Shenzhen yongda chuangli electronic co., LTD

PRODUCT SPECIFICATION

MODEL CL70RGB1028-40A

<◇> PRELIMINARY SPECIFICATION

<◆> APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2018.07.19	-	First Issued.	Xu

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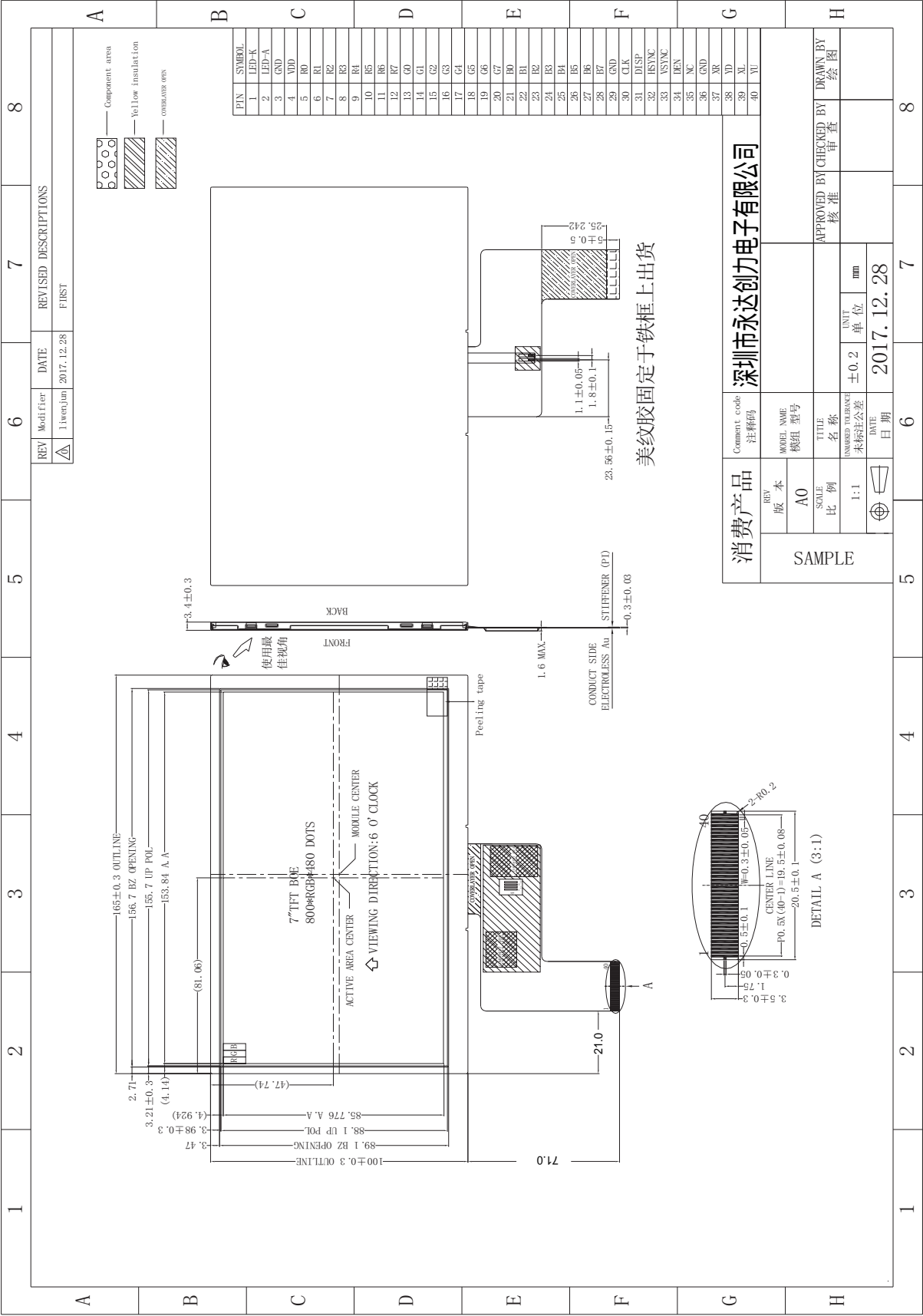| NO. CONTENTS	PAGE

