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: H101WU45I3501

Date: _____

Version: _____

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

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< **Table 2. Absolute Maximum Ratings**>

Parameter		Symbol	Min.	Max.	Unit	Remarks
Power Supply	LCD Module	VDD	VSS-0.3	3.6	V	Ta = 25 ℃ Note 1&2
Operating Temperature		T_{OP}	0	+50	℃	Note 3
		T_{SUR}	0	+60	℃	
Storage Temperature		T_{ST}	-20	+60	℃	
Operating Ambient Humidity		Hop	10	90	%RH	
Storage Humidity		Hst	10	90	%RH	

Note:
1. These range above is maximum value not the actual operating temperature . Actual Operating temperature is no more than 40℃ and temperature refers to the LCM surface temperature ; Length of operation: No more than 8 hours per day, and no more than 4 hours of continuous use one time.
2. BOE is not responsible for product problems beyond the use conditions.
3. Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be 39 ℃ max. and no condensation of water.

1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2019/10/12	First Release.	KING

2 General Specifications

Feature		Spec
Characteristics	Size	10.1 inch
	Resolution	1920(horizontal)*1200(Vertical)
	Interface	LVDS
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. (mm)	TBD
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally Black
	Driver IC	TBD
	Surface Treatment	HC
	Viewing Direction	Full View
	Gray scale Direction	free
Mechanical	LCM (W x H x D) (mm)	229.45*149.22*2.63
	Active Area(mm)	216.8064(H)*135.504(V)
	With /Without TSP	Without TSP
	Weight (g)	-
	LED Numbers	45LEDs

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

Pin No.	Symbol	Description	I/O
1	VDDIN	Power supply VDDIN=3.3V (Typ.)	P
2	VDDIN		P
3	VDDIN		P
4	VDDIN		P
5	VDDIN		P
6	VDDIN		P
7	VDD_OTP	OTP Power supply VDD OTP=8.6V	P
8	I2C _SCL	OTP_SCL	I
9	I2C _SDA	OTP_SDA	I
10	GND	GROUND	P
11	OLV0N	Odd LVDS Negative data signal (-)	I
12	OLV0P	Odd LVDS Positive data signal (+)	I
13	GND	GROUND	P
14	OLV1N	Odd LVDS Negative data signal (-)	I

15	OLV1P	Odd LVDS Positive data signal (+)	I
16	GND	GROUND	P
17	OLVCLKN	Odd LVDS Negative CLK signal (-)	I
18	OLVCLKP	Odd LVDS Positive CLK signal (+)	I
19	GND	GROUND	P
20	OLV2N	Odd LVDS Negative data signal (-)	I
21	OLV2P	Odd LVDS Positive data signal (+)	I
22	GND	GROUND	P
23	OLV3N	Odd LVDS Negative data signal (-)	I
24	OLV3P	Odd LVDS Positive data signal (+)	I
25	GND	GROUND	P
26	ELV0N	EVEN LVDS Negative data signal (-)	I
27	ELV0P	EVEN LVDS Positive data signal (+)	I
28	GND	GROUND	P
29	ELV1N	EVEN LVDS Negative data signal (-)	I
30	ELV1P	EVEN LVDS Positive data signal (+)	I
31	GND	GROUND	P

32	ELVCLKN	EVEN LVDS Negative CLK signal (-)	I
33	ELVCLKP	EVEN LVDS Positive CLK signal (+)	I
34	GND	GROUND	P
35	ELV2N	EVEN LVDS Negative data signal (-)	I
36	ELV2P	EVEN LVDS Positive data signal (+)	I
37	GND	GROUND	P
38	ELV3N	EVEN LVDS Negative data signal (-)	I
39	ELV3P	EVEN LVDS Positive data signal (+)	I
40	GND	GROUND	P
41	NC	NC	-
42	VLED+	LED Anode	P
43	VLED+	LED Anode	P
44	VLED-	LED Cathode	P
45	VLED-	LED Cathode	P

