PRODUCT SPECIFICATION

CDTECH Model: **S068BWV01ND**

CUSTOMER Model: -

Description: **6.8” TFT-LCD Module**

Version: **1.0**

CDTECH	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2023.6.7	2023.6.7	2023.6.7

CUSTOMER APPROVAL	SIGNATURE	DATE

Record of Revisions

Version	Revise Date	Description	Page
1.0	2022-09-01	First Release	-
	2023-2-27	Update reliability conditions	4,16
	2023-6-7	Update FPC pin 40 definition	6,17

Contents

1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	6.8	inch
Number of Pixels	800(H) RGB x 480(V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	o' clock
Interface	RGB	-
Display Colors	16.7M	colors
Outline Dimension	165.00 (H) x 100.00 (V) x 5.50 (D)	mm
Active Area	148.10 (H) x 88.86 (V)	mm
Pixel Pitch	0.1851 (H) x 0.1851 (V)	mm
Driver IC	ST7265	-
Operation Temperature	-30~85	℃
Storage Temperature	-30~85	℃

Note1:Requirements on environmental protection RoHS compliant.

2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	5.0	V	Note 1

Note 1:Permanent damage may occur to the LCD module if beyond this specification.
Functional operation should be restricted to the conditions described under normal operating conditions.

3. Elecrical Characteristics

3.1 Recommended Operating Condition for TFT LCD

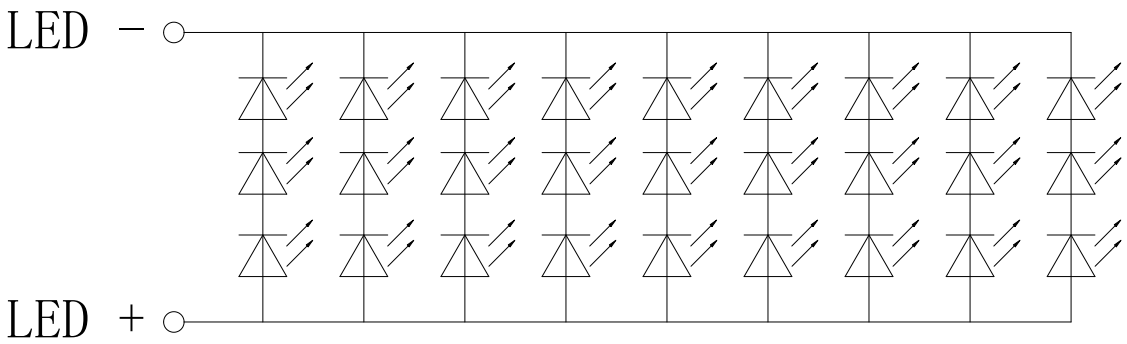
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I_{VDD}	-	TBD	-	mA	VDD=3.3V
Power supply for LCD	AVDD	-	-	-	V	
	VGH	-	17	-	V	
	VGL	-	-11	-	V	
	VCOM	-	-	-	V	
Logic input voltage	VIH	0.7*VDD	-	VDD	V	
	VIL	GND	-	0.3*VDD	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I_F	-	180	-	mA	
Driving Voltage	V_F	8.1	-	10.2	V	
Power consumption	W_{BL}	1.458	-	1.836	W	
LED Life-Time	N/A	-	50,000	-	Hours	Ta=25℃ Note 1

Note 1:LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2:LED circuit :