1. GENERAL DESCRIPTION

1.1 DESCRIPTION

The lcm is a color active matrix thin film transistor(TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switchingdevice. Thismodule is composed of a TFT LCD panel, driver ICs, FPC and a Backlight unit.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	7"	inch
2	Number of Pixels	800(H) × 3(RGB) ×480(V)	pixels
3	Active Area	153.84 (W) × 85.776(H)	mm
4	Pixel Pitch	0.1923(W) × 0.1784(H)	mm
5	Outline Dimension	165(W)×100(H)×3.4(T)	mm
6	Pixel arrangement	RGB vertical stripe	-
7	Display Mode	Normally White	-
8	Viewing Direction	6 o'clock	-
9	Display Color	16.7M	-
12	Surface Treatment	Anti-Glare	-
13	Interface	TTL	-
14	Backlight	White LED	-
15	Operation Temperature	0~50	℃
16	Storage Temperature	-10~60	℃
17	Weight	-	g

2. MECHANICAL SPECIFICATION

PIN	SYMBOL
1	LED-K
2	LED-A
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	CLK
31	DISP
32	HSYNC
33	VSYNC
34	DEN
35	NC
36	GND
37	XR
38	YD
39	XL
40	YU

Component area
Yellow insulation
COVERLAYER OPEN

REV	Modifier	DATE	REVISED DESCRIPTIONS
△	liwenjun	2017.12.28	FIRST

7"TFT BOE
800*RGB*480 DOTS

ACTIVE AREA CENTER
MODULE CENTER
VIEWING DIRECTION:6 O'CLOCK

使用最佳视角

165±0.3 OUTLINE
156.7 BZ OPENING
155.7 UP POL
153.84 A.A
(81.06)

100±0.3 OUTLINE
89.1 BZ OPENING
88.1 UP POL
85.776 A.A
(4.924)
3.98±0.3
3.21±0.3
2.71
3.47
(4.14)
(47.74)
21.0
71.0

BACK
FRONT
STIFFENER (P1)
-0.3±0.03
1.6 MAX.
3.4±0.3
CONDUCT SIDE
ELECTROLESS Au
Peeling tape

美纹胶固定于铁框上出货
25.24±2
5±0.5
1.1±0.05
1.8±0.1
23.56±0.15

2-R0.2
N=0.3±0.05
CENTER LINE
P0.5X(40-1)=19.5±0.08
20.5±0.1
0.5±0.1
3.5±0.3
1.75
0.3±0.05
DETAIL A (3:1)

Comment code 注释码	
MODEL NAME 模组 型号	
TITLE 名 称	SAMPLE
REV 版 本	A0
SCALE 比 例	1:1
UNNAMED TOLERANCE 未标注公差	±0.2
DATE 日 期	2017.12.28
UNIT 单 位	mm

APPROVED BY 核准 | CHECKED BY 审查 | DRAWN BY 绘图

消费产品

3. PIN DESCRIPTION.

Pin No.	Symbol	Type	Function
1	K	P	LED Cathode
2	A	P	LED Anode
3	GND	P	Power Ground
4	VDD	P	Power for Digital Circuit
5	R0	P	Red data(LSB)
6	R1	I	Red data
7	R2	P	Red data
8	R3	I	Red data
9	R4	I	Red data
10	R5	I	Red data
11	R6	I	Red data
12	R7	I	Red data(MSB)
13	G0	I	Green data(LSB)
14	G1	I	Green data
15	G2	I	Green data
16	G3	I	Green data
17	G4	I	Green data
18	G5	I	Green data
19	G6	I	Green data
20	G7	I	Green data(MSB)
21	B0	I	Blue data(LSB)
22	B1	I	Blue data
23	B2	I	Blue data
24	B3	I	Blue data
25	B4	I	Blue data
26	B5	I	Blue data
27	B6	I	Blue data
28	B7	I	Blue data(MSB)
29	GND	I	Power Ground
30	DCLK	I	Clock input
31	DISP	I	Display on/off
32	HSYNC	I	Horizontal sync input
33	VSYNC	I	Vertical sync input

34	DE	I	Date Input Enable
35	NC	I	Red data(LSB)
36	GND	P	Power Ground
37	XR	I	Right electrode-differential analog
38	YD	P	Bottom electrode-differential analog
39	XL	I	Left electrode-differential analog
40	YU	I	Top electrode-differential analog

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Digital Supply Voltage	VDD	-0.3	5.0	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	
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	IVDD	VDD= 3.3V	-	95	-	mA	Note1
Total Power Consumption	PC		-	TBD	TBD	mW	Note1