4 Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

< Table 2. Absolute Maximum Ratings>

Parameter		Symbol	Min.	Max.	Unit	Remarks
Power Supply	LCD Module	VDD	VSS-0.3	3.6	V	Ta = 25 ℃ Note 1&2
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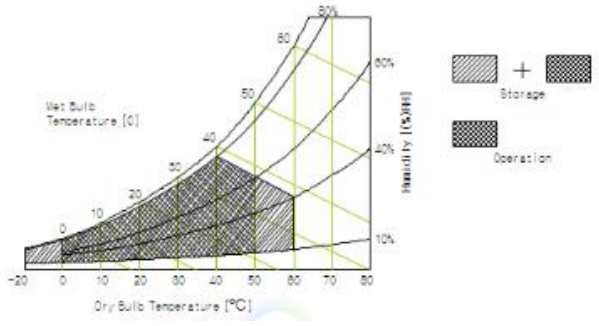
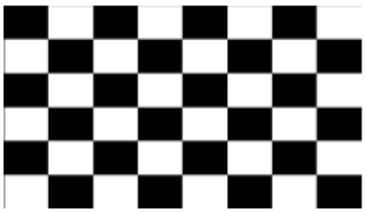


5 Electrical Characteristics

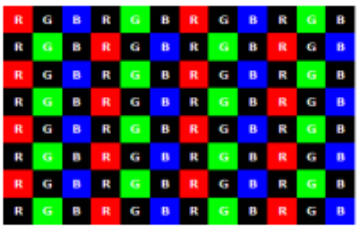
Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Power Supply Voltage		VDD	3.0	3.3	3.6	V	
		VRP			300	mV	Ripple
Power Supply Current		IDD	-	300	360	mA	Note 1
Power Consumption		PLCD	-	1	1.2	W	
Rush current		IRUSH	-	-	3.0	A	Note 2
CMOS Interface	Input Voltage	VIH	2.7		3.3	V	
		VIL	0		0.5	V	
	Output Voltage	VOH	2.7		3.3	V	
		VOL	0		0.5	V	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for VDD=3.3V, Frame rate f_V=60Hz and Clock frequency = 80MHz. Test Pattern of power supply current

a) Typ : Mosaic 8 x 6 Pattern(L0/L255)



b) Max : skip subPixel(L255)



2. The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

5.2Driving Backlight

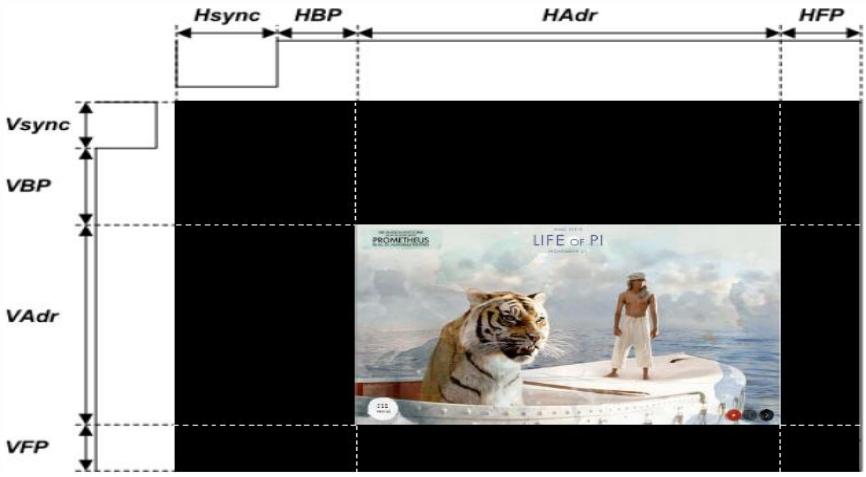
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	300	-	mA	
Forward Voltage	V_F	-	9.6		V	
Reverse current	IR		50		uA	
Power dissipation	Pd				mW	
Peak forward current	IFP		100		mA	
Peak forward current	VR		5		V	
LED Life Time	-	25000	-	-	Hr	

Note 1: Each LED : IF =20 mA, VF =3.3V.
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. TIMING CHARACTERISTICS OF INPUT SIGNAL