4. Interface Pin Assignment

4.1 LCM Pin Assignment

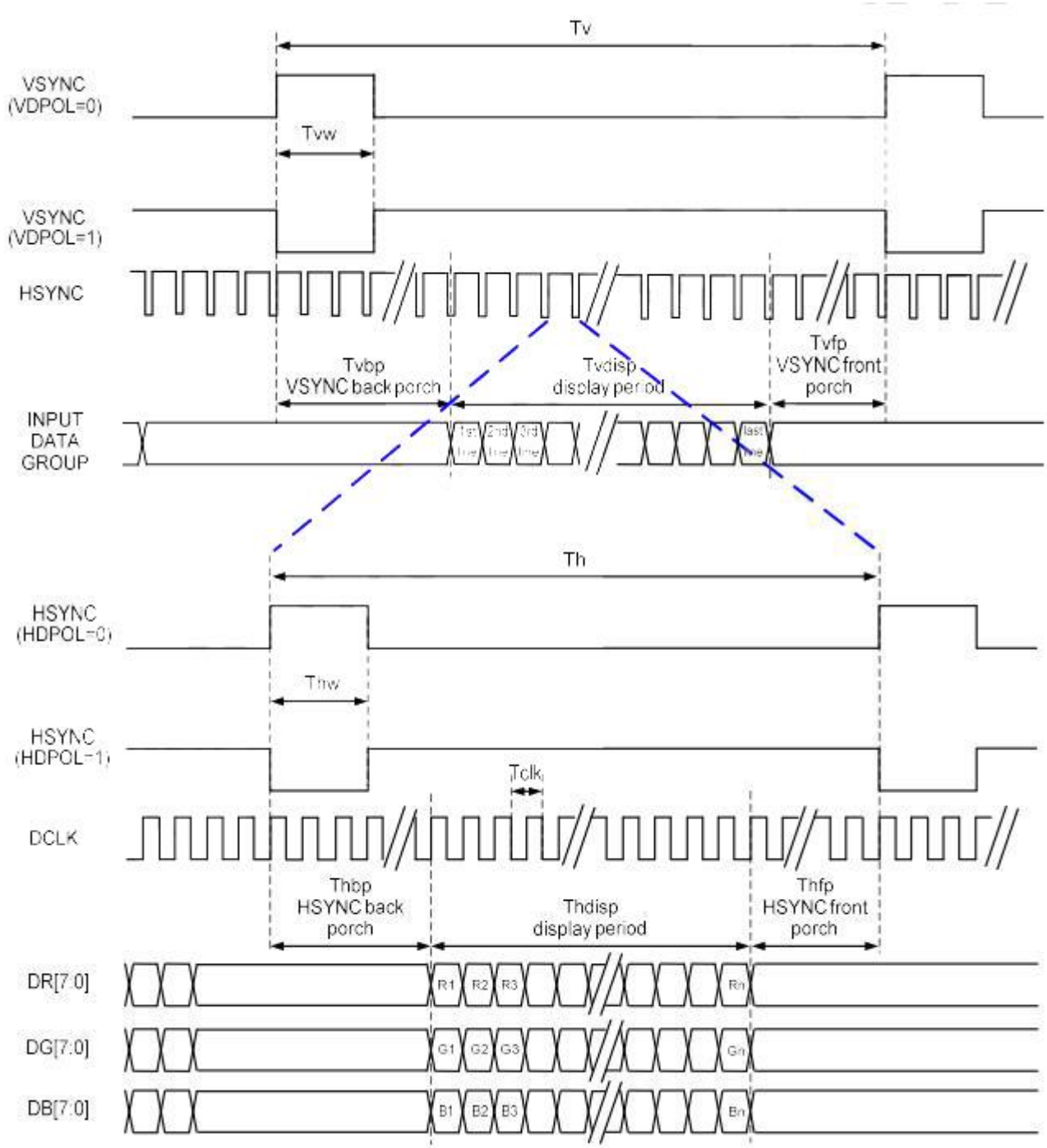
Recommended connector：FH12-50S-0.5SH manufactured by HIROSE

No.	Symbol	Description
1-2	LEDA	Backlight LED Anode
3-4	LEDK	Backlight LED Cathode
5	GND	Ground
6	VCOM(NC)	No connection
7	DVDD	Power voltage for digital circuit
8	MODE	DE / SYNC mode select under TTL mode. Normally pull high H:DE mode L:HSD/VSD mode
9	DE	Data enable input. Active high to enable the input data bus under “DE Mode”
10	VS	Vertical sync input. Negative polarity
11	HS	Horizontal sync input. Negative polarity
12-19	B7-B0	Data bus
20-27	G7-G0	Data bus
28-35	R7-R0	Data bus
36	GND	Ground
37	DCLK	Dot clock signal input. Latching input data at its rising edge
38	GND	Ground
39	L/R	Horizontal inversion (Note 1)
40	NC	No connection
41	VGH	Gate on voltage
42	VGL	Gate off voltage Power supply
43	AVDD(NC)	No connection
44	RESET	Global reset pin
45	NC	No connection
46	VCOM	Common voltage
47	DITHB	Dithering function enable control
48	GND	Ground
49-50	NC	No connection

