深圳市思迪科科技有限公司
SHENZHEN CDTECH ELECTRONICS

Product Specification

Model Name	S101HWX56HD
Description	1280(RGB)x800 Dots 10.1" TFT LCD
Date	2023/11/28
Revision	2.0

Approved by/Date	**Check by/Date**	**Prepared by/Date**
ZHP 2022/06/15	HL 2023/11/28	MHY 2023/1128

Customer Approval	
Date	

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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2022/02/09	First Release	ZJ
	2022/06/15	Update the sheet page labels	ZWF
2.0	2023/11/28	Update packaging	MHY

2 General Specifications

Feature		Spec
Characteristics	Size	10.1 inch
	Resolution	1280(Horizontal)*800(Vertical)
	Interface	LVDS
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.1695(H)×0.1695(V)
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	Driver IC	EK79202
	Viewing Direction	ALL
Mechanical	LCM (W x H x D) (mm)	229.46(W)*149.10(H)*4.5 (D)
	Active Area(mm)	216.96(H)x 135.60(V)
	With /Without TP	Without TP
	Weight (g)	TBD
	LED Numbers	45 LEDs

Note 1: Requirements on Environmental Protection: RoHS
Note 2: LCM weight tolerance: +/- 5%

3 Input/Output Terminals

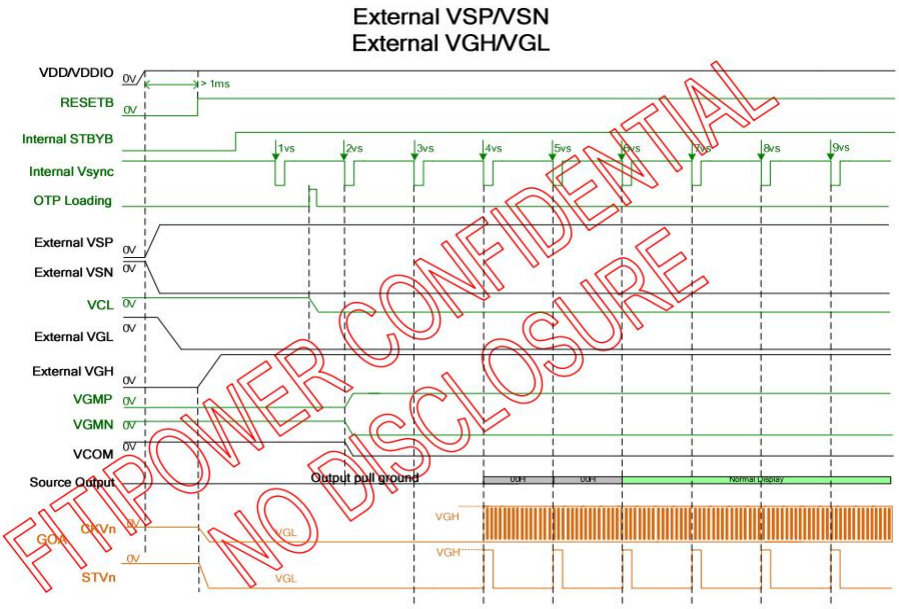
No.	Symbol	Description	Note
1	NC	No connection	
2-3	VDD（3.3V）	Power Supply	
4	NC	No connection	
5	RESET(NC)	No connection	
6	STBYB(NC)	No connection	
7	GND	Ground	
8	RXIN0-	- LVDS differential data input	
9	RXIN0+	+ LVDS differential data input	
10	GND	Ground	
11	RXIN1-	- LVDS differential data input	
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	RXCLK-	- LVDS differential clock input	
18	RXCLK+	+ LVDS differential clock input	
19	GND	Ground	
20	RXIN3-	- LVDS differential data input	
21	RXIN3+	+ LVDS differential data input	
22	GND	Ground	
23	SDA(NC)	No connection	
24	SCL(NC)	No connection	
25	GND	Ground	
26	CS(NC)	No connection	
27	NC	No connection	
28	LVBIT(NC)	No connection	
29	NC	No connection	
30	GND	Ground	
31-32	LEDK	Power for LED backlight (Cathode)	
33-38	NC	No connection	
39-40	LEDA	Power for LED backlight (Anode)	