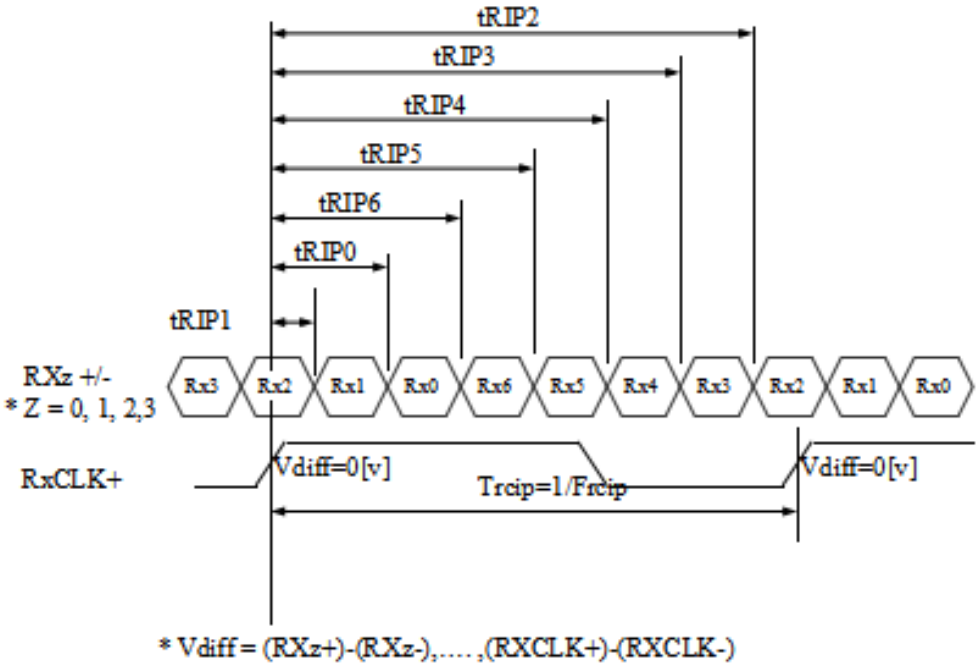
< Table5. LVDS Timing Parameter >

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	Fdclk	74.5	77.56	85	MHz
Horizontal display area	Thd		960		DCLK
HSYNC period time	Th	989	1040	1248	DCLK
Horizontal Blank	THB	29	80	288	DCLK
HSYNC pulse width	Thp	2	10	255	DCLK
HSYNC back porch	thbp	3	6	255	DCLK
HSYNC Front porch	thfp	24	64	260	DCLK
Vertical display area	Tvd		1200		H
VSYNC period time	Tv	1243	1243	1560	H
Vertical Blank	TVB	43	43	360	H
VSYNC Pluse width	Tvp	4	4	20	H
VSYNC back porch	Tvbp	20	20	255	H
VSYNC front porch	Tvfp	19	19	260	H
Frequency	fV	-	60	-	Hz



<Table 6. LVDS AC Timing Specification>

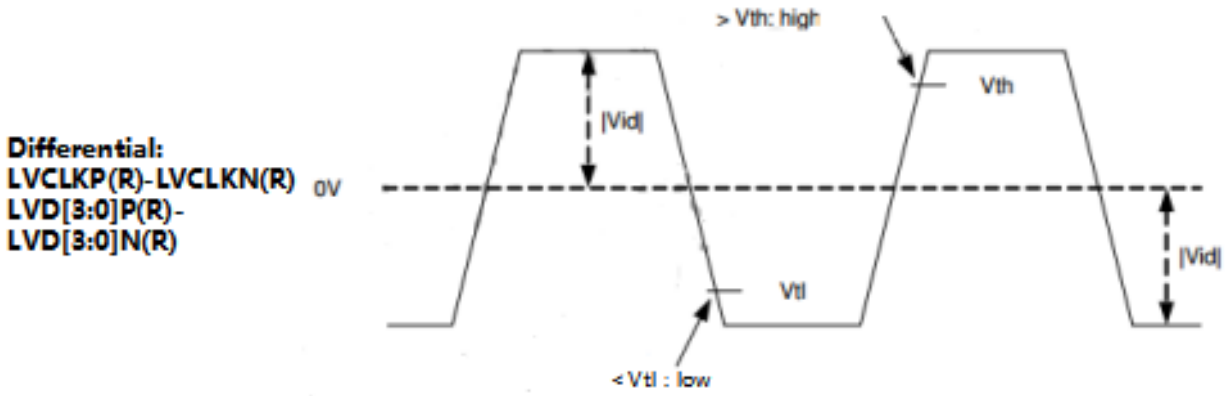
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKfrequency	Frcip	20	-	85	MHZ	
CLKIN Period	tRCIP	11.76	-	-	nsec	
Input Data 0	tRIP1	tRCIP/7 × (-0.2)	0.0	tRCIP/7 × 0.2	nsec	
Input Data 1	tRIP0	tRCIP/7 × 0.8	tRCIP/7	tRCIP/7 × 1.2	nsec	
Input Data 2	tRIP6	tRCIP/7 × 1.8	tRCIP/7 × 2	tRCIP/7 × 2.2	nsec	
Input Data 3	tRIP5	tRCIP/7 × 2.8	tRCIP/7 × 3	tRCIP/7 × 3.2	nsec	
Input Data 4	tRIP4	tRCIP/7 × 3.8	tRCIP/7 × 4	tRCIP/7 × 4.2	nsec	
Input Data 5	tRIP3	tRCIP/7 × 4.8	tRCIP/7 × 5	tRCIP/7 × 5.2	nsec	
Input Data 6	tRIP2	tRCIP/7 × 5.8	tRCIP/7 × 6	tRCIP/7 × 6.2	nsec	