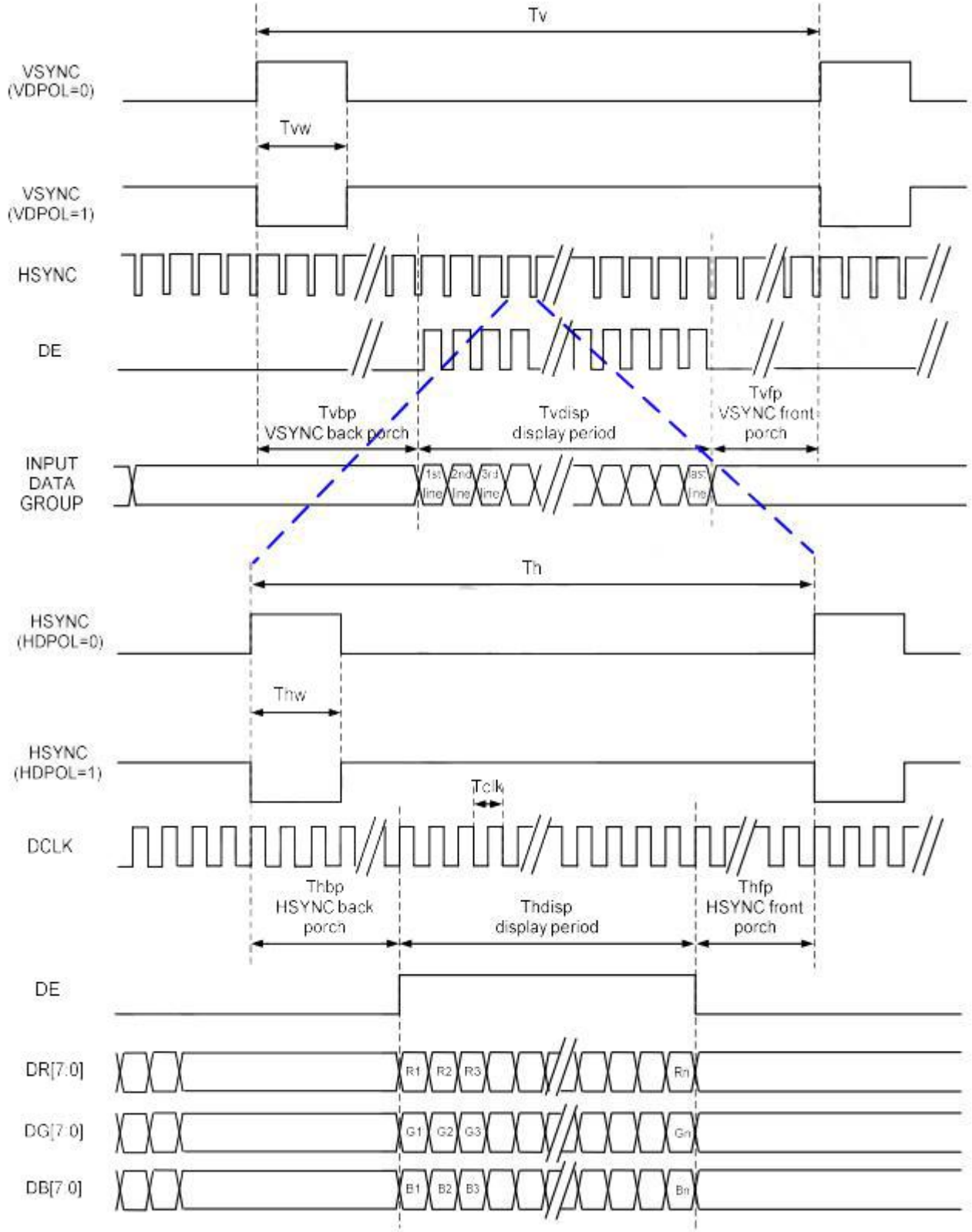
Note 1: When L/R=0 set right to left scan direction
When L/R=1 set left to right scan direction
When U/D=0 set bottom to top scan direction
When U/D=1 set top to bottom scan direction