Note1: Typ. specification：Gray-level test Pattern

Max. specification：Black test Pattern

(a)Gray-level Pattern   (b)Black Pattern

4.3POWER、SIGNAL SEQUENCE

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power ON: VDD, VSS →AVDD, VSSA→V1 to V14

Power OFF: V1 to V14→AVDD, VSSA→VDD, VSS

4.3.1Power on/off control
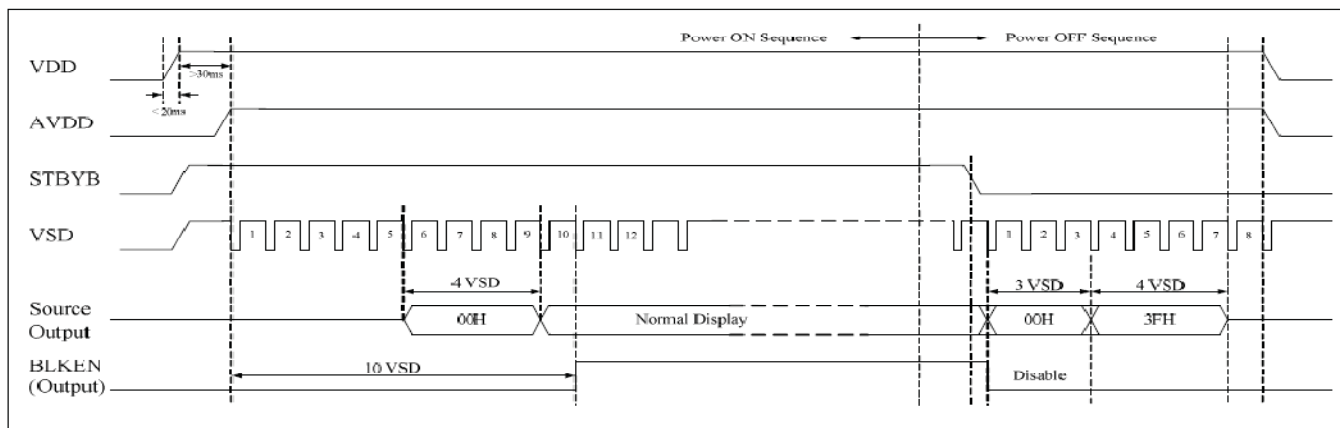
### 4.3.2 Enter and exit standby mode sequence

Standby Mode Sequence
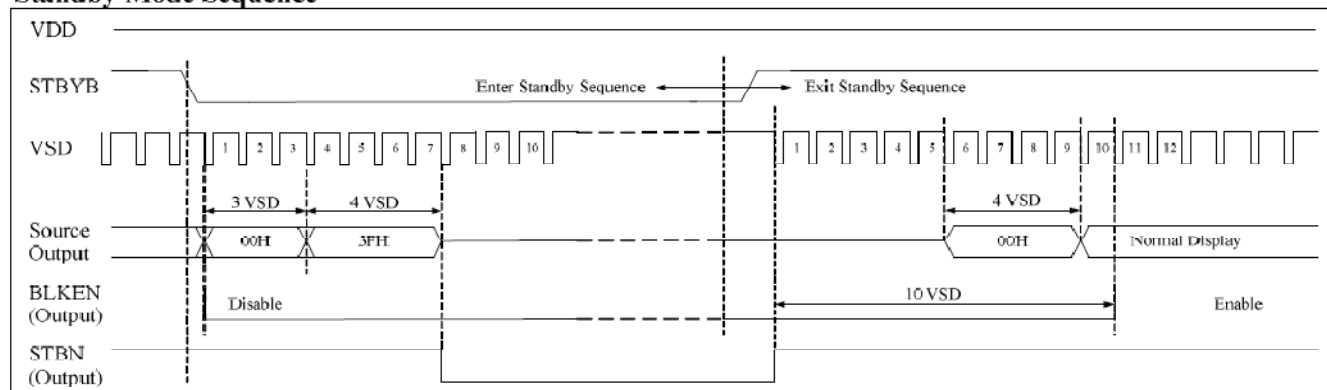
4.4 BACKLIGHT UNIT

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LED Current	Iled	-	150	-	mA	Total LED
Forward voltage	VF	9.0	9.6	10.1	V	IF=150mA
Reverse current	IR	-	-	50	μA	VR=5V,1LED
Power dissipation	Pd	1206			mW	Total LED
Peak forward current	IFP	100			mA	1LED
Reverse Voltage	VR	5			V	1LED

