



深圳市思迪科科技有限公司

SHENZHEN CDTECH ELECTRONICS

Product Specification

Model Name	S050BWV100ES
Description	5.0" WVGA 800(RGB)x480 Dots
Date	2022/03/25
Version	1.0

Approved by/Date	Check by/Date	Prepared by/Date
ZHP 2022/03/25	HZX 2022/03/25	ZWF 2022/03/25

Customer Approval	
Date	



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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2022/03/25	First Release.	ZWF
	2022/04/19	Add IVDD Current	ZWF

2. General Specifications

	Feature	Spec
Characteristics	Size	5 inch
	Resolution	800(horizontal)*480(Vertical)
	Interface	RGB-24bit
	Connect type	Connector
	Display Colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.135*0.135
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally Black
	LCD Driver IC	ST7262
	Viewing Direction	Full view
Mechanical	LCM (W x H x D) (mm)	120.75*75.80*2.95
	Active Area(mm)	108 x 64.80
	Weight (g)	TBD
	LED Numbers	14 LEDs

Note 1: Requirements on Environmental Protection: RoHs

Note 2: LCM weight tolerance: +/- 5%

3. Input/Output Terminals

No.	Symbol	Description
1	VLED-	Backlight LED Cathode
2	VLED+	Backlight LED Anode.
3	GND	Ground
4	VDD	Power supply
5~12	R0~R7	Data bus
13~20	G0~G7	Data bus
21~28	B0~B7	Data bus
29	GND	Ground
30	DCLK	Dot clock signal input. Latching input data at its rising edge.
31	DISP	Normally pulled high. DISP="1": Normally operation (Default) DISP="0": Timing controller, source driver will turn off ,all output are High-Z.
32	HSYNC(NC)	Horizontal sync input. Negative polarity.(NC)
33	VSYNC(NC)	Vertical sync input. Negative polarity.(NC)
34	DE	Data enable input. Active high to enable the input data bus under "DE Mode."
35	NC	No connect
36	GND	System Ground
37	XR(NC)	No connect
38	YD(NC)	No connect
39	XL(NC)	No connect
40	YU(NC)	No connect

4. Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	VDD	-0.5	-	5	V	-
Operating Temperature	TOPR	-30	-	85	℃	-
Storage Temperature	TSTG	-30	-	85	℃	

5. Electrical Characteristics

5.1 ELECTRICAL CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	VDD	3.0	3.3	3.6	V	
Supply Current	I _{VDD}	-	10	-	mA	white displayed
Charge Pump Supply Voltage	PVDD	3.0	3.3	3.6	V	

5.2 DC Characteristics for Digital Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic-High Input Voltage	V _{ih}	0.7VDDI	-	VDDI	V	
Logic-Low Input Voltage	V _{il}	DGND	-	0.3VDDI	V	
Logic-High Output Voltage	V _{oh}	VDDI-0.4	-	VDDI	V	
Logic-Low Output Voltage	V _{ol}	DGND	-	DGND+0.4	V	

5.3 DC Characteristics for Analog Circuit

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Positive High-Voltage Power	V _{GH}	13	15	16.5	V	No Load@ FR=60Hz
Negative High-Voltage Power	V _{GL}	-7	-10	-11	V	
Output Voltage Deviation	V _{od}	-	±35	±45	mV	
Standby Current	I _{sc}	-	-	50-	uA	
Operation Current	I _{oc}	-	20	-	mA	

5.4 LED Driving Conditions

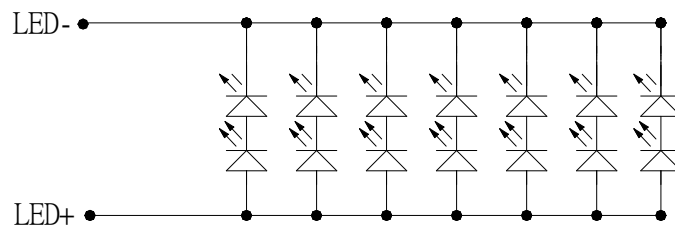
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	140	175	mA	
Forward Voltage	V_F	11.2	-	12.8	V	
Backlight Power consumption	W_{BL}	1.568	-	2.24	W	
LED Lifetime		-	50000	-	Hrs	

Note 1: Each LED: $I_F = 20 \text{ mA}$, $V_F = 5.6 - 6.4 \text{ V}$.

Note 2: Optical performance should be evaluated at $T_a = 25^\circ \text{C}$ only.

