PRODUCT SPECIFICATION

CDTECH Model: **S046HWV17EN**

CUSTOMER Model: -

Description: **4.6 ” TFT-LCD Module**

Version: **1.0**

CDTECH	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2024.7.11	2024.7.11	2024.7.11

	SIGNATURE	DATE
CUSTOMER APPROVAL		

Record of Revisions

Version	Revise Date	Description	Page
1.0	2024-7-11	First Release	-

Contents

1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	4.6	inch
Number of Pixels	800 (H) RGB x 320 (V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	o' clock
Interface	LVDS	-
Display Colors	16.7M	colors
Outline Dimension	119.90 (H) x 55.36 (V) x 2.80 (D)	mm
Active Area	108.00 (H) x 43.20 (V)	mm
Pixel Pitch	0.135 (H) x 0.135 (V)	mm
Driver IC	ST7262	-
Operation Temperature	-20~70	℃
Storage Temperature	-30~80	℃

Note1:Requirements on environmental protection RoHS compliant.

2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	4.0	V	Note 1
Digital supply voltage	VDDI	-0.3	4.0	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

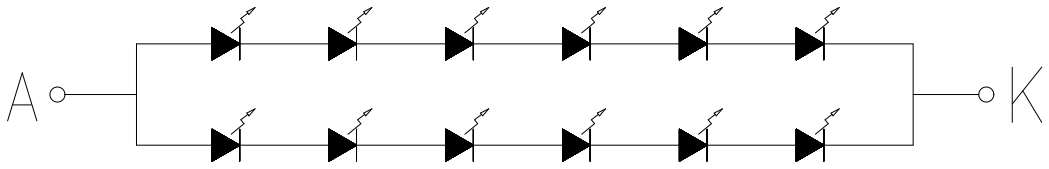
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I_{VDD}	-	TBD	-	mA	VDD=3.3V
Logic supply voltage	VDDI	3.0	3.3	3.6	V	
Logic supply current	I_{VDDI}	-	TBD	-	mA	VDDI=3.3V
Logic input voltage	VIH	0.7*VDDI	-	VDDI	V	
	VIL	GND	-	0.3*VDDI	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I_F	-	40	-	mA	
Driving Voltage	V_F	16.2	-	20.4	V	
Power consumption	W_{BL}	0.648	-	0.816	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

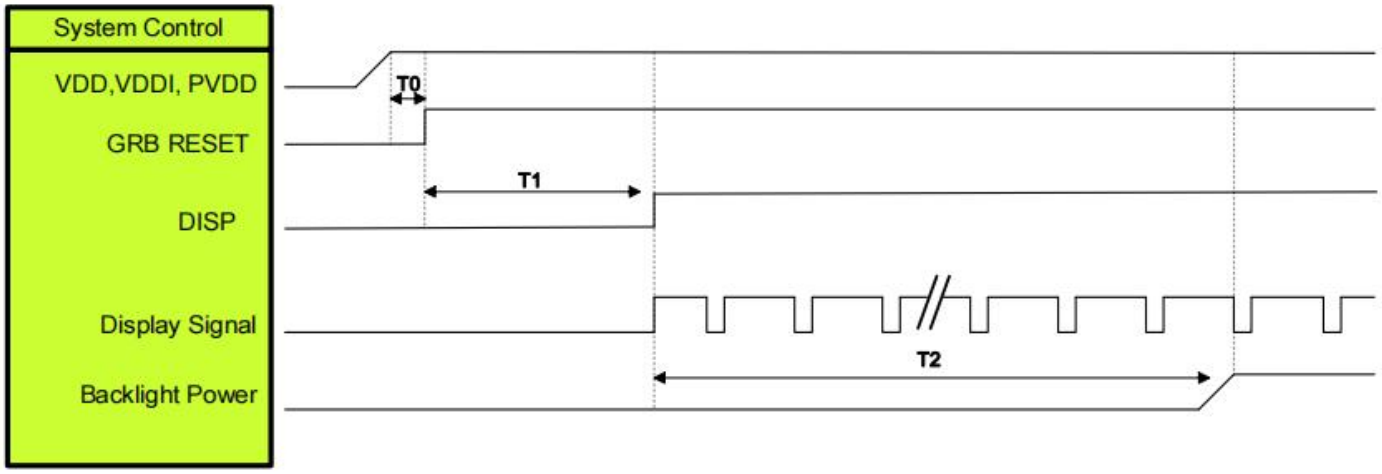
No.	Symbol	Description
1-2	LEDK	Power for LED backlight (Cathode)
3-4	LEDA	Power for LED backlight (Anode)
5	NC	No connection
6	DISP	DISP sets the display mode. DISP: L — Function Description: Standby mode (Default) DISP: H — Function Description: Normal display mode
7	GND	Ground
8-9	VDDI	Power supply
10-11	VDD	Power supply
12	SCL(NC)	No connection
13	SDA(NC)	No connection
14	CS(NC)	No connection
15	GND	Ground
16	RXCLKN	-LVDS differential clock input
17	RXCLKP	+LVDS differential clock input
18	GND	Ground
19	RXD0N	- LVDS differential data input
20	RXD0P	+ LVDS differential data input
21	GND	Ground
22	RXD1N	- LVDS differential data input
23	RXD1P	+ LVDS differential data input
24	GND	Ground
25	RXD2N	- LVDS differential data input
26	RXD2P	+ LVDS differential data input
27	GND	Ground
28	RXD3N	- LVDS differential data input
29	RXD3P	+ LVDS differential data input
30	GND	Ground
31	RESET	Global reset pin
32	ENPROG(NC)	No connection

