深圳市勋瑞光电科技有限公司
Xunrui Shenzhen Optoelectronics Technology Co., Ltd.

CERT. No. QAC0946535
(ISO9001)

CERT. No. HKG002005
(ISO14001)

Product Specification

Customer: _____

Model Name: _____H070BWS40I3532_____

Date: _____

Version: _____

■ **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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Table of Contents

![Xunrui Shenzhen Optoelectronics Technology Co., Ltd. logo]

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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2018/07/06	First Release.	Rich liang

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2 General Specifications

Feature		Spec
Characteristics	Size	7.0 inch
	Resolution	**1024(Horizontal)*600(Vertical)**
	Interface	LVDS
	Connect type	Connector
	Color Depth	262K
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.05 x 0.15
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Driver IC	-
	Surface Treatment	HC
	Viewing Direction	ALL
Mechanical	LCM (W x H x D) (mm)	164.9*100*3.5
	Active Area(mm)	154.21 x 85.92
	With /Without TSP	Without
	Weight (g)	TBD
	LED Numbers	24LEDs

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	VCOM	Common Voltage
2	VDD	Power Voltage for digital circuit
3	VDD	Power Voltage for digital circuit
4	NC	No connection
5	RESET	Global reset pin
6	STBYB	Standby mode Normally pulled high STBYB=1,normal operation STBYB=0,timing contrller,source Driver will turn off,all output are High-Z
7	GND	Ground
8	RXIN0-	-LVDS differential data input
9	RXIN0+	+LVDS differential data input
10	GND	Ground
11	RXIN1-	-LVDS differential data input
12	RXIN1+	+LVDS differential data input
13	GND	Ground
14	RXIN2-	-LVDS differential data input
15	RXIN2+	+LVDS differential data input
16	GND	Ground
17	RXCLKIN-	-LVDS differential clock input
18	RXCLKIN+	+LVDS differential clock input
19	GND	Ground
20	RXIN3-	-LVDS differential data input
21	RXIN3+	-LVDS differential data input
22	GND	Ground
23	NC	No connection
24	NC	No connection
25	GND	Ground
26	NC	No connection
27	DIMO	Backlight CABC controller signal output
28	SELB	6bit/8bit mode select (Note 1)
29	AVDD	Power for Analog Circuit
30	GND	Ground

31	LED-	LED Cathode	
32	LED-	LED Cathode	
33	L/R	Horizontal inversion	(Note 3)
34	U/D	Vertical inversion	(Note 3)
35	VGL	Gate oFF Voltage	
36	CABCEN1	CABC H/W enable	(Note 2)
37	CABCEN0	CABC H/W enable	(Note 2)
38	VGH	Gate ON Voltage	
39	LED+	LED Anode	
40	LED+	LED Anode	

Note 1: if LVDS input data is 6bit,selb must be set to high;

if LVDS input data is 8bit,selb must be set to low;

Note 2:When CABC_EN=00,CABC OFF.

When CABC_EN=01,user interface image.

When CABC_EN=10,still picture.

When CABC_EN=11,moving image

When CABC off,don't connect DIMO,else connect it to backlight

Note 3: when L/R=0 set right to left scan direction

when L/R=1 set left to right scan direction

when U/D=0 set top to bottom scan direction

when U/D=1 set bottom to top scan direction

4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{CC}	-0.3	5	V	
Input logic Voltage	Vi	-0.3	Vcc+0.3	V	

5 Electrical Characteristics

5.1 .1Driving TFT LCD Panel

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power voltage	V_{DD}	-0.3	3.2	5.0	V	Note 2
	AVDD	6.5	11	13.5	V	±1
	VGH	-0.3	20	40	V	±2
	VGL	-20	-6.8	0.3	V	±1
	VCOM	2.0	3	4.5	V	±1
	VGH-VGL	-		40	V	
Operating Temperature	T_{OPR}	-20		70	℃	
Storage Temperature	T_{STG}	-30		80	℃	

Ta = 25 °C

5.1.2 Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	-	0.25	1.0	mA	V_{GH} =20V
	I_{GL}	-	0.25	1.0	mA	V_{GL} = -6.8V
	IDV_{DD}	-	38	60	mA	DV_{DD} =3.3V
	IAV_{DD}	-	20	30	mA	AV_{DD} =11V