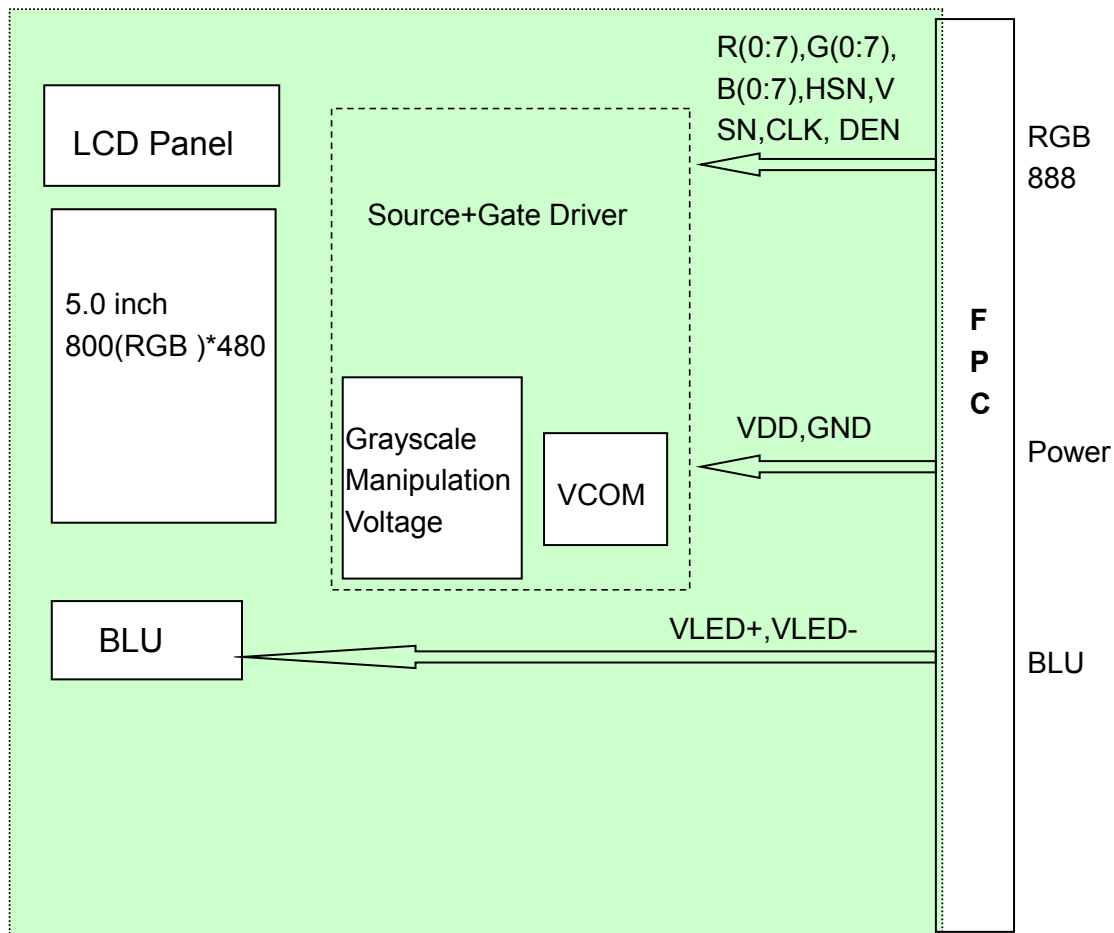
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

Figure: LED connection of backlight(Constant Current)