<table>
<tr><td>33</td><td>VDIR</td><td>Vertical scan direction control pin. This pin must be connected to “H” or “L” according to system application.
<table><tr><th>VDIR</th><th>Function Description</th></tr><tr><td>L</td><td>From down to up.</td></tr><tr><td>H</td><td>From up to down. (Default)</td></tr></table></td></tr>
<tr><td>34</td><td>HDIR</td><td>Horizontal scan direction control pin. This pin must be connected to “H” or “L” according to system application.
<table><tr><th>HDIR</th><th>Function Description</th></tr><tr><td>L</td><td>From right to left</td></tr><tr><td>H</td><td>From left to right(Default)</td></tr></table></td></tr>
<tr><td>35</td><td>NC</td><td>No connection</td></tr>
<tr><td>36</td><td>GND</td><td>Ground</td></tr>
<tr><td>37</td><td>XR(NC)</td><td>No connection</td></tr>
<tr><td>38</td><td>YD(NC)</td><td>No connection</td></tr>
<tr><td>39</td><td>XL(NC)</td><td>No connection</td></tr>
<tr><td>40</td><td>YU(NC)</td><td>No connection</td></tr>
</table>

5. Interface Characteristics

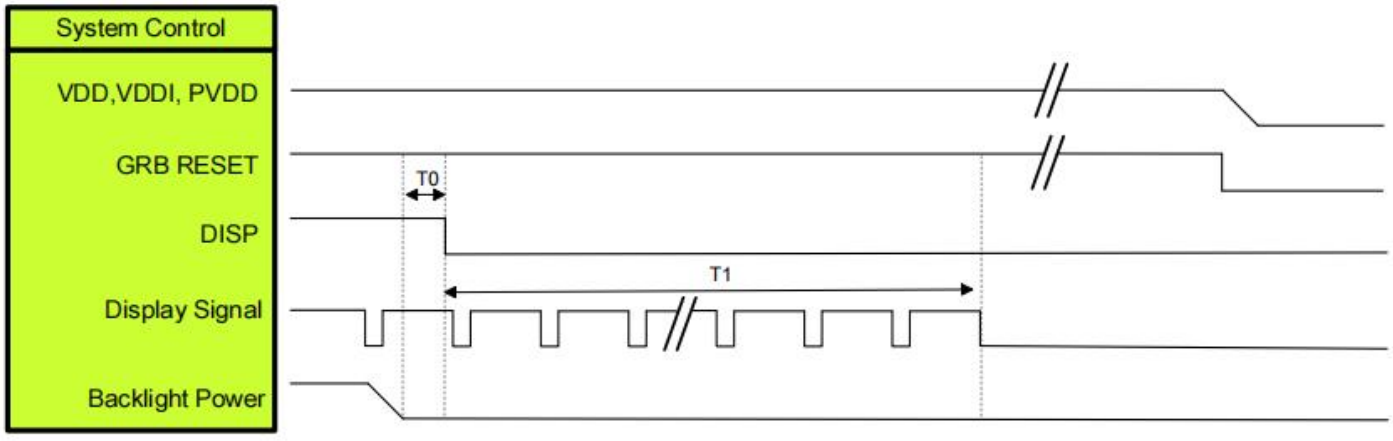
5.1 Power Sequence

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

Power Off Sequence

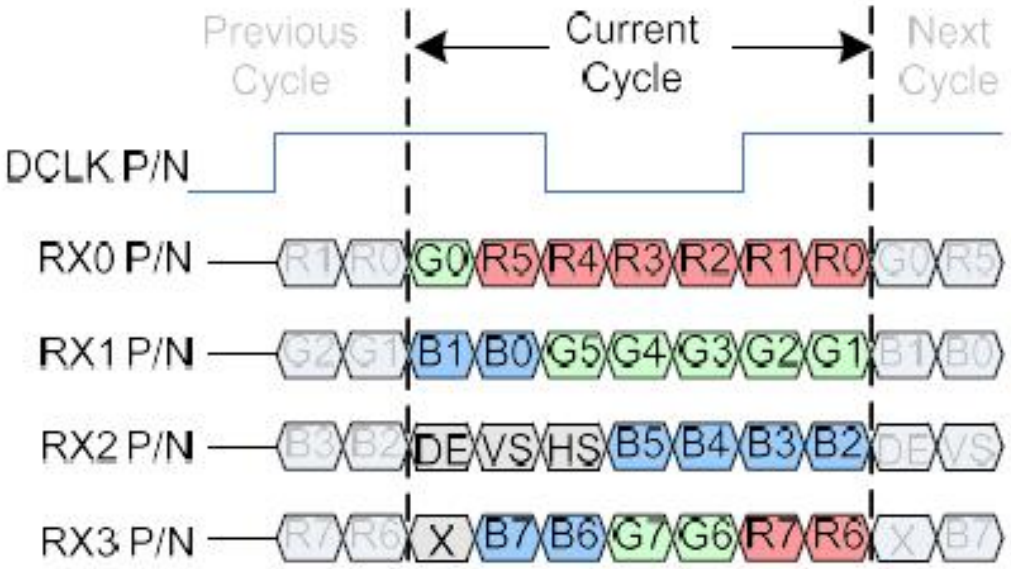


Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP=”Low”	5	ms
T1	DISP=”Low” to IC internal voltage discharge complete	100	ms