4 Absolute Maximum Ratings

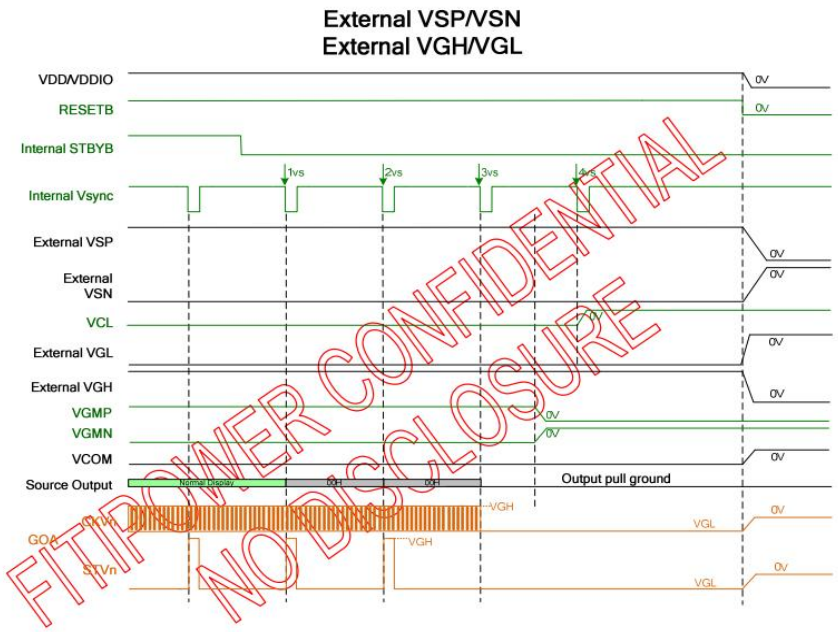
Item	Symbol	MIN	Typ	MAX	Unit
Supply Voltage	VDD	-0.3	3.3	3.6	V
Supply Current	VDD	260	290	320	mA
Input voltage “H”level	VIH	0.7VDD	-	VDD	V
Input voltage “L”level	VIL	0	-	0.3VDD	V
Operating Temperature	TOPR	-30	-	80	℃
Storage Temperature	TSTG	-30	-	80	℃

5 Electrical Characteristics

5.1 POWER ON/OFF SEQUENCE



Power on sequence with PMODE=H



Power off sequence with PMODE=H

FITIPOWER CONFIDENTIAL
NO DISCLOSURE

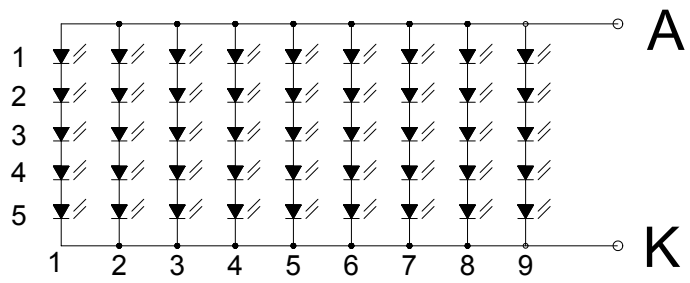
5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	270	-	mA	
Forward Voltage	V_F	14V	16V	18V	V	
Backlight Power consumption	W_{BL}	-	4.32	-	W	
LED Lifetime		-	50000	-	Hrs	

Note 1: Each LED: IF =40 mA, VF =2.7-3.4V.

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.



CIRCUIT DIAGRAM

5.3 RESET TIMING CHARACTERISTICS

When RESETB of the reset pin equals to Low, it will be in the condition of reset. When it is in the condition of reset, it will make the device recover the initial set.

However, in order to avoid the reset noise cause reset, there is a mechanism to judge about whether the reset is needed or not.

The closed interval of Low can be shown as the following.

(Test condition: VDDIO=2.3V~3.6V, VSS=0V, T_A=-20 ~+85)

Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max	
Reset low pulse width	Trst		20	-	-	μs

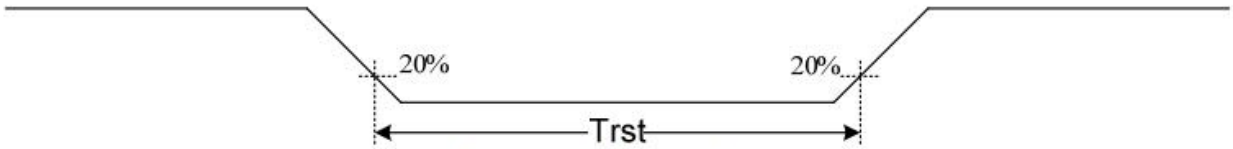
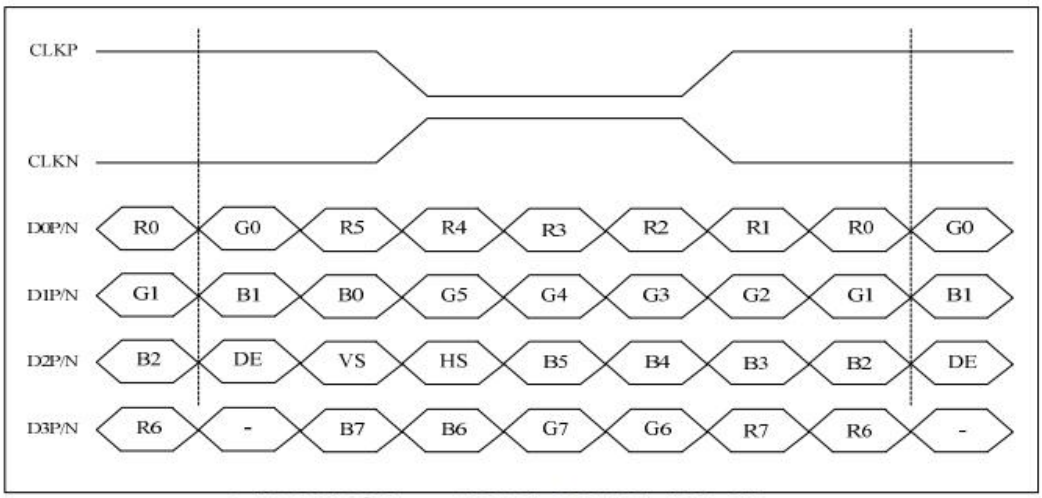