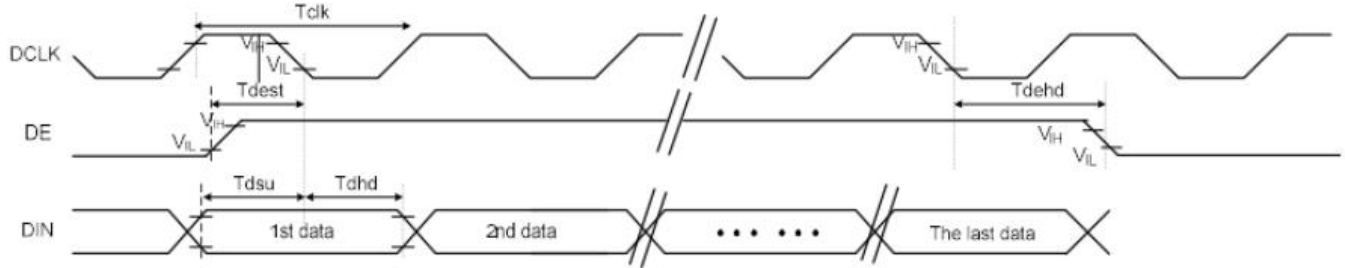
CIRCUIT DIAGRAM

5.5 Block Diagram



6. Interface Timing

6.1 System Bus Timing for RGB Interface



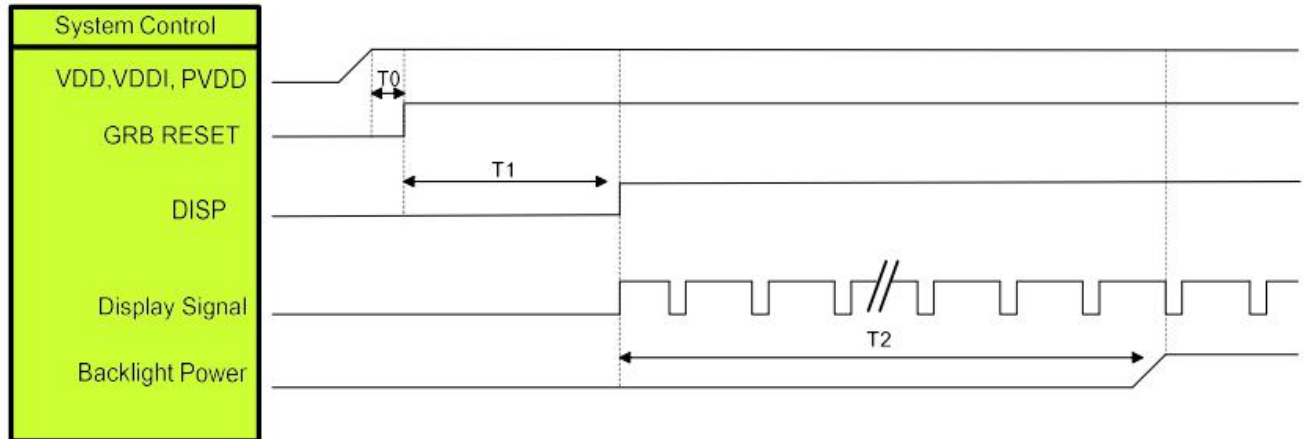
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Data Setup Time	T_{dsu}	12	-	-	ns	
Data Hold Time	T_{dhd}	12	-	-	ns	
DE Setup Time	T_{dest}	12	-	-	ns	
DE Hold Time	T_{dehd}	12	-	-	ns	

6.2 Parallel 24-bit RGB Input Timing Table

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

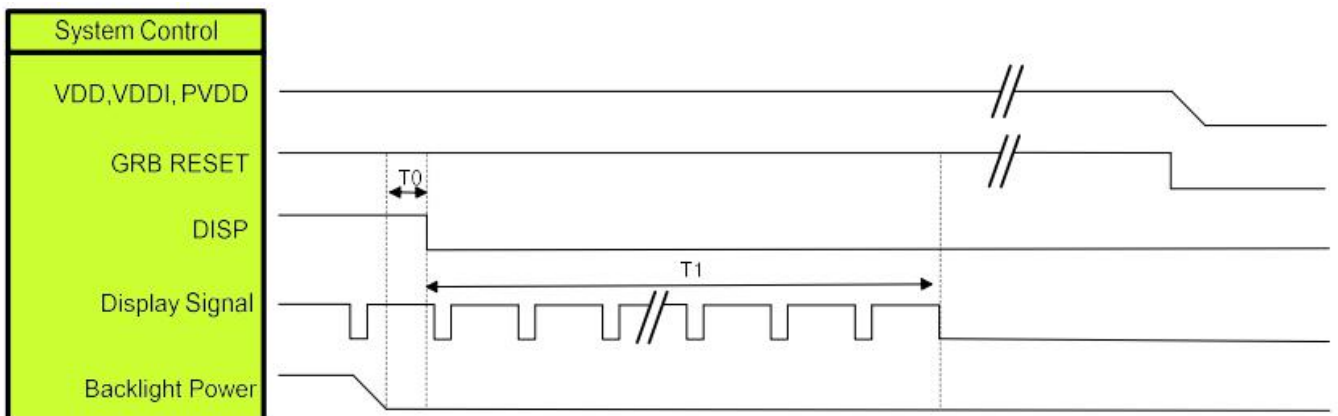
Parallel 24-bit RGB Interface Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp	800			DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	488	496	504	HSYNC	
	Display Period	Tvdisp	480			HSYNC	
	Back Porch	Tvbp	4	8	12	HSYNC	
	Front Porch	Tvfp	4	8	12	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

