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深圳市奥视特科技有限公司

Shenzhen Aoshite Technology Co., Ltd

**PRODUCTION SPECIFICATION
OF LCD MODULE
MODULE NO.:ET068WY05-G**

Customer Name:			
Customer Part Number:			
Approved By:		Date:	

Prepared By	Checked By	Approved By

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2017.09.09	-	First Issued.	
V1.1	2018.09.19	6	Update pin description.	

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1. GENERAL DESCRIPTION

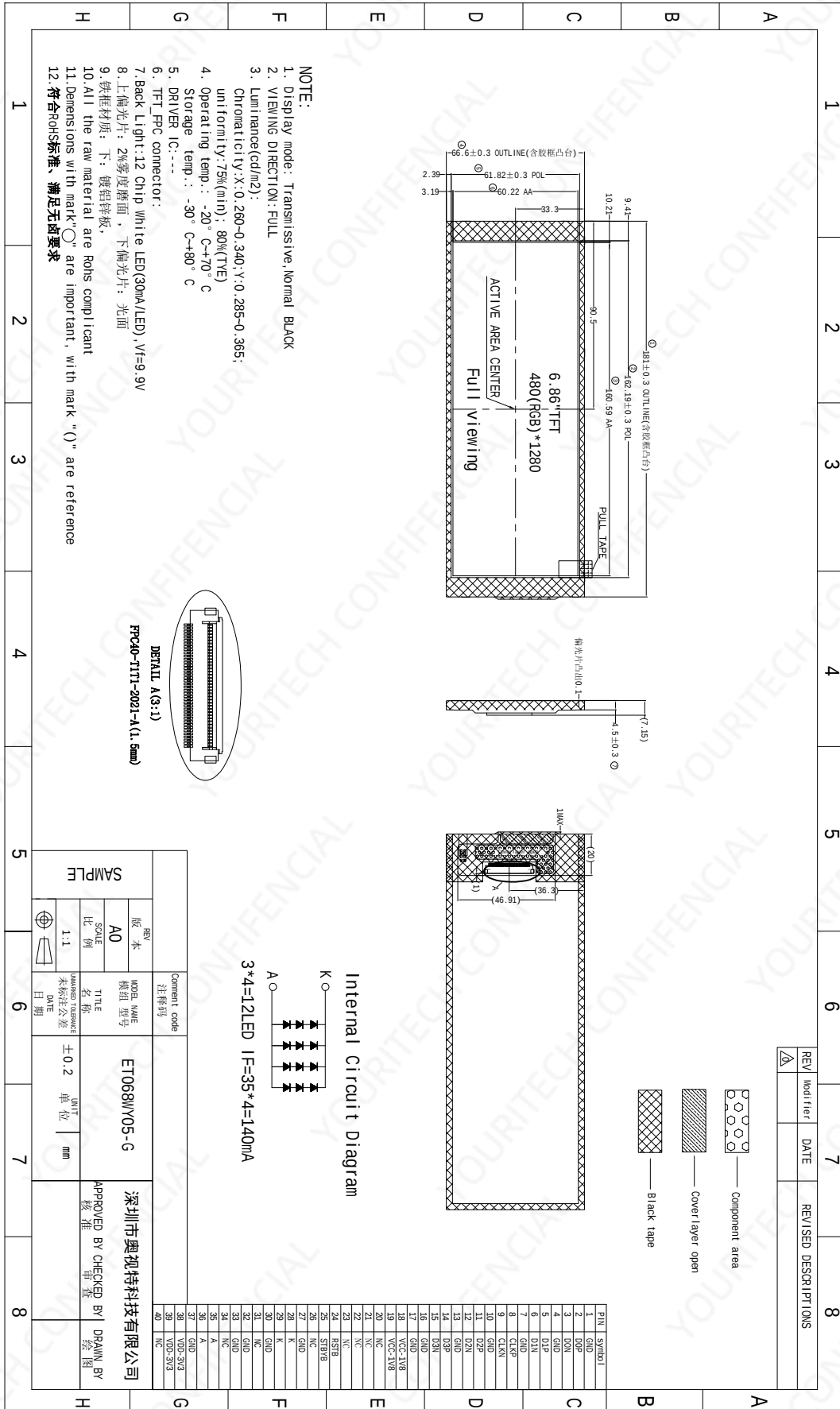
1.1 DESCRIPTION

This LCM is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC, FPC and Backlight, This TFT LCD has a 6.86-inch diagonally measured active display area with (480 horizontal by 1280 vertical pixel) resolution.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	6.86"	inch
2	Number of Pixels	480×RGB (3)×1280	pixels
3	Active Area	60.22(H)×160.59(V)	mm
4	Pixel Pitch	41.82(H)×125.46(V)×RGB	um
5	Outline Dimension	66.6(W)×181.0(H)×4.5(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Transmission mode, normally black	-
8	Viewing Direction	Full viewing	-
9	Display Format	RGB vertical stripe	-
10	Surface Treatment	Anti-Glare	-
11	Interface	MIPI	-
12	Backlight	White LED	-
13	Operation Temperature	-20~70	°C
14	Storage Temperature	-30~80	°C
15	Weight	TBD	g

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

3.1 FPC Connector is used for the module electronics interface.

No.	Symbol	Function	Remark
1	GND		
2	MIPI-D0P	Positive MIPI differential data input	
3	MIPI-D0N	Negative MIPI differential data input	
4	GND	Ground	
5	MIPI-D1P	Positive MIPI differential data input	
6	MIPI-D1N	Negative MIPI differential data input	
7	GND	Ground	
8	MIPI-CLKP	Positive MIPI differential clock input	
9	MIPI-CLKN	Negative MIPI differential clock input	
10	GND	Ground	
11	MIPI-2P	Positive MIPI differential data input	
12	MIPI-2N	Negative MIPI differential data input	
13	GND	Ground	
14	MIPI-3P	Positive MIPI differential data input	
15	MIPI-3N	Negative MIPI differential data input	
16	GND	Ground	
17	GND		
18	IOVCC	A power supply for the logic power and I/O circuit(1.8V).	
19	IOVCC		
20	NC	No connection	
21	NC	No connection	
22	NC	No connection	
23	NC	No connection	
24	RESET	Reset pin with low active	
25	STBYB	Low:Standby mode ,High:Normal display.	
26	NC	No connection	
27	GND	Ground	
28	K	LED Cathode	
29	K		
30	GND	Ground	
31	NC	No connection	
32	GND	Ground	
33	GND	Ground	
34	NC	No connection	
35	A	LED Anode	
36	A		
37	GND	Ground	
38	VDD(3.3V)	A power supply for the analog power.	
39	VDD(3.3V)		
40	NC	No connection	

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Digital Supply Voltage	VCI	-0.3	4.0	V	
Digital Supply Voltage	IOVCC	-0.3	3.0	V	

4.2 TFT LCD MODULE

4.2.1 Operating Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Digital Supply Voltage	IOVCC	1.6	1.8	2.0	V	
Logic Input Voltage	VIH	0.7VDD	-	VDD	V	
	VIL	GND	-	0.3VDD	V	

Note1: Please adjust VCOM to make the flicker level be minimum

Note2:TYP VCOM is only reference value. It must be optimized according to each LCM. Be sure to use VR and OP buffer on VCOM output. Please adjust VCOM to make the flicker level be minimum for getting excellent image.

4.2.2Current Consumption

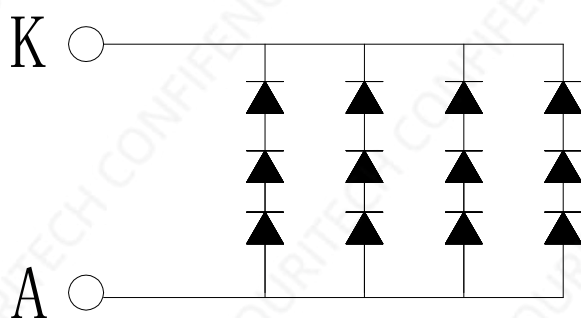
Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Digital Current	IVCI	VDD= 3.3V	-	130	-	mA	Note1
Digital Current	IIOVCC	IOVCC=1.8v	-	20	-	mA	

Note1: Typ. specification : Gray-level test Pattern

4.3 BACKLIGHT UNIT

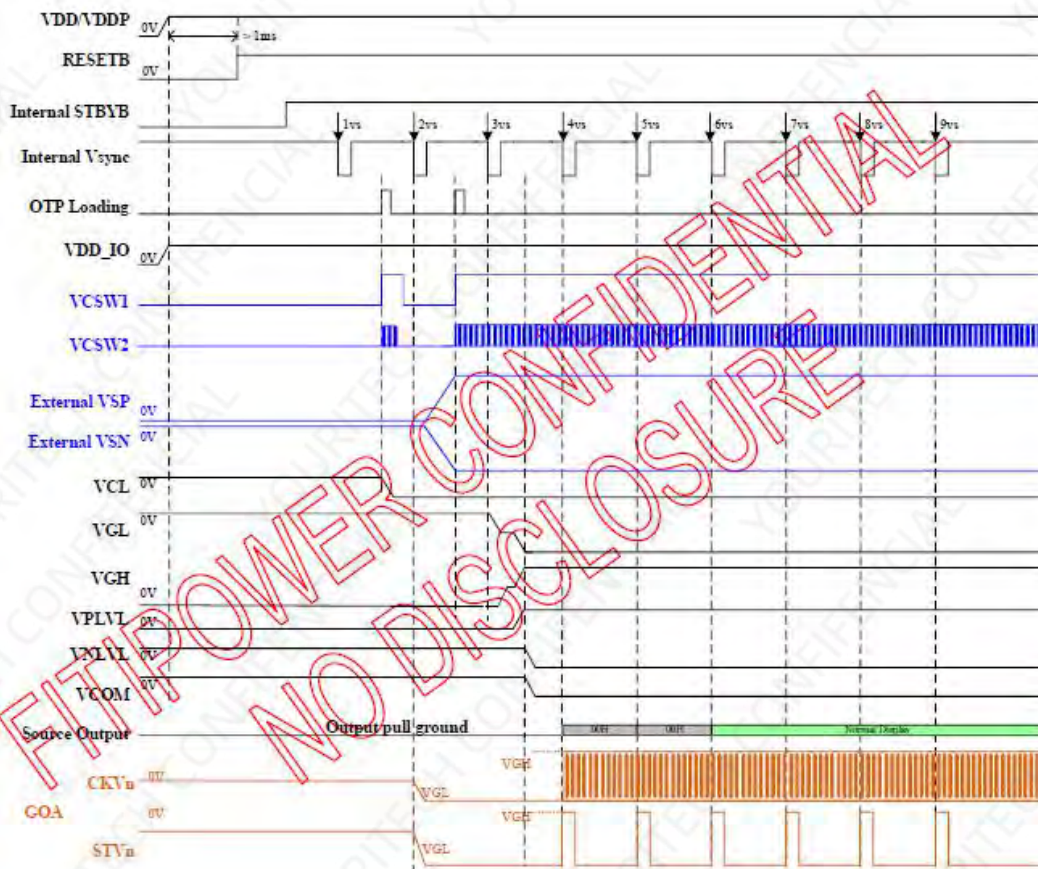
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LED Current	Iled	-	120	-	mA	Total LED
Forward voltage	VF	9.0	9.9	10.8	V	IF=120mA
Reverse current	IR	-	-	50	μA	VR=5V, 1LED
Power dissipation	Pd	1188			mW	Total LED
Peak forward current	IFP	100			mA	1LED
Reverse Voltage	VR	5			V	1LED

Internal Circuit Diagram



$$3 \times 4 = 12 \text{LED} \quad I_F = 30 \times 4 = 120 \text{mA}$$

4.4 POWER ON/OFF SEQUENCE

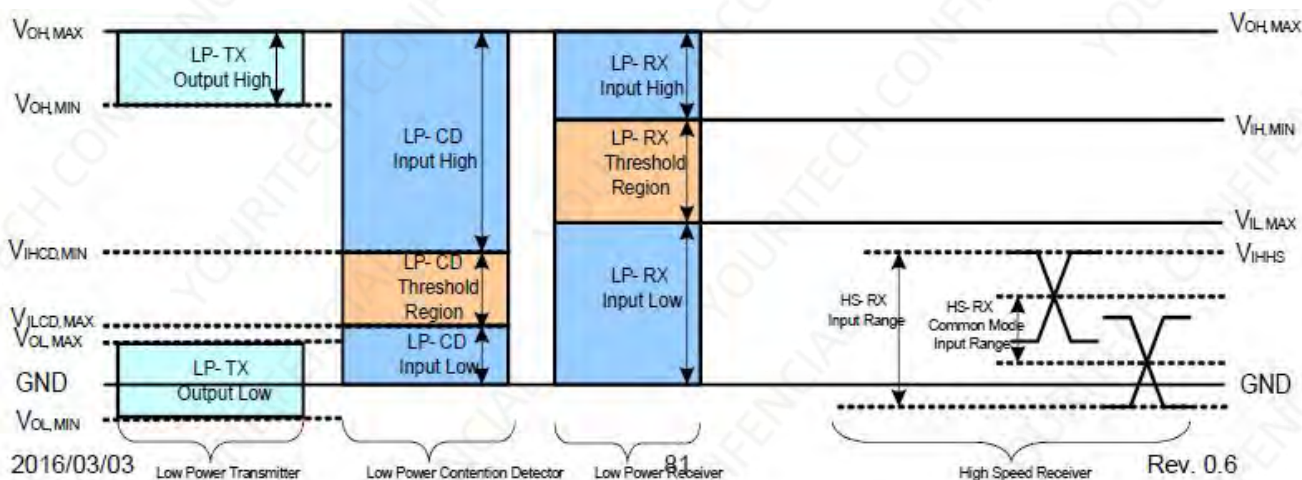


5.INPUT SIGNAL TIMING

5.1 MODE DC ELECTRICAL CHARACTERISTICS

(Test condition: VCI=1.6~3.6V, TA=-20℃~+85℃, VSS=VSSA=0V)

Parameter	Symbol	Spec.			Unit	Note
		Min.	Typ.	Max.		
VDDIO Input high level voltage	VIH	0.8 x VDDIO		VDDIO	V	
VDDIO input low level voltage	VIL	VSS		0.2 x VDDIO	V	
Input Leakage Current	Ileak	(-1)		(+1)	μA	
VGL_REG2 output voltage	VGL_REG2		TBD		V	
VGMP output voltage	VGMP		TBD		V	
VGMN output voltage	VGMN		TBD		V	
VCI1 output voltage	VCI1		TBD		V	
VGL output voltage	VGL_O	-16		-6	V	
VGH output voltage	VGH_O	8		19	V	
VCL output voltage	VCL	-2.1	-2.4	-3	V	
VOM output voltage	VCOM	-2.75	-1.48	-0.2	V	
Input terminal resistance	ZiB		100		ohm	
Source output level deviation	Graycode = 0 ~ 14		TBD		mV	
	Graycode = 241 ~ 255		TBD		mV	
	Graycode = 15 ~ 31		TBD		mV	
	Graycode = 208 ~ 240		TBD		mV	
Source output offset deviation	Graycode = 0 ~ 14	-	TBD		mV	
	Graycode = 241 ~ 255	-	TBD		mV	
	Graycode = 15 ~ 31	-	TBD		mV	
	Graycode = 208 ~ 240	-	TBD		mV	
Current consumption	Analog Operating	IAOP	TBD		mA	
	Analog Stand-by	IAST	TBD		mA	
Rush current		Ivddpeak	TBD		mA	
VOTP operation current		Ivpp	TBD		mA	



5.2 AC CHARACTERISTICS

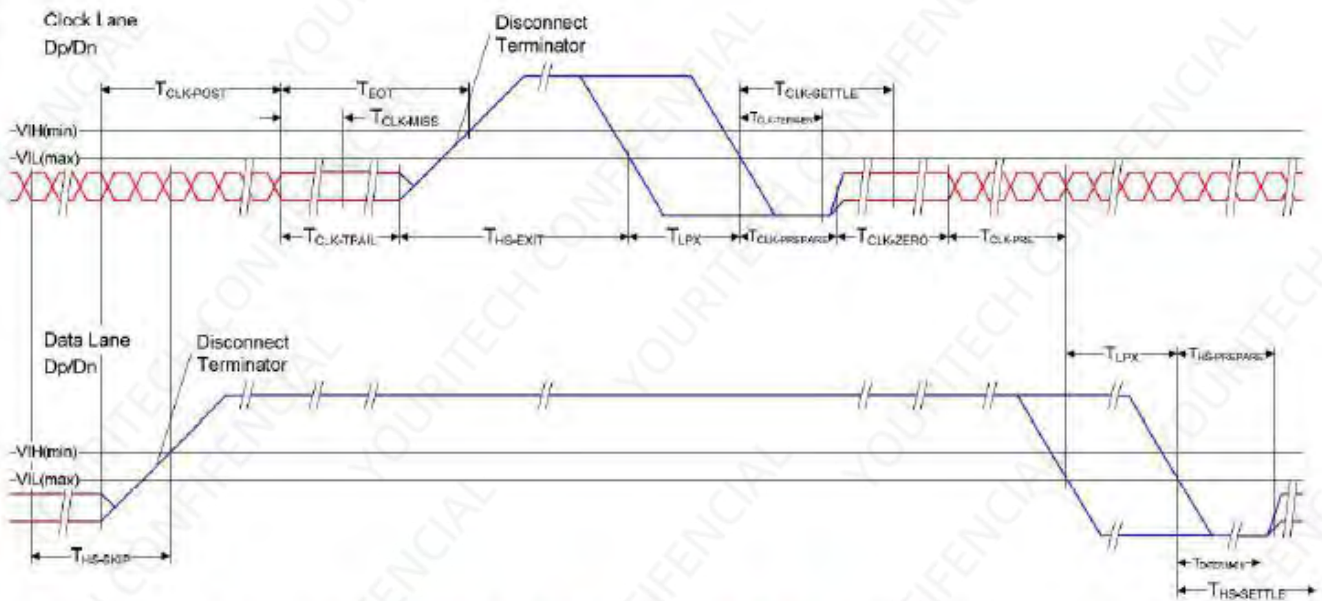


Figure 13.1: Switching the clock lane between clock transmission and low-power mode

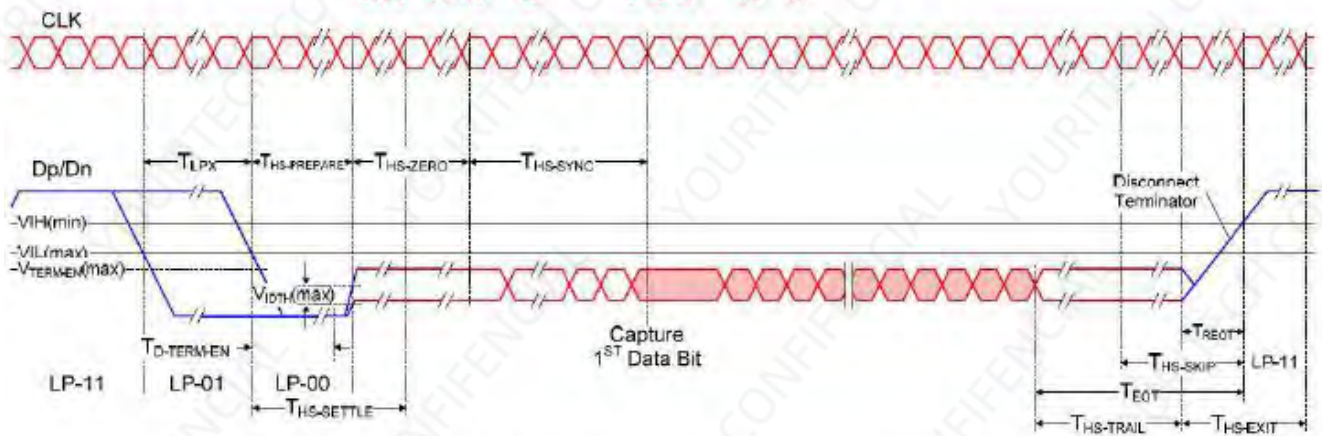


Figure 13.2: Timing of high-speed data transmission in bursts

5.3 PARALLEL RGB INPUT TIMING TABLE

For 480RGBx1280

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
MIPI (4 Lane) @Frame rate=60Hz			386		Mbps
MIPI (3 Lane) @Frame rate=60Hz			515		Mbps
DCLK frequency @Frame rate=60Hz	F _{DCLK}		64.4		MHz
HSYNC period time	T _H		824		DCLK
Horizontal display area	T _{HD}		480		DCLK
HSYNC pulse width	T _{HPW}		24	-	DCLK
HSYNC back porch	T _{HBP}		160	-	DCLK
HSYNC front porch	T _{FBP}		160	-	DCLK
VSYNC period time	T _V		1304		H
Vertical display area	T _{VD}		1280		H
VSYNC pulse width	T _{VPW}		2	-	H
VSYNC back porch	T _{VBP}		10	-	H
VSYNC front porch	T _{VFP}		12	-	H

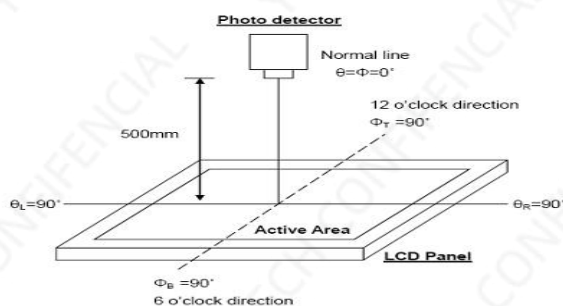
MIPI Frequency = (Frame rate) x T_H x T_V x 24bits.

6.OPTICAL CHARACTERISTICS

Ta=25±2℃

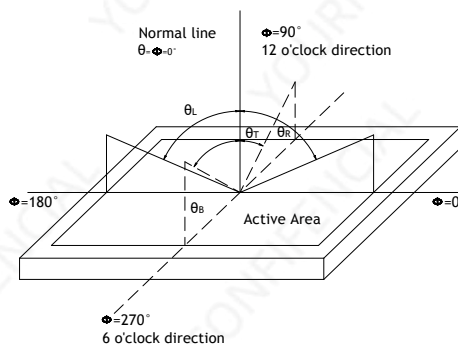
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	-	700	-		Note1 Note3
Luminance(center)		L	450	500	-	cd/m ²	Note1 Note5 Note7
Luminous tolerance		LU	70	75		%	Note7
Response Time		Rising + Falling	-	30	35	ms	Note1 Note4
Viewing Angle K=Contrast Ratio>10	Horizontal	θx ⁺	80	85	-	degr ee	Note2
		θx ⁻	80	85	-		
	Vertical	θy ⁺	80	85	-		
		θy ⁻	80	85	-		
Color Chromaticity (CIE1931)	Red	x	Typ- 0.05	0.623	Typ+ 0.05		Note1 Note5 Note7
		y		0.331			
	Green	x		0.299			
		y		0.542			
	Blue	x		0.142			
		y		0.076			
	White	x		0.285			
		y		0.304			
Color gamut (NTSC ratio)			50	60		%	

Note1: Definition of optical measurement system (BM-7)



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%.

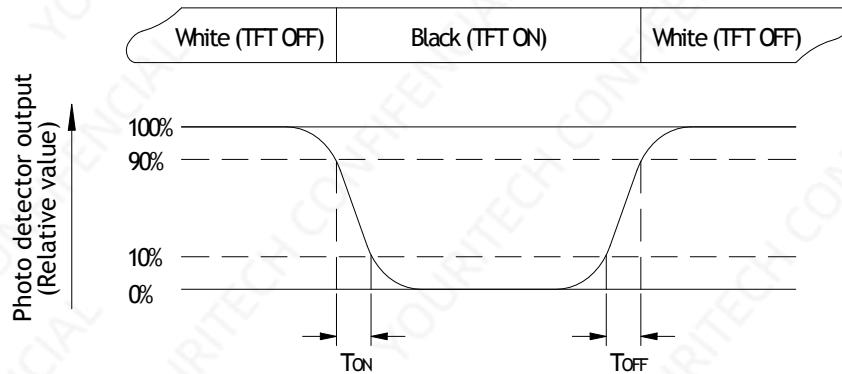


Fig. 6-3 Definition of response time

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 Vwhite.

“Black state”: The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

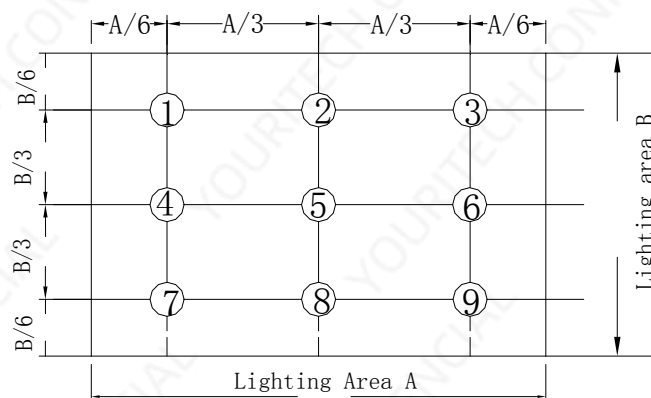
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=120mA

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.

Luminance Uniformity (U) = Lmin/ Lmax

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



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

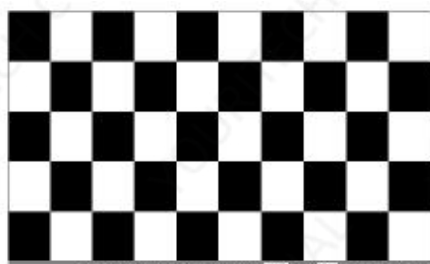
7. RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=80℃; 24hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-30℃;24hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=70℃ , 24Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=-20℃; 24hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=60℃ , 90%RH , 32Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-30℃(0.5h) ~ 80℃(0.5h) / 5 cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃ ; 1hrs	Note1

Note1:Condition of image sticking test :25℃±2℃

Operation with test pattern sustained for 1 hrs,then change to gray pattern immediately.after 5 mins,the mura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

7.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s ² ,6ms, ±x,y,z 3times for direction	IEC60068-2-27 : 1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32 : 1990 GB/T2423.8-1995

7.3ESD

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

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins
3. ESD class B:some performance degradation allowed. Self-recoverable.
No data lost,no hardware failures.

8. GENERAL PRECAUTION

8.1 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.

8.2 STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and The humidity is below $50\pm20\%\text{RH}$.
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.

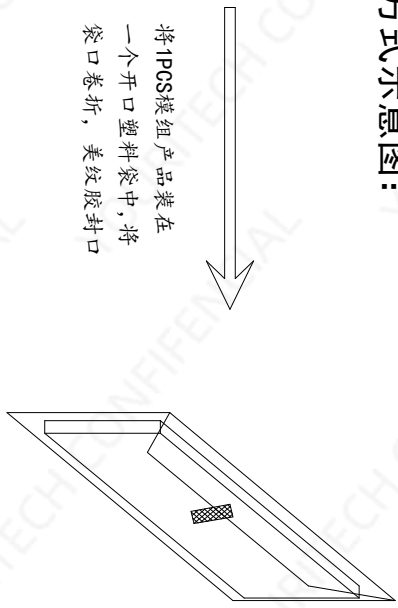
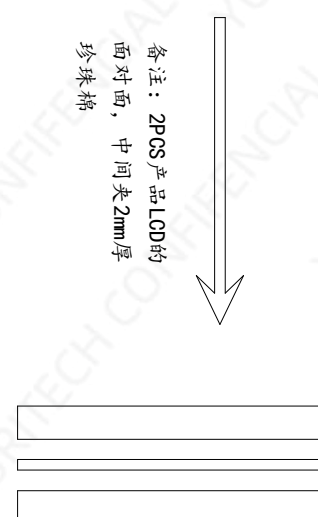
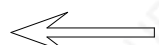
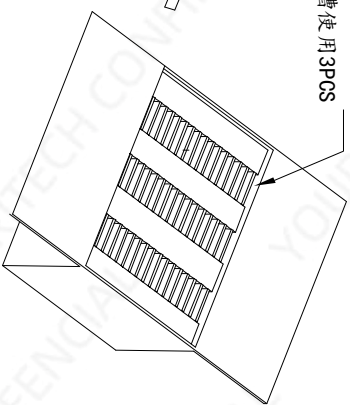
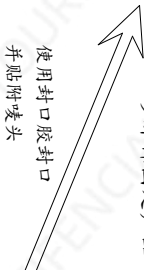
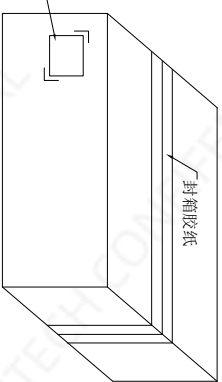
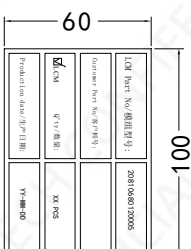
8.3 HANDLING PRECAUTIONS

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.

8.4 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.

9. PACKAGE DRAWING

	1	2	3	4	5	6	7	8																																				
A	包装方式示意图:																																											
B	将1PCS模组产品装在一个开口塑料袋中, 将袋口卷折, 美纹胶封口 																																											
C	备注: 2PCS产品LCD的面对面, 中间夹2mm厚珍珠棉 																																											
D	将2PCS放入纸板格子 里, 共计90pcs 																																											
E	上面四凹槽用4PCS珍珠棉固定产品, 下三凹槽使用3PCS珍珠棉固定产品 																																											
F	使用封口胶封口 并贴附唛头 																																											
G	包材请回收! 																																											
H	Drawing of Marks  唛头图 图案说明: 模组型号: 2061068W120005 客户料号: 由客户提供 数量: 按实际出货数量打印 YY-MM-DD: 按生产日期进行打印 <table border="1"><thead><tr><th>Label Item</th><th>Value</th></tr></thead><tbody><tr><td>LCD Part No. (模组型号)</td><td>2061068W120005</td></tr><tr><td>Customer Part No. (客户料号)</td><td></td></tr><tr><td>Quantity (数量)</td><td>XX PCS</td></tr><tr><td>Production date (生产日期)</td><td>YY-MM-DD</td></tr></tbody></table> 备注: LCD模组拆包部分注意事项 1. 拆开纸箱, 拿出一包LCD模组, 从袋内取出模组产品 2. 撕取LCD模组表面保护膜: 拿住撕膜右手柄, 沿左上角与右下角的对角线方向撕取保护膜, 速度约5S/PCS. 同时, 撕取时需用离子风机吹模组表面, 风筒沿撕取方向 <table border="1"><thead><tr><th>REV</th><th>版本</th><th>MODULE NAME</th><th>模组型号</th></tr></thead><tbody><tr><td>A0</td><td>版本</td><td>ET068WY05-G</td><td></td></tr></tbody></table> 图面检查 OK ☐ 图式 <table border="1"><thead><tr><th>DATE</th><th>日期</th><th>SCALE</th><th>比例</th><th>UNIT</th><th>单位</th></tr></thead><tbody><tr><td>2017-03-08</td><td></td><td>1:1</td><td></td><td>mm</td><td></td></tr></tbody></table> <table border="1"><thead><tr><th>APPROVED BY</th><th>CHECKED BY</th><th>DRAWN BY</th></tr></thead><tbody><tr><td>深圳市奥视特科技有限公司</td><td></td><td></td></tr></tbody></table>								Label Item	Value	LCD Part No. (模组型号)	2061068W120005	Customer Part No. (客户料号)		Quantity (数量)	XX PCS	Production date (生产日期)	YY-MM-DD	REV	版本	MODULE NAME	模组型号	A0	版本	ET068WY05-G		DATE	日期	SCALE	比例	UNIT	单位	2017-03-08		1:1		mm		APPROVED BY	CHECKED BY	DRAWN BY	深圳市奥视特科技有限公司		
Label Item	Value																																											
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