5. Interface Characteristics

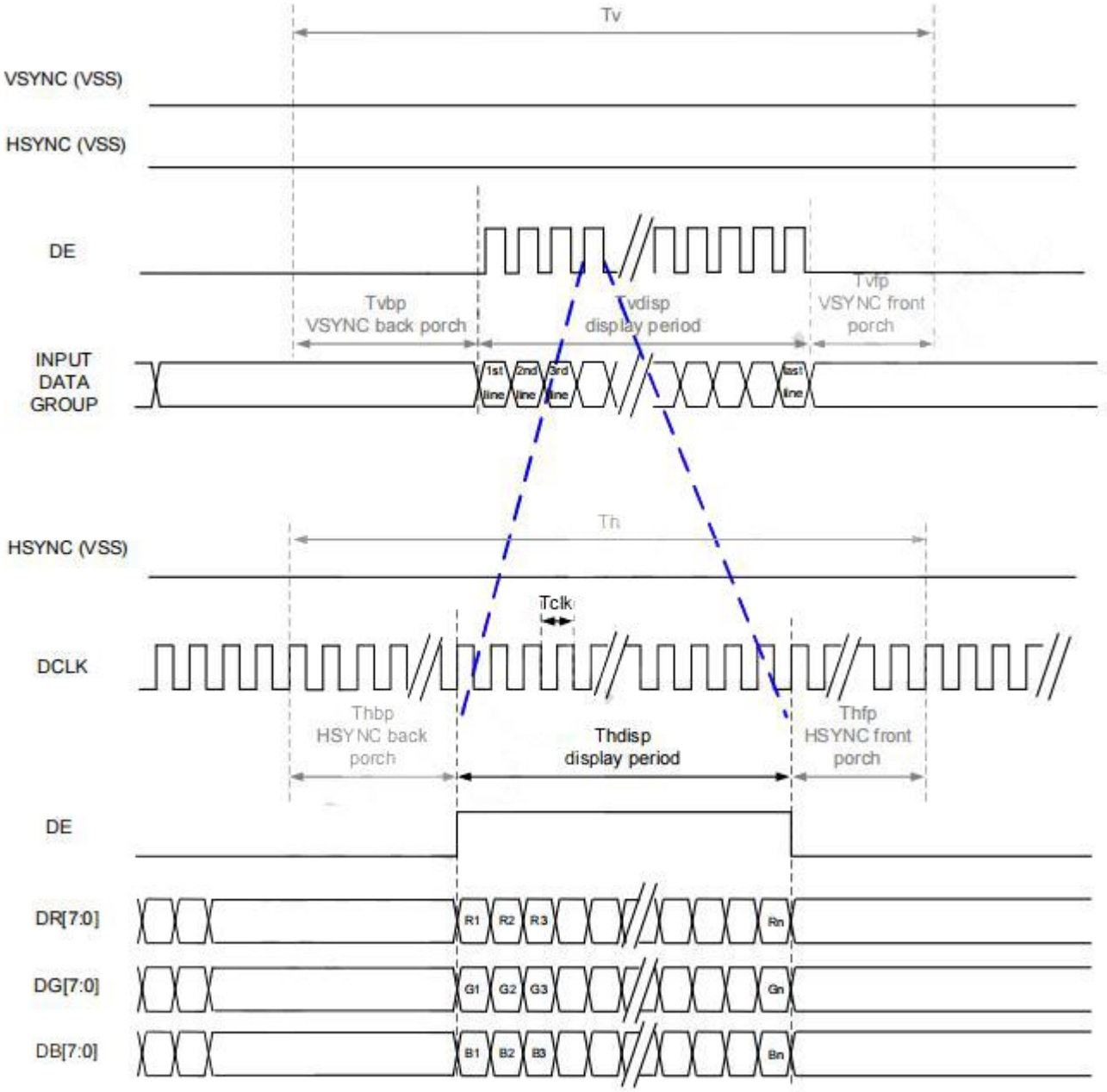
5.1 SYNC Mode



5.2 SYNC-DE Mode



5.3 DE Mode


Tv
VSYNC (VSS)
HSYNC (VSS)
DE
Tvbp
VSYNC back porch
Tvdisp
display period
Tvfp
VSYNC front
porch
INPUT
DATA
GROUP
1st line
2nd line
3rd line
last line
Th
HSYNC (VSS)
Tclk
DCLK
Thbp
HSYNC back
porch
Thdisp
display period
Thfp
HSYNC front
porch
DE
DR[7:0]
R1
R2
R3
Rn
DG[7:0]
G1
G2
G3
Gn
DB[7:0]
B1
B2
B3
Bn

5.4 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	848	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	24	DCLK	
	Front Porch	Thfp	4	8	24	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	496	512	528	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	8	16	24	HSYNC	
	Front Porch	Tvfp	8	16	24	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

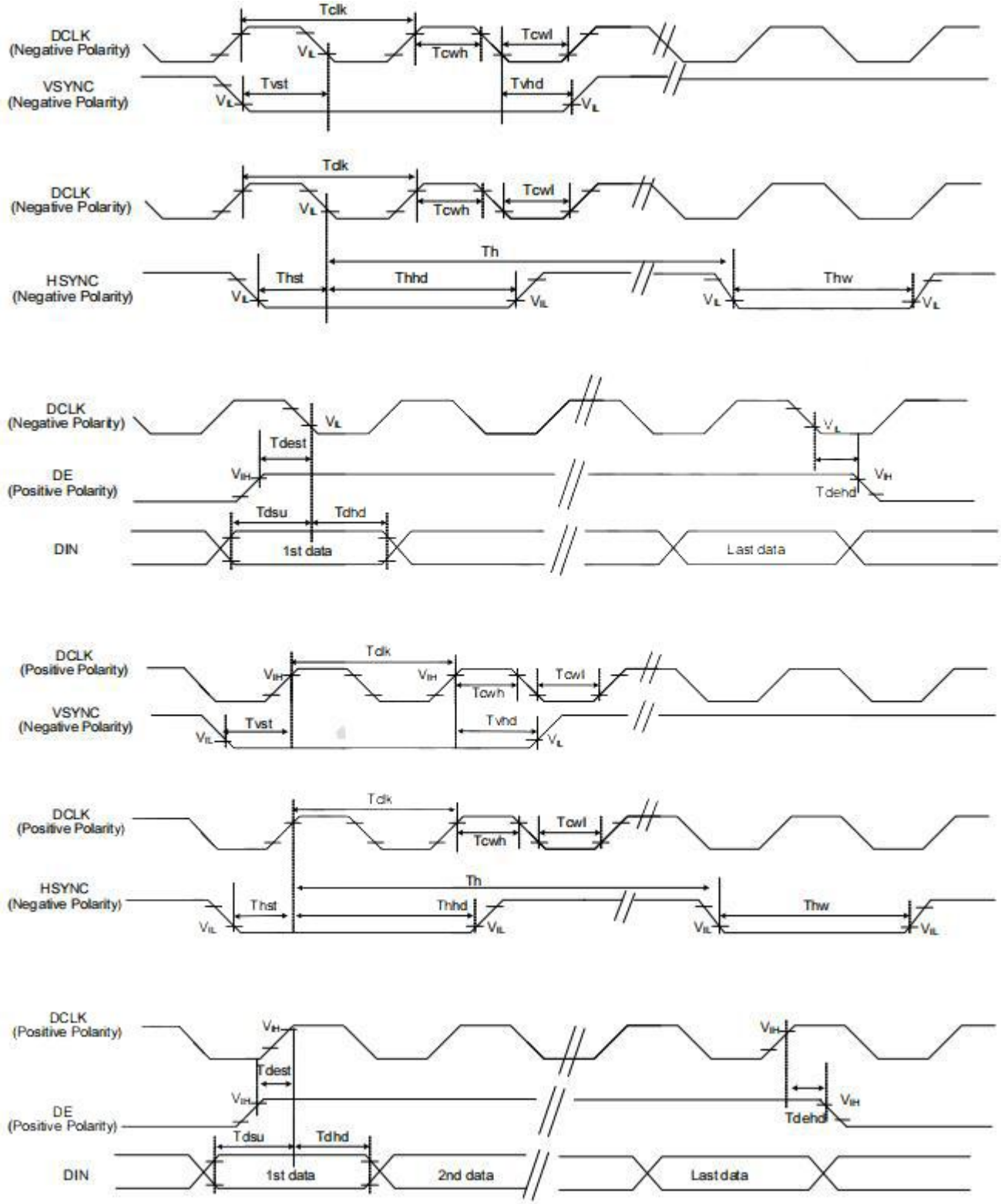
Note: 1. The minimum blanking time depends on the GIP timing of the panel specification