6.3 Power On Sequence



Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

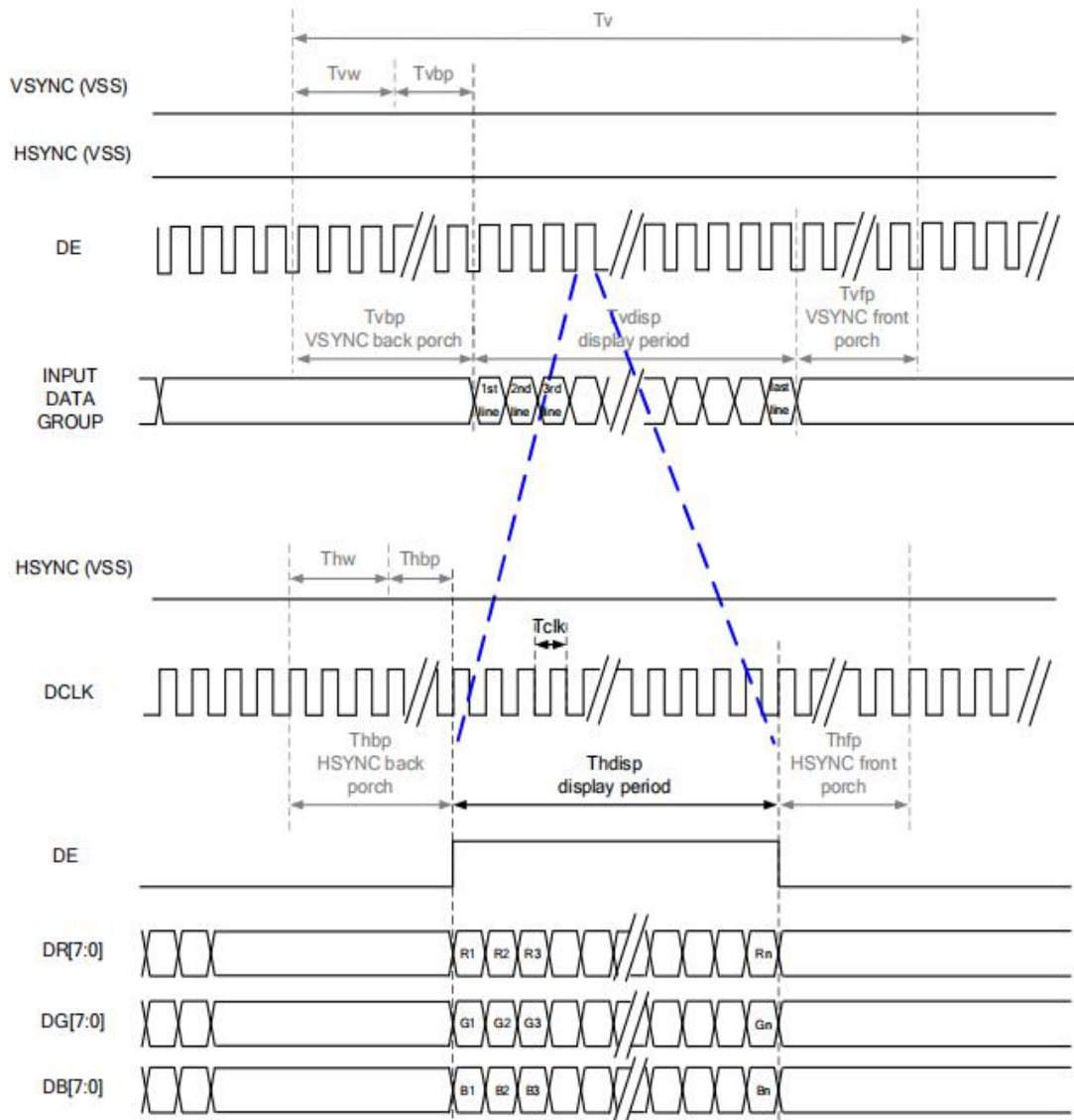
6.4 Power Off Sequence



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms

6.5 RGB Interface

DE Mode



RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC - DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

Note: "Input" means these signals are driven by host side.

7. Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time		Tr+Tf	-	-	30	40	ms	FIG.1	Note4
Contrast Ratio		CR		1000	1500	-	-	FIG.2	Note1
Surface luminance		LV	$\theta = 0^\circ$	850	1000	-	cd/m ²	FIG.2	Note2
NTSC		-	$\theta = 0^\circ$	55	60	-	%	FIG.2	Note5
Viewing angle		θ_T	Center CR $\geq$ 10	80	85	-	deg	FIG.3	Note6
		θ_B		80	85	-	deg	FIG.3	
		θ_L		80	85	-	deg	FIG.3	
		θ_R		80	85	-	deg	FIG.3	
Chromaticity	Red	R _X	$\theta = 0^\circ$ $\phi = 0^\circ$ Ta=25°	0.585	0.635	0.685	-	FIG.2 CIE1931	Note5
		R _Y		0.286	0.336	0.386	-		
	Green	G _X		0.247	0.297	0.347	-		
		G _Y		0.529	0.579	0.629	-		
	Blue	B _X		0.084	0.134	0.184	-		
		B _Y		0.072	0.122	0.172	-		
	White	W _X		0.271	0.321	0.371	-		
		W _Y		0.291	0.341	0.391	-		

Note1. Definition of contrast ratio

Contrast ratio(Cr) is defined mathematically by the following formula. For more information see FIG.2.

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

For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON' s BM-5 or BM-7 photo detector or compatible.

Note2. Definition of surface luminance.

Surface luminance is the luminance with all pixels displaying white. For more information see FIG.2.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3,,Pn)

Note3. Definition of luminance uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1

through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.2.

$$YU = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}$$

Note4. Definition of response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_r) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_f) is the time between photo detector output intensity changed from 10% to 90%.

For additional information see FIG1.