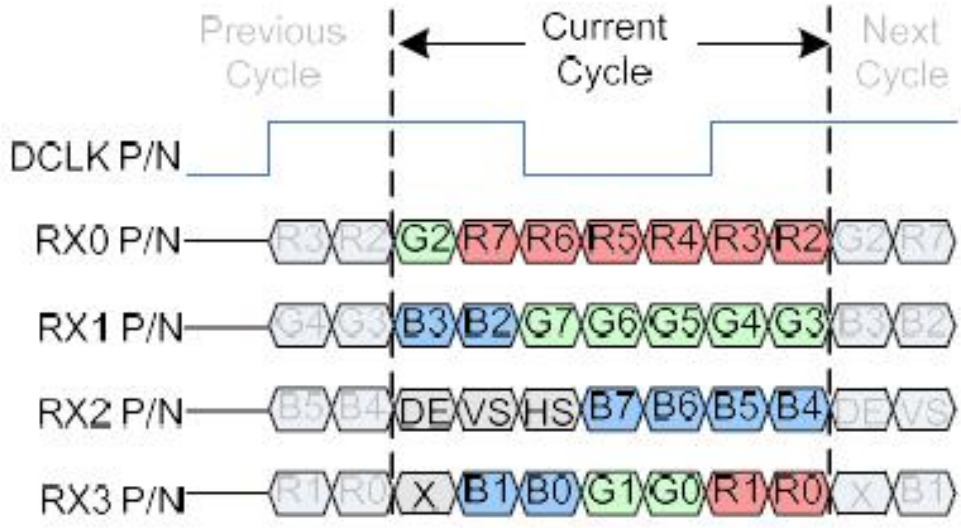
5.2 AC Characteristics

LVDS Interface

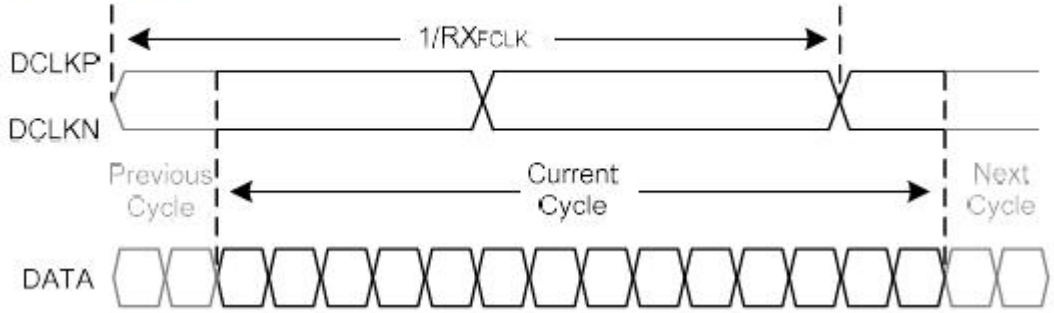
4 Lane VESA Data Format Color Bit Map

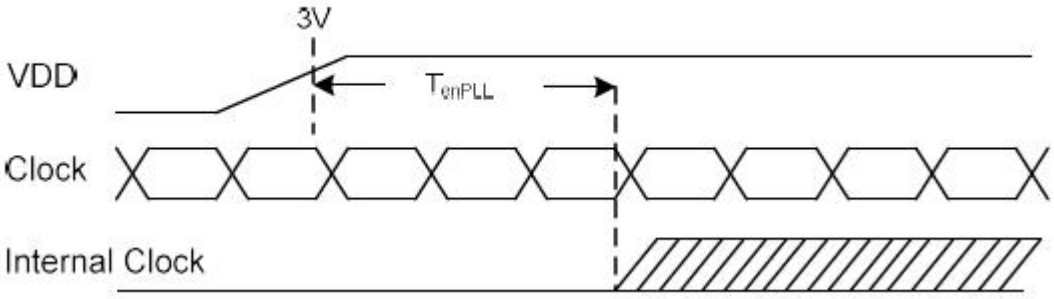


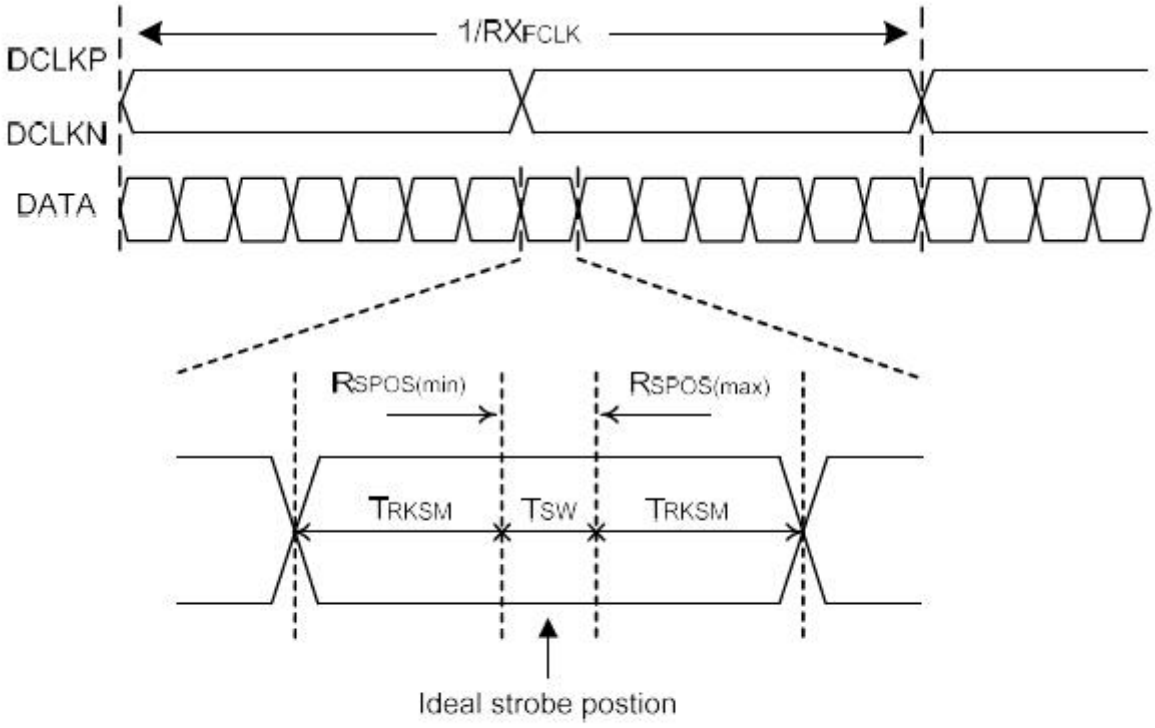
4 Lane JEIDA Data Format Color Bit Map



LVDS Input Timing Table







RRKSM: Receiver strobe margin
RSPOS: Receiver strobe position
TSW: Strobe width (internal DATA sampling window)

LVDS Input Timing (PVDD=PVDD1=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