Figure 13.5: Reset timing

5.4 LVDS interface CHARACTERISTCS



8-bit LVDS input(LVBIT=H, LVFMT=H)

For 1280RGBx800

Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)		F_{DCLK}	66.3	72.4	78.9	MHz
HSYNC period time		T_H	1380	1440	1500	DCLK
Horizontal display area		T_{HD}		1280		DCLK
HSYNC pulse width	Min.	T_{HPW}		1		
	Typ.			-		
	Max.			40		
HSYNC back porch(with pulse width)		T_{HBP}	88	88	88	DCLK
HSYNC front porch		T_{HFP}	12	72	132	DCLK
VSYNC period time		T_V	824	838	872	H
Vertical display area		T_{VD}		800		H
VSYNC pulse width	Min.	T_{VPW}		1		H
	Typ.			-		
	Max.			20		
VSYNC back porch(with pulse width)		T_{VBP}	23	23	23	H
VSYNC front porch		T_{VFP}	1	15	49	H

5.5 LVDS mode AC electrical characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	500	-	-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	

Table 13.1: LVDS mode AC electrical characteristics

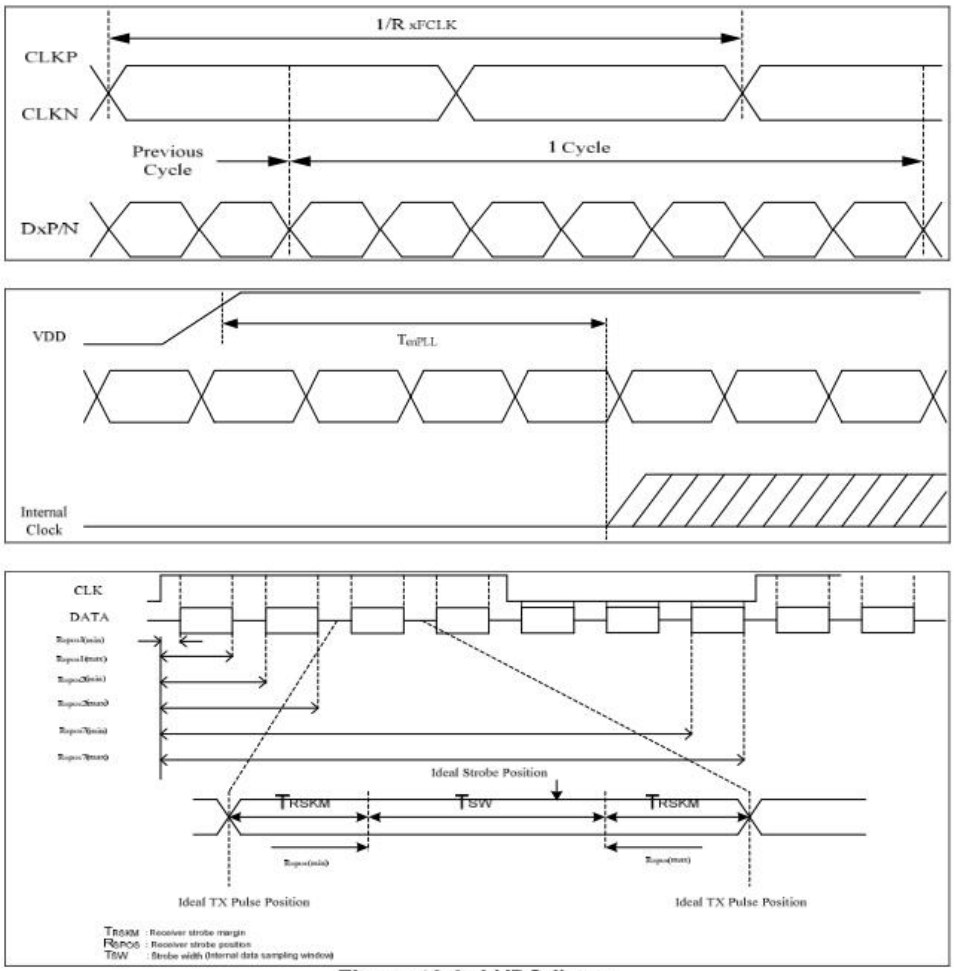
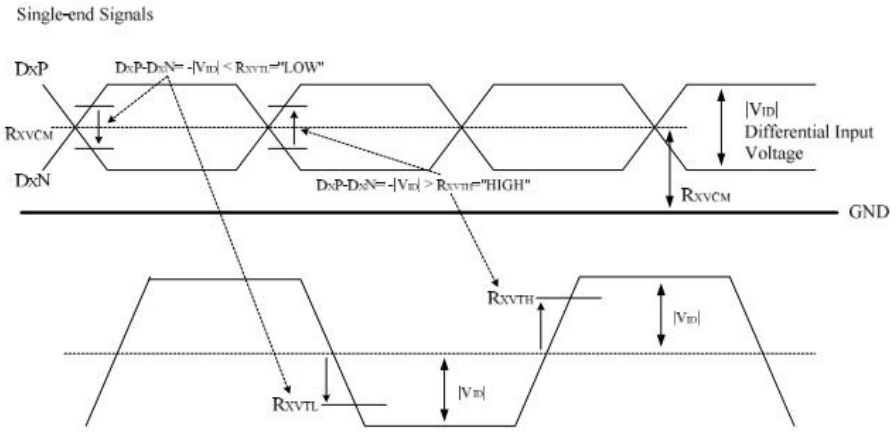