5.2 Power Seqence
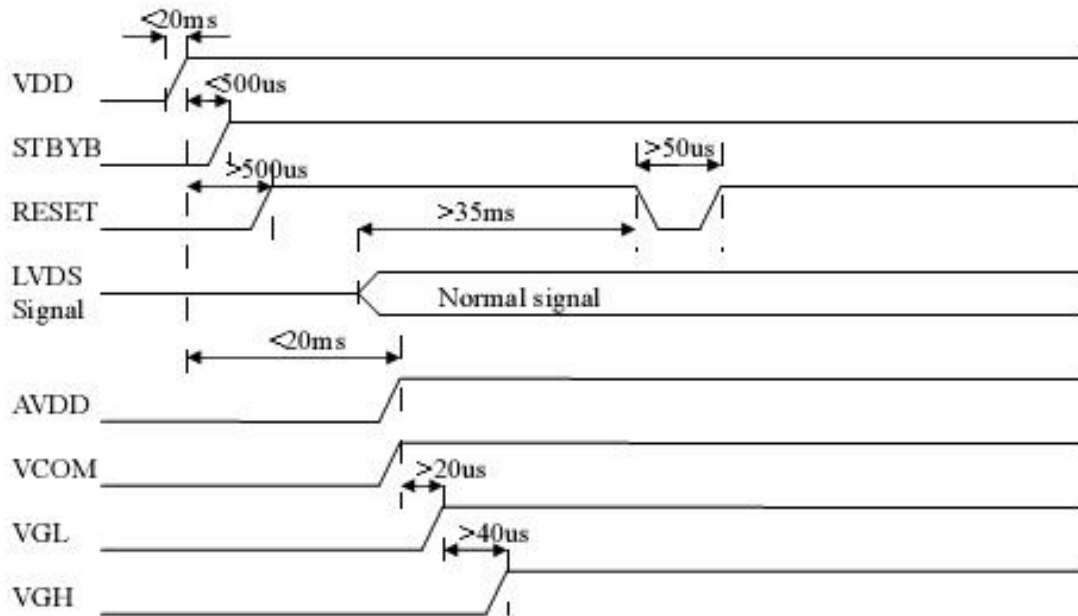
a. Power on:

b. Power off:
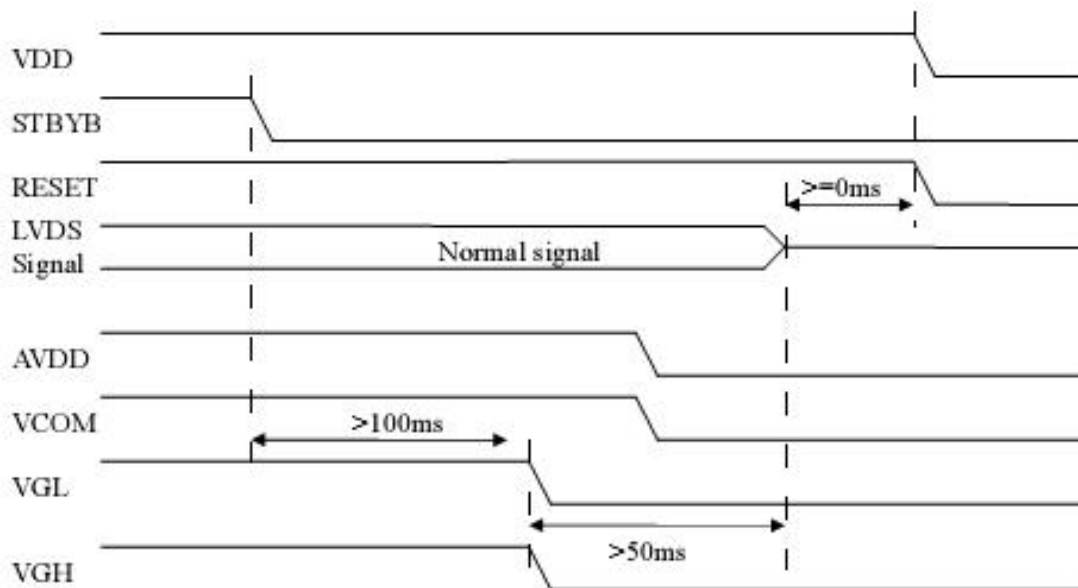
5.3 Timing

Characteristics

3.3.1. AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	40.8	51.2	67.2	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	$4/(7* R_{xFCLK})$	-	ns	
Clock low time	T_{LVCL}	-	$3/(7* R_{xFCLK})$	-	ns	

