

Product Specification

Model Name	S070SWV27EDO
Description	Standard LCD Module 7.0" WVGA 800(RGB)x480 Dots
Date	2021/10/07
Version	1.0

Approved by/Date	Check by/Date	Prepared by/Date
ZHP 2021/10/07	HZX 2021/10/07	ZJ 2021/10/07

Customer Approval	
Date	



深圳市思迪科科技有限公司

SHENZHEN CDTECH ELECTRONICS

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1. Record of Revision

Rev	Issued Date	Description	Editor
1.0	2021/10/07	First Release.	ZJ

2. General Specifications

Feature		Spec
Characteristics	Size	7 inch
	Resolution	800(horizontal)*480(Vertical)
	Interface	24-bit RGB
	Connect type	Connector
	Display Colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.1926(W) × 0.1790(H) mm
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally White
	LCD Driver IC	HX8264-E+HX8664-B
	Viewing Direction	12 O'clock
	Gray Inversion Direction	6 O'clock
Mechanical	LCM (W x H x D) (mm)	164.90*100.00*5.70
	Active Area(mm)	154.08 x 85.92
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	27 LEDs

Note 1: Requirements on Environmental Protection: RoHs

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

3. Input/Output Terminals

LCD PIN-MAP

No.	Symbol	Description
1-2	VLED+	Power for LED backlight anode
3-4	VLED-	Power for LED backlight cathode
5	GND	Ground
6	VCOM	Common voltage.
7	DVDD	Power for Digital Circuit.
8	MODE	DE/SYNC mode select.
9	DE	Data Input Enable.
10	VS	Vertical Sync Input.
11	HS	Horizontal Sync Input.
12-19	B7~B0	Blue Data
20-27	G7~G0	Green Data
28-35	R7~R0	Red Data.
36	GND	Ground
37	DCLK	Pixel clock
38	GND	Ground
39	L/R	Left/right selection.
40	U/D	Up/down selection
41	VGH	Gate ON Voltage.
42	VGL	Gate OFF Voltage.
43	AVDD	Power for Analog Circuit.
44	RESET	Global reset pin.
45	NC	No connected
46	VCOM	Common Voltage.
47	DITHB	Dithering function.
48	GND	Ground
49-50	NC	No connected

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE= "0", DE must be grounded.

Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

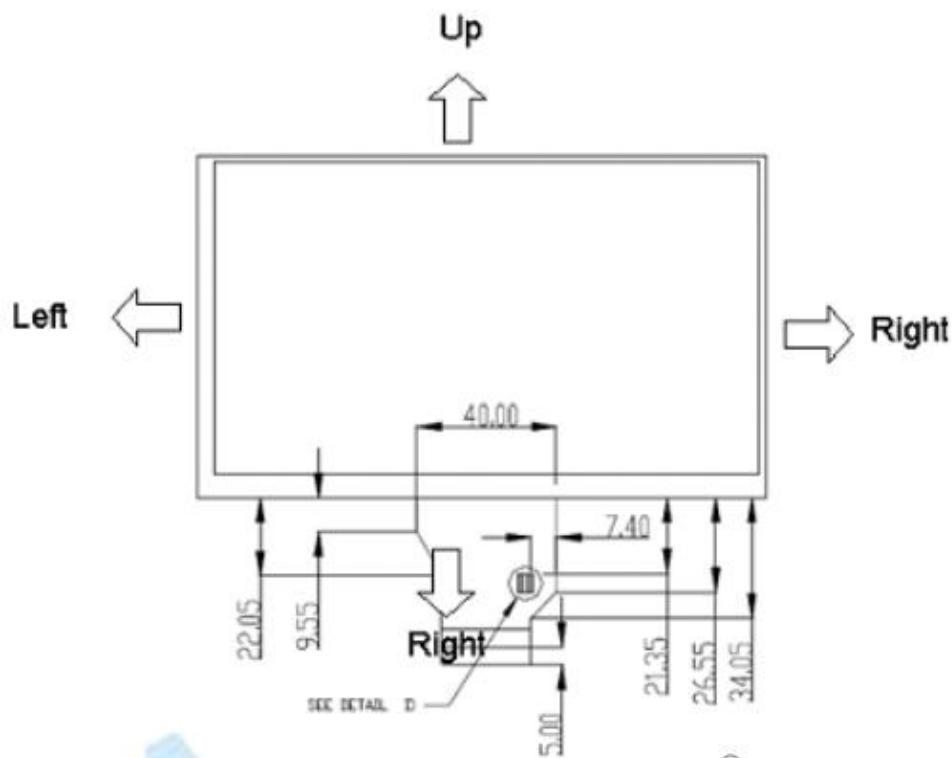
Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode

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

Note 5: Definition of scanning direction.