2. To ensure the compatibility of different panels, it is recommended to use the typical setting.

3. It is necessary to keep Tvbp =8 and Thbp =8 in sync mode. DE mode is unnecessary to keep it.

4. The maximum DCLK Frequency is 27MHz. If the case needs faster DCLK, please contact Sitronix .

5.5 System Bus Timing for RGB Interface



DC Electrical Characteristics (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C, Bare Chip)

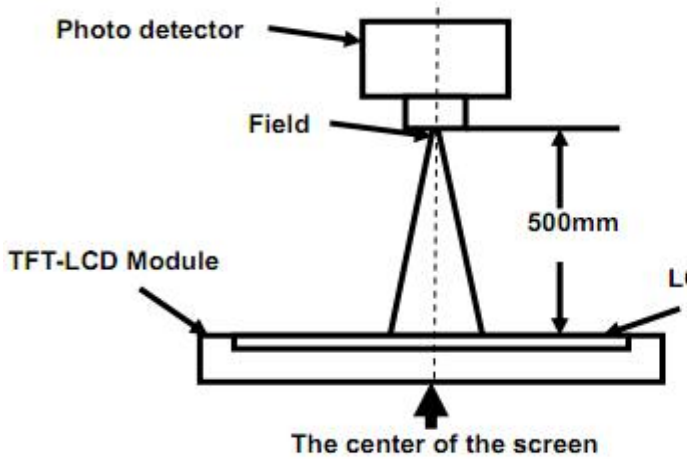
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	Tcw	40	50	60	%	
VSYNC Setup Time	Tvst	10	-	-	ns	
VSYNC Hold Time	Tvhd	10	-	-	ns	
HSYNC Setup Time	Thst	10	-	-	ns	
HSYNC Hold Time	Thhd	10	-	-	ns	
Data Setup Time	Tdsu	10	-	-	ns	
Data Hold Time	Tdhd	10	-	-	ns	
DE Setup Time	Tdest	10	-	-	ns	
DE Hold Time	Tdehd	10	-	-	ns	

6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10) B/L ON	θ_T	Φ=90°(12 o'clock)	-	85	-	deg	Note2
	θ_B	Φ=270°(6 o'clock)	-	85	-	deg	Note2
	θ_L	Φ=180°(9 o'clock)	-	85	-	deg	Note2
	θ_R	Φ=0°(3 o'clock)	-	85	-	deg	Note2
Response Time	T_{ON}	Normal θ=Φ=0°	-	15	-	msec	Note4
	T_{OFF}		-	15	-	msec	Note4
Contrast Ratio	CR		-	1000	-	-	Note1 Note3
Color Chromaticity	W_X		0.285	0.315	0.345	-	Note1 Note5
	W_Y		0.298	0.328	0.358	-	Note1 Note5
Luminance	L		400	450	-	cd/m²	Note1 Note7
Luminance Uniformity	Y_U		75	80	-	%	Note1 Note6
NTSC	-		55	60	-	%	-

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).