Figure 13.3: LVDS figure

5.6 LVDS DC electrical characteristics

(VDD=VDDIO=VDDIF=2.3 to 3.6V, VSS=VSSA=VSS_IF=0V, TA=-20 to +85℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	R_{XVTH}	+0.1	0.2	0.3	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.3	-0.2	-0.1	V	
Input voltage range (singled-end)	R_{XVIN}	0.7	-	1.7	V	
Differential input common mode voltage	R_{XVCM}	1	1.2	1.4	V	$\|V_{ID}\|$=0.2
Differential input impedance	Z_{ID}	80	100	125	ohm	
Differential input voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	I_{LCLVDS}	-10	-	+10	uA	
LVDS Digital Operating Current	$I_{VDDMIPI}$	-	15	20	mA	F_{DCLK}=80MHz,VDD=3.3V, Input pattern: 55h->AAh->55h->AAh
LVDS Digital Stand-by Current	I_{STMIPI}	-	-	250	uA	Clock & all Functions are stopped



6 Optical Characteristics

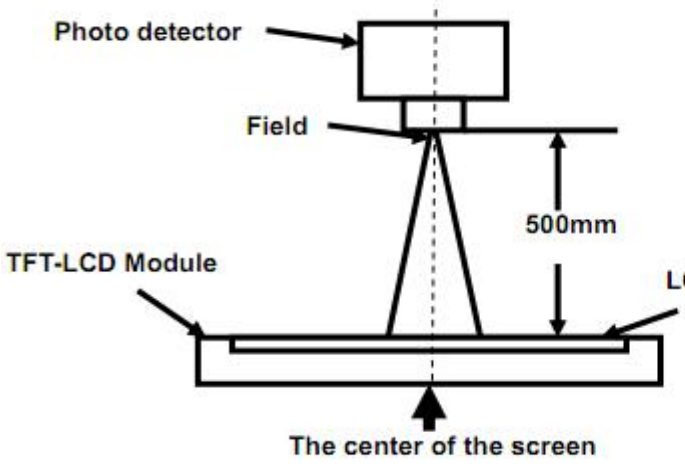
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10		80	-	Degree.	Note2
		θ_B			80	-		
		θ_L			80	-		
		θ_R			80	-		
Contrast Ratio		CR	Θ =0	800	1000	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	25	35	ms	Note1, Note4
		T_{OFF}						
Chromaticity	Red	X_W	Backlight is on	0.568	0.618	0.668	-	Note1, Note5
		Y_W		0.278	0.328	0.378	-	
	Green	X_W		0.285	0.335	0.385	-	Note1, Note5
		Y_W		0.492	0.542	0.592	-	
	Blue	X_W		0.086	0.136	0.186	-	Note1, Note5
		Y_W		0.095	0.145	0.195	-	
	White	X_W		0.272	0.322	0.372	-	Note1, Note5
		Y_W		0.294	0.344	0.394	-	
Luminance Uniformity		LU		70	75	-	%	Note1, Note6
Luminance		L		450	500		cd/m2	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	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).