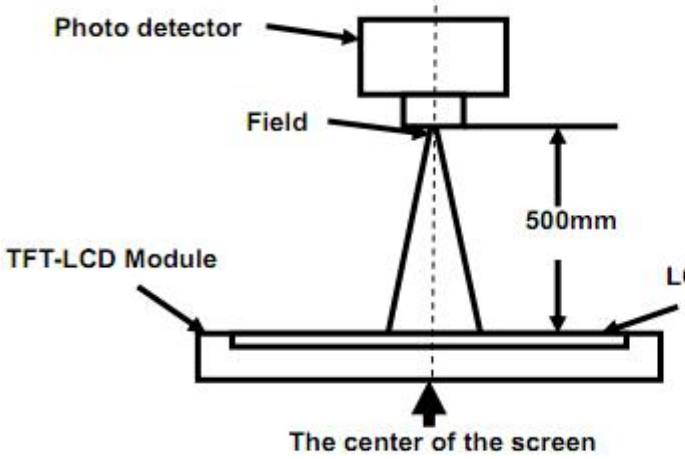
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Clock Frequency	RX_{FCLK}	23	25	27	MHz	
Input Data Skew Margin	T_{RSKM}	400			ps	
Clock High Time	T_{LVCH}	4/(7 x RX_{FCLK})			ns	
Clock Low Time	T_{LVCL}	3/(7 x RX_{FCLK})			ns	
PLL Wake-up Time	T_{enPLL}			150	us	
LVDS Spread Spectrum Clocking (SSC) Tolerance of LVDS Receiver						
Modulation Frequency	SSC_{MF}			100	KHz	
Modulation Rate	SSC_{MR}			+/-3	%	

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)	70	80	-	deg	Note2
	θ_B	Φ=270°(6 o'clock)	70	80	-	deg	Note2
	θ_L	Φ=180°(9 o'clock)	70	80	-	deg	Note2
	θ_R	Φ=0°(3 o'clock)	70	80	-	deg	Note2
Response Time	T_{ON}	Normal θ=Φ=0°	-	15	20	msec	Note4
	T_{OFF}		-	15	20	msec	Note4
Contrast Ratio	CR		800	1000	-	-	Note1 Note3
Color Chromaticity	W_X		TBD	TBD	TBD	-	Note1 Note5
	W_Y		TBD	TBD	TBD	-	Note1 Note5
Luminance	L		750	850	-	cd/m²	Note1 Note7
Luminance Uniformity	Y_U		75	80	-	%	Note1 Note6
NTSC	-		45	50	-	%	-

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°

Fig 1

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).

