editor
A0	2023/06/08	First Release.	

2 General Specifications

Feature		Spec
Characteristics	Size	10.1 inch
	Resolution	1024(horizontal)*600(Vertical)
	Interface	RGB
	Connect type	Connector
	Display colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.2175*0.2088
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally Black
	Driver IC	HX8282&HX8696
	Surface Treatment	HC
	Viewing Direction	ALL
	Gray Viewing Direction	FREE
Mechanical	LCM (W x H x D) (mm)	235.*143*5.1
	Active Area(mm)	222.72 x 125.28
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	42 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	I/O	Function
1~2	LEDA	P	LED Anode
3~4	LEDK	P	LED Cathode
5	GND	P	Ground
6	VCOM(NC)	P	Common voltage
7	DVDD	P	Digital power
8	MODE	I	DE/SYNC mode select MODE=H: DE mode(normally pull high) MODE=L: HSD/VSD mode
9	DE	I	Data enable signal
10	VS	I	Vertical sync input.Negative polarity
11	HS	I	Horizontal sync input.Negative polarity
12~19	B7~B0	I	Blue data Input
20~27	G7~G0	I	Green data Input
28~35	R7~R0	I	Red data Input
36	GND	P	Ground
37	DCLK	I	Clock input
38	GND	P	Ground
39	L/R	I	Source right or left sequence control SHLR=H: right shift, Left → Right(Default) SHLR=L: left right, Right → Left
40	U/D	I	Gate up or down scan control UPDN=H: up shift, Down → Up UPDN=L: down shift, Up → Down(Default)
41	VGH	P	Positive power for TFT
42	VGL	P	Negative power for TFT
43	AVDD	P	Power for Analog Circuit
44	RESET	I	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10K，C=1μF)
45	NC	-	Not connect
46	VCOM(NC)	P	Common voltage
47	DITHB	I	Dithering function
48	GND	P	Ground
49~50	NC	-	Not connect

I：input , O：output , P：Power

4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Digital Supply Voltage	V_{DD}	-0.5	5.0	V	
TFT Gate on Voltage	VGH	-0.3	40	V	
TFT Gate off Voltage	VGL	-20	0.3	V	
Analog power Supply Voltage	AVDD	-0.5	15.0	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	
Humidity	R_H	-	90%	RH	

5 Electrical Characteristics

5.1 Typical Operation Conditions

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Digital Supply Voltage	VDD	3	3.3	3.6	V	
TFT Gate on Voltage	VGH	-	18	-	V	
TFT Gate off Voltage	VGL	-	-6	-	V	
Analog power Supply Voltage	AVDD	-	9.6	-	V	
TFT Common electrode Voltage	VCOM	4.0	-	4.4	V	
Current Consumption of VDD	I_{DD}	-	20	35	mA	V_{DD}=3.3V
Current Consumption of AVDD	I_{AVDD}	-	10	12	mA	AV_{DD}=9.6V
Current Consumption of VGH Current Consumption of VGL	I_{VGH} I_{VGL}	-	0.5	1	mA	V_{GH}=18V V_{GL}=--6V

5.2Timing Characteristics

5.2.1 POWER ON/OFF SEQUENCE

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power on: VDD, GND _ AVDD, AGND _ V1 to V14

Power off: V1 to V14 _ AVDD, AGND_ VDD, GND

Power on/off control

Power on timing sequence

Power off timing sequence

5.2.2 INPUT SIGNAL TIMING

DC electrical characteristics

TTL mode DC electrical characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Low level input voltage	Vil	For the digital circuit	0	-	0.3×VDD	V
High level input voltage	Vih	For the digital circuit	0.7×VDD	-	VDD	V
Input leakage current	Ii	For the digital circuit	-	-	±1	μA
High level output voltage	Voh	Ioh= -400 μA	VDD-0.4	-	-	V
Low level output voltage	Vol	Iol= +400 μA	-	-	GND+0.4	V
Pull low/high resistor	Ri	For the digital input pin @ VDD=3.3V	200K	250K	300K	ohm
Digital Operation current	Idd	Fclk=65 MHz, FLD=50KHz, VDD=3.3V	-	15	25	mA
Digital Stand-by current	Ist1	Clock and all functions are stopped	-	10	50	μA
Analog Operating Current	Idda	No load, Fclk=65MHz, FLD=50KHz @ AVDD=10V,V1=8V, V14=0.4V	-	10	12	mA
Analog Stand-by current	Ist2	No load, Clock and all functions are Stopped	-	10	50	μA
Input level of V1 ~ V7	Vref1	Gamma correction voltage input	0.4*AVDD	-	AVDD-0.1	V
Input level of V8 ~ V14	Vref2	Gamma correction voltage input	0.1	-	0.6*AVDD	V
Output Voltage deviation	Vod1	Vo = AVSS+0.1V ~ AVSS+0.5V and Vo = AVDD-0.5V ~ AVDD-0.1V	-	±20	±35	mV
Output Voltage deviation	Vod2	Vo = AVSS+0.5V ~ AVDD-0.5V	-	±15	±20	mV
Output Voltage Offset between Chips	Voc	Vo = AVSS+0.5V ~ AVDD-0.5V	-	-	±20	mV
Dynamic Range of Output	Vdr	SO1 ~ SO1536	0.1	-	AVDD-0.1	V
Sinking Current of Outputs	IOLy	SO1 ~ SO1536; Vo=0.1V v.s 1.0V , AVDD=13.5V	80	-	-	uA
Driving Current of Outputs	IOHy	SO1 ~ SO1536; Vo=13.4V v.s 12.5V , AVDD=13.5V	80	-	-	uA
Resistance of Gamma Table	Rg	Rn: Internal gamma resistor	0.7*Rn	1.0*Rn	1.3*Rn	ohm