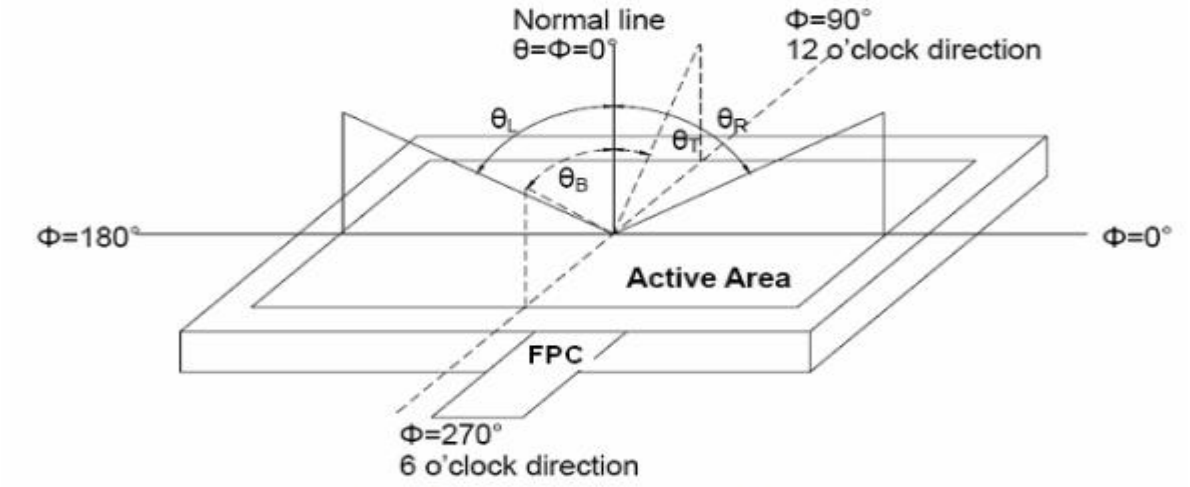


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

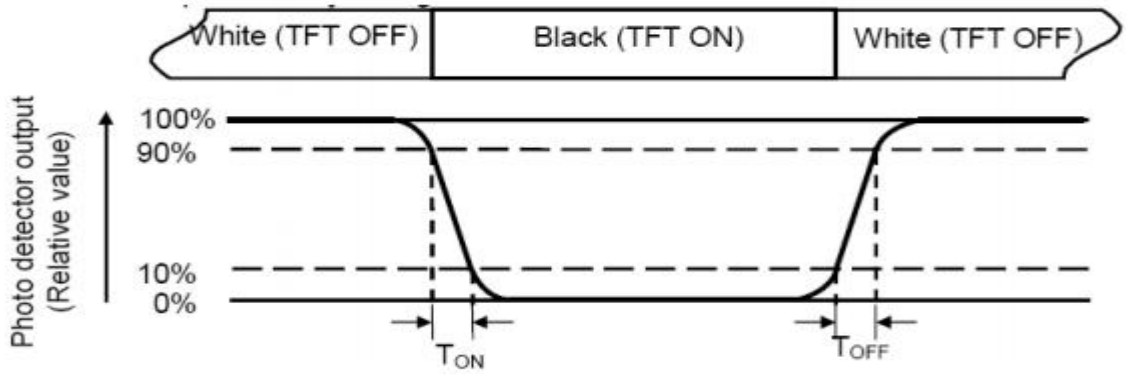
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

“White state “:The state is that the LCD should driven by Vwhite.

“Black state”: The state is that the LCD should driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

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

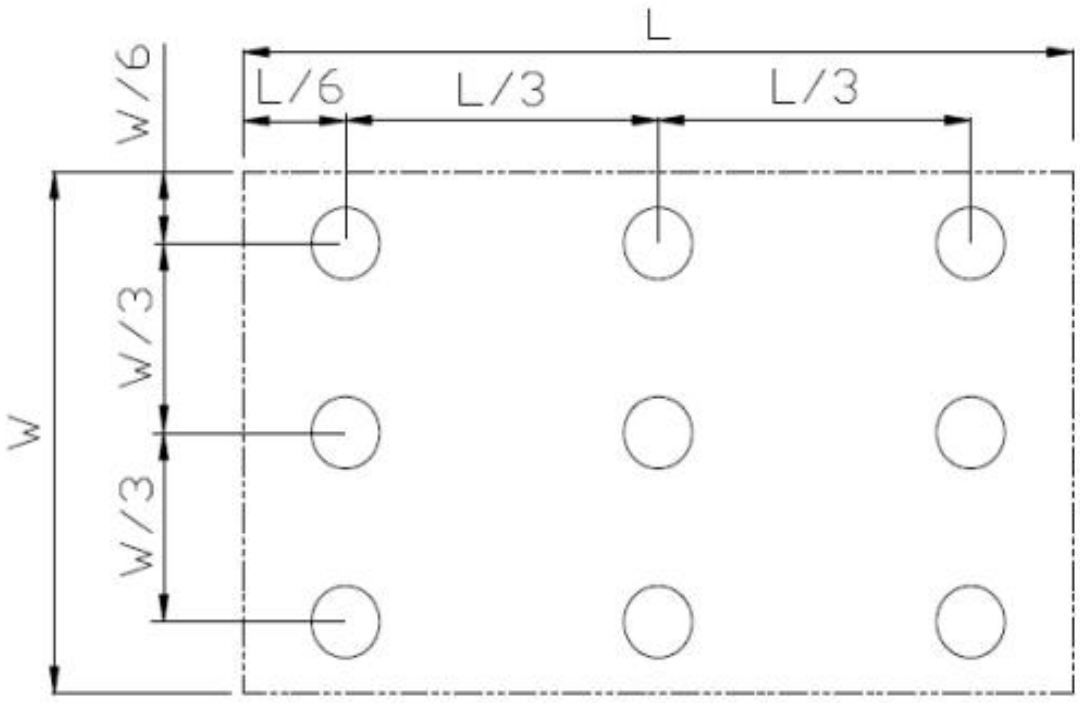


Fig. 2 Definition of uniformity
Lmax: The measured maximum luminance of all measurement position.
Lmin: The measured minimum luminance of all measurement position.