Refer to the figure as below:



Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.
When DITHB="1", Disable internal dithering function,
When DITHB="0", Enable internal dithering function,

Note 8: Reserve for LED power input.

4. Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	VDD	-0.3	-	5.0	V	-
Operating Temperature	TOPR	-30	-	85	°C	-
Storage Temperature	TSTG	-30	-	85	°C	

5. Electrical Characteristics

5.1 Driving TFT LCD Panel

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV _{DD}	3.0	3.3	3.6	V	Note 2
	AV _{DD}	10.2	10.4	10.6	V	
	V _{GH}	15.3	16.0	16.7	V	
	V _{GL}	-9.7	-9.0	-8.3	V	
Input signal voltage	V _{COM}	2.8	3.8	4.8	V	Note 4
Input logic high voltage	V _H	0.7 DV _{DD}	-	DV _{DD}	V	Note 3
Input logic low voltage	V _L	0	-	0.3 DV _{DD}	V	

Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GH}.

Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 3: DCLK, HS, VS, RESET, U/D, L/R, DE, R0~R7, G0~G7, B0~B7, MODE, DITHB.

Note 4: Typical V_{COM} is only a reference value. It must be optimized according to each LCM. Please use VR and base on below application circuit.

Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	-	0.2	1.0	mA	V _{GH} = 16.0V
	I _{GL}	-	0.2	1.0	mA	V _{GL} = -7.0V
	IDV _{DD}	-	4.0	10	mA	DV _{DD} = 3.3V
	IAV _{DD}	-	20	50	mA	AV _{DD} = 10.4V

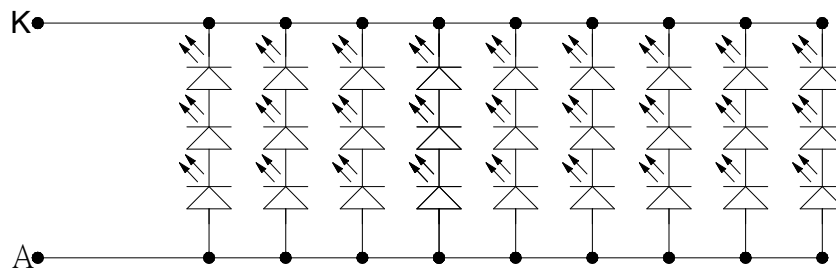
5.2 LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	270	-	mA	
Forward Voltage	V_F	8.1	-	10.2	V	
Backlight Power consumption	W_{BL}	2.19	-	2.75	W	
LED Lifetime		-	30000	-	Hrs	

Note 1: Each LED: $I_F = 30 \text{ mA}$, $V_F = 2.7\text{-}3.4\text{V}$.