Note5. Definition of color chromaticity (CIE1931)

CIE (x,y) chromaticity, The x,y value is determined by screen active area center position P5. For more information see FIG.2.

Note6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. 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. For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers' s ConoScope or DMS series Instruments or compatible.

FIG.1. The definition of response Time

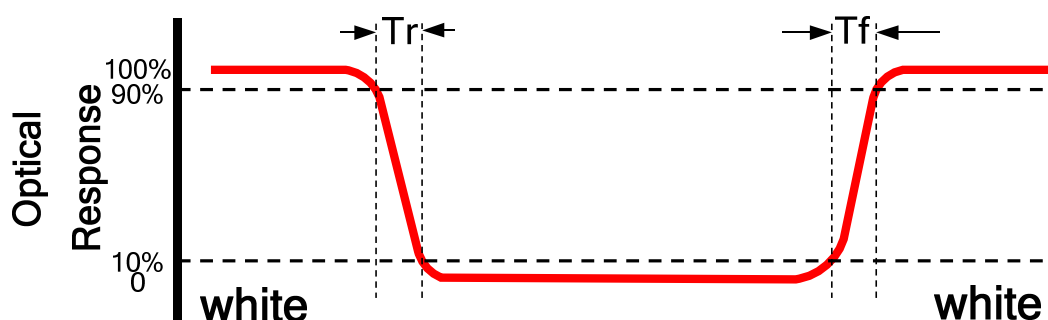


FIG.2. Measuring method for contrast ratio, surface luminance,

luminance uniformity, CIE (x,y) chromaticity

Size : $S \leq 5''$ (see Figure a) A : 5 mm B : 5 mm

H,V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

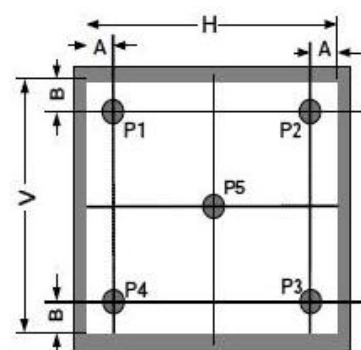
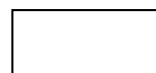


Figure a

Size : $5'' < S \leq 12.3''$ (see Figure b) H,V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure b.

measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

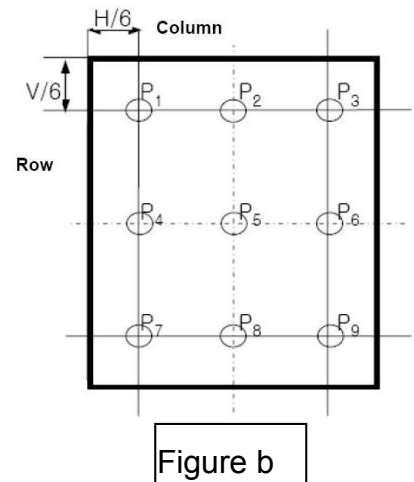
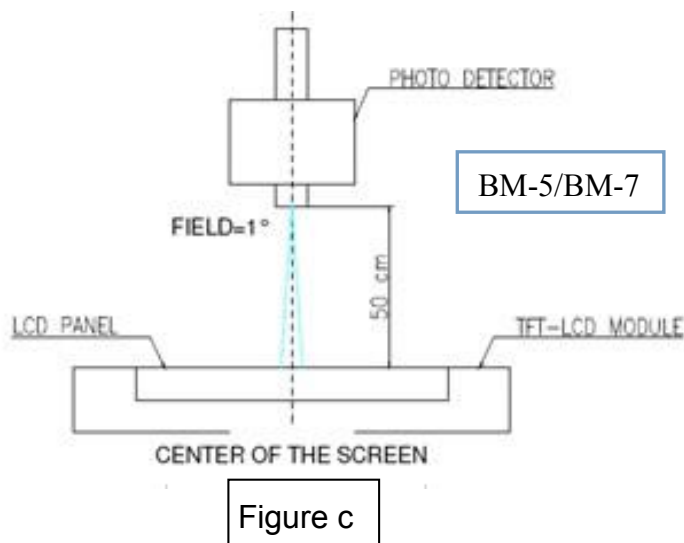
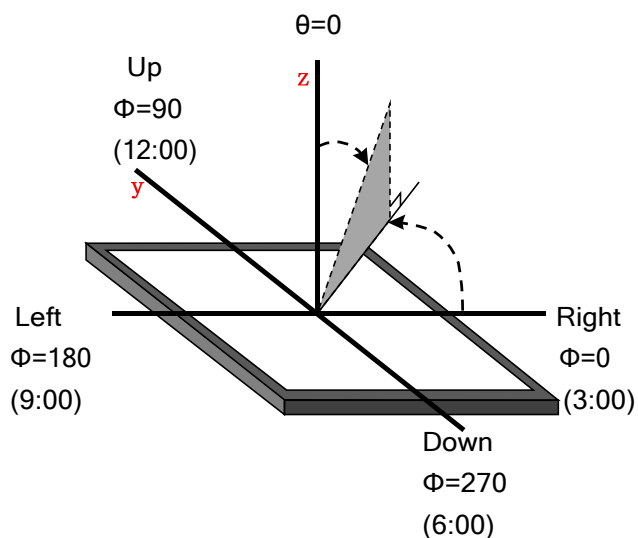