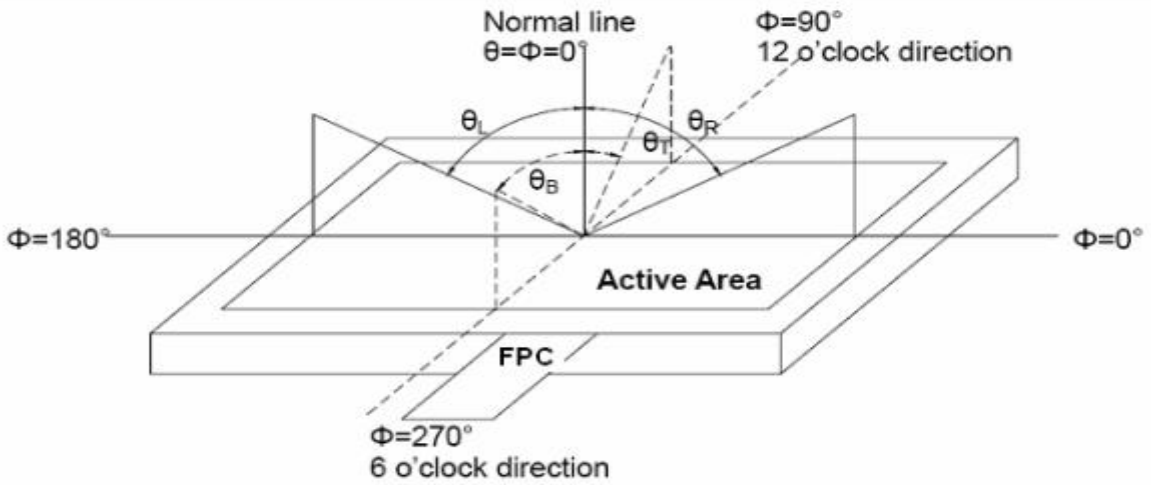


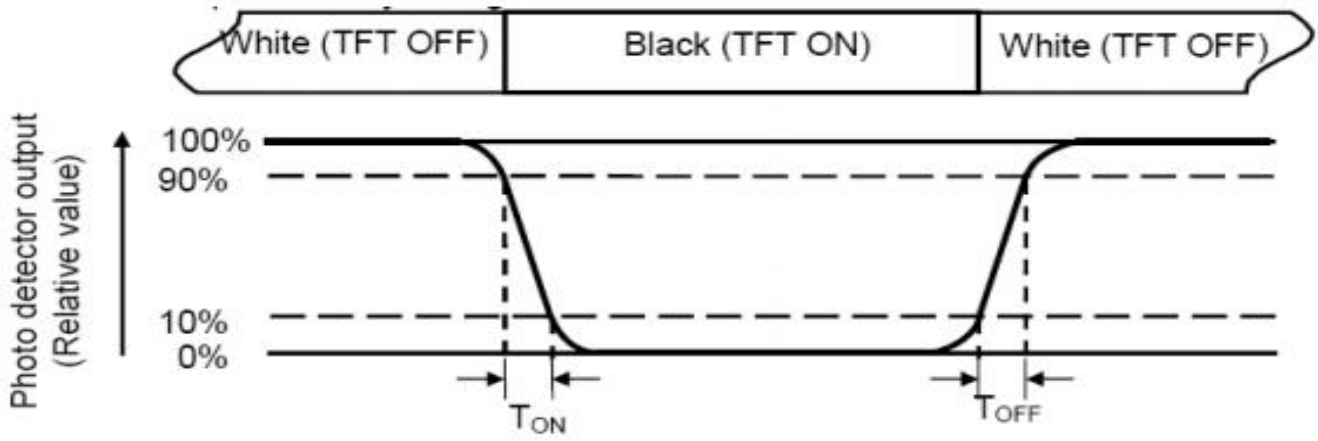
Fig 2 Definition of viewing angle

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.3-a/b

Note 7:Surface luminance is the luminance with all pixels displaying white.

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

For more information see FIG.3-a/b

Note 8:Size : S≤5”(see Figure a) H,V : Active area
Light spot size ⌀ =5mm(BM-5) or ∅=7.7mm (BM-7)50cm distance or test spot position : see Figure a.
measurement instrument : TOPCON’s luminance meter SR-3A or BM-7 or compatible (see Figure 1).

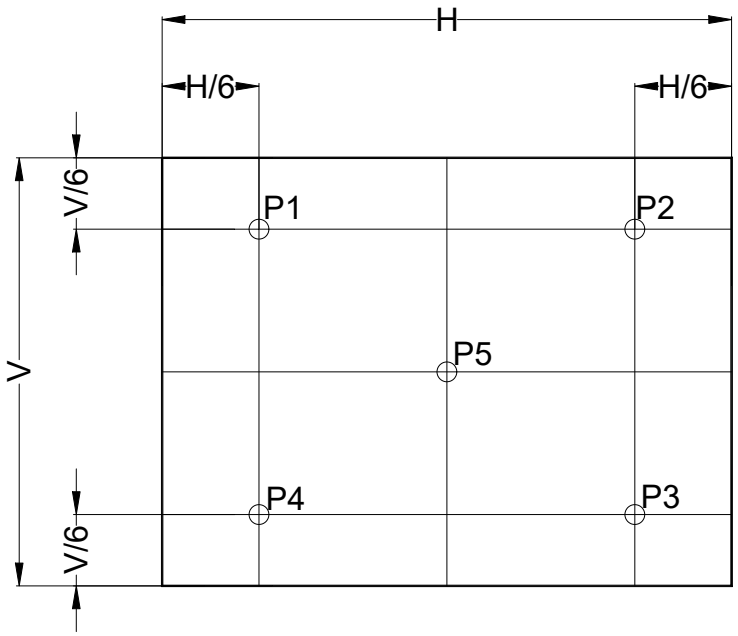


Fig. 3-a Definition of points

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 SR-3A or BM-7 or compatible (see Figure 1).