3.3.2. Input Clock and Data Timing Diagram

T_{RSKM}: Receiver strobe margin
R_{SPOS}: Receiver strobe position
T_{SW} : Strobe width (internal data sampling window)
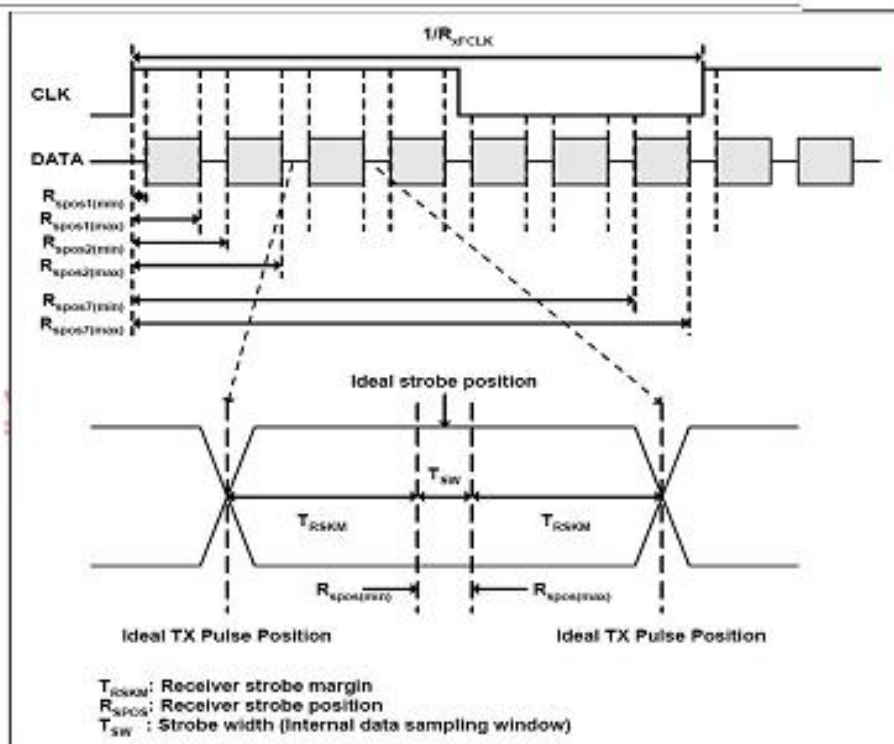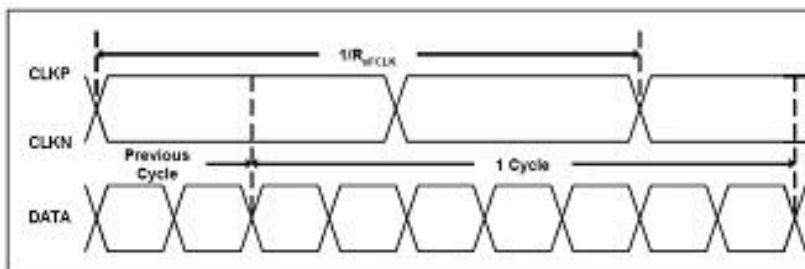
3.3.3. DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	+0.1	V	R_{xVCM}=1.2V
Differential input low Threshold voltage	R_{xVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{xVIN}	0	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$|V_{ID}|/2$	-	$2.4-|V_{ID}|/2$	V	
Differential voltage	$|V_{ID}|$	0.2	-	0.6	V	
Differential input leakage current	RV_{xIz}	-10	-	+10	uA	
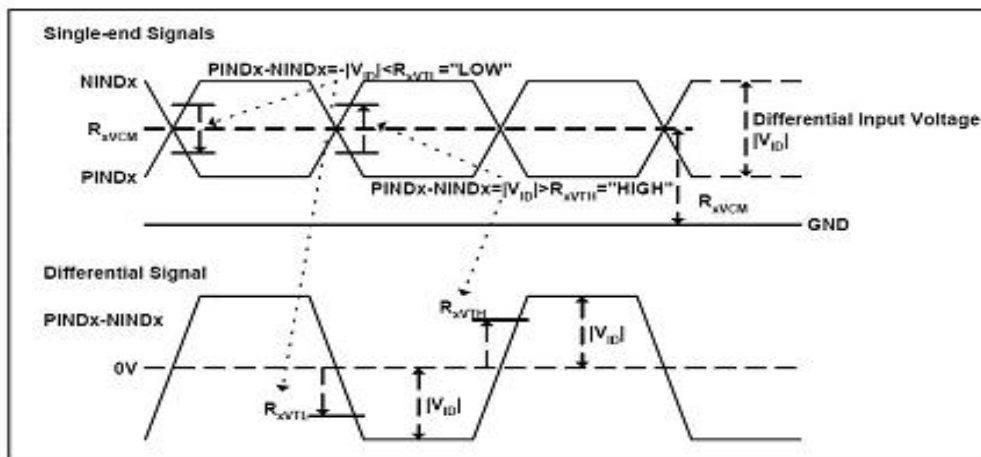
3.3.4. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd		1024		DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd		600		H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