※1. Internal Circuit Diagram

CIRCUIT DIAGRAM (LED 3 * 7 = 21 dies)
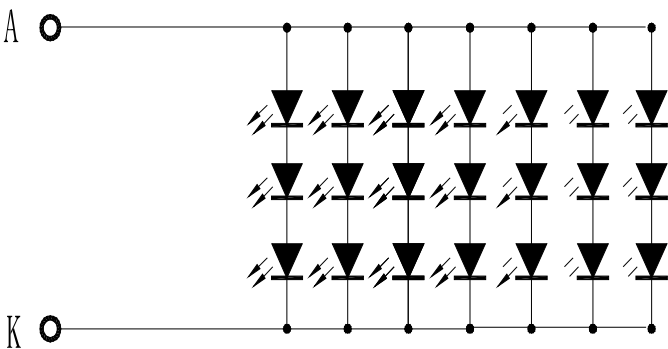
5. INPUT SIGNAL TIMING

5.1 DC electrical characteristics (VSS=0V, TA=25℃)

Parameter	Symbol	Spec.			Unit	Condition
		Min.	typ.	Max.		
Powersupplyvoltage	VDD	2.7	3.3	3.6	V	-
Power supply voltage	VDDA	6.5	-	13.5	V	-
Low level input voltage	VIL	0	-	0.3VDD	V	For digital circuit
High level input voltage	VIH	0.7VDD	-	VDD	V	For digital circuit
Output low voltage	VOL	-	-	VSS+0.4	V	IOL=400μA
Output high voltage	VOH	VDD-0.4	-	-	V	IOH=-400μA
Pull low/high resistance	Ri	200	250	300	kΩ	For the digital input pin @VDD=3.3V
Input leakage current	Ii	-	-	±1	uA	For digital circuit
Digital Operation current	Idd	-	5	14	mA	Dual gate mode or Cascade modeslave, Fclk=50MHz, LD=48KHzVDD=3.3V, CABC disable, Noload
		-	7	16	mA	Cascade mode master, Fclk=50MHz,LD=48KHz,VDD=3.3V, CABCdisable, Noload
Digital stand-by current	Ist1	-	10	50	μA	Clock & all functions are stopped
Analog Operating current	Idda	-	6	8	mA	Noload,Fclk=50MHz,FLD=48KHz=@VDDA=10V, V1=8V, V14=0.4V
Analog Stand-by current	Ist2	-	10	50	μA	No load, clock & all functions arestopped
Input level of V1~V7	Vref1	0.4VDDA	-	VDDA-1	V	Gamma correction voltage input
Input level of V8~V14	Vref2	0.1	-	0.6VDDA	V	Gamma correction voltage input
Output Voltage deviation	Vod1	-	±20	±35	mV	Vo=VSSA+0.1V~VSSA+0.5V &Vo=VDDA-0.5V~VDDA-0.1V
Output Voltage deviation	Vod2	-	±15	±20	mV	Vo=VSSA+0.5V~VDDA-0.5V
Output Voltage Offset between Chips	Voc	-	-	±20	mV	Vo=VSSA+0.5V~VDDA0.5V
Dynamic Range of Output	Vdr	0.1	-	VDDA-0.1	V	SO1~SO1200
Sinking Current of Outputs	IOLy	80	-	-	μA	SO1~SO1200; Vo=0.1V vs.1.0V, VDDA=13.5V
Driving Current of Outputs	IOHy	80	-	-	μA	SO1~SO1200;Vo=0.1Vvs.12.5V,VDDA=13.5V
Resistance of Gamma Table	Rg	0.7*Rn	1.0*Rn	1.3*Rn	Ω	Rn: Internal gamma resistor

5.2 AC electrical characteristics

Parameter	Symbol	Spec.			Unit
		Min.	typ.	Max.	
HS setup time	T_{hst}	8	-	-	ns
HS hold time	T_{hhd}	8	-	-	ns
VS setup time	T_{vst}	8	-	-	ns
VS hold time	T_{vhd}	8	-	-	ns
Data setup time	T_{dsu}	8	-	-	ns
Data hold time	T_{dhd}	8	-	-	ns
DE setup time	T_{esu}	8	-	-	ns
DE hold time	T_{ehd}	8	-	-	ns
VDD Power On Slew rate	T_{POR}	-	-	20	ms
RSTB pulse width	T_{Rst}	10	-	-	us
CLKIN cycle time	T_{cph}	20	-	-	ns