PHOENIX DISPLAY
INTERNATIONAL, INC.

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SPECIFICATION FOR LCD MODULE

CUSTOMER	
PART NUMBER	PDIS080QSV03EA
DESCRIPTION	8.0" 800 (RGB) x 600 dots
VERSION	2.0
ISSUE DATE	12/28/2018

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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2015/12/15	First Release.	Li Huang
2.0	2018/18/28	Update PN	Yigui.Han

2. General Specifications

Feature		Spec
Characteristics	Size	8.0 inch
	Resolution	800(horizontal)*600(Vertical)
	Interface	RGB
	Connect type	Connector
	Display Colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.2025*0.2025
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally White
	Driver IC	TBD
	Viewing Direction	12 O’ clock
	Gray Inversion Direction	6 O’clock
Mechanical	LCM (W x H x D) (mm)	183.00*141.00*6.10
	Active Area(mm)	162.00*121.50
	Weight (g)	TBD
	LED Numbers	27 LEDs

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

3. Input/Output Terminals

No	Symbol	Description
1~4	NC	No connection
5	GND	Power ground
6	VCOM	Common voltage
7	VCC	Power for Digital circuit
8	MODE	DE/SYNC mode select (Note3)
9	DE	Data Input Enable
10	VS	Vertical Sync Input
11	HS	Horizontal Sync Input
12	B7	Blue data(MSB)
13	B6	Blue data
14	B5	Blue data
15	B4	Blue data
16	B3	Blue data
17	B2	Blue data
18	B1	Blue data
19	B0	Blue data(LSB)
20	G7	Green data (MSB)
21	G6	Green data
22	G5	Green data
23	G4	Green data
24	G3	Green data
25	G2	Green data
26	G1	Green data
27	G0	Green data (LSB)
28	R7	Red data (MSB)
29	R6	Red data
30	R5	Red data
31	R4	Red data
32	R3	Red data
33	R2	Red data
34	R1	Red data
35	R0	Red data (LSB)
36	GND	Power ground
37	DOCLK	Sample clock
38	GND	Power ground
39	L/R	Right/ left selection (Note2,5)
40	U/D	Up/down selection (Note2,5)

41	VGH	Gate ON voltage
42	VGL	Gate OFF voltage
43	AVDD	Power for Analog circuit
44	RESET	Global reset pin (Note1)
45	NC	No connection
46	VCOM	Common voltage
47	DITHB	Dithering function (Note 4)
48	GND	Power ground
49	NC	No connection
50	NC	No connection

I: input, O: output, P: Power

Note 1: Global reset pin. Active Low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.

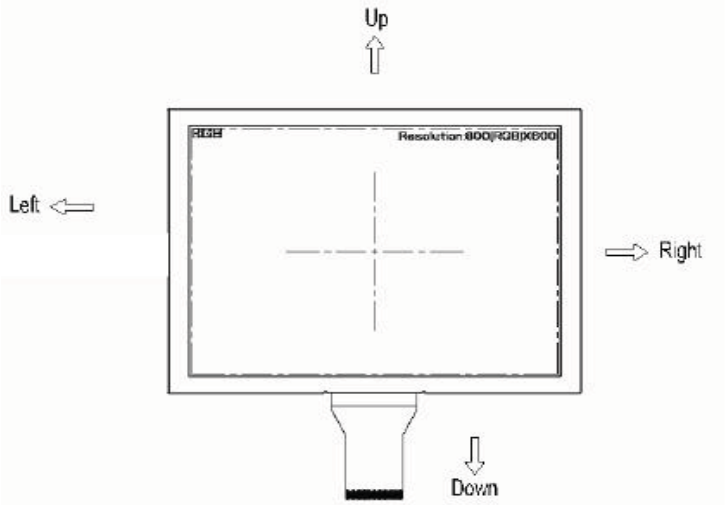
Note 2: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	R/L	
GND	V_{CC}	Up to down, left to right
V_{CC}	GND	Down to up, right to left
GND	GND	Up to down, right to left
V_{CC}	V_{CC}	Down to up, left to right

Note 3: DE/SYNC mode select, Normally pull high.
H: DE mode.
L: HS/VS mode.

Note4: Dithering function enable control.Normally pull high.
DITHB="1",Disable internal dithering function. For 18bit RGB interface, connect two LSB bits of all the R/G/B data buses to GND.
DITHB="0",Enable internal dithering function, For TTL 24bit parallel RGB image data input.

Note 5: Definition of scanning direction.
Refer to the figure as below:



4. Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	V_{DD}	-0.3	-	5	V	-
Operating Temperature	T_{OPR}	-20	-	70	℃	-
Storage Temperature	T_{STG}	-30	-	70	℃	

5. Electrical characteristics

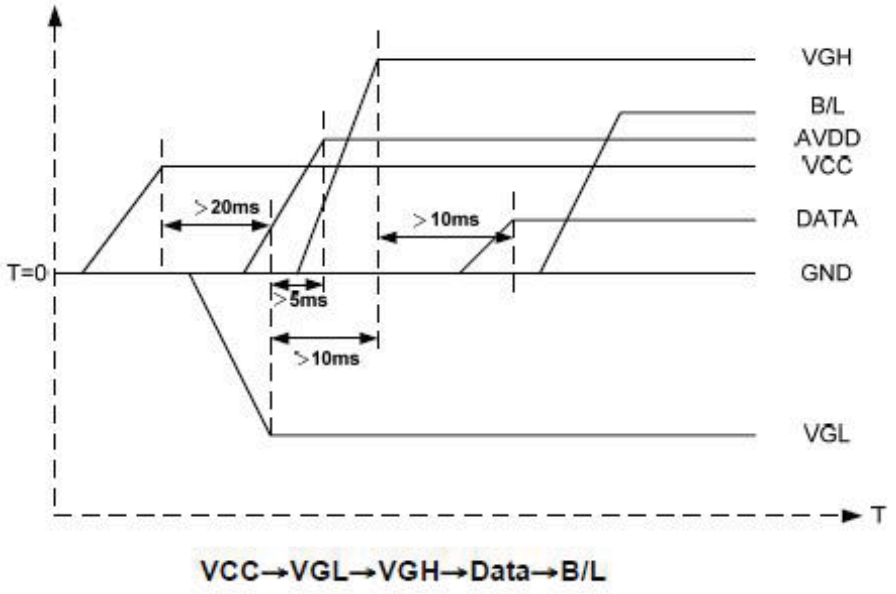
5.1 Driving TFT LCD Panel

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power voltage	V_{CC}	3.0	3.3	3.6	V	-
	AV_{DD}	10.2	10.4	10.6	V	-
	V_{GH}	15.3	16	16.7	V	-
	V_{GL}	-7.7	-7	-6.3	V	-
Input signal voltage	V_{COM}	2.8	3.8	4.8	V	-
Input logic high voltage	V_{IH}	0.7Vcc	-	Vcc	V	-
Input logic low voltage	V_{IL}	-	-	0.3Vcc	V	

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Current for Driver	I_{CC}	-	5.0	10	mA	VCC=3.3V
	I_{AVDD}	-	32	50	mA	AVDD=10.4V
	I_{VGH}	-	0.2	0.5	mA	VGH=16V
	I_{VGL}	-	0.2	1.0	mA	VGL=-7V
	I_{VCOM}	-	8	12	mA	VCOM=3.8V

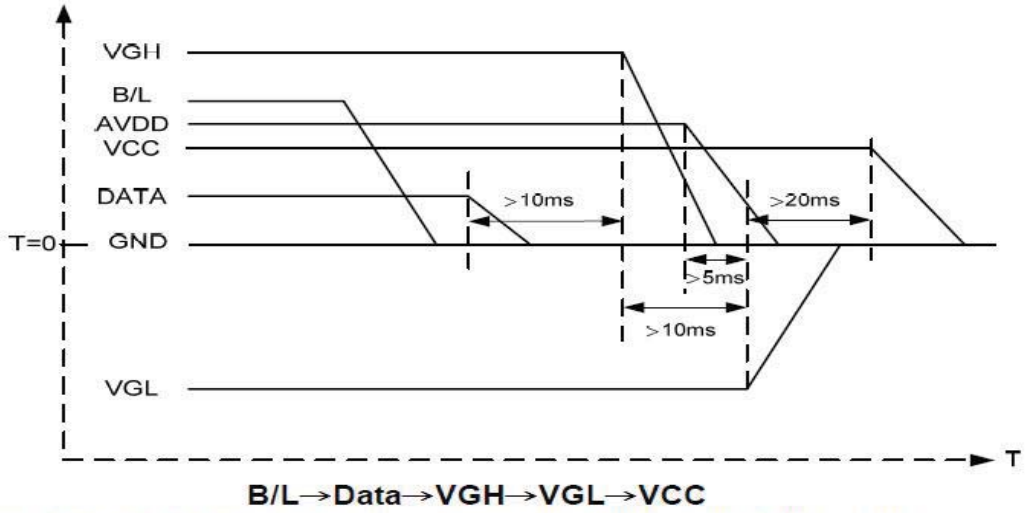
5.2 Power sequence

Power on:



VCC→VGL→VGH→Data→B/L

Power off:



B/L→Data→VGH→VGL→VCC

Note: Data include R0~R5, B0~B5, GO~G5, STLR,UPDN, DCLK, HS,VS,DE.

5.3 Timing Characteristics

5.3.1 AC electrical characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	Ns	
HS hold time	T_{hhd}	8	-	-	Ns	
VS setup time	T_{vst}	8	-	-	Ns	
VS hold time	T_{vhd}	8	-	-	Ns	
Data setup time	T_{dsu}	8	-	-	Ns	
Data hole time	T_{dhd}	8	-	-	Ns	
DE setup time	T_{esu}	8	-	-	Ns	
DE hole time	T_{ehd}	8	-	-	Ns	
VDD Power On Slew rate	T_{POR}	-	-	20	ms	
RSTB pulse width	T_{Rst}	10	-	-	us	
CLKIN cycle time	T_{coh}	20	-	-	Ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
Output stable time	T_{sst}	-	-	6	us	

5.3.2 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	Th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	600	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

5.3.3 Timing Diagram

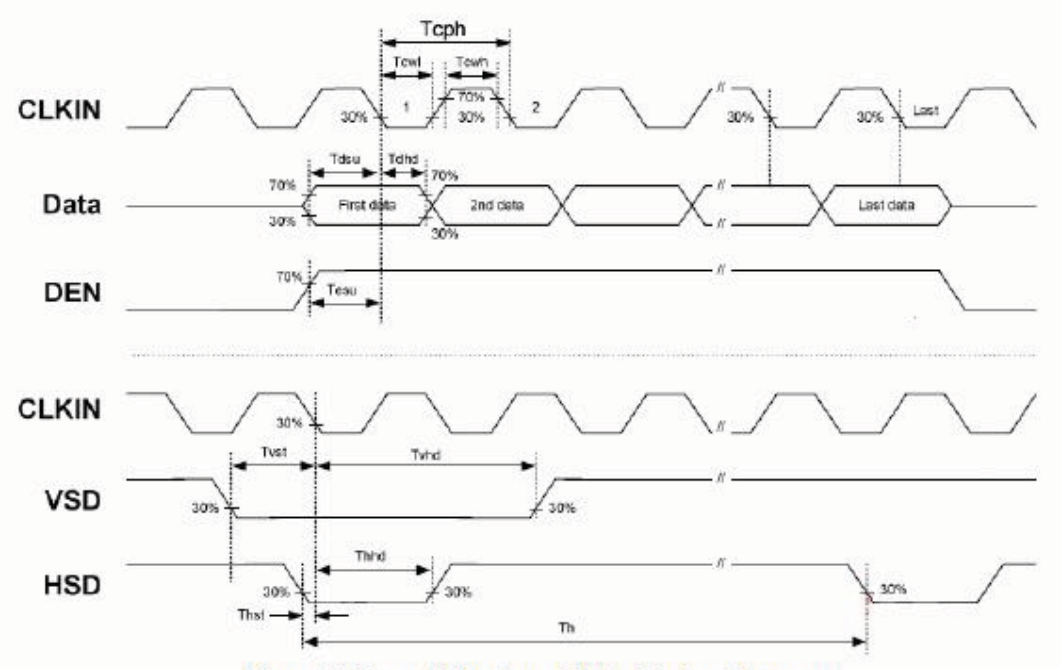
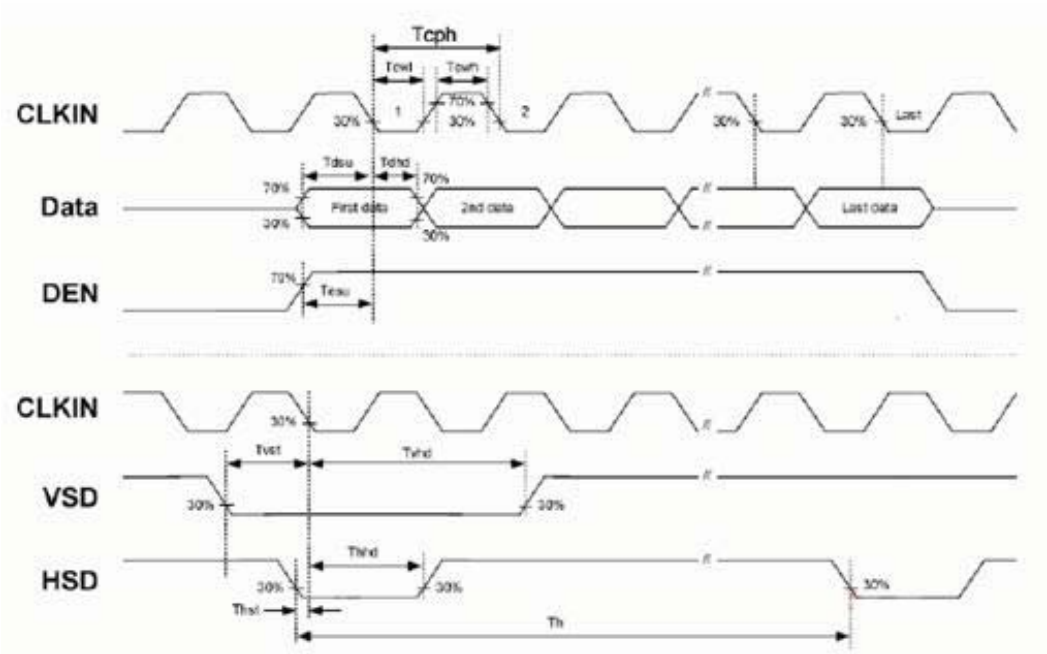


Figure 3.1 Input Clock and Data Timing Diagram



5.4 LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	540	-	mA	
Forward Voltage	V_F	7.6	9.6	11.6	V	
Backlight Power consumption	W_{BL}	-	5.184	5.79	W	
LED Lifetime		-	30000	-	Hrs	

Note 1: Each LED: IF =60 mA, VF =3.2+/0.2V.
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.

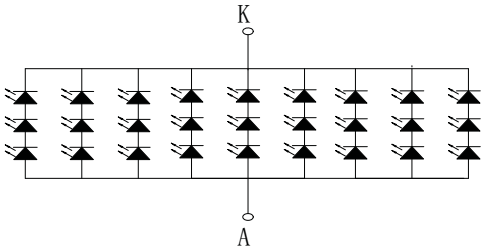


Figure: LED connection of backlight(Constant Current)

6. Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time		Tr+Tf	-	-	26	36	ms	FIG.1	Note4
Contrast Ratio		CR		400	500	-	-	FIG.2	Note1
Surface luminance		LV	θ =0°	900	1000	-	cd/m2	FIG.2	Note2
Luminance uniformity		Yu	θ =0°	80	-	-	%	FIG.2	Note3
Viewing angle		θ Cr>10	θ_T	-	65	-	deg	FIG.3	Note6
			θ_B	-	55	-	deg	FIG.3	
			θ_L	-	65	-	deg	FIG.3	
			θ_R	-	65	-	deg	FIG.3	
Chromaticity	Red	R_X	θ =0° ∅=0° Ta=25°	TBD	TBD	TBD	-	FIG.2 CIE1931	Note5
		R_Y		TBD	TBD	TBD	-		
	Green	G_X		TBD	TBD	TBD	-		
		G_Y		TBD	TBD	TBD	-		
	Blue	B_X		TBD	TBD	TBD	-		
		B_Y		TBD	TBD	TBD	-		
	White	W_X		0.26	0.31	0.36	-		
		W_Y		0.28	0.33	0.38	-		

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 (Tr) is the time between photo detector output intensity changed from 90% to 10%. And fall time (Tf) 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

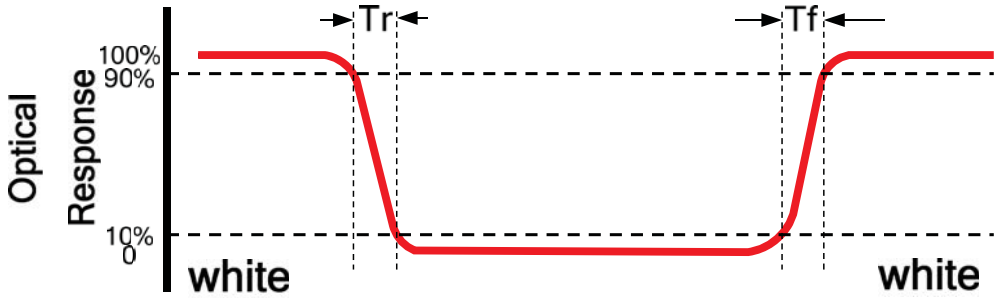


FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity

Size : S≤5"(see Figure a) A : 5 mm B : 5 mm
H,V : Active area
Light spot size ∅=5mm(BM-5) or ∅=7.7mm (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).

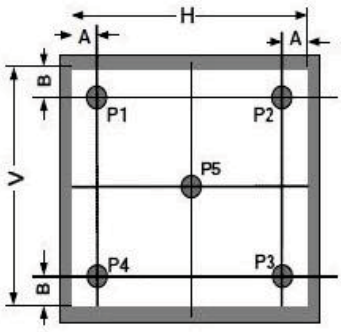


Figure a

Size : 5"＜S≤12.3"(see Figure b) H,V : Active area
Light spot size ∅=5mm(BM-5) or ∅=7.7mm (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).

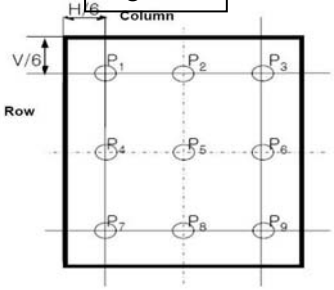


Figure b

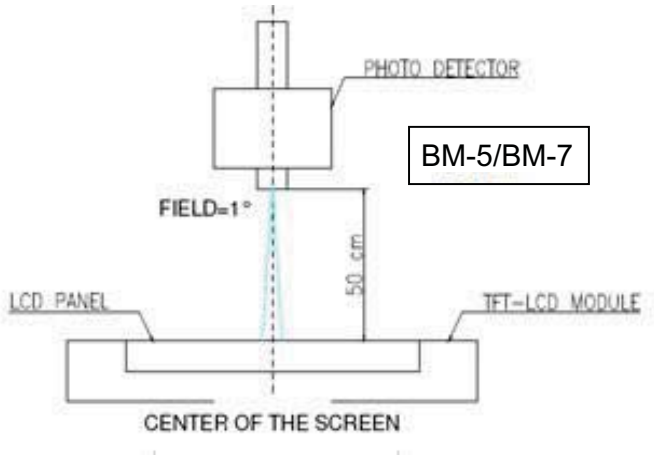
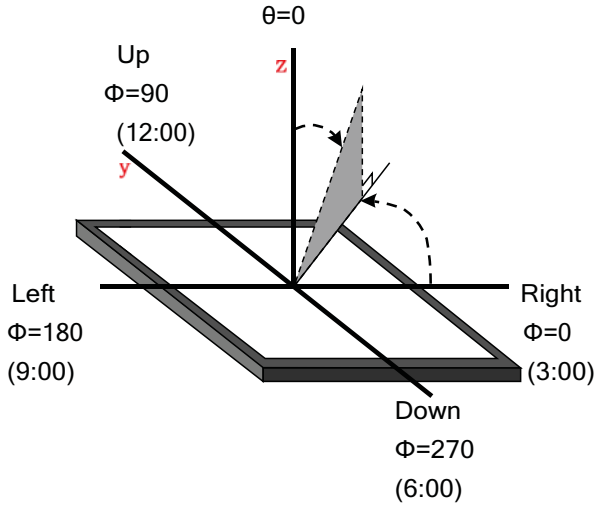


Figure c

FIG.3.The definition of viewing angle

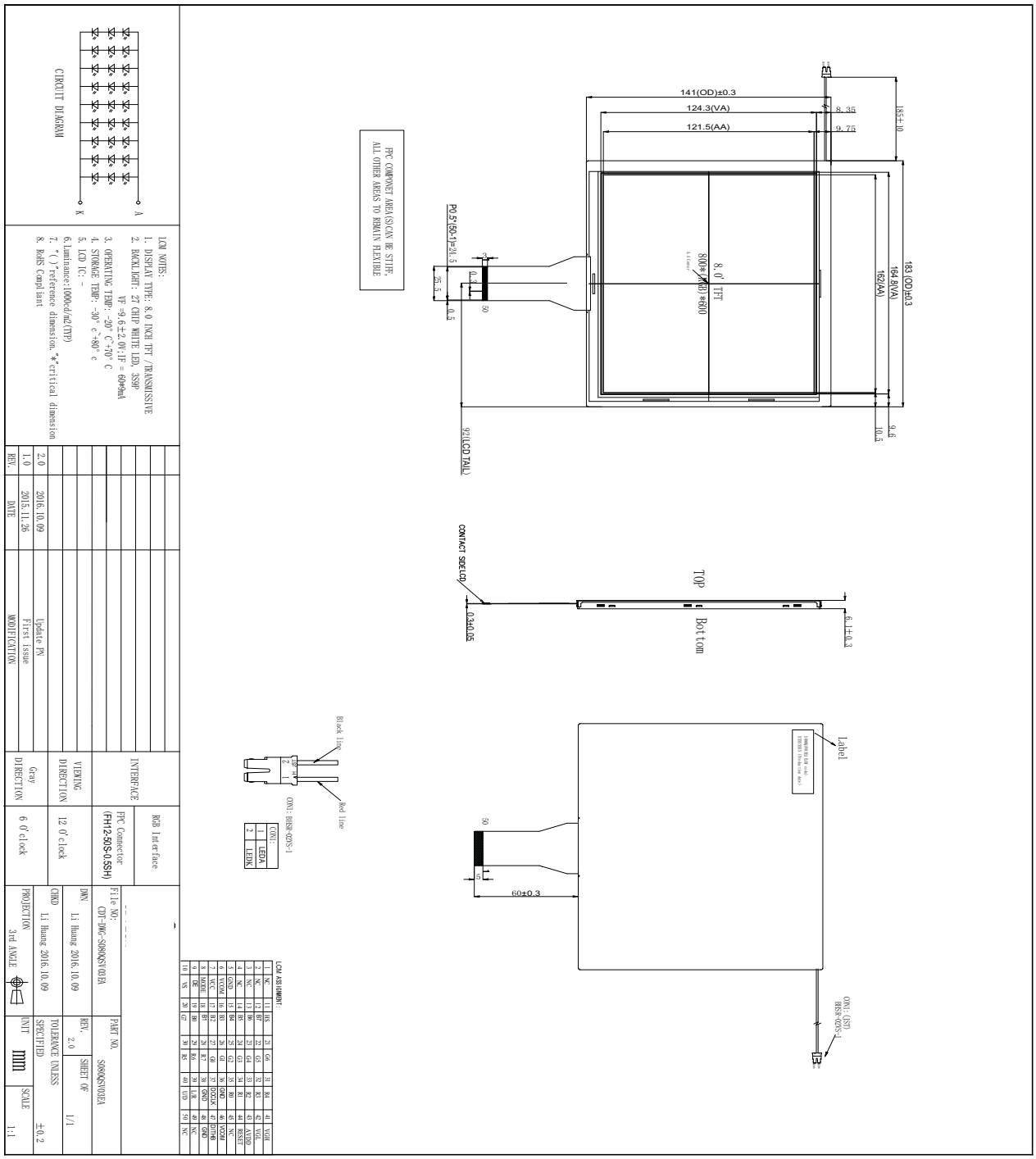


7. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20℃, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 120hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 120hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max,120 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 (Operation)	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

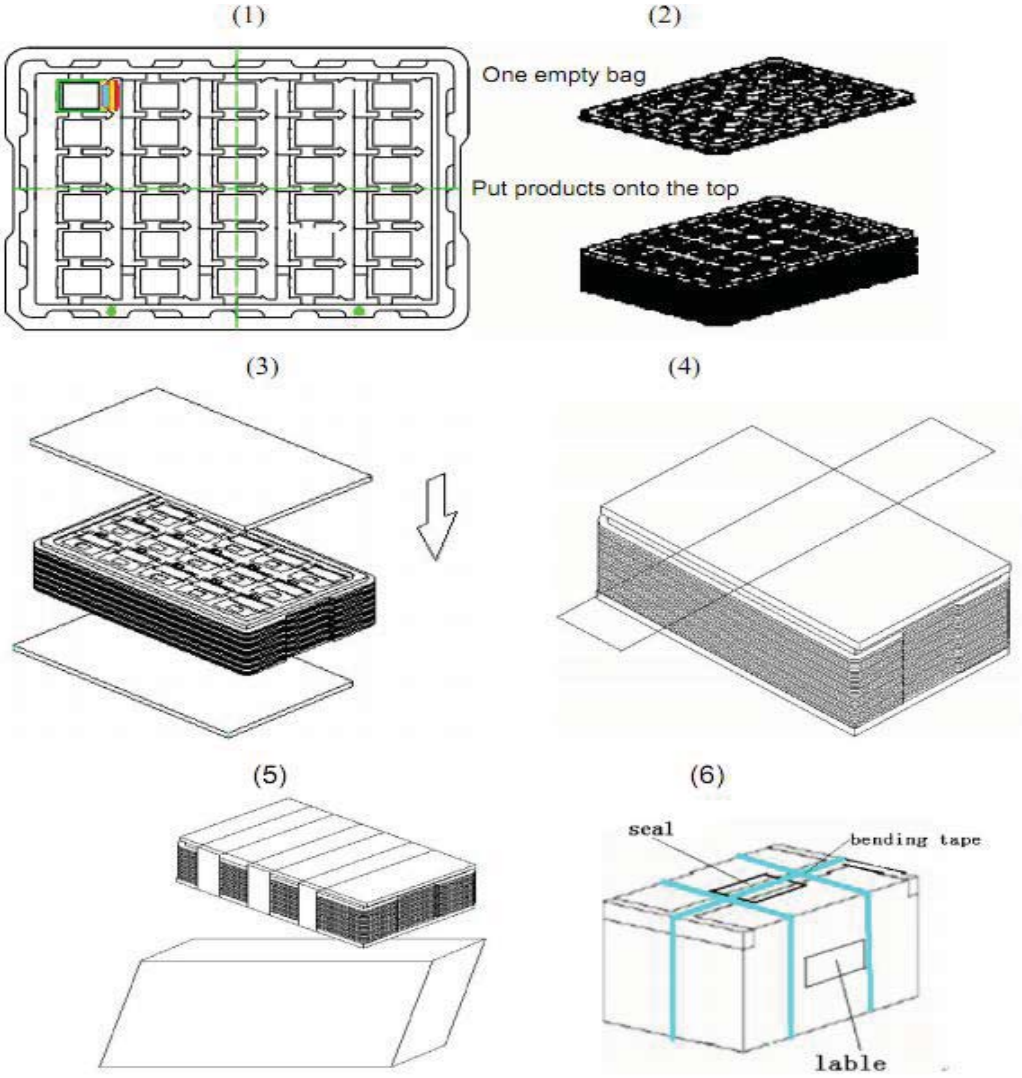
Note:1. Ts is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.
3. The size of sample is 5pcs.

8. Mechanical Drawing



9. Packing

Packing Method



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. 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

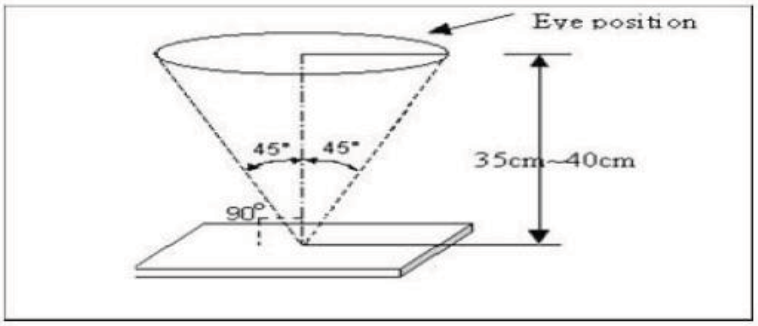
The customer shall inspect the modules within twenty calendar days of the delivery date（the “inspection period）at its own cost. The result of the inspection（acceptance or rejection）shall be recorded in writing, and a copy of this writing will be promptly sent to The seller, If the results of the inspecting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



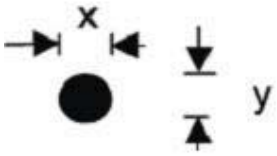
10.5 Inspection Criteria

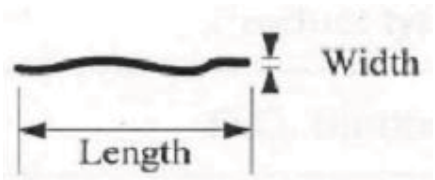
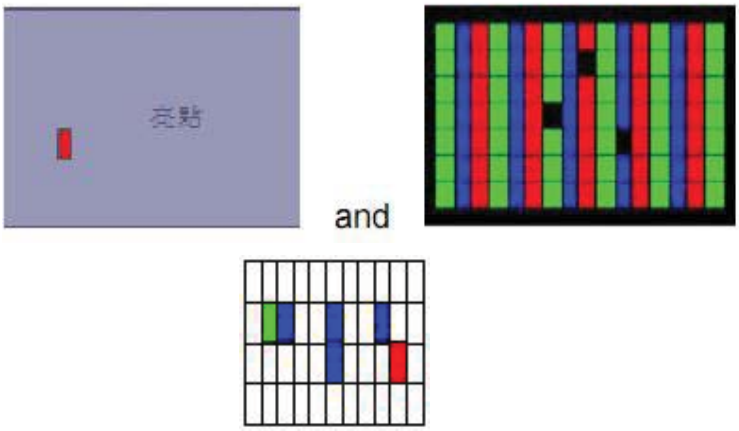
Defects are classified as major defects and minor defects according to the degree of Defectiveness defined herein.

10.5.1 Major defect

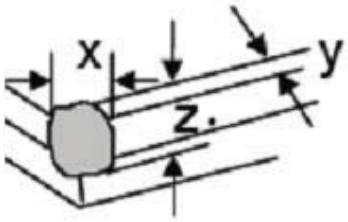
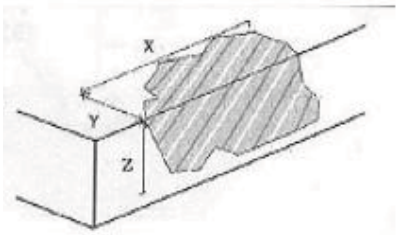
Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
`5.1.2	Missing	Missing function component
5.1.3	Crack	Glass Crack

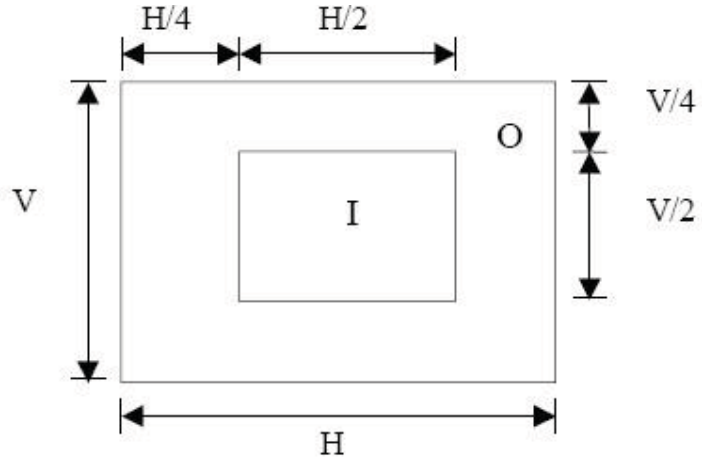
10.5.2 Minor defect

Item No	Items to be inspected	Inspection standard	
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
		φ≤0.2	Ignore
		0.2 < ϕ ≤0.5	3
		0.5< ϕ	Not allowed

<table>
<tr><td rowspan="5">5.2.2</td><td rowspan="5">Line Defect
Including Black line
White line Scratch</td><td colspan="2">Define:

</td></tr>
<tr><td>Width(mm) Length(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>W≤0.05</td><td>Ignore</td></tr>
<tr><td>0.05 ＜W≤0.1
L≤2.5</td><td>3</td></tr>
<tr><td>0.1＜W，or L>2.5</td><td>Not allowed</td></tr>
<tr><td rowspan="6">5.2.3</td><td rowspan="6">Polarizer
Dent/Bubble</td><td>Sizeφ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>ϕ≤0.2</td><td>Ignore</td></tr>
<tr><td>0.2 ＜ ϕ≤0.3</td><td>2</td></tr>
<tr><td>0.3 ＜ ϕ≤0.5</td><td>1</td></tr>
<tr><td>0.5＜ϕ</td><td>Not allowed</td></tr>
<tr><td>Total QTY</td><td>3</td></tr>
<tr><td rowspan="6">5.2.4</td><td rowspan="6">Electrical Dot
Defect</td><td colspan="2">Bright and Black dot define:


Two Adjacent Dot</td></tr>
<tr><td colspan="2">Inspection pattern: Full white、Full black、Red、green and blue screens</td></tr>
<tr><td rowspan="2">Item</td><td colspan="3">Acceptable Quantity</td></tr>
<tr><td>I</td><td>O</td><td>Note</td></tr>
<tr><td>Black dot defect</td><td colspan="2">2</td><td rowspan="2">ϕ≤0.15
(5mm≤Distance)</td></tr>
<tr><td>Bright dot defect</td><td colspan="2">1</td></tr>
<tr><td>Total Dot</td><td colspan="2">1</td><td></td></tr>
</table>

<table>
<tr><td rowspan="5">5.2.5</td><td rowspan="5">Glass defect</td><td colspan="2">1.Corner Fragment:
</td></tr>
<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>
<tr><td colspan="2">2. Side Fragment:
</td></tr>
<tr><td>Size(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>X≤5.0mm
Y ≤1mm
Z≤T</td><td>T：Glass thickness
X: Length
Y: Width
Z: thickness</td></tr>
</table>



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
- Aromatic solvents

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.