3.3.5. Data Input Format

6bit LVDS input
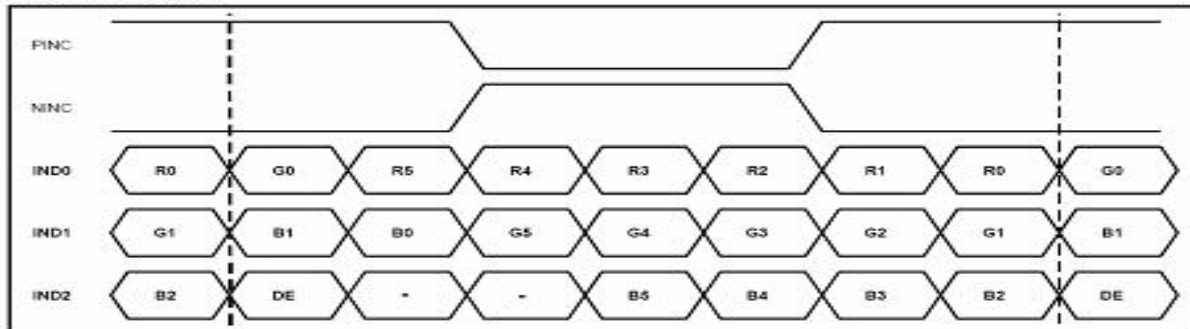
8bit LVDS input
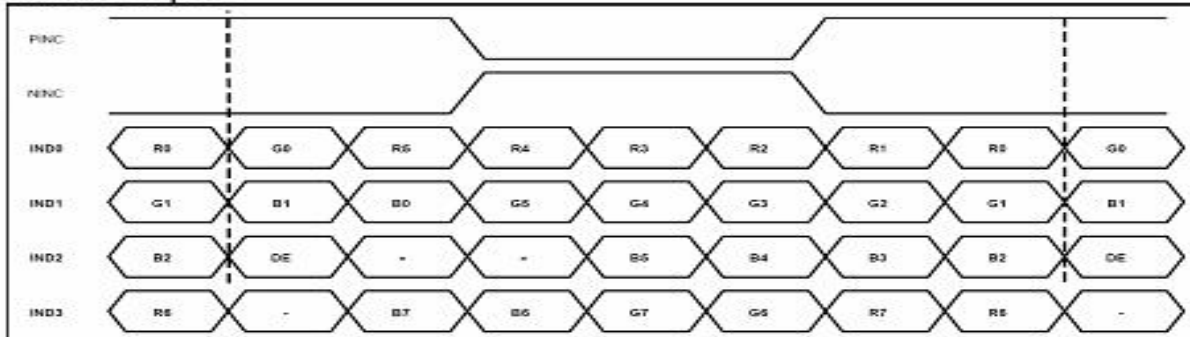
Note: Support DE timing mode only, SYNC mode not supported.