FIG.3.The definition of viewing angle



8. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +85℃, 96hrs	IEC60068-2-1:2007 GB2423. 2-2008
2	Low Temperature Operation	Ta= -30℃, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta= +85℃, 96hrs	IEC60068-2-1:2007 GB2423. 2-2008
4	Low Temperature Storage	Ta= -30℃, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Operation	Ta= +60℃, 90% RH max, 96 hours	IEC60068-2-78:2001 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:±8KV, 5 times Contact: ±4KV, 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,	IEC60068-2-32:1990



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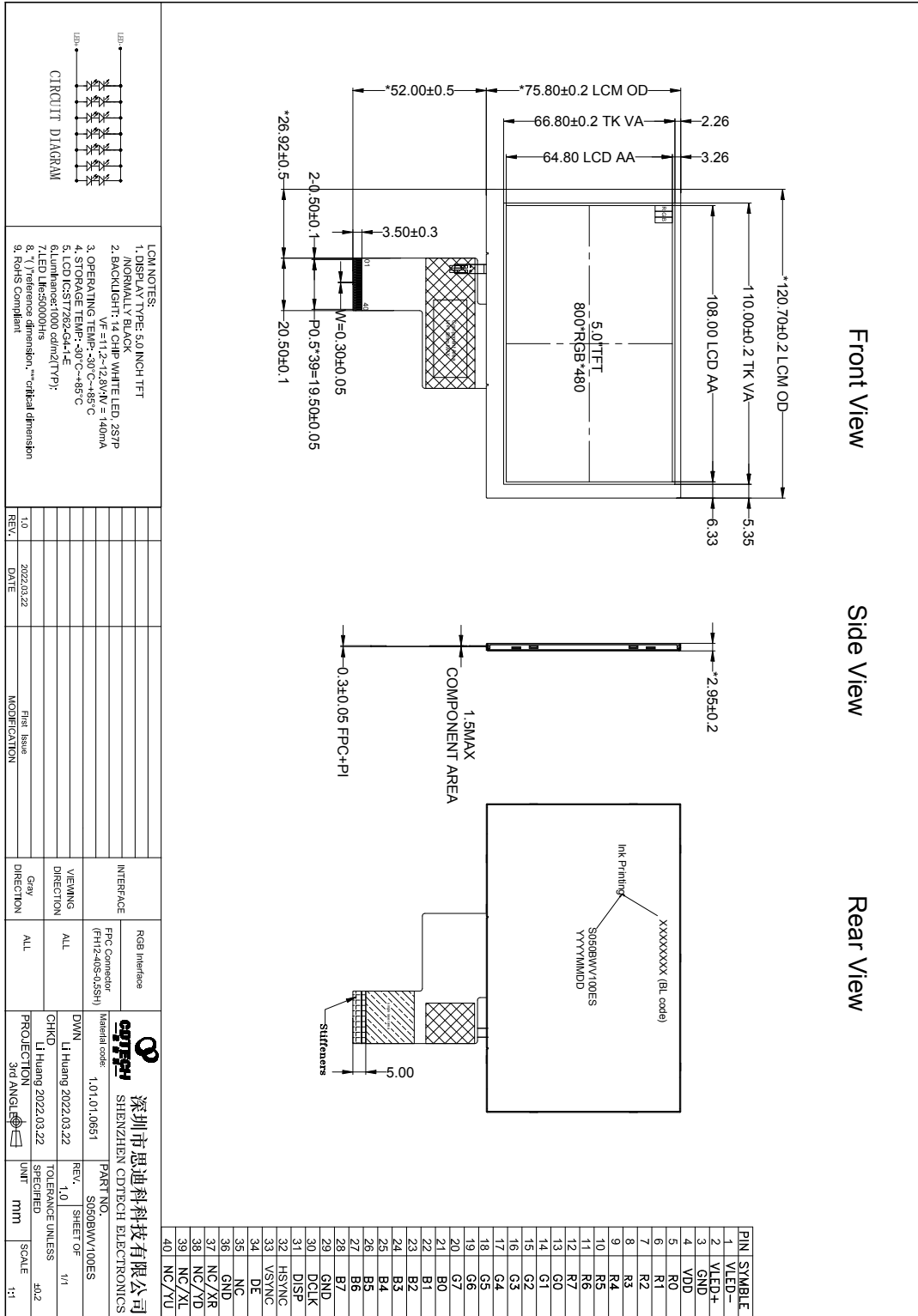
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		1 corner, 3 edges, 6 surfaces	GB/T2423.8-1995
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Notes:

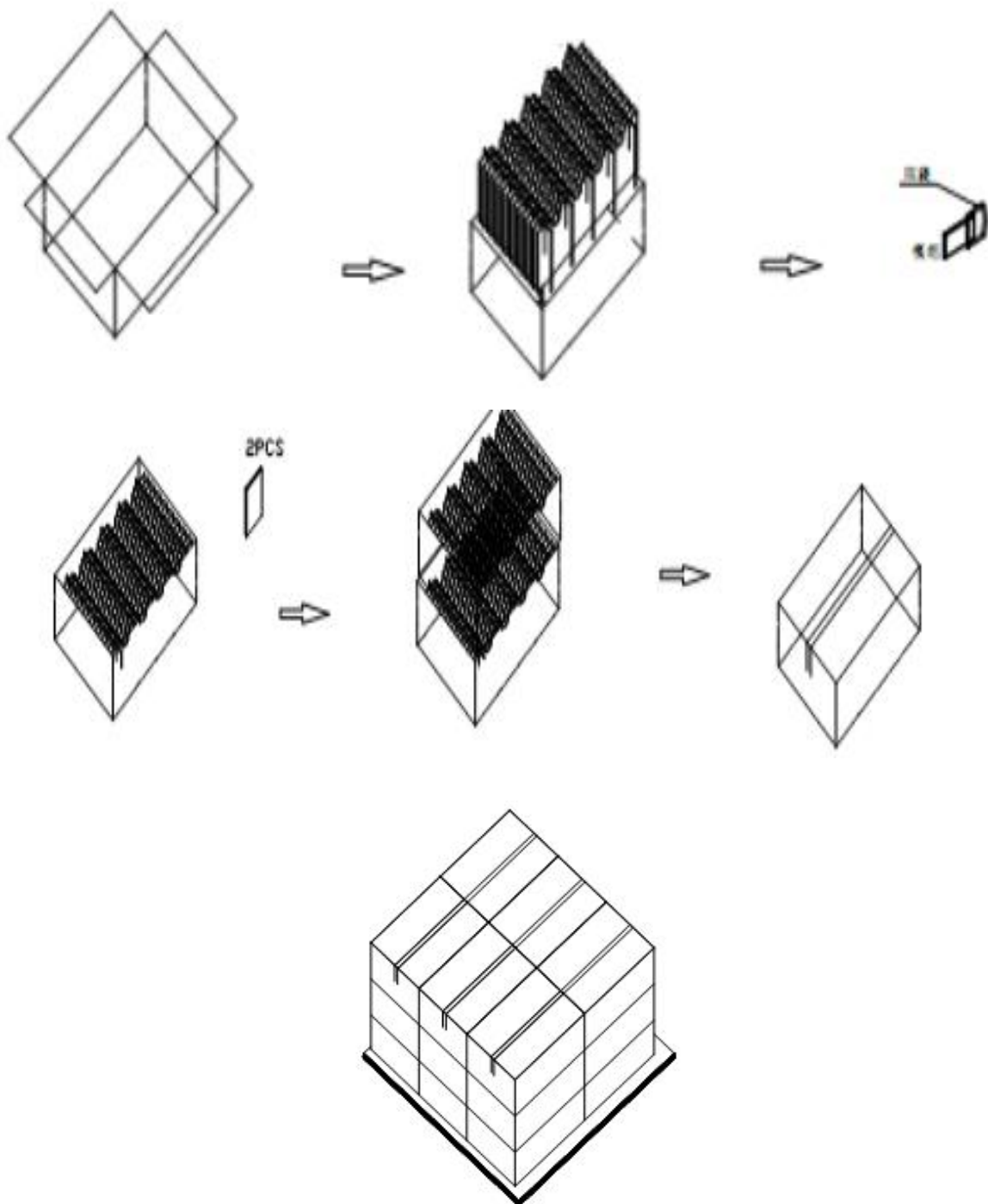
1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:
 - 1).Air bubble in the LCD;
 - 2).Seal leak
 - 3).Non-display
 - 4).missing segments
 - 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.

9. Mechanical Drawing



10. Packing

Packing Method



11. TFT-LCD Module Inspection Criteria

11.1 Scope

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

11.2 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

11.3 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

11.4 Inspection Conditions

4.1 Ambient conditions:

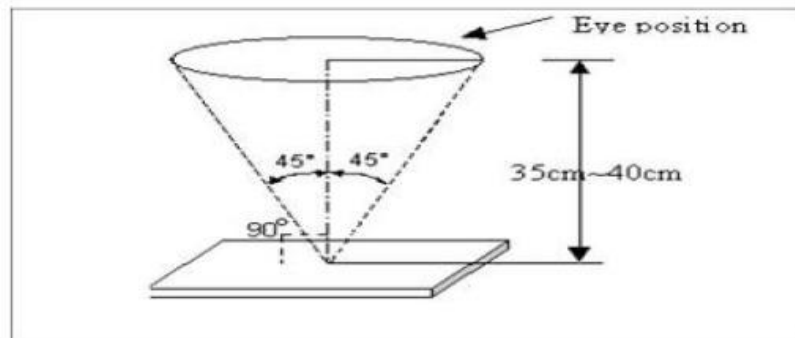
- a. Temperature: Room temperature $25 \pm 5^{\circ}\text{C}$
- b. Humidity: $(60 \pm 10) \% \text{RH}$
- c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)

4.2 Viewing distance

The distance between the LCD and the inspector's eyes shall be at least $35 \pm 5 \text{ cm}$.