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5.2.3 AC ELECTRICAL CHARACTERISTICS

TTL mode AC electrical characteristics

TTL mode

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
VDD Power On Slew rate	TPOR	From 0V to 90% VDD	1	-	20	ms
RST pulse width	TRST	DCLK = 65MHz	50	-	-	us
DCLK cycle time	Tcph	-	14	-	-	ns
DCLK pulse duty	Tcwh	-	40	50	60	%
VSD setup time	Tvst	-	5	-	-	ns
VSD hold time	Tvhd	-	5	-	-	ns
HSD setup time	Thst	-	5	-	-	ns
HSD hold time	Thhd	-	5	-	-	ns
Data set-up time	Tdsu	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
Data hold time	Tdhd	D0[7:0], D1[7:0], D2[7:0] to DCLK	5	-	-	ns
DE setup time	Tesu	-	5	-	-	ns
DE hold time	Tehd	-	5	-	-	ns
Output stable time	Tsst	Dual gate	-	-	3	us

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5.2.4 TTL mode data input format

Vertical timing

Figure 10.2: Vertical input timing diagram

Horizontal timing

5.3 PARALLEL RGB INPUT TIMING TABLE

Resolution:1024x600

DE mode

DE mode					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd		600		H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

HV mode Horizontal input timing						
Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		—			
	Max.		140			
HSYNC back porch		thbp	160	160	160	
HSYNC front porch		thfp	16	160	216	

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HV mode(2)

Vertical input timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

5.4 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	210	-	mA	
Forward Voltage	V_F	16.2	18	19.8	V	
Backlight Power consumption	W_{BL}	-	3.78	-	W	

Note 1: Each LED : IF =30 mA, VF =3.0V.
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.

6 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	-	800	-	-	Note1 Note3
Response Time		T_{ON}	25° C	-	30	40	ms	Note1 Note4
		T_{OFF}		-				
Chromaticity	White	X_W	Backlight is on	0.297	0.317	0.337	-	Note1 Note5
		Y_W		0.306	0.326	0.346	-	
	Red	X_R		0.575	0.605	0.635	-	
		Y_R		0.306	0.336	0.366	-	
	Green	X_G		0.267	0.297	0.327	-	
		Y_G		0.522	0.552	0.582	-	
	Blue	X_B		0.109	0.139	0.169	-	
		Y_B		0.102	0.132	0.162	-	
Uniformity		U		75	80	-	%	Note1 Note6
NTSC				-	50	-	%	Note5
Luminance		L		800	900	-	cd/m^2	Note1 Note7

Test Conditions:

1. IF= 30mA(one channel),the ambient temperature is 25° C
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	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	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 X100%

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.

7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70℃, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -20℃, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 96hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 96hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 96 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 20 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.

8 Mechanical Drawing

REV.	DATE	MODIFICATION
A0	2023.06.07	First issue

PIN	ASSIGNMENT
1	LEDA
2	LEDA
3	LEDK
4	LEDK
5	GND
6	VCOM
7	DVDD
8	MODE
9	DE
10	VS
11	HS
12	B7
13	B6
14	B5
15	B4
16	B3
17	B2
18	B1
19	B0
20	G7
21	G6
22	G5
23	G4
24	G3
25	G2
26	G1
27	G0
28	R7
29	R6
30	R5
31	R4
32	R3
33	R2
34	R1
35	R0
36	GND
37	DCOLK
38	GND
39	L/R
40	U/D
41	VGH
42	VGL
43	AVDD
44	RESET
45	NC
46	VCOM
47	DITHB
48	GND
49	NC
50	NC

NOTES:

1. DISPLAY TYPE: 10.1 INCH TFT /BLACK
2. BACKLIGHT: 42 CHIP WHITE LED, IN PARALLEL
3. OPERATING TEMP: -20° C~+70° C
4. STORAGE TEMP: -30° c~+80° c
5. RESOLUTION: 1024xRGBx600
6. LCD IC: Source IC:HX8282 +Gate IC:HX8696
7. Luminous instensity(CENTER):800cd/m^2(MIN),900cd/m^2(TYP)
8. "( )"reference dimension. " * "critical dimension
9. RoHS Compliant

LED 6串7并18.6V 210mA

INTERFACE	RGB Interface	深圳市勋瑞光电科技有限公司 Xunrui Shenzhen Optoelectronics Technology Co., Ltd.		
	FPC Connector	MODEL NAME TFT Display Module	PART NO. H101BWS50I8001	
VIEWING DIRECTION	ALL	DWN	REV. A0	SHEET OF 1/1
		CHKD	TOLERANCE UNLESS SPECIFIED ±0.3	
Gray Scale DIRECTION	FREE	PROJECTION 3RD ANGLE	UNIT mm	SCALE 1:1

9 Packing

10. Precautions For Use of LCD modules

10.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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.

10.2 Storage Precautions

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

10.2.2. 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%

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

10.3 Transportation Precautions

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