5.4 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F		160		mA	
Forward Voltage	V_F	9.3	9.6	9.9	V	
Backlight Power consumption	W_{BL}	-		-	W	

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.
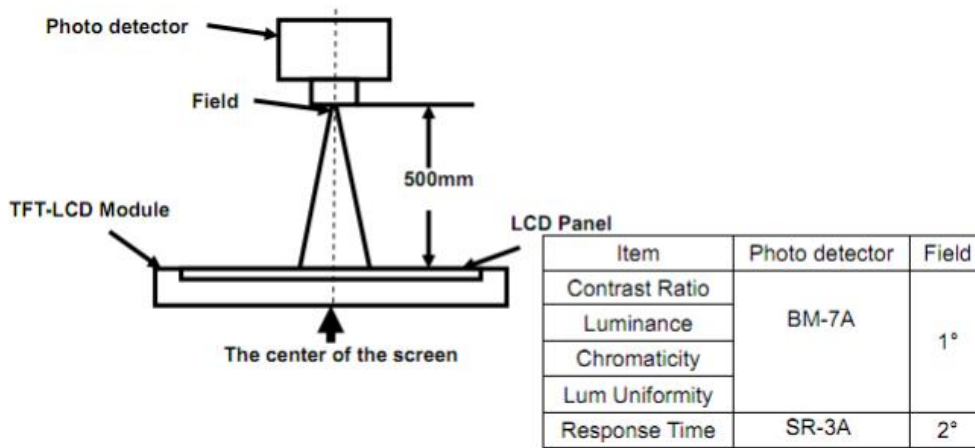
6 Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10	70	85	-	Degree.	Note2
		θ_B		70	85	-		
		θ_L		70	85	-		
		θ_R		70	85	-		
Contrast Ratio		CR	$\Theta = 0$	500	700	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	10	20	ms	Note1, Note4
		T_{OFF}		-	15	30		
Chromaticity	White	X_W	Backlight is on	TBD	TBD	TBD	-	Note1, Note5
		Y_W		TBD	TBD	TBD	-	
	Red	X_R		TBD	TBD	TBD	-	
		Y_R		TBD	TBD	TBD	-	
	Green	X_G		TBD	TBD	TBD	-	
		Y_G		TBD	TBD	TBD	-	
	Blue	X_B		TBD	TBD	TBD	-	
		Y_B		TBD	TBD	TBD	-	
Uniformity		U		-	70	-	%	Note1, Note6
Luminance		L		300	350			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	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).
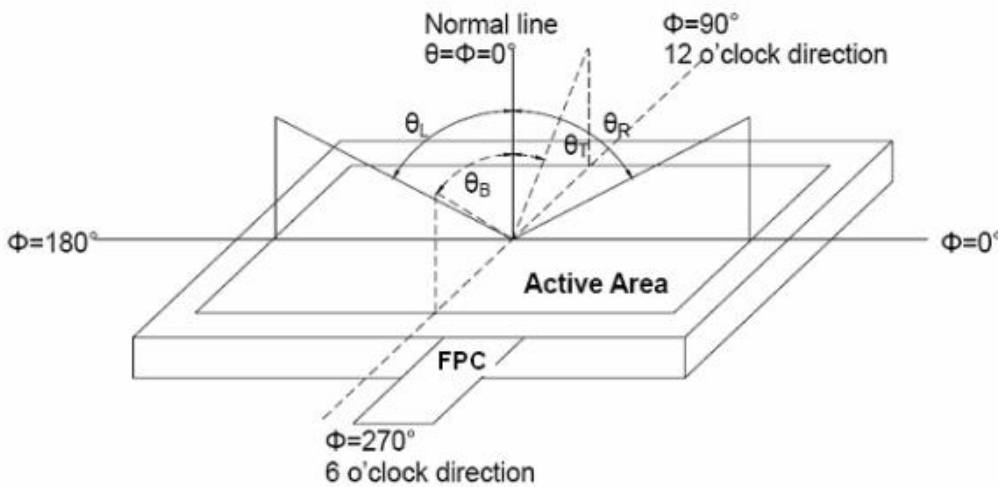