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

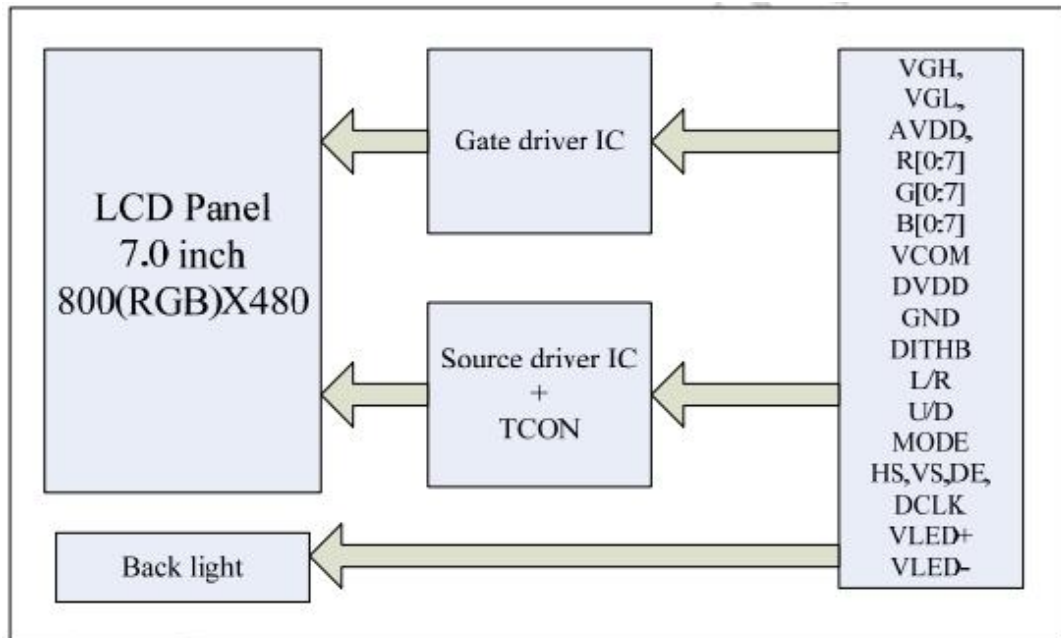
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.



Backlight Circuit diagram

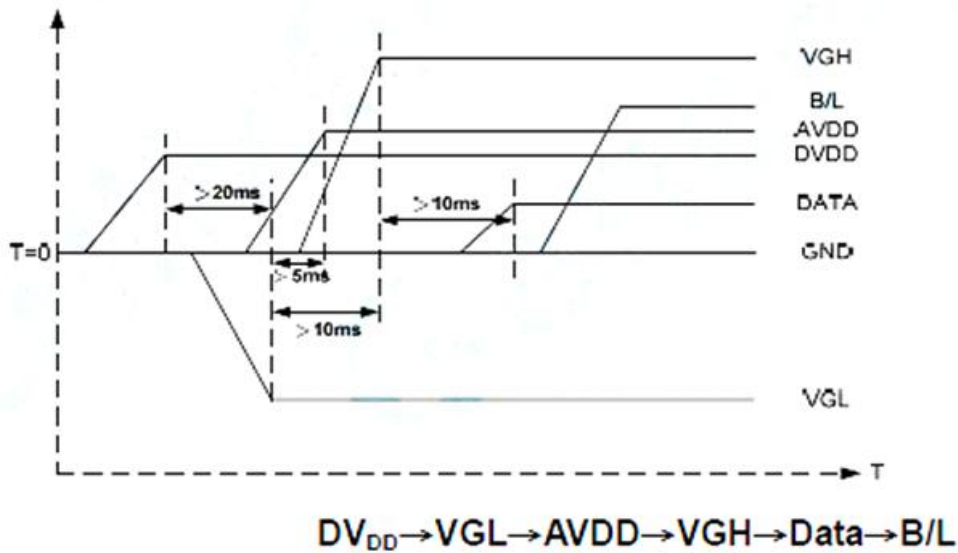
Figure: LED connection of backlight(Constant Current)

5.3 Block Diagram

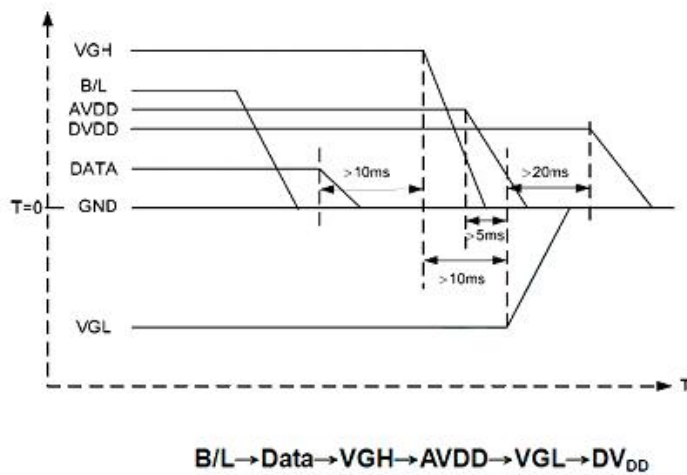


5.4 Power Sequence

a. Power on:



b. Power off:



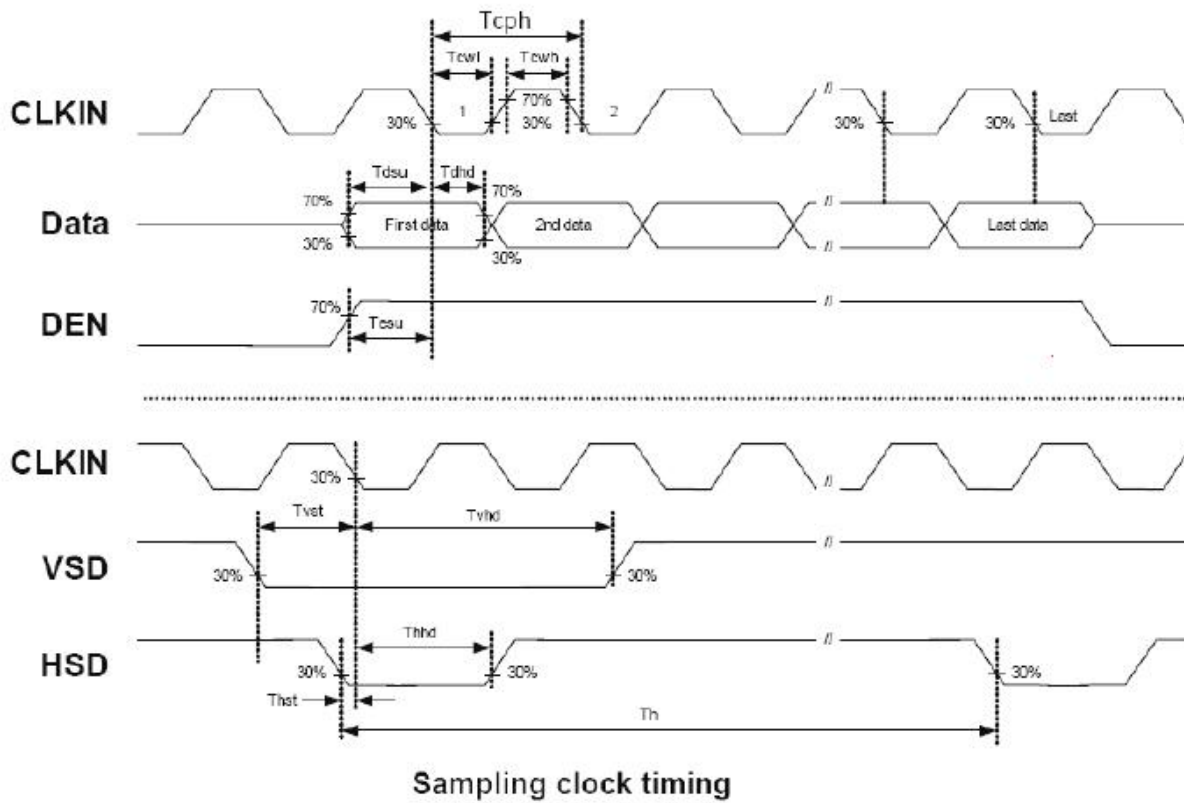
Note: Data include R0~R7, B0~B7, GO~G7, U/D, L/R, DCLK, HS, VS, DE.

6. Interface Timing

6.1 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	Thst	8			ns	
HS hold time	Thhd	8			ns	
VS setup time	Tvst	8			ns	
VS hold time	Tvhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hole time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hole time	Tehd	8			ns	
DVDD Power On Slew rate	TPOR	-		20	ms	From 0 to 90% DVDD
RESET pulse width	TRst	1			ms	
DCLK cycle time	Tcoh	20			ns	
DCLK pulse duty	Tcwh	40	50	60	%	