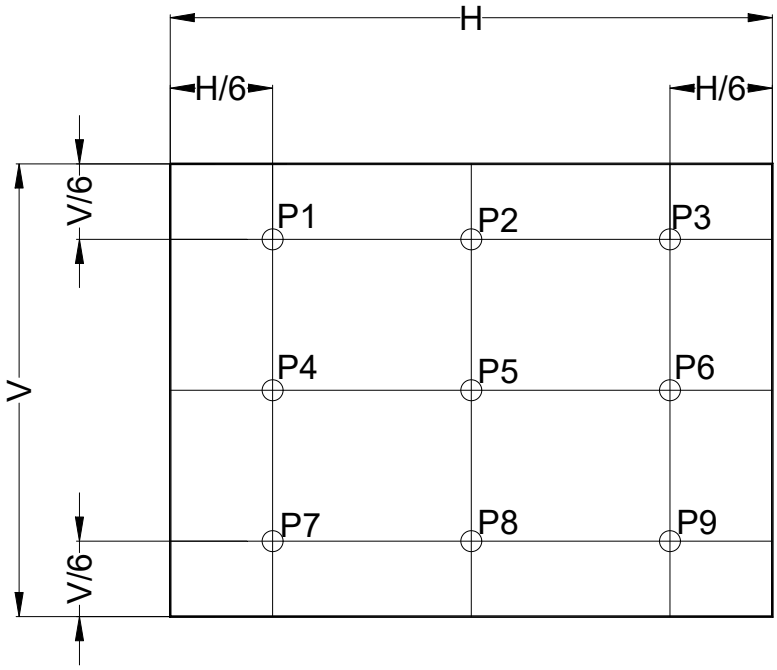


Fig. 3-b Definition of points

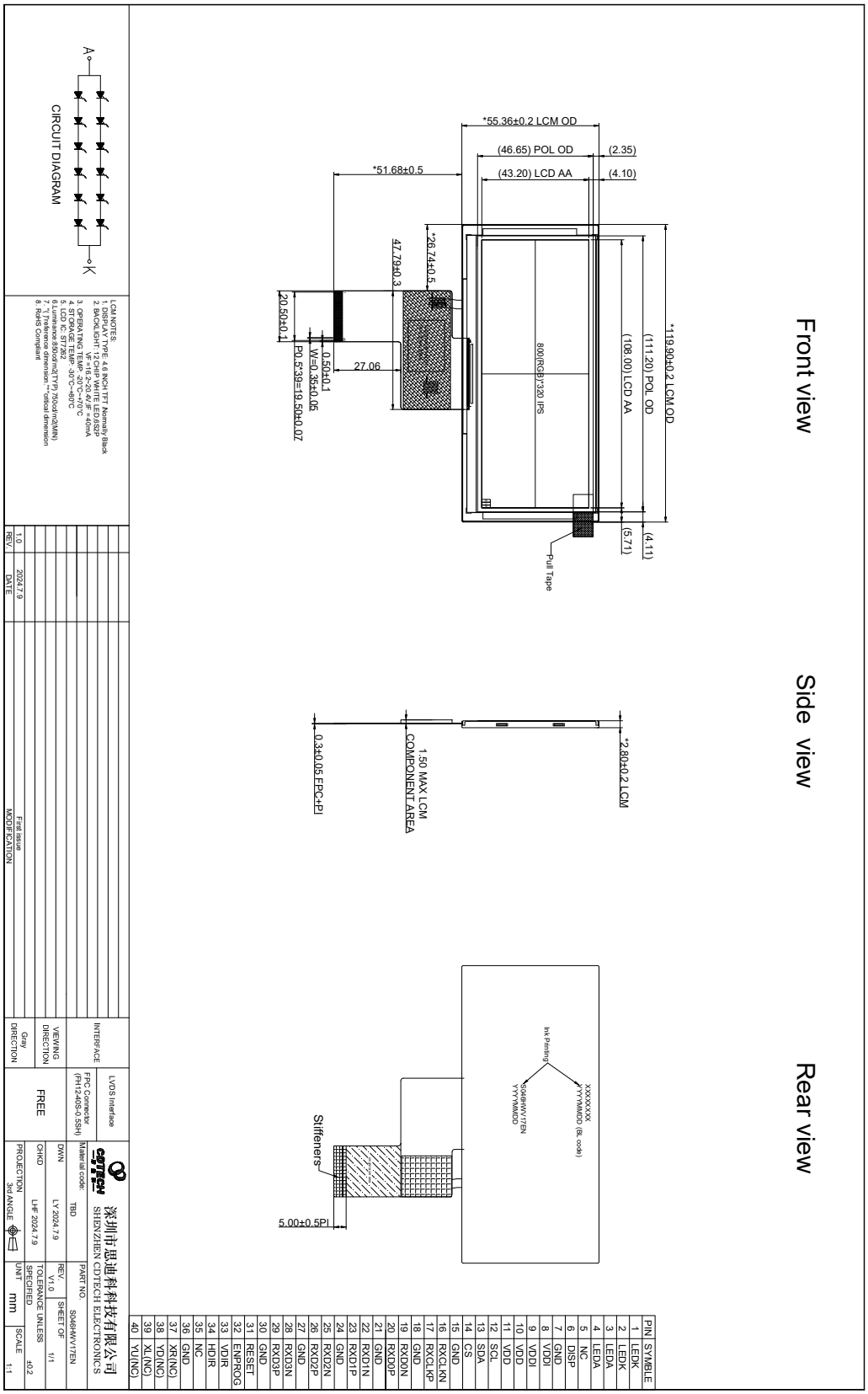
7. Reliability Test Items

Test Item	Test Conditions	
High Temperature Storage	Ta= +80℃	96hrs
Low Temperature Storage	Ta= -30℃	96hrs
High Temperature Operation	Ta= +70℃	96hrs
Low Temperature Operation	Ta= -20℃	96hrs
High Temperature and Humidity Storage	Ta= +60℃, 90% RH	96hrs
Thermal Shock (Non-operation)	-30℃/30 min ~ +80℃/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:

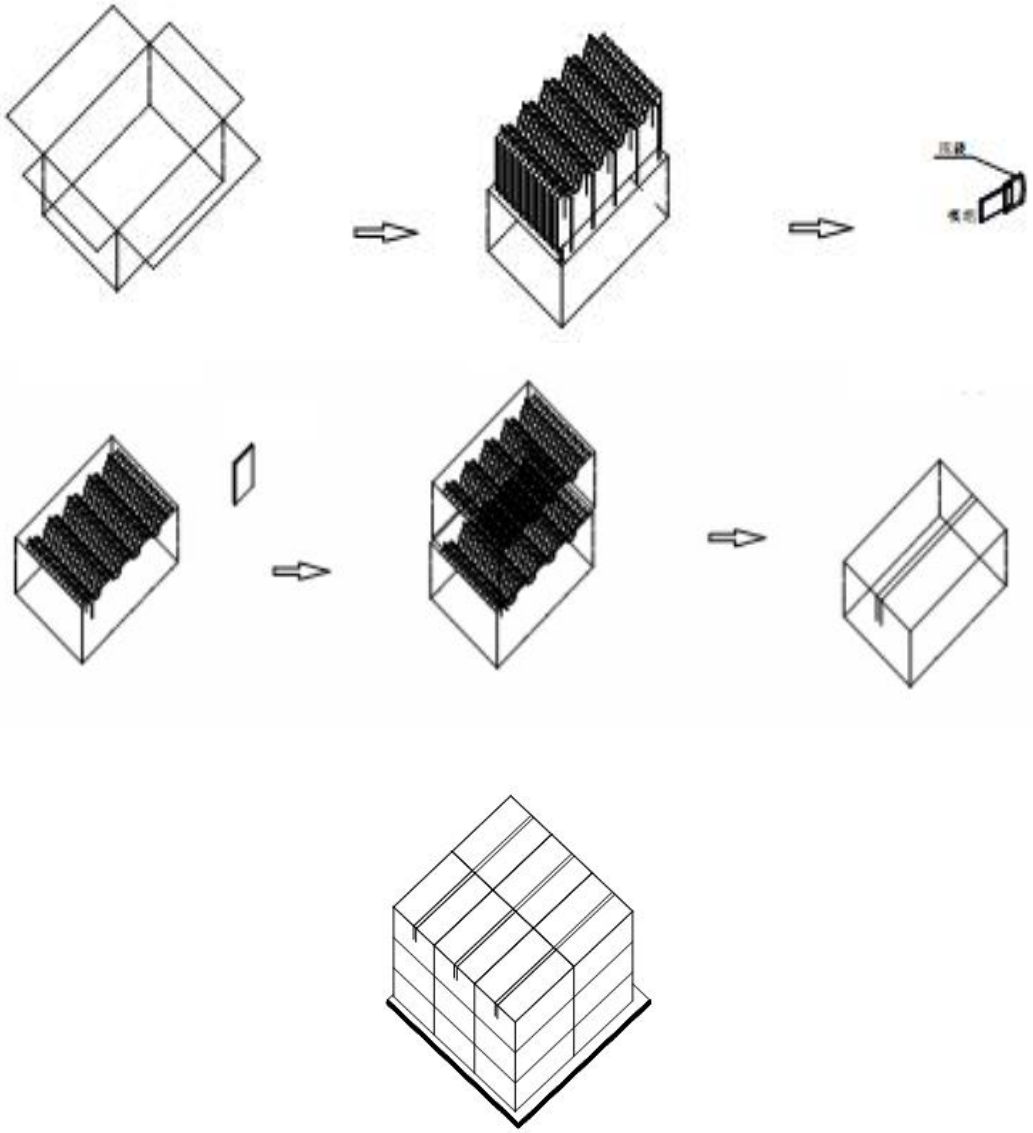
1). Air bubble in the LCD
2). Seal leak or Glass crack
3). Non display or abnormal display
4). Brightness reduction >50%

8. Mechanical Drawing



9. Packing

Packing Method



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
- Ketene
- 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.