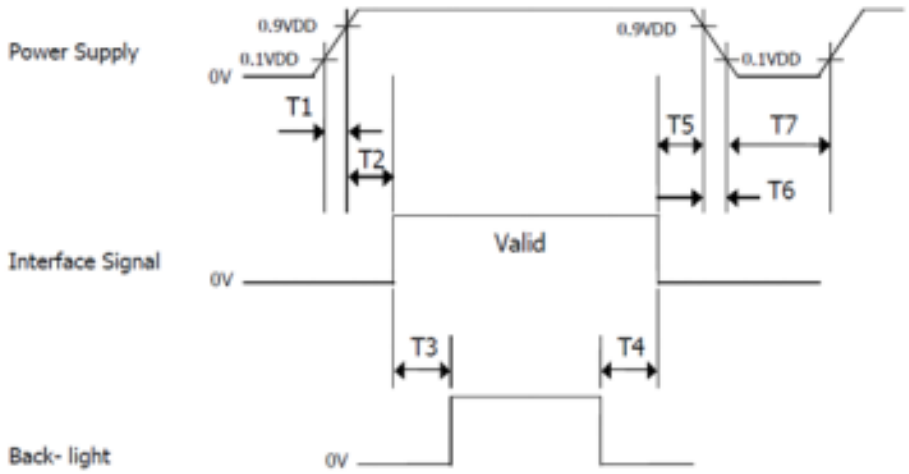
* Vdiff = (RXz+)-(RXz-),…. ,(RXCLK+)-(RXCLK-)