6.2 Input clock and Data Timing Diagram

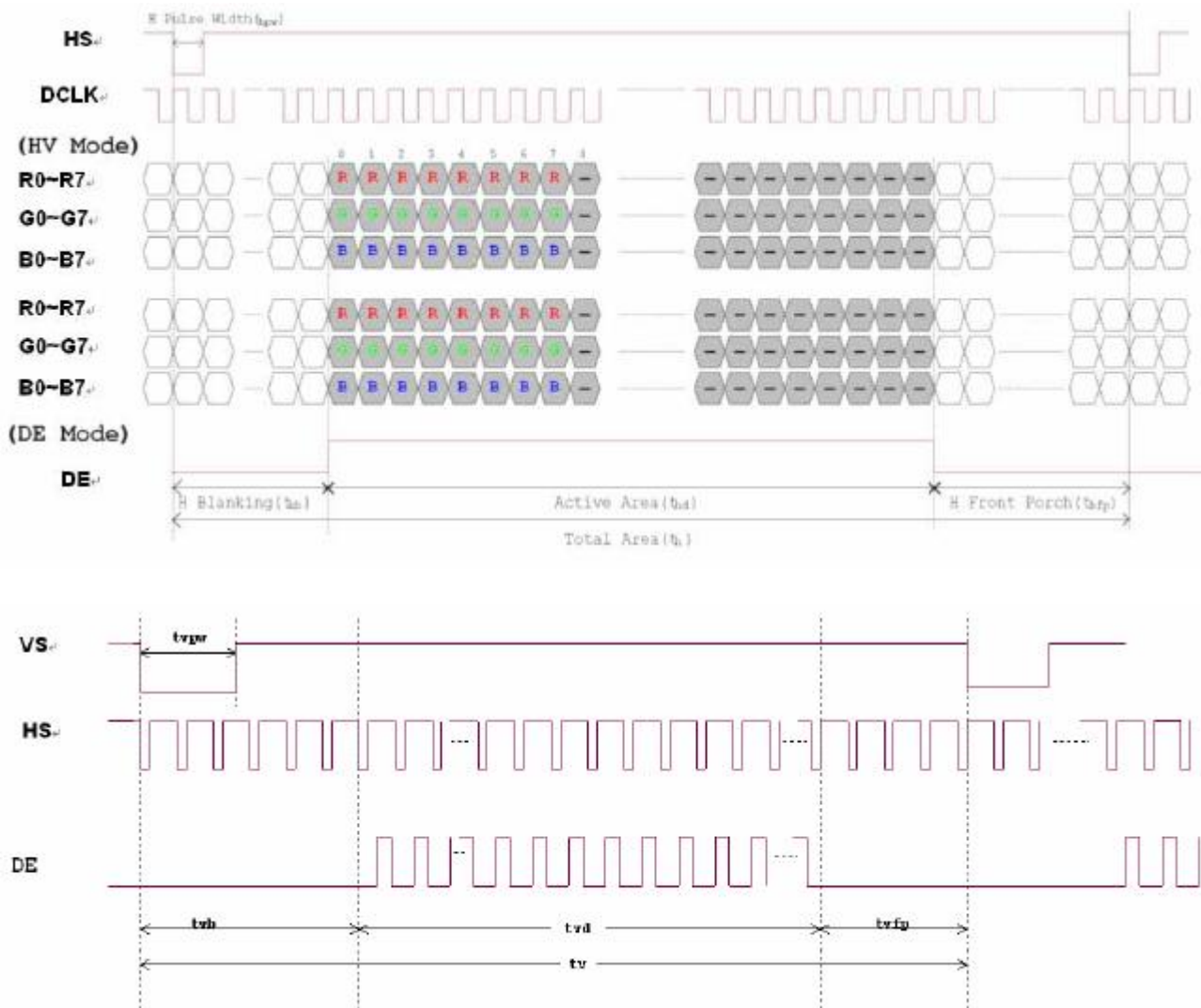


6.3 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd		800		DCLK	
DCLK Frequency	fclk	26.3	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS 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		480		TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tpw	1		20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