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$
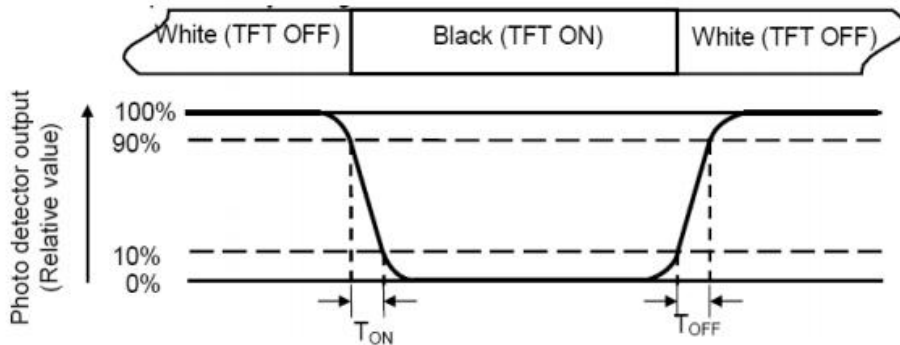
Note 4: Definition of Response time
The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output 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
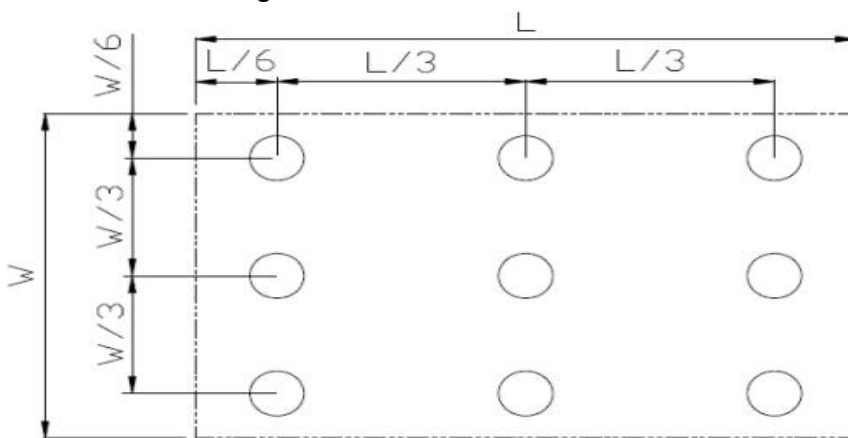

Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

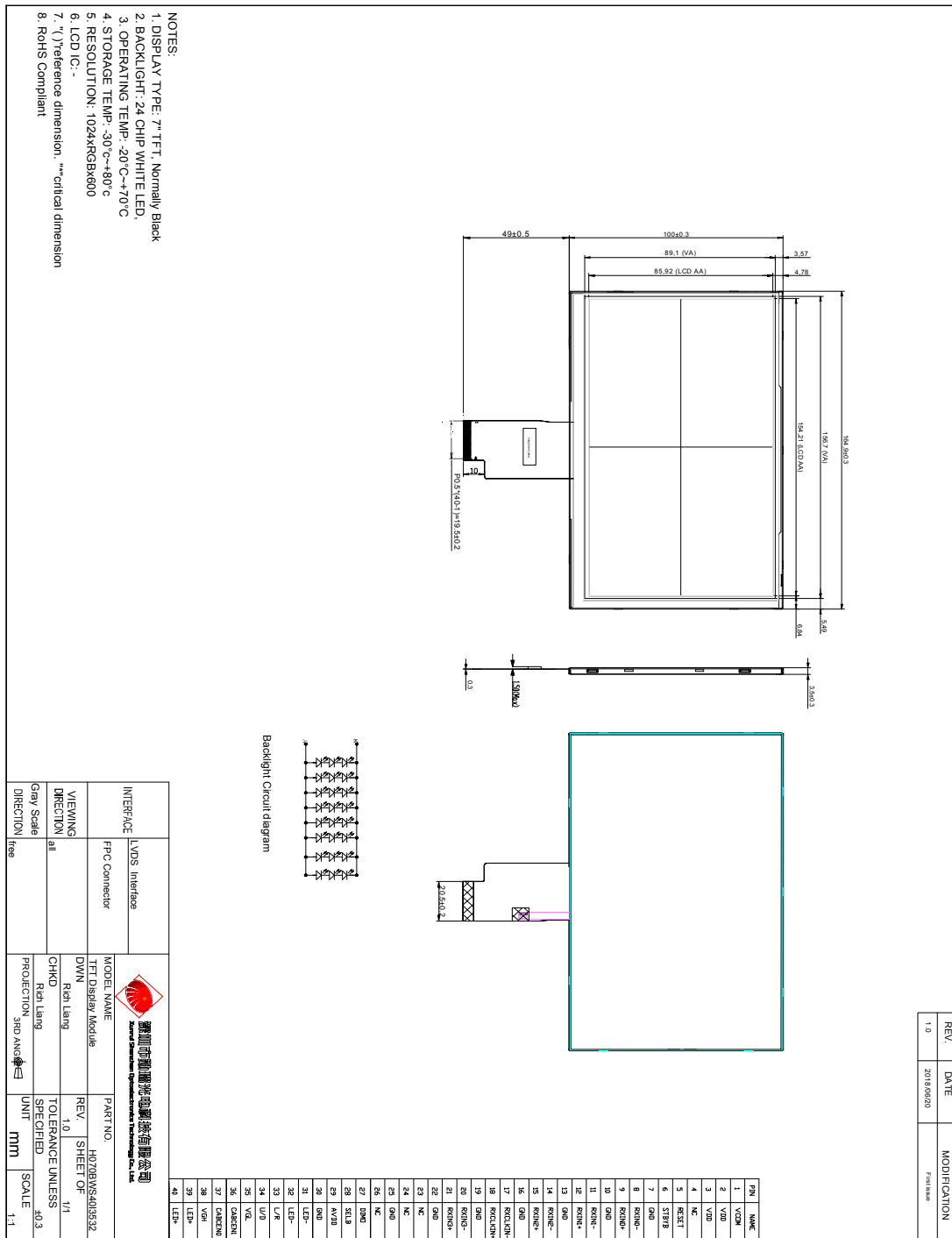Measure the luminance of white state at center point.