<Table 7. LVDS DC Timing Specification>

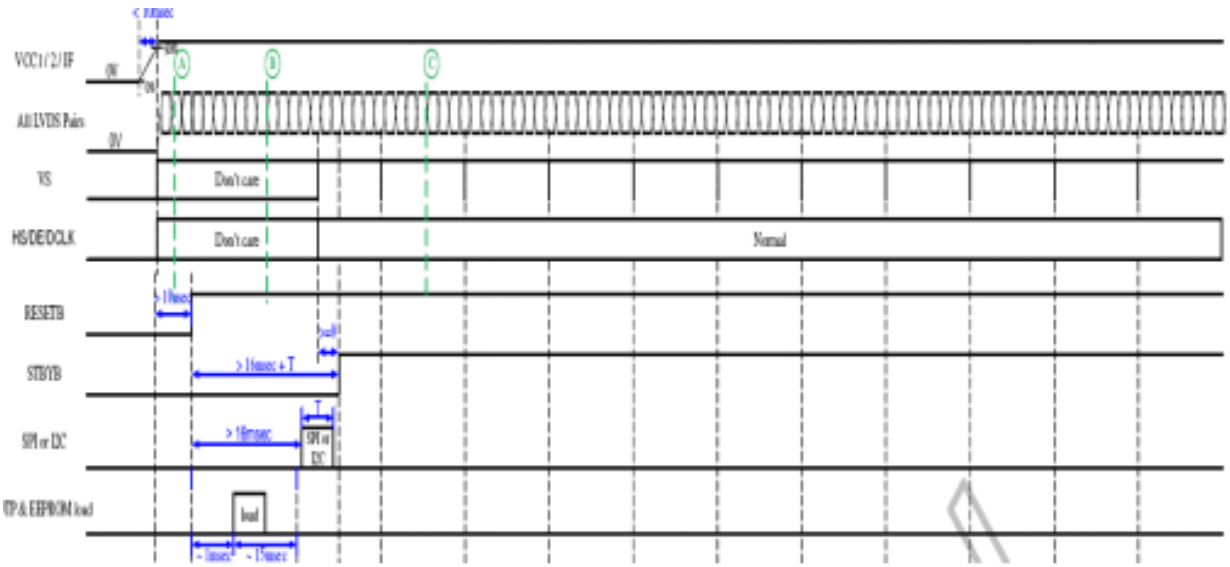
Item	Symbol	Condition	MIN	TYP	MAX	Unit
Differential input high Threshold voltage	Vth	Vcm=1.2V	-	-	+0.1	V
Differential input low Threshold voltage	Vtl	-	-0.1	-	-	V
Differential input common Threshold voltage	Vcm	-	1	1.2	1.7-|Vid|/2	V
LVDS input voltage	Vinlv	-	0.7	-	1.7	V
Differential input voltage	|Vid|	-	0.35	-	0.6	V
Differential input leakage voltage	Ilvleak	-	-10	-	+10	uA



Power Sequence



Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms



6 Optical Characteristics

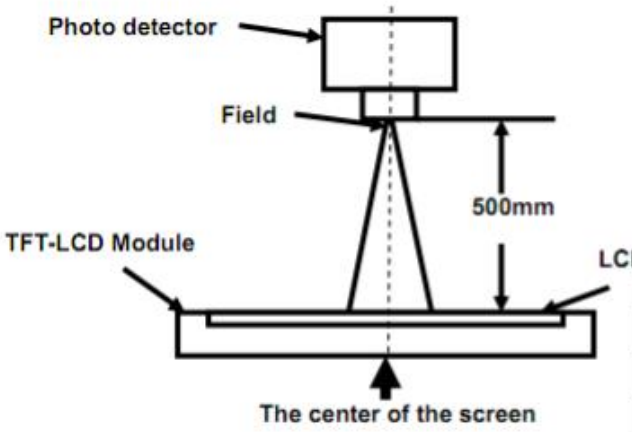
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		□θ_T	Center CR≥10	70	80	-	Degree.	Note2
		□θ_B		70	80	-		
		□θ_L		70	80	-		
		□θ_R		70	80	-		
Contrast Ratio		CR	Θ =0	-	900	-	-	Note1, Note3
Response Time		T_{ON}	25° C	-			ms	Note1, Note4
		T_{OFF}		-	30	35		
Chromaticity	White	X_W	Backlight is on	0.262	0.302	0.342	-	Note1, Note5
		Y_W		0.298	0.338	0.378	-	
	Red	X_R		0.566	0.606	0.646	-	
		Y_R		0.285	0.325	0.365	-	
	Green	X_G		0.263	0.303	0.343	-	
		Y_G		0.527	0.567	0.607	-	
	Blue	X_B		0.107	0.147	0.187	-	
		Y_B		0.121	0.161	0.201	-	
Uniformity		U			72	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		□□□□□ □□□□□ □L		300	350			Note1, Note7

Test Conditions:

1. IF= 20mA(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).

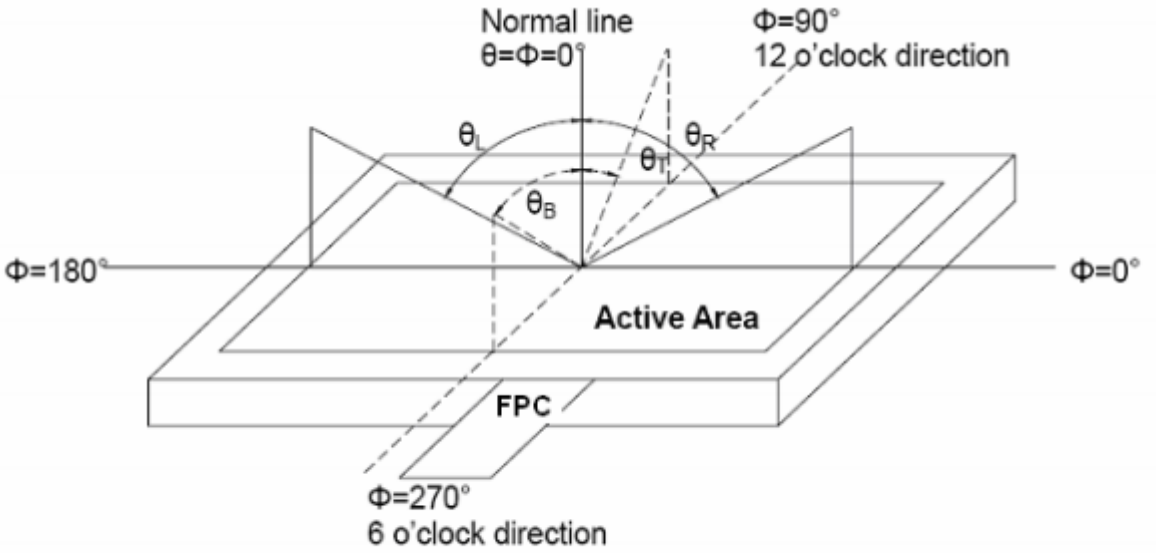


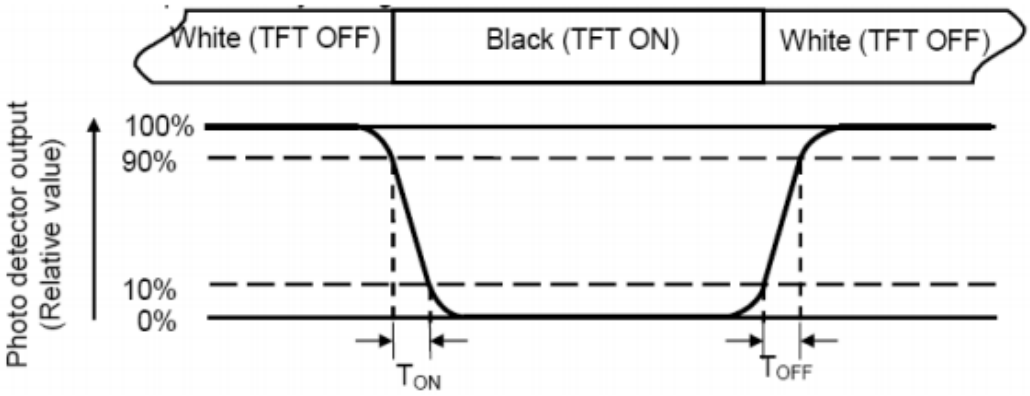
Fig. 1 Definition of viewing angle

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

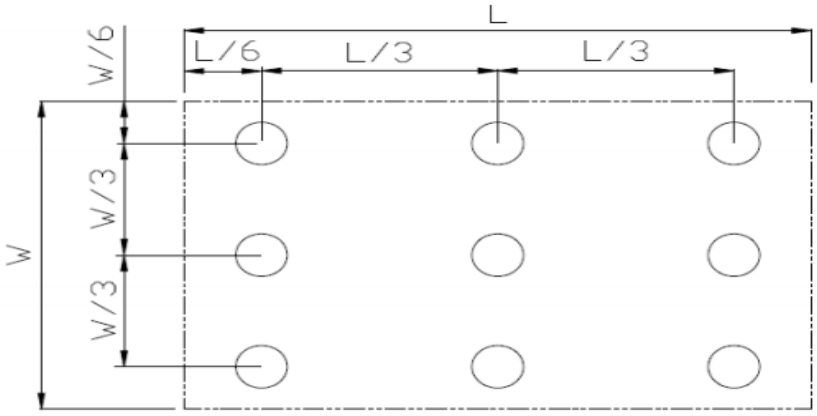


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

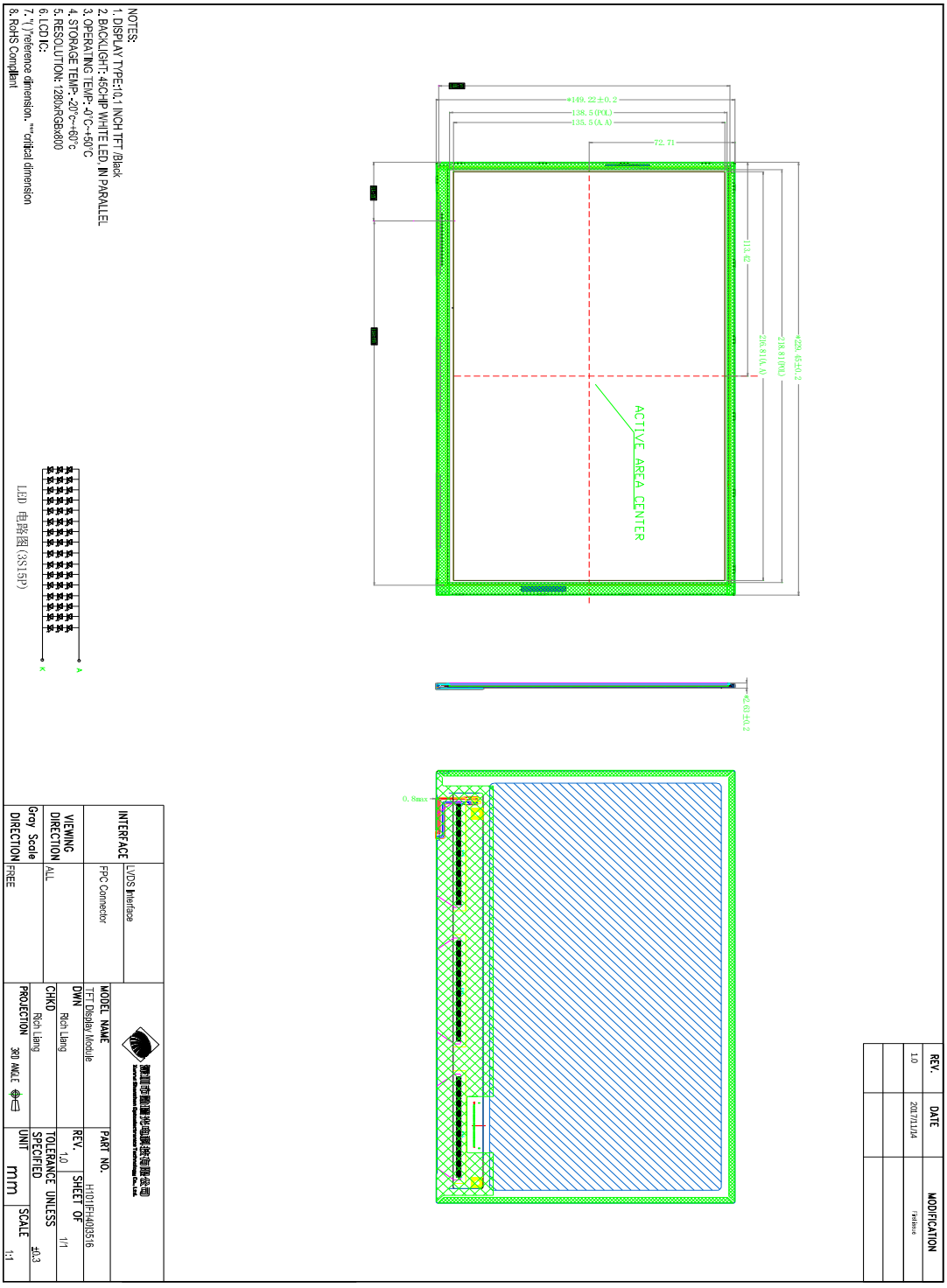
Measure the luminance of white state at center point.

7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +60℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -0℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +60℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -20℃, 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)	-20℃ 30 min ~ +60℃ 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



9 Packing

TBD

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.