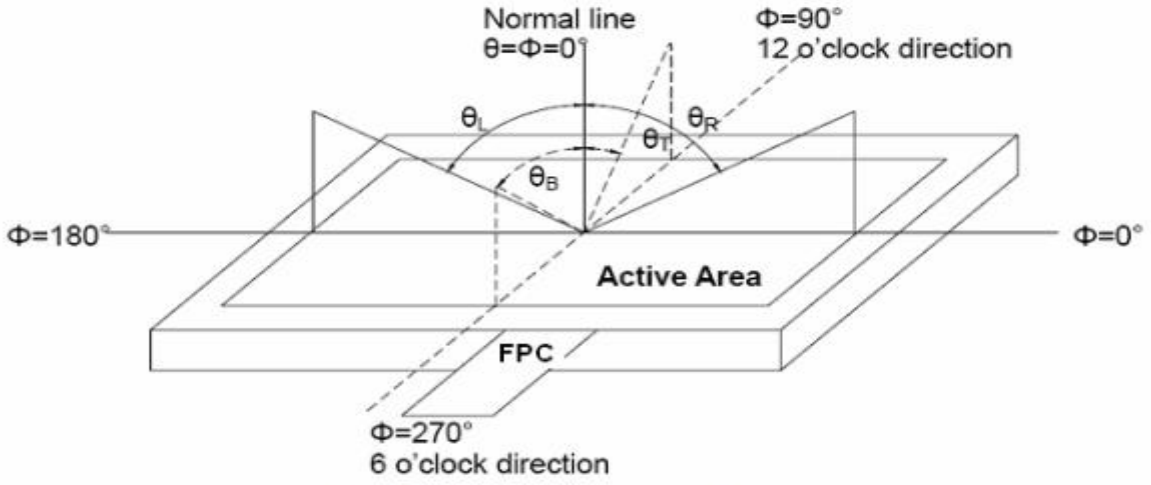


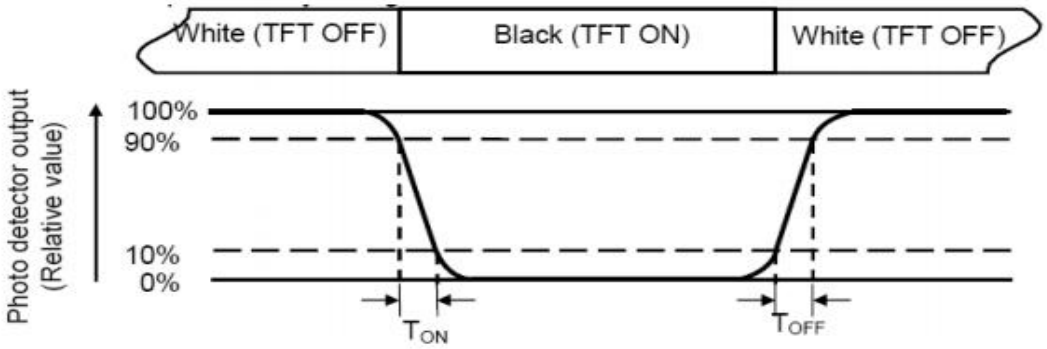
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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

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.

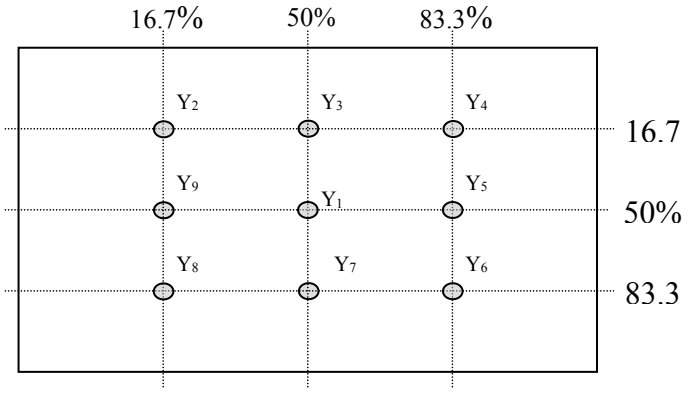


Fig. 2 Definition of points

Note 7:Definition of Luminance (Refer Fig. 2)

Surface luminance is the luminance with all pixels displaying white.

