



**SPECIFICATION
FOR
LCD MODULE**

Customer : _____
Product Model: YH080BH4003
Sample code: _____

Designed by	Checked by	Approved by

Final Approval by Customer

<input type="checkbox"/> LCM Machinery OK Checked By _____ <input type="checkbox"/> LCM Display OK Checked By _____	<input type="checkbox"/> LCM OK <input type="checkbox"/> NG , Problem survey: Approved By _____
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※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.



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REVISION STATUS

Version	Revise Date	Page	Content	Modified by
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CONTENTS

1. GENERAL DESCRIPTION	P.4
2. MECHANICAL SPECIFICATION	P.5
3. PIN DESCRIPTION.....	P.6
4. BLOCK DIAGRAM.....	P.8
5. ELECTRICAL CHARACTERISTICS	P.9
6. INPUT SIGNAL CHARACTERISTICS	P.12
7. OPTICAL CHARACTERISTICS	P.14
8. RELIABILITY TEST	P.18
9. GENERAL PRECAUTION	P.19
10. PACKAGE DRAWING.....	P.20



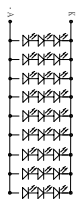
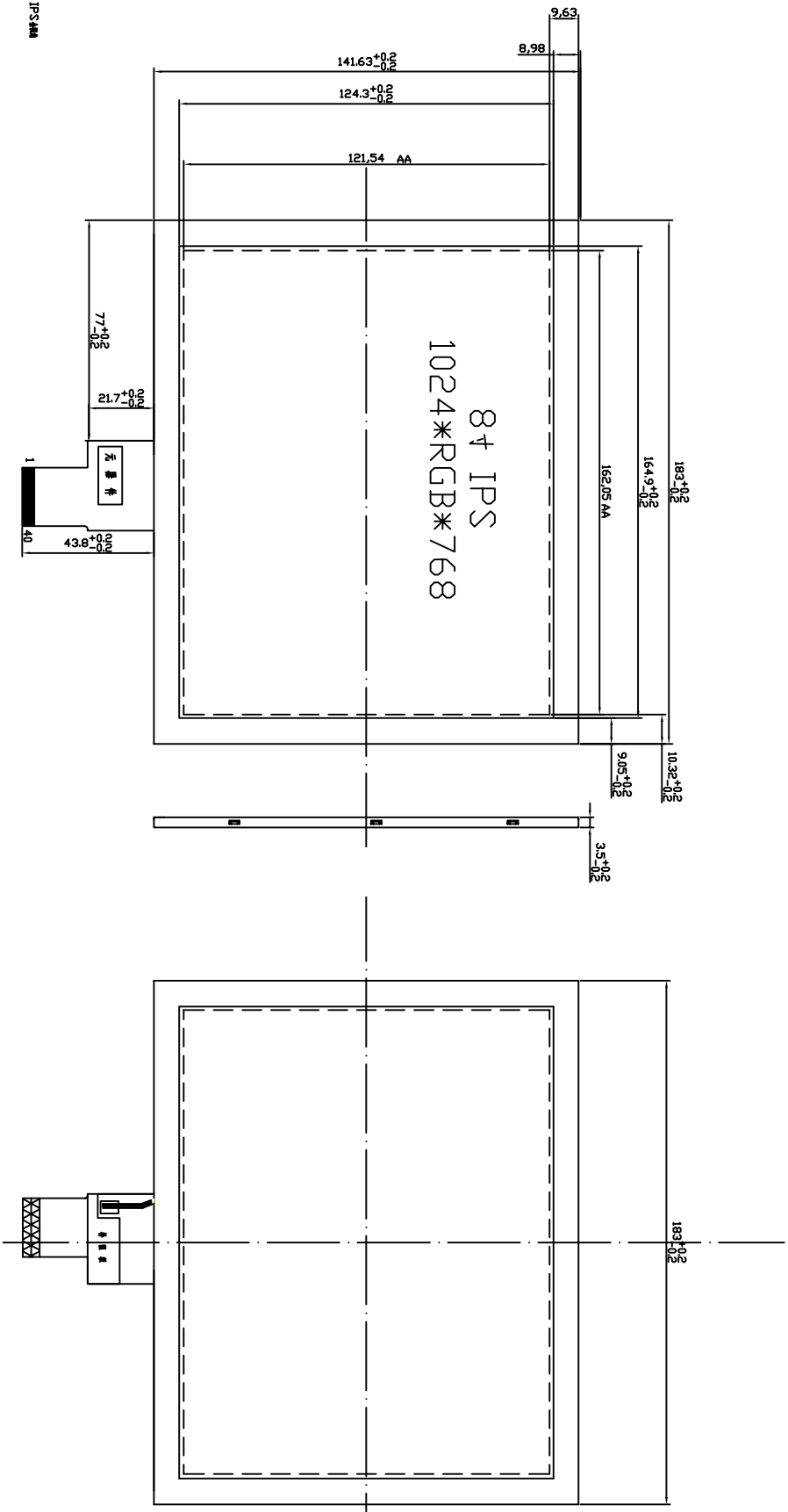
1. GENERAL DESCRIPTION

1.1 DESCRIPTION

Display model1 is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver ICs and a backlight unit. The following table describes the features of this LCM.

1.2 FEATURES

No.	Item	Specification	Unit
1	Panel Size	8	inch
2	Number of Pixels	1024 ×3(RGB) ×768	pixels
3	Active Area	162.05(H) ×121.54(V)	mm
4	Pixel Pitch	0.2025(H) ×0.2025 (V)	mm
5	Outline Dimension	183.00(H) × 141.00(V) × 3.50(D)	mm
6	Pixel arrangement	RGB Vertical stripe	-
7	Display Mode	TN , Normally White	-
8	Viewing Direction	12 o'clock	-
9	Display Color	16.7M	-
10	Surface Treatment	Anti-Glare and Hard-coating 3H	-
11	Interface	Digital	-
12	Backlight	White LED	-
13	Drive IC	-	-
14	Operation Temperature	0~50	°C
15	Storage Temperature	-20~60	°C
16	Weight	216(Typ.)	g



Item (项目)	Symbol	Unit	Condition
Main screen luminance (亮度)	Lv	cd/m ²	(目视测试法)
Main screen Color Coordinate (色坐标)	X, Y	%	(目视测试法)
Main screen Contrast (对比度)	Y		LV=xxxx mcd
Main screen Luminance (亮度)	Lv	cd/m ²	
Main screen Tilt (倾斜)	Avg	%	
Main screen Colour (颜色)	X, Y	%	
Main screen Coordinate (坐标)	X, Y	%	
Forward Voltage (正向电压)	Vf	V	

Design by: (设计) ATEON (审查)

Approval By: (核准)

Date: 2018. 11. 14 (日期)

Page: 1/1 (页数)



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3. PIN DESCRIPTION

3.1 CN1 of FPC

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	-	No connection	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pull high	
7	GND	P	Ground	
8	RXIN0-	I	-LVDS differential data input	
9	RXIN0+	I	+LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	-LVDS differential data input	
12	RXIN1+	I	+LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	-LVDS differential data input	
15	RXIN2+	I	+LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	-LVDS differential clock input	
18	RXCLKIN+	I	+LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	-LVDS differential data input	
21	RXIN3+	I	+LVDS differential data input	
22	GND	P	Ground	
23	NC	-	No connection	
24	NC	-	No connection	
25	GND	P	Ground	
26	NC	-	No connection	
27	DIMO	O	Backlight CABC controller signal	
28	SELB	I	6bit/8bit mode select	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	NC	-	No connection	
32	NC	-	No connection	
33	L/R	I	Horizontal inversion	
34	U/D	I	Vertical inversion	
35	VGL	P	Gate OFF Voltage	
36	CABCEN1	I	CABC H/W enable	
37	CABCEN0	I	CABC H/W enable	
38	VGH	P	Gate ON Voltage	
39	NC	-	No connection	Note1,2
40	NC	-	No connection	Note1,2



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3.2 CN2 of Backlight

Pin No.	Symbol	I/O	Function	Remark
1	VLED+	P	Power for LED backlight anode	Black
2	VLED-	P	Power for LED backlight cathode	White

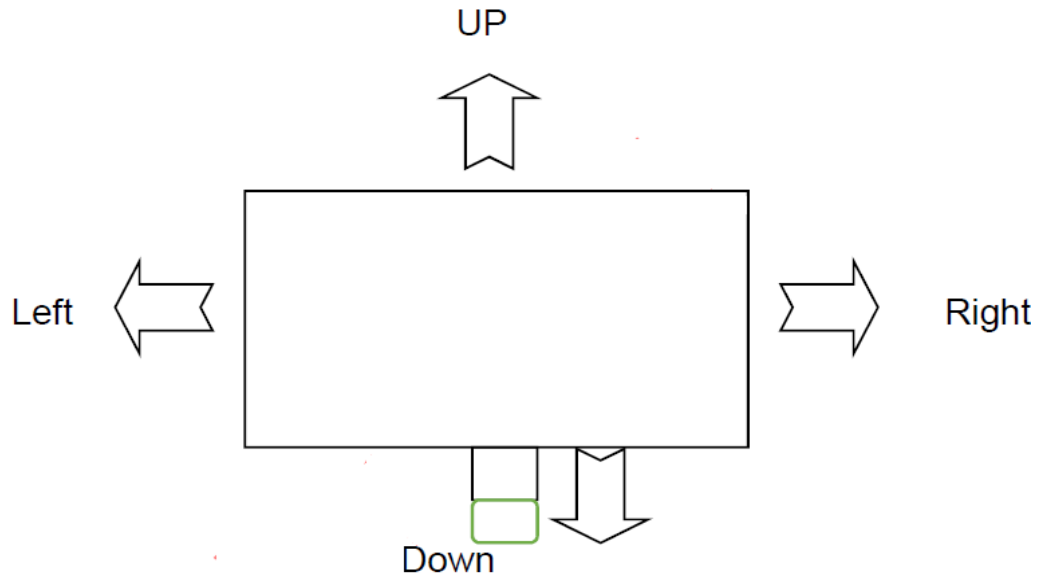
I/O definition:

I: input, O: output, P: Power, -:No Connection

Note1:Selection of scanning mode

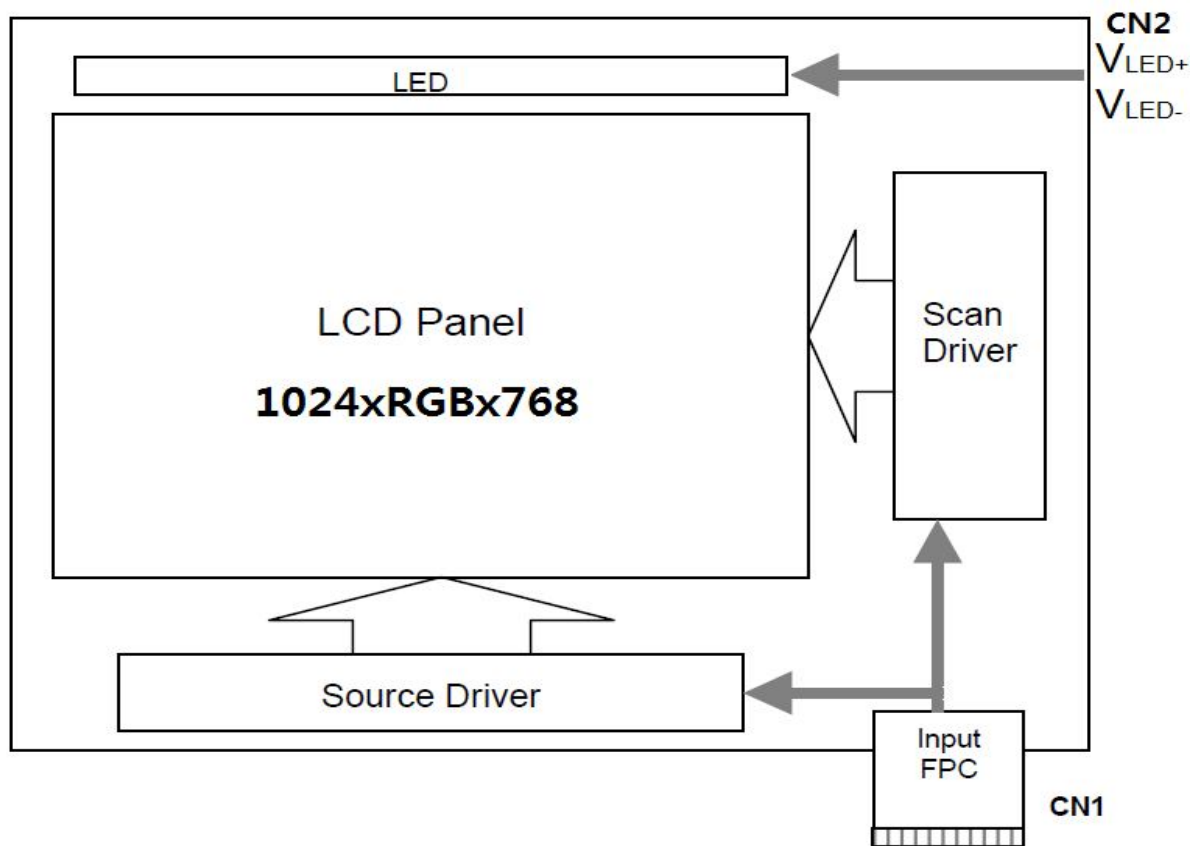
Setting of scan control input		Scanning direction
U/D	L/R	
GND	DVDD	Up to down,left to right
DVDD	GND	Down to up,right to left
GND	GND	Up to down,right to left
DVDD	DVDD	Down to up,left to right

Note2:Definition of scanning direction.Refer to the figure as below.





4. BLOCK DIAGRAM





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5. ELECTRICAL CHARACTERISTICS

5.1 ABSOLUTE MAXIMUM RATINGS (Note

AGND=GND=0V, Ta = 25 °C

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	DVDD	-0.3	4.0	V	
	AVDD	0.5	15	V	
	VGH	-0.3	40	V	
	VGL	-20	0.3	V	
	VGH-VGL	12	40	V	

5.2 RECOMMENDED OPERATING CONDITION

AGND=GND=0V, Ta = 25°C

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DVDD	3.0	3.3	3.6	V	Note2
	AVDD	8.2	8.4	8.6	V	-
	VGH	22	23	24	V	-
	VGL	-8.8	-7.8	-6.8	V	-
Current for Driver	IGH	-	0.5	1.0	mA	VGH=23V
	IGL	-	0.5	1.0	mA	VGL=-7.8V
	IDVDD	-	10	15	mA	DVDD=3.3V
	I _{AVDD}	-	30	40	mA	AVDD=8.4V
Input signal voltage	VCOM	2.4	2.8	3.2	V	-
Input logic high voltage	V _{IH}	0.7DVDD	-	DVDD	V	-
Input logic low voltage	V _{IL}	0	-	0.3DVDD		

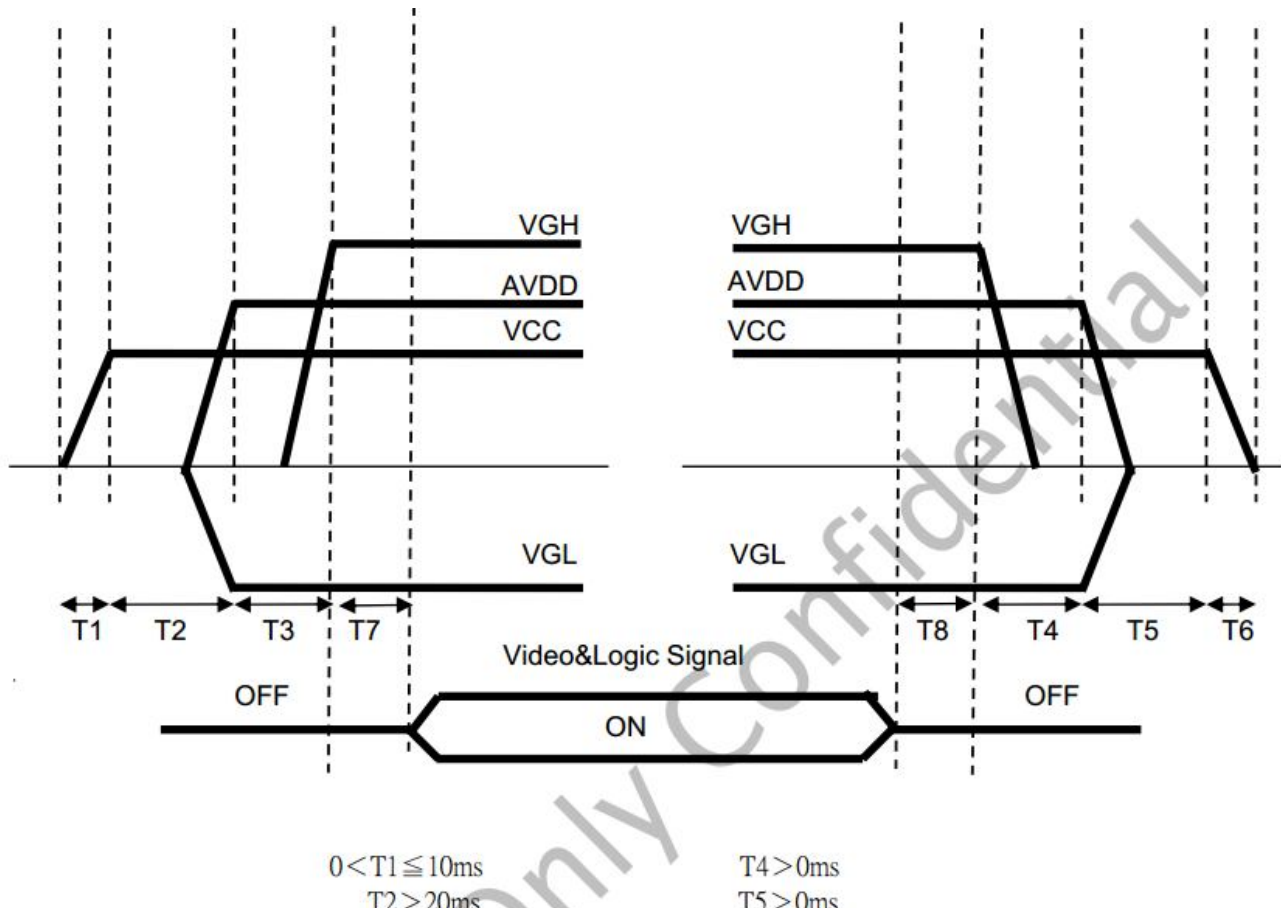
Note1: If product were used out of the operation and storage range, it will have quality issue.
 Note2: DVDD setting should match the signals output voltage (refer to Note3) of customer's system board.



5.3 POWER SEQUENCE

Power on: VCC(DVDD) → AVDD/VGL → VGH → Video&Logic Signal

Power off: Video&Logic Signal → VGH → AVDD/VGL → VCC(DVDD)





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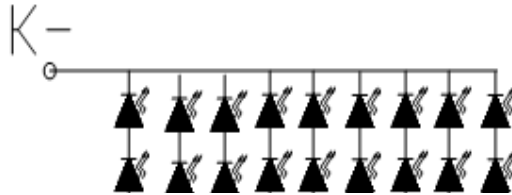
5.4 BACKLIGHT UNIT

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	VL	8.5	9.3	10.2	V	Note1
Current for LED backlight	IL	-	180	-	mA	
LED life time	-	20000	-	-	Hrs	Note2

Note1: The LED supply Voltage is defined by the number of LED at $T_a=25^{\circ}\text{C}$ and $I_L=180\text{mA}$.

Note2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=180\text{mA}$. The LED life time could be decreased if operating I_L is larger than 180mA.

5.4.1 Internal Circuit Diagram

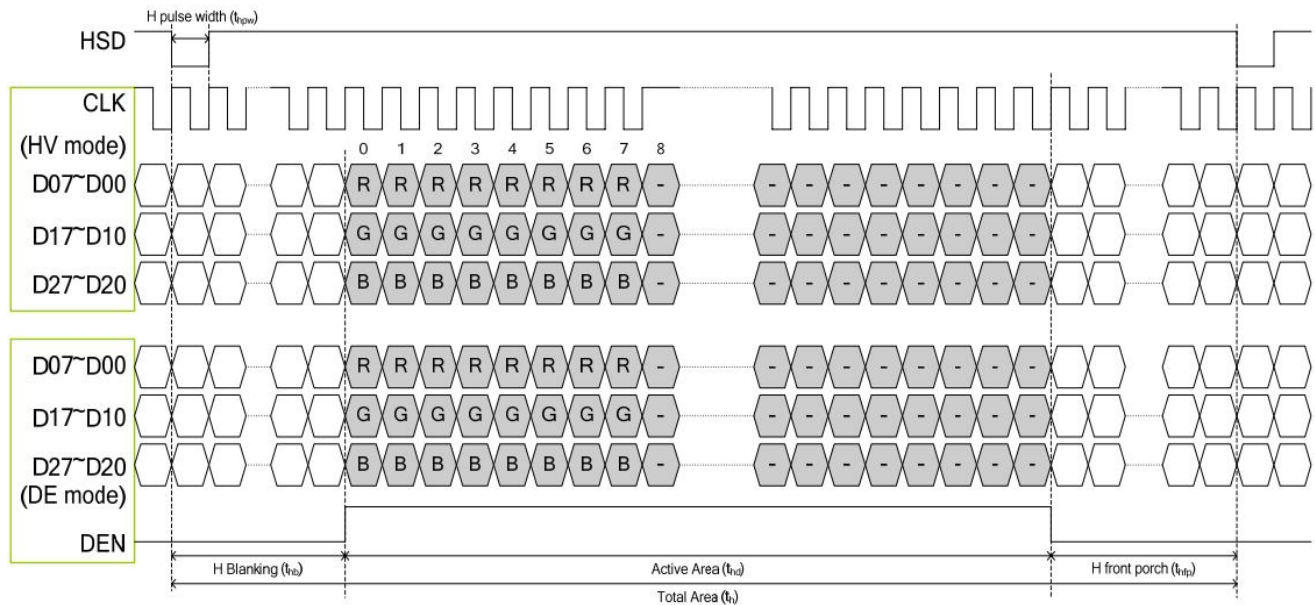




6. INPUT SIGNAL CHARACTERISTICS

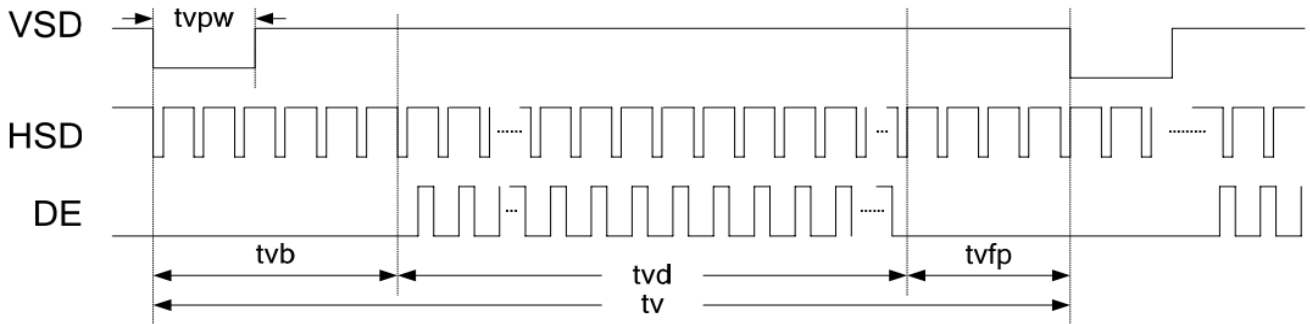
6.1. Horizontal timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	1024			DCLK	
DCLK frequency	fclk	52	65	71	MHz	
One Horizontal line	th	1114	1344	1600	DCLK	
HS pulse width	thpw	1	48	140	DCLK	
HS Back Porch(Blanking)	thb	160			DCLK	
HS Front Porch	thfp	16	160	216	DCLK	
DE mode Blanking	Th-thd	90	320	376	DCLK	



6.2. Vertical timing

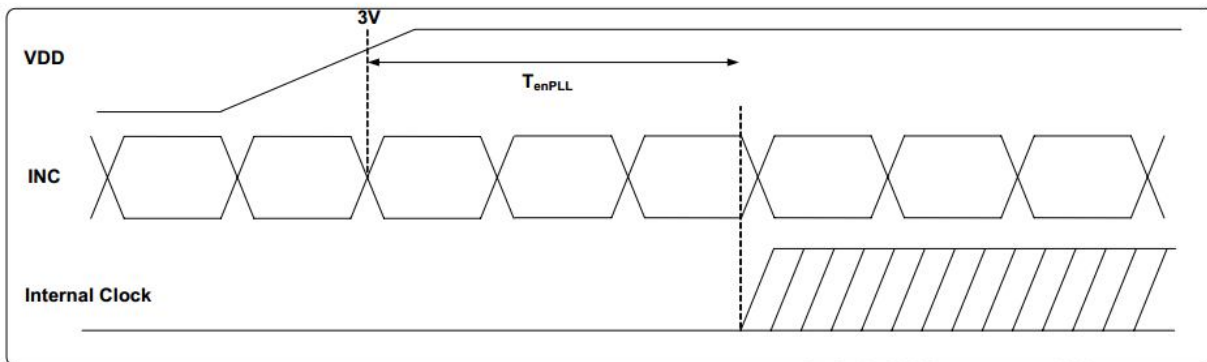
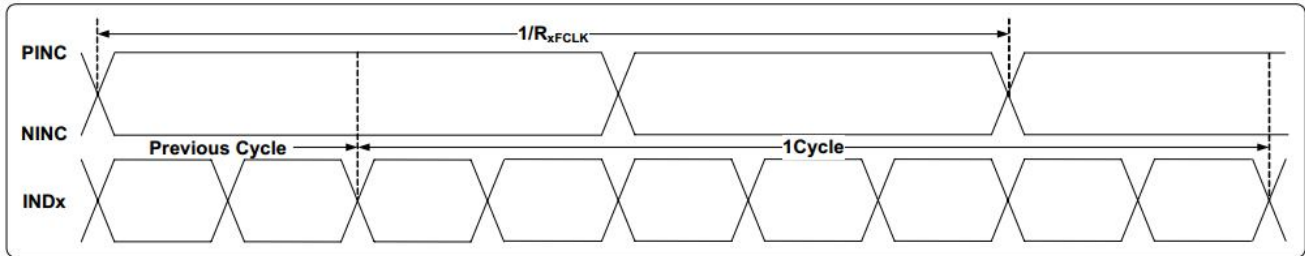
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	768			TH	
VS period time	tv	792	806	840	TH	
VS pulse width	tvpw	1	3	20	TH	
VS Back Porch(Blanking)	tvb	23			TH	
VS Front Porch	tvfp	1	15	49	TH	
DE mode Blanking	tv-tvd	10	38	77	TH	



6.3. AC electrical characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	$ V_{ID} =400mV$ $R_{XVCM}=1.2V$ $R_{XFCLK}=71MHz$
Clock high time	T_{LVCH}	-	$4/(7 * R_{XFCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7 * R_{XFCLK})$	-	ns	-
PLL wake-up time	T_{emPLL}	-	-	150	μs	-

Table 10.2: LVDS mode AC electrical characteristics



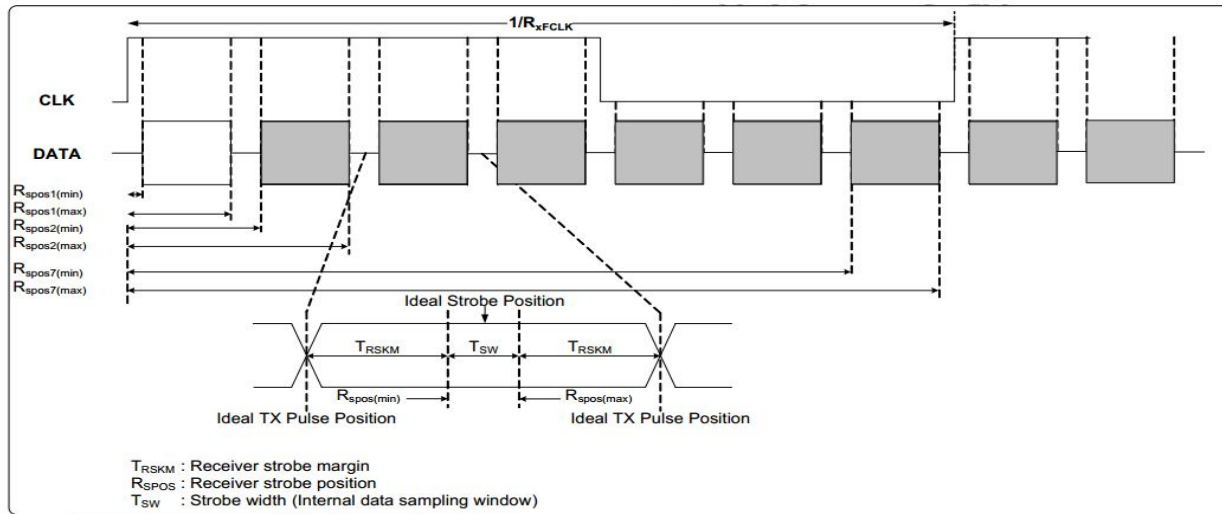


Figure 10.1: LVDS figure

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Modulation Frequency	SSC_{MF}	23	-	93	KHz	-
Modulation Rate	SSC_{MR}	-	-	± 3	%	LVDS clock =71MHz center spread

Table 10.3: SSC table

6.4. LVDS mode data input format

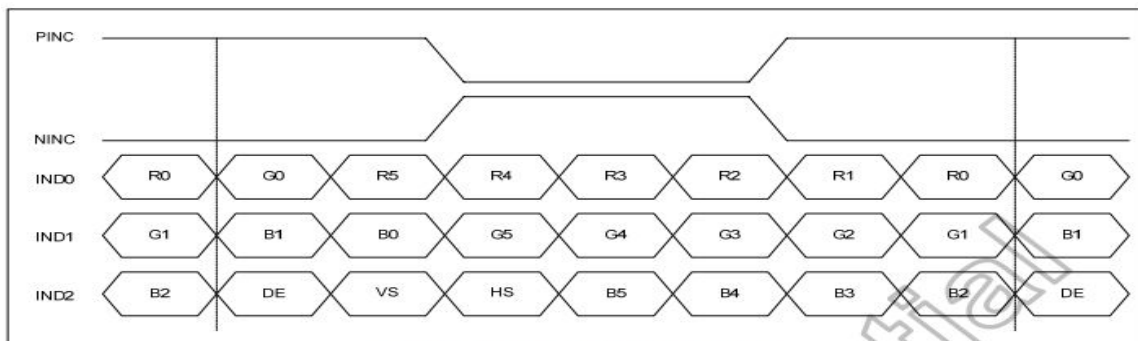


Figure 10.4: 6-bit LVDS input

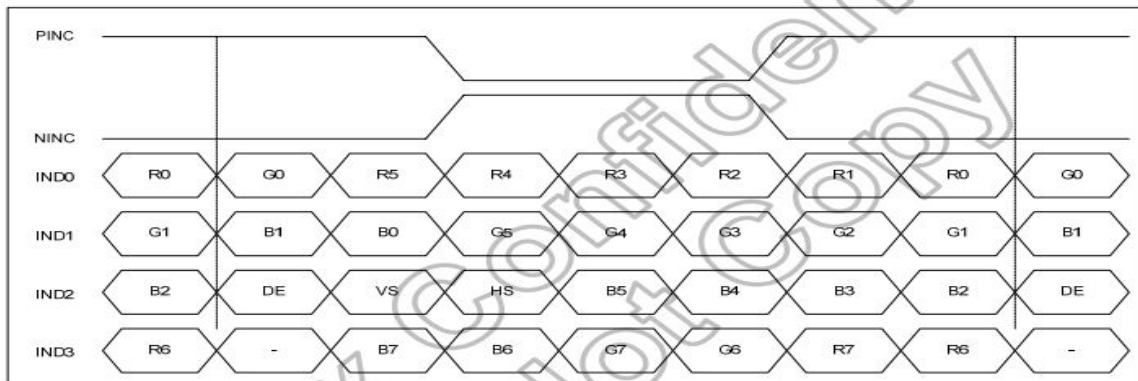


Figure 10.5: 8-bit LVDS Input



7. OPTICAL CHARACTERISTICS

Light source :c-light(with normal polarizer)

Item	Symbol	Condition	Values			Unit	Remark	
			Min.	Typ.	Max.			
Viewing angle	Θ_U	$CR \geq 10$	-	75	-	degree	Note2	
	Θ_D		-	70	-			
	Θ_L		-	75	-			
	Θ_R		-	75	-			
Response time	$T_{ON}+T_{OFF}$	$\theta=\Phi =0^\circ$ Normal viewing angle	-	20	30	ms	Note1 Note3	
Contrast ratio	CR		400	500	-	-	Note1 Note4	
Luminance	L		200	220	-	cd/m ²		
Luminance uniformity	YU		75	80	-	%		
Color chromaticity (CIE1931)	White		W _X	0.273	0.313	0.353		Note1 Note5
			W _Y	0.289	0.329	0.369		
	Red		R _X	0.573	0.603	0.633		
			R _Y	0.300	0.330	0.360		
	Green	G _X	0.308	0.338	0.368			
		G _Y	0.573	0.603	0.633			
	Blue	B _X	0.133	0.163	0.193			
		B _Y	0.089	0.119	0.149			

Test Conditions:

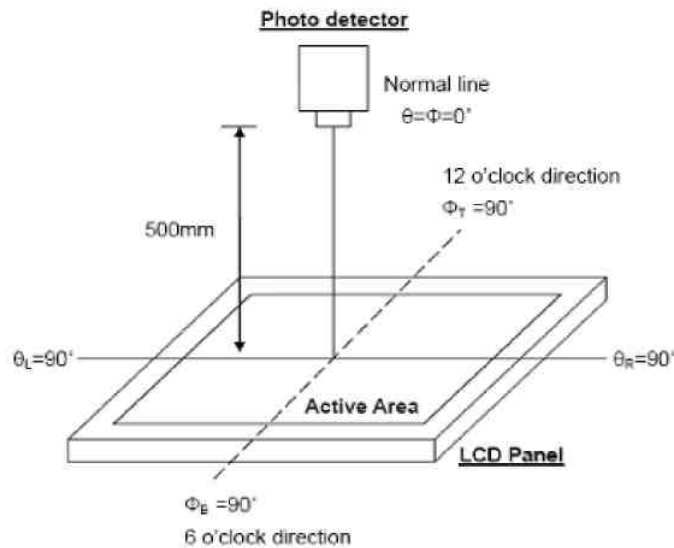
- 1.Measuring surrounding:dark room
- 2.The ambient temperature is 25±2°C.
- 3.The test systems refer to Note1 and Note2.



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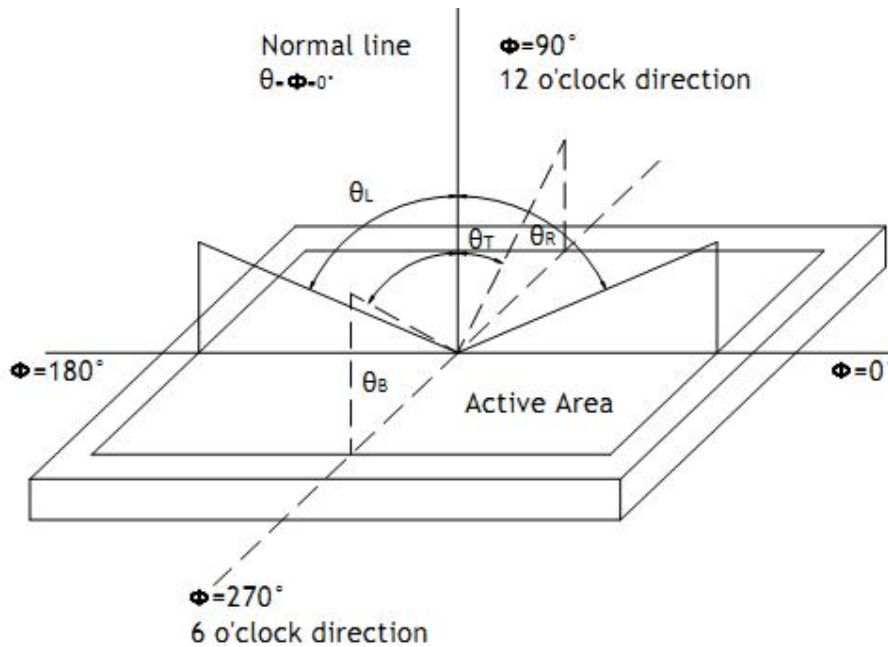
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Note1: Definition of optical measurement system



Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note3: 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%.



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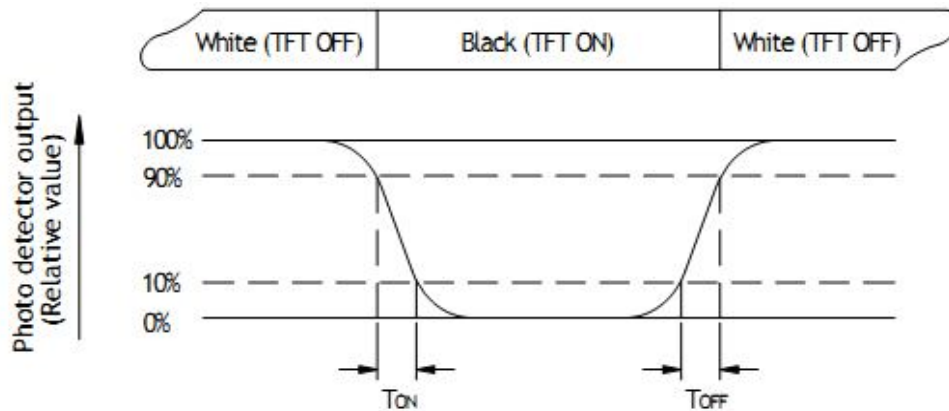


Fig. 6-3 Definition of response time

Note4: Definition of contrast ratio

$$\text{Contrast ratio(CR)} = \frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

“White state “: The state is that the LCD should drive by V_{white} .

“Black state”: The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: All input terminals LCD panel must be ground while measuring the center area of the panel.

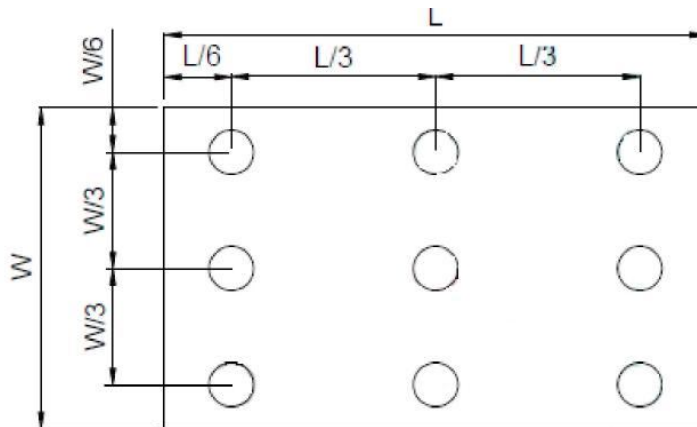
The LED driving condition is $I_L=20\text{mA}$ of which each LED module is 3 LED serial.

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\text{min}} / L_{\text{max}}$$

L----Active area length, W---- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

Note8: Definition of Luminance

Measure the luminance of white state at center point.



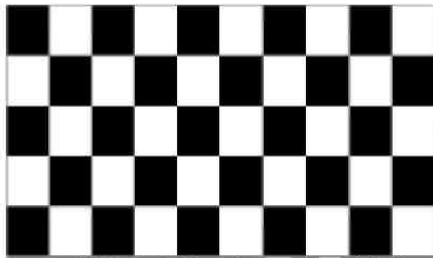
8. RELIABILITY TEST

8.1 TEMPERATURE AND HUMIDITY

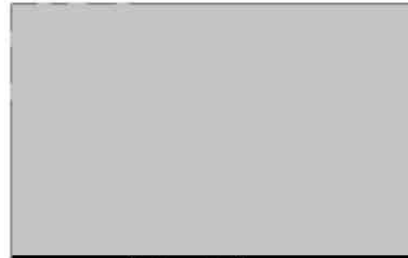
Test Item	Test Condition
High Temperature Storage	Ta=60°C; 240hrs
Low Temperature Storage	Ta=-20°C; 240hrs
High Temperature Operation	Ta=50°C ; 240hrs
Low Temperature Operation	Ta=0°C; 240hrs
High Temperature High Humidity Operation	Ta=60°C ; 90%RH ; 240hrs(no condensation)
Thermal Shock	-20°C(0.5hrs) ~ 60°C(0.5hrs) / 100 cycles
Image Sticking	25°C ; 2hrs Note1

Note1:Condition of image sticking test :25°C±2°C

Operation with test pattern sustained for 4hrs,then change to gray pattern immediately.after5 mins,the mura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

8.2 VIBRATION & SHOCK

Test item	Conditions
Packing Shock (non-operation)	Shock level:980m/s ² Waveform:1/2 Sine wave,6msec ±X, ±Y ±Z,each axis 1 times
Packing Vibration (non-operation)	Frequency range:8 HZ~33.3HZ Stroke:1.0mm,sweep:10 HZ ~50 HZ x,y,z 2 hours for each direction

8.3 ESD

Test item	Conditions
Electro Static Discharge Test (non-operation)	150pF,330 Ω , Contact±4KV,Air : ±8KV Note 1
	200pF,0 Ω , ±200V Contact test.Note 2

Note1:LCD glass and metal bezel

Note2:IF connector pins



9. GENERAL PRECAUTION

9.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

9.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

9.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

9.4 WARRANTY

- (1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- (2) Do not repaired or modified the LCM . It may cause function to lose efficacy , Starry does not warrant the LCM.
- (3) All process and material comply RoHS.

10. PACKAGE DRAWING

TBD