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 Operation	Ts= +80℃, 240hrs	IEC60068-2-1:2007 GB2423. 2-2008
2	Low Temperature Operation	Ta= -30℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta= +80℃,240hrs	IEC60068-2-1:2007 GB2423. 2-2008
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Operation	Ta= +60℃, 90% RH max,240 hours	IIEC60068-2-78:2001 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 IEC60068-2-14:1984, GB2423.22-2002
7	ESD	C=150pF, R=330 Ω, 5 points/panel , Air:±15KV, 5 times Contact: ±8KV, 5 times (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	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)	IEC60068-2-6:1982 GB/T2423.10-1995
9	Mechanical Shock (Non-operation)	Half Sine Wave 60G ,6ms,±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995

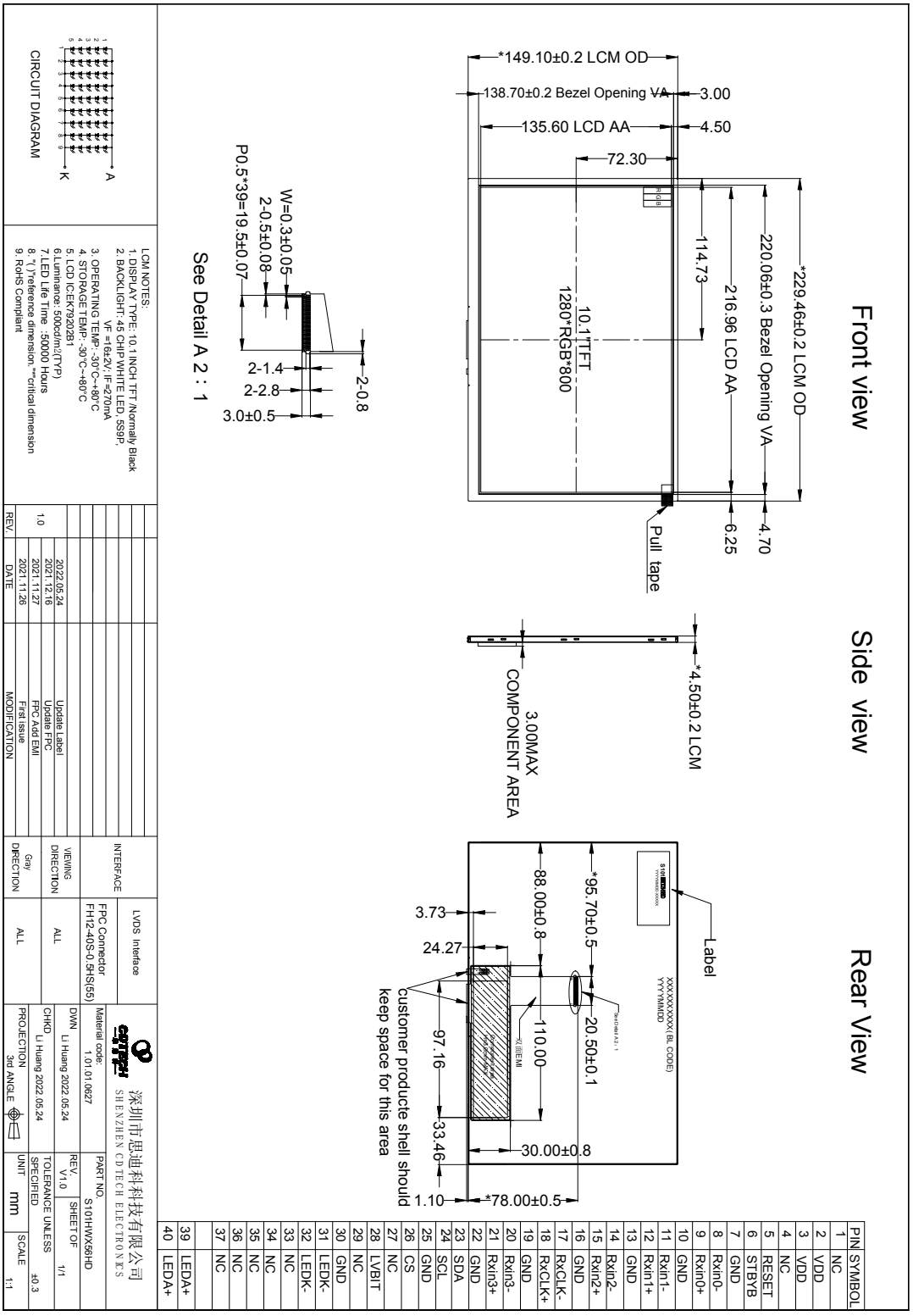
Notes:
1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:
1).Air bubble in the LCD;
2).Seal leak
3).Non-display
4).missing segments
5).Glass crack
6).CR reduction >40%
7).IDD increase >100%
8).Brightness reduction >50%
9).Color coordinate tolerance >0.05

2.≤7.0 inch：The size of sample is 5pcs；

> 7.0 inch：The size of sample is 2pcs；

3. One test sample must complete each test item;
4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
5.In the test of High Temperature Operation and High Temperature & Humidity Operation ,the operation temperature is the surface temperature of module.