4.3 Viewing Angle

U/D: $45^{\circ} / 45^{\circ}$, L/R: $45^{\circ} / 45^{\circ}$



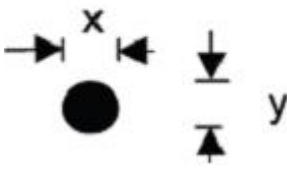
11.5 Inspection Criteria

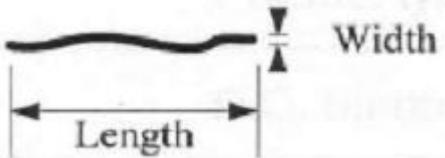
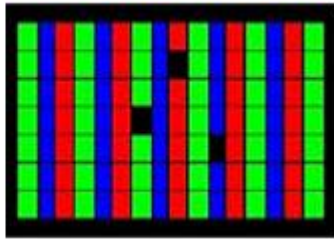
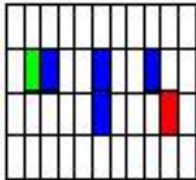
Defects are classified as major defects and minor defects according to the degree of Defectiveness defined herein.

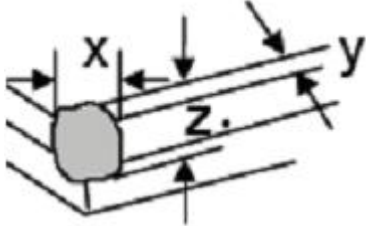
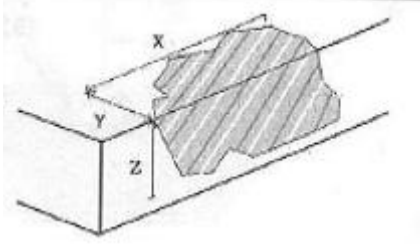
10.5.1 Major defect

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

11.5.2 Minor defect

5.2.1	Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt	For dark/white spot is defined $\varphi = (x + y) / 2$ 	
		Size φ (mm)	Acceptable Quantity
		$\varphi \leq 0.2$	Ignore

		$0.2 < \phi \leq 0.3$	3
		$0.3 < \phi$	Not allowed
5.2.2	Line Defect Including Black line White line Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		$W \leq 0.05$	Ignore
		$0.05 < W \leq 0.1$ $L \leq 2.5$	3
		$0.1 < W$, or $L > 2.5$	Not allowed
5.2.3	Polarizer Dent/Bubble	Size ϕ (mm)	Acceptable Quantity
		$\phi \leq 0.2$	Ignore
		$0.2 < \phi \leq 0.3$	2
		$0.5 < \phi$	Not allowed
		Total QTY	3
5.2.4 Electrical Dot Defect		Bright and Black dot define:   and 	
		Two Adjacent Dot	
		Inspection pattern: Full white、Full black、Red、green and blue screens	
		Item	Acceptable Quantity
		Black dot defect	2
		Bright dot defect	1

		Two Adjacent Dot	1
		There or more Adjacent Dot	Not allowed
		Total Dot	2
5.2.5	Glass defect	 <p>1. Corner Fragment:</p>	
		Size(mm)	Acceptable Quantity
		$X \leq 3\text{mm}$ $Y \leq 1\text{mm}$ $Z \leq T$	Ignore T: Glass thickness X: Length Y: Width Z: thickness
		 <p>2. Side Fragment:</p>	
		Size(mm)	Acceptable Quantity
		$X \leq 5.0\text{mm}$ $Y \leq 1\text{mm}$ $Z \leq T$	T: Glass thickness X: Length Y: Width Z: thickness

- 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.

11.6 Mechanics specification

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

12. Precautions for Use of LCD modules

12.1 Handling Precautions

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

12.1.2. 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.

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

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

12.1.5. 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
- Aromatic solvents

12.1.6. Do not attempt to disassemble the LCD Module.

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

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

- 12.1.8.1. Be sure to ground the body when handling the LCD Modules.
- 12.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.
- 12.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
- 12.1.8.4. 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.

12.2 Storage Precautions

- 12.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 12.2.2. 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°C ~ 40°C Relatively humidity: ≤80%
- 12.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

12.3 Transportation Precautions

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