7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70℃, 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.
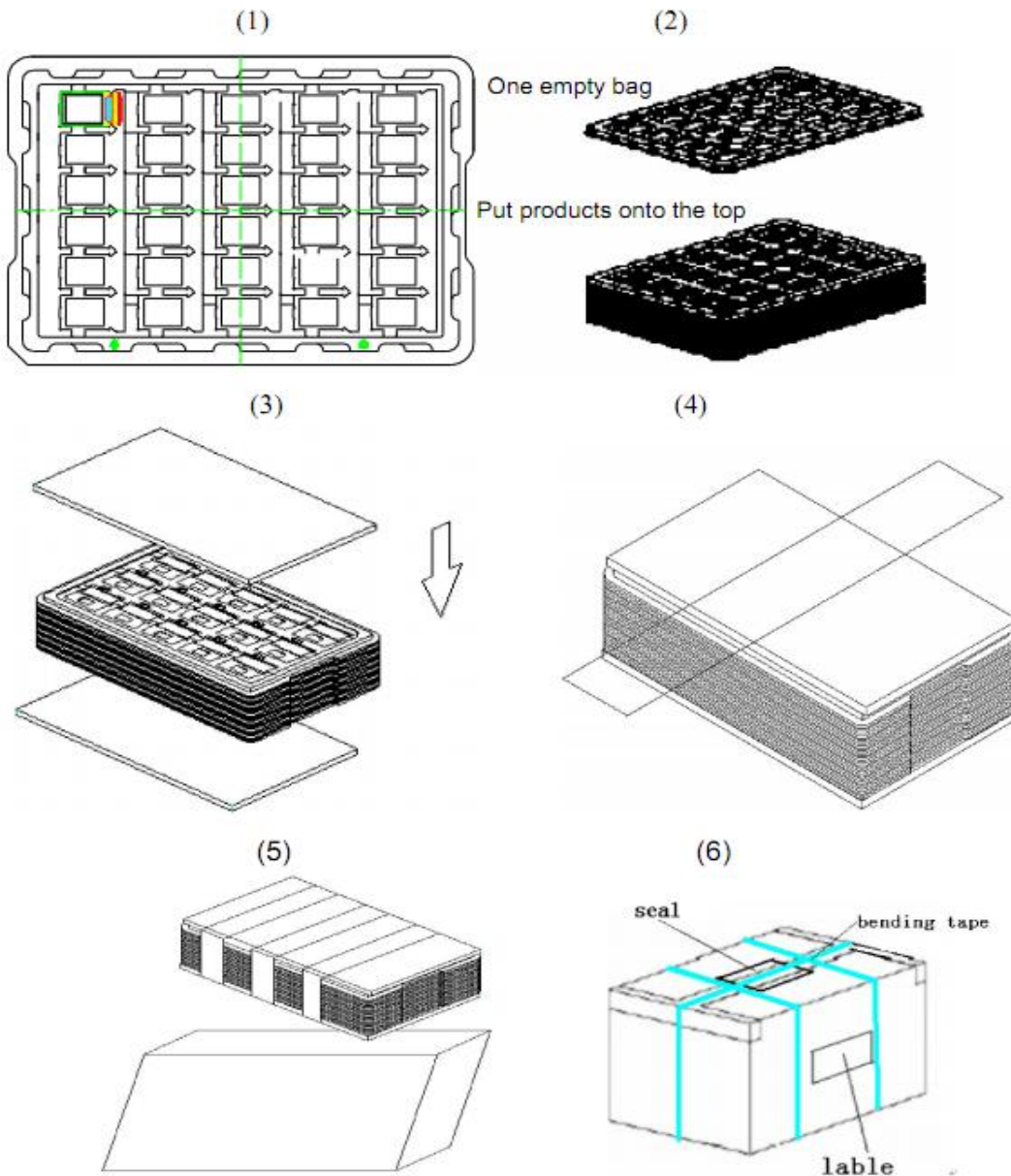   2. Ta is the ambient temperature of sample.

8 Mechanical Drawing

NOTES:
1. DISPLAY TYPE: 7" TFT, Normally Black
2. BACKLIGHT: 24 CHIP WHITE LED.
3. OPERATING TEMP: -20°C~+70°C
4. STORAGE TEMP: -30°c~+80°c
5. RESOLUTION: 1024xRGBx600
6. LCD IC: -
7. "( )"reference dimension. "*"critical dimension
8. RoHS Compliant

Backlight Circuit diagram

| INTERFACE | LVDS Interface |
| FPC Connector |
| VIEWING DIRECTION | all |
| Gray Scale DIRECTION | free |

MODEL NAME	TFT Display Module
PART NO.	H070BWS40/35/32
DWN	Rich Liang	REV	1.0	SHEET OF	1/1
CHKD	Rich Liang	TOLERANCE UNLESS SPECIFIED	±0.3
PROJECTION 3RD ANGLE	UNIT	mm	SCALE	1:1

PIN	NAME
1	VCOM
2	VID
3	VDD
4	NC
5	RESET
6	STBYB
7	GND
8	RXIN0+
9	RXIN0-
10	GND
11	RXIN1+
12	RXIN1-
13	GND
14	RXIN2+
15	RXIN2-
16	GND
17	RXCLKIN+
18	RXCLKIN-
19	GND
20	RXIN3+
21	RXIN3-
22	GND
23	NC
24	NC
25	GND
26	NC
27	DIM0
28	SELB
29	AVDD
30	GND
31	LED-
32	LED-
33	L/R
34	U/D
35	VGL
36	CABCEN0
37	VGH
38	CABCEN1
39	LED+
40	LED+

9 Packing

Packing Method

(1)

(2)

One empty bag

Put products onto the top

(3)

(4)

(5)

(6)

seal

bending tape

lable

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.

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.