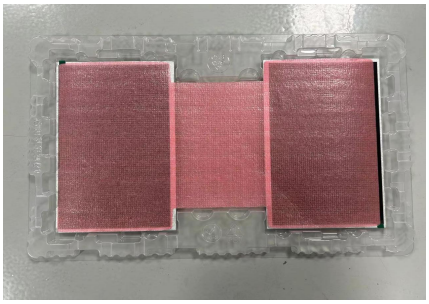
8 Mechanical Drawing



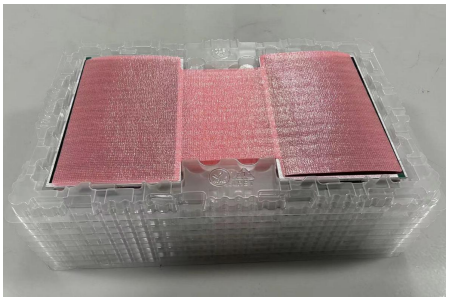
9 Packing

Packing Method

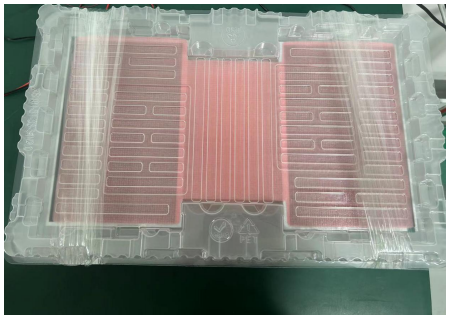
(1)



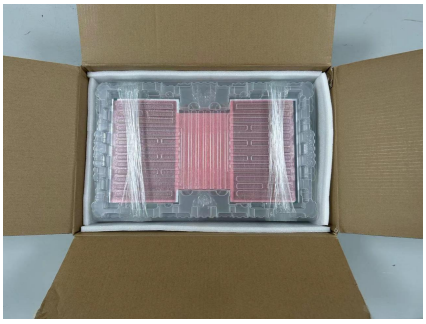
(2)



(3)



(4)



(5)



(6)



(7)



(1) Install two modules in one plate, and put the modules into the plastic suction plate.

(2) Place the pearl cotton pads on the plastic suction tray and stack them to a box.

(3) After wrapping the plastic box with stretch film, place it inside a transparent PET bag.

(4) - (5) Put the plastic suction tray into the carton, and insert the foam around and at the bottom. Top is covered with white cotton foam.

(6) Seal it well with adhesive tape.

(7) Paste the labels.

10. TFT-LCD Module Inspection Criteria

10.1 Scope

The incoming inspection standards shall be applied to TFT –LCD Modules (hereinafter Called "Modules") that supplied by CDTech Technology LTD.

10.2 Incoming Inspection

The customer shall inspect the modules within twenty calendar days of the delivery date (the "inspection period) at its own cost. The result of the inspection (acceptance or rejection) shall be recorded in writing, and a copy of this writing will be promptly sent to

The seller, If the results of the inspecting from buyer does not send to the seller within twenty Calendar days of the delivery date. The modules shall be regards as acceptance. Should the customer fail to notify the seller within the inspection period, the buyers Right to reject the modules shall be lapsed and the modules shall be deemed to have Been accepted by the buyer

10.3 Inspection Sampling

3.1. Lot size: Quantity per shipment lot per model
3.2. Sampling type: Normal inspection, Single sampling
3.3. Inspection level: II
3.4. Sampling table: MIL-STD-105E

3.5. Acceptable quality level (AQL)

Major defect: AQL=0.65 Minor defect: AQL=1.00

10.4 Inspection Conditions

4.1 Ambient conditions:

a. Temperature: Room temperature 25±5℃

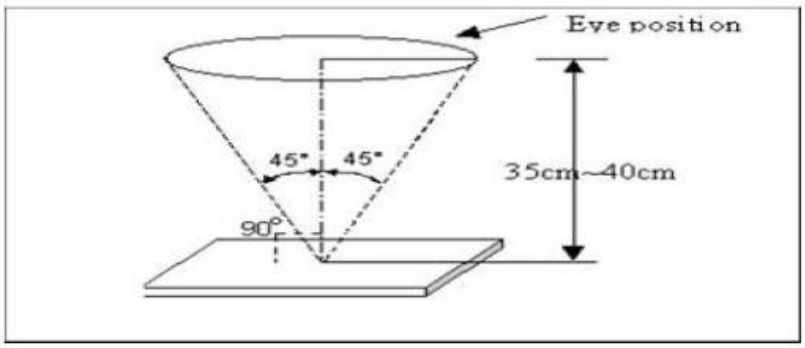
b. Humidity: (60±10) %RH

c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)
4.2 Viewing distance

The distance between the LCD and the inspector's eyes shall be at least 35±5 ㎝.

4.3 Viewing Angle

U/D: 45 °/45°, L/R: 45°/45°



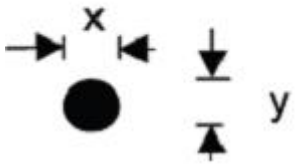
10.5 Inspection Criteria

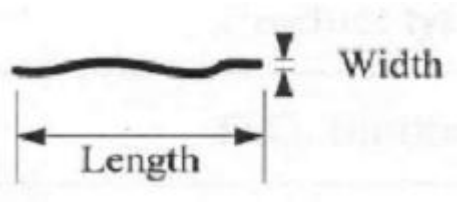
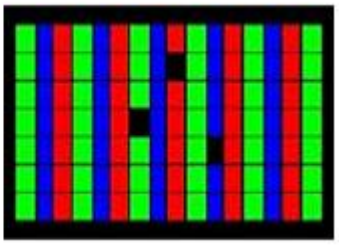
Defects are classified as major defects and minor defects according to the degree of Defectiveness defined herein.