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

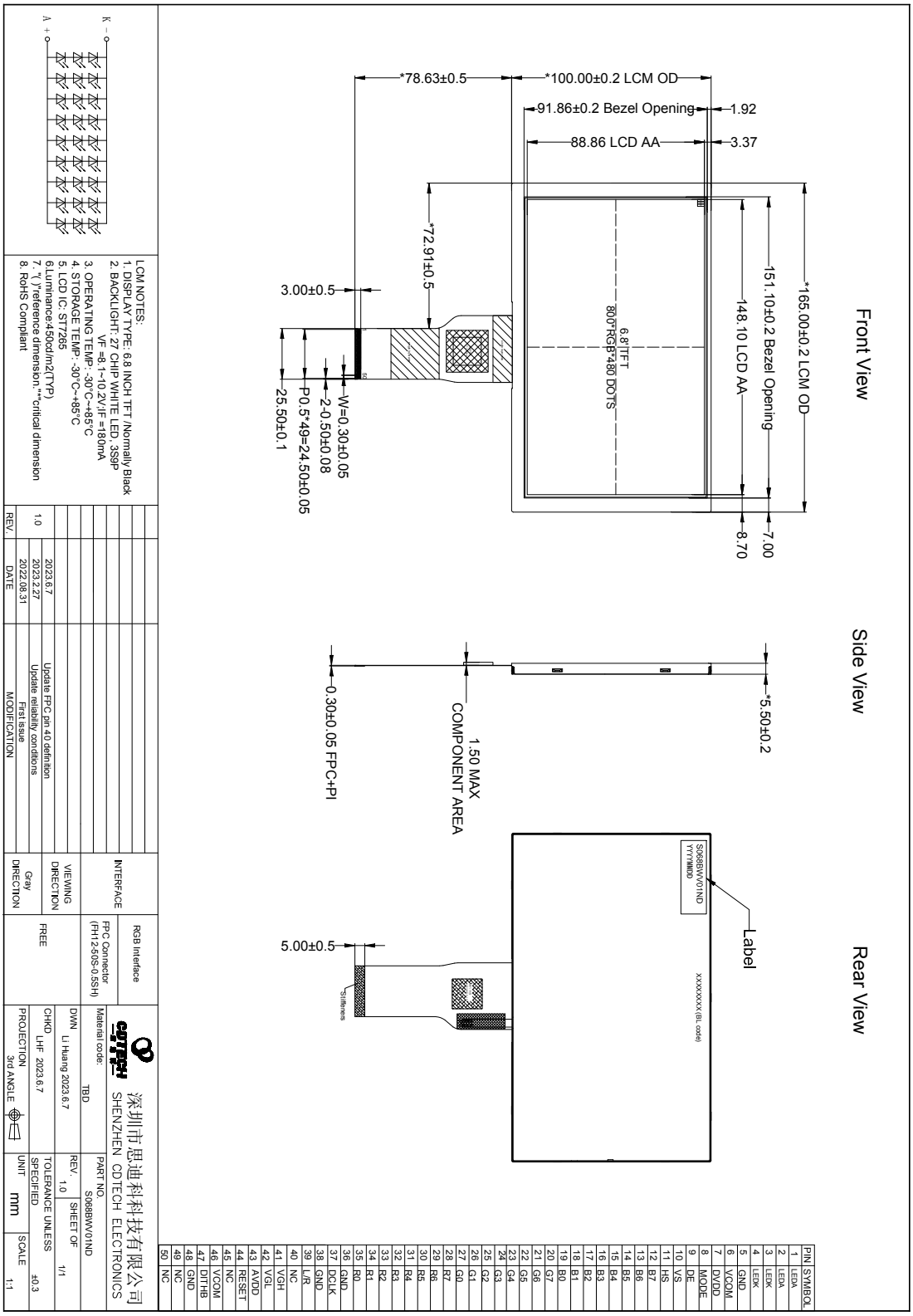
7. Reliability Test Items

Test Item	Test Conditions	
High Temperature Storage	Ta= +85℃	96hrs
Low Temperature Storage	Ta= -30℃	96hrs
High Temperature Operation	Ta= +85℃	96hrs
Low Temperature Operation	Ta= -30℃	96hrs
High Temperature and Humidity Storage	Ta= +60℃, 90% RH	96hrs
Thermal Shock (Non-operation)	-30℃/30 min ~ +85℃/30 min for 20 cycles Start with cold temperature end with high temperature	
Electro Static Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B R=330Ω,C=150pF	
Vibration	Sweep: 10Hz~55Hz~10Hz Stroke: 1.5mm 2 hrs for each direction of X .Y. Z.	
Mechanical Shock	60G 6ms,±X,±Y,±Z 3 times for each direction	
Package Drop Test	Height: 60 cm 1 corner, 3 edges, 6 surfaces	

Notes: 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 or Glass crack
3). Non display or abnormal display
4). Brightness reduction >50%

8. Mechanical Drawing



9. Packing

TBD

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.

10.2 Incoming Inspection

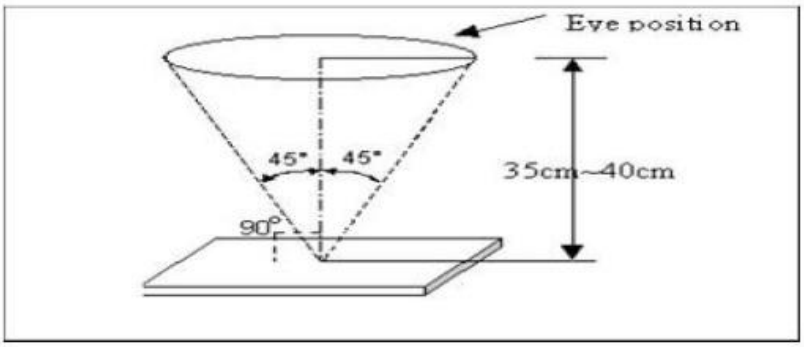
The customer shall inspect the modules within twenty calendar days of the delivery date（the “inspection period”）at its own cost. The result of the inspection（acceptance or rejection）shall be recorded in writing, and a copy of this writing will be promptly sent to the seller, If the results of the inspecting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