6.4 Data Input Format



7. Optical Characteristics

Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
Response time	Tr+Tf	-	-	25	50	ms	FIG.1	Note4
Contrast Ratio	CR		400	500	-	-	FIG.2	Note1
Surface luminance	LV	$\theta = 0^\circ$	750	850	-	cd/m2	FIG.2	Note2
Luminance uniformity	Yu	$\theta = 0^\circ$	75	80	-	%	FIG.2	Note3
NTSC	-	$\theta = 0^\circ$	-	50	-	%	FIG.2	Note5
Viewing angle	θ_T	Center CR ≥ 10	-	70	-	deg	FIG.3	Note6
	θ_B		-	80	-	deg	FIG.3	
	θ_L		-	80	-	deg	FIG.3	
	θ_R		-	80	-	deg	FIG.3	
Chromaticity	White		0.258	0.308	0.358	-		
			0.277	0.327	0.377	-		

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 based 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

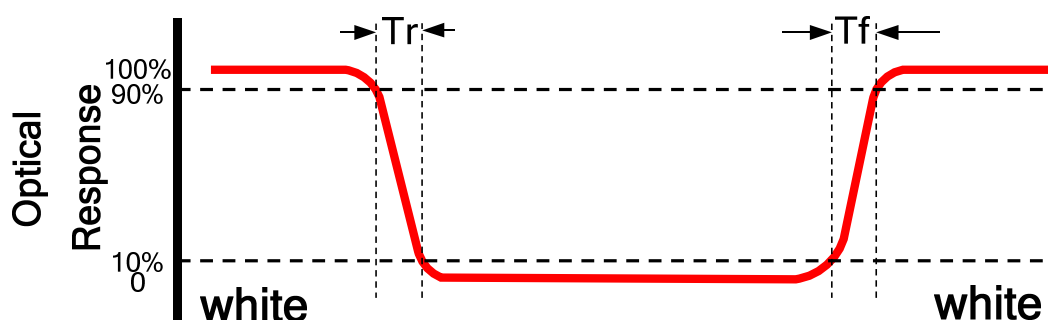


FIG.2. Measuring method for contrast ratio, surface luminance,

luminance uniformity, CIE (x,y) chromaticity

Size : $S \leq 5"$ (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).

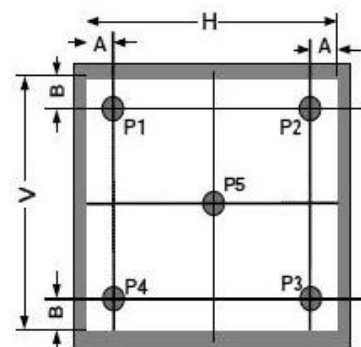


Figure a

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).

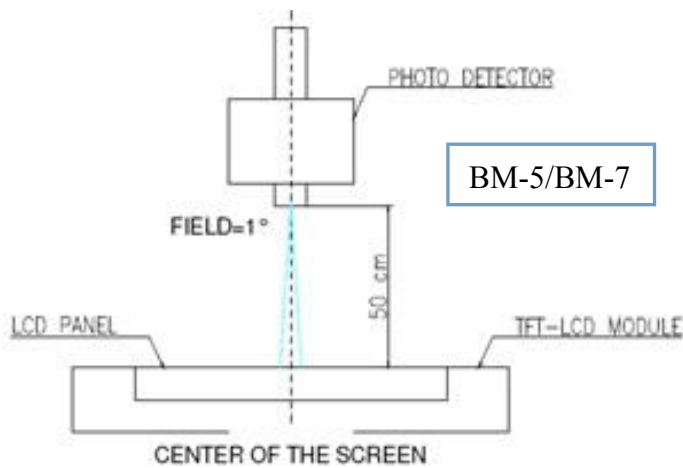


Figure c

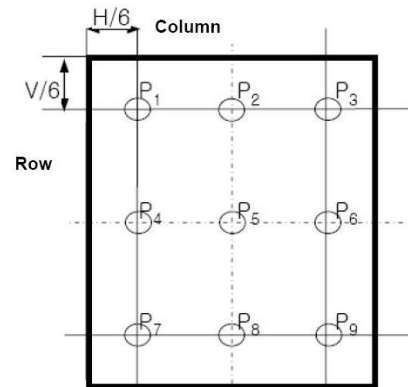
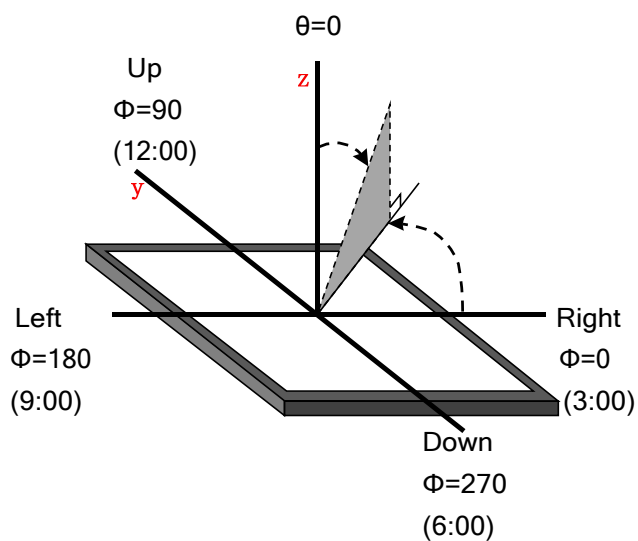


Figure b

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, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995



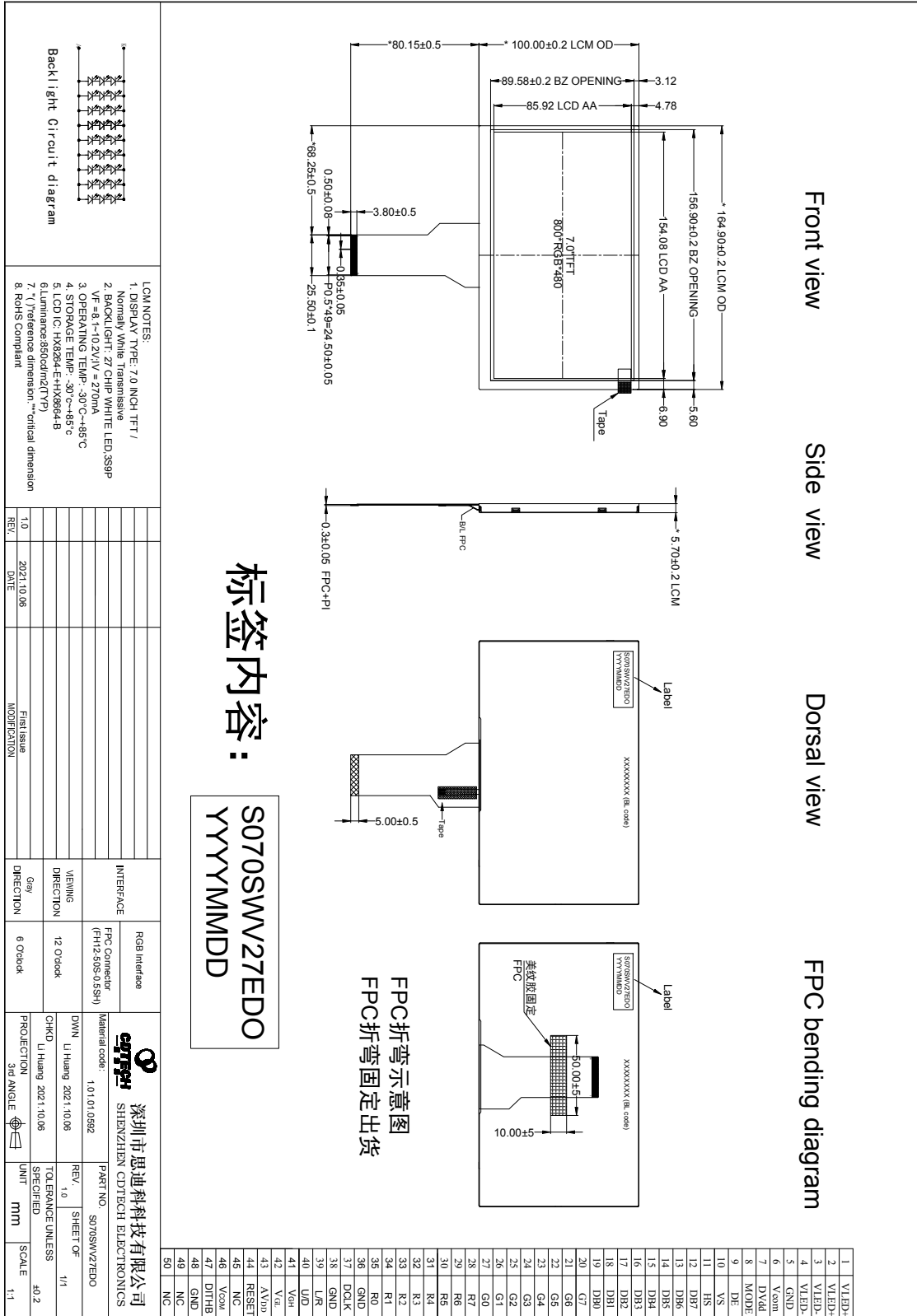
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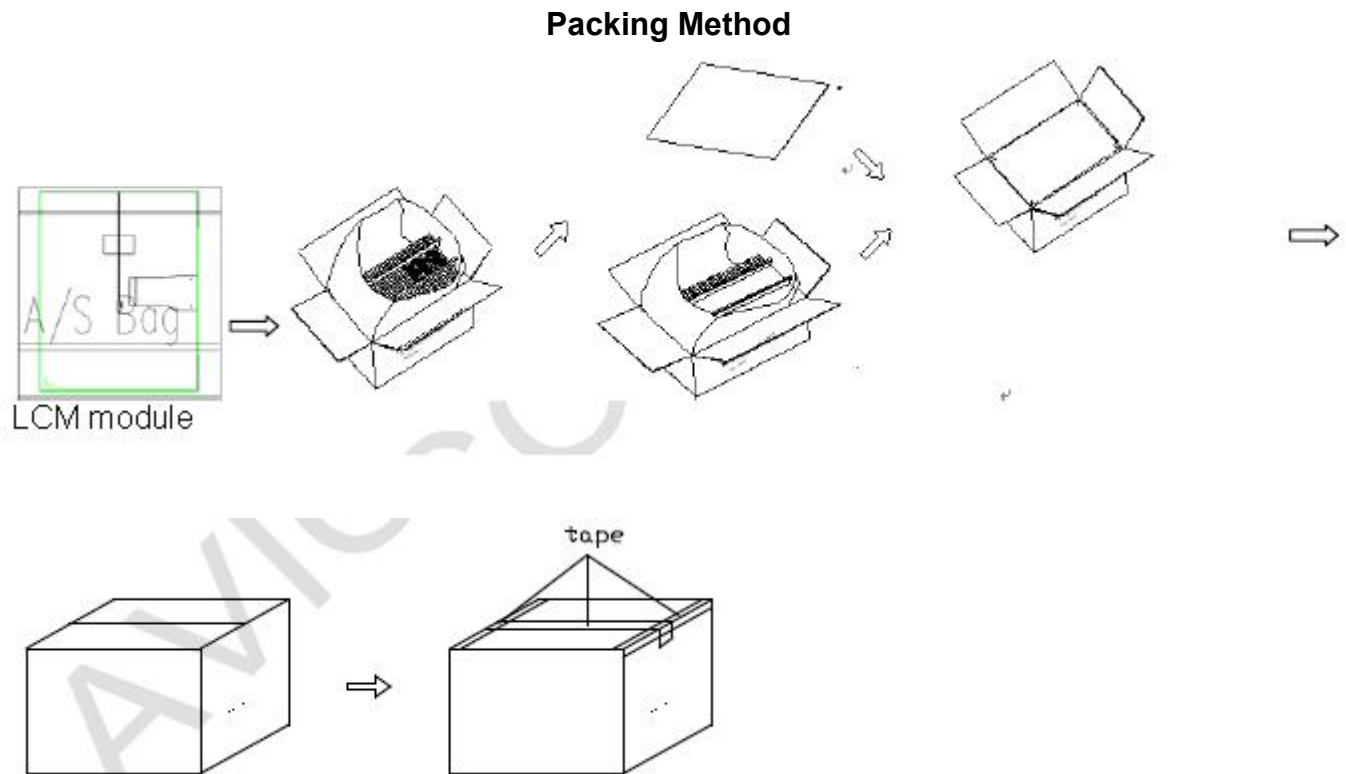
Notes:

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



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.



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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.