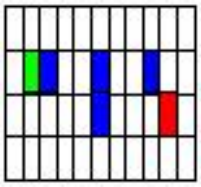
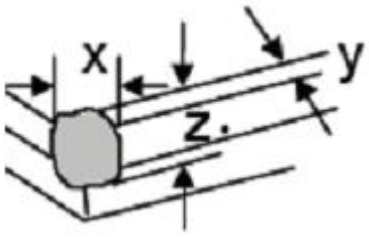
10.5.1 Major defect

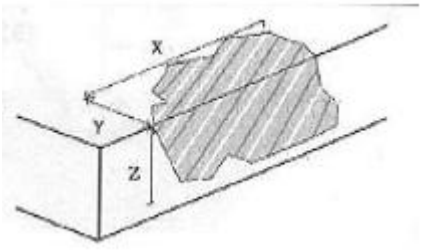
Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
`5.1.2	Missing	Missing function component
5.1.3	Crack	Glass Crack

10.5.2 Minor defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th colspan="2">Inspection standard</th></tr>
<tr><td rowspan="3">5.2.1</td><td rowspan="3">Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt</td><td colspan="2">For dark/white spot is defined
$\varphi = (x+y) / 2$

</td></tr>
<tr><td>Size ϕ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>ϕ≤0.2</td><td>Ignore</td></tr>
</table>

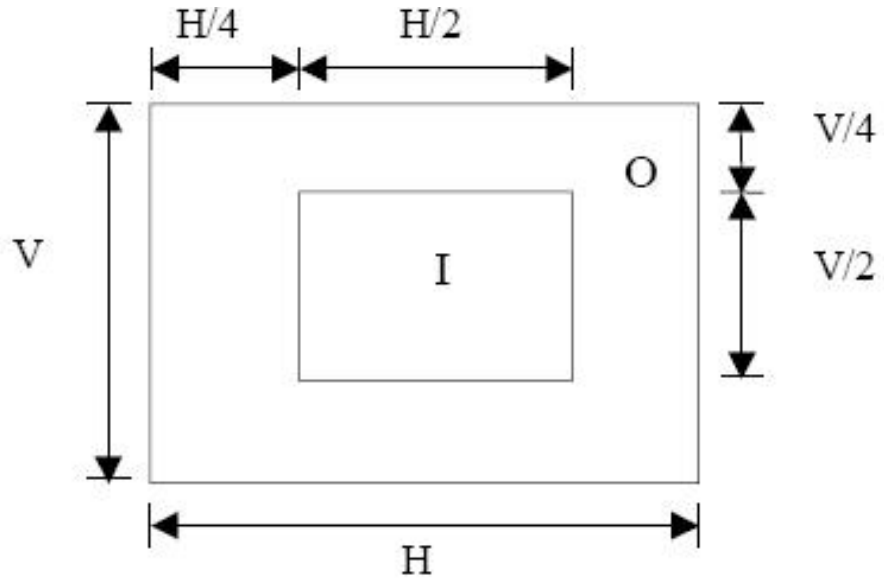
		0.2 ＜φ≤0.3	3
		0.3 <φ	Not allowed
5.2.2	Line Defect Including Black line White line Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		W≤0.03	Ignore
		0.03 ＜W≤0.04 L≤5.0	4
		0.04＜W，or L>5.0	Not allowed
5.2.3	Polarizer Dent/Bubble	Sizeϕ(mm)	Acceptable Quantity
		φ≤0.25	Ignore
		0.25 ＜φ≤0.5	3
		0.5 <φ	Not allowed
		Total QTY	3
5.2.4	Electrical Dot Defect	Bright and Black dot define:  and 	

<table>
<tr><td></td><td></td><td>
Two Adjacent Dot</td></tr>
<tr><td></td><td></td><td>Inspection pattern: Full white、 Full black、 Red、 green and blue screens</td></tr>
<tr><td></td><td></td><td>
<table>
<tr><td rowspan="2">Item</td><td colspan="3">Acceptable Quantity</td></tr>
<tr><td>I</td><td>O</td><td>Total</td></tr>
<tr><td>Black dot defect</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Bright dot defect</td><td>0</td><td>3</td><td>3</td></tr>
<tr><td>Total Dot</td><td>2</td><td>4</td><td>5</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td>3% Bright Dot is allowed</td></tr>
<tr><td>5.2.5</td><td>Glass defect</td><td>1.Corner Fragment:


<table>
<tr><td>Size(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>X≤3mm
Y≤1mm
Z≤T</td><td>Ignore
T：Glass thickness
X: Length
Y: Width
Z: thickness</td></tr>
</table>
2. Side Fragment:


<table>
<tr><td>Size(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>X≤5.0mm
Y ≤1mm</td><td>T：Glass thickness
X: Length
Y: Width</td></tr>
</table>
</td></tr>
</table>

		Z≤T	Z: thickness



I area & O area

Note: 1). Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.

2). The distance between two bright dot defects (red, green, blue, and white) should be larger than 15mm.

3). The distance between black dot defects or black and bright dot defects should be more than 5mm apart.

4). Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.

10.6 Mechanics specification

As for the outside dimension, weight of the modules, please refer to product specification For more details

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
- Ketene

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.