10.3.1. Lot size: Quantity per shipment lot per model
10.3.2. Sampling type: Normal inspection, Single sampling
10.3.3. Inspection level: II
10.3.4. Sampling table: MIL-STD-105E
10.3.5. Acceptable quality level （AQL ）
Major defect: AQL=0.65
Minor defect: AQL=1.00

10.4 Inspection Conditions

10.4.1 Ambient conditions:
a. Temperature: Room temperature 25±5℃
b. Humidity: (60±10) ％RH
c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)
10.4.2 Viewing distance
The distance between the LCD and the inspector’s eyes shall be at least 35±5 cm.
10.4.3 Viewing Angle
U/D: 45 °/45°, L/R: 45°/45°



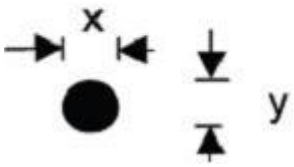
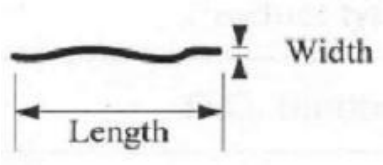
10.5 Inspection Criteria

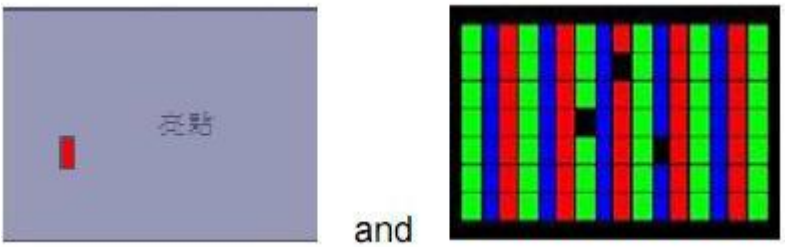
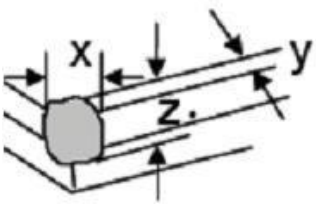
Defects are classified as major defects and minor defects according to the degree of defectiveness defined here in.

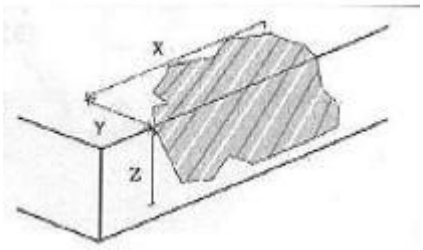
10.5.1. Major defect

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="5">5.2.1</td><td rowspan="5">Spot Defect
Including Black spot White spot
Pinhole
Foreign particle
Polanizer dirt</td><td colspan="2">For dark/white spot is defined
φ=(x+y)／2
  </td></tr>
<tr><td>Sizeφ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>φ≤0.15</td><td>Ignore</td></tr>
<tr><td>0.15<φ≤0.3</td><td>N≤4</td></tr>
<tr><td>φ>0.3</td><td>Not allowable</td></tr>
<tr><td>5.2.2</td><td>Line Defect
Including Black line White line
Scratch</td><td colspan="2">Define:
  </td></tr>
</table>

<table>
<tr><td></td><td></td><td>Width(mm)
Length(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td></td><td></td><td>W≦0.05</td><td>No count</td></tr>
<tr><td></td><td></td><td>0.05<W≦0.1,L≦3</td><td>N≤3</td></tr>
<tr><td></td><td></td><td>W>0.1</td><td>Not allowed</td></tr>
<tr><td>5.2.3</td><td>Polarizer
Dent/Bubble</td><td>Sizeφ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td></td><td></td><td>φ≤0.15</td><td>Ignore</td></tr>
<tr><td></td><td></td><td>0.15<φ≤0.3</td><td>N≤4</td></tr>
<tr><td></td><td></td><td>φ>0.3</td><td>Not allowed</td></tr>
<tr><td>5.2.4</td><td>Electrical
Dot Defect</td><td colspan="3">Bright and Black dot define:
 
Two Adjacent Dot</td></tr>
<tr><td></td><td></td><td colspan="3">Inspection pattern: Full white,Full black,Red,Green and Blue screens</td></tr>
<tr><td></td><td></td><td rowspan="2">Item</td><td colspan="2">Acceptable Quantity</td></tr>
<tr><td></td><td></td><td>Single Dot</td><td>Adjacent 2dots</td><td>Total</td></tr>
<tr><td></td><td></td><td>Black dot defect</td><td>4</td><td>1</td><td>4</td></tr>
<tr><td></td><td></td><td>Bright dot defect</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td></td><td></td><td>Total Dot</td><td colspan="2"></td><td>4</td></tr>
<tr><td></td><td></td><td colspan="3">1. Corner Fragment:
  </td></tr>
</table>

<table>
<tr><td rowspan="5">5.2.5</td><td rowspan="5">Glass defect</td><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>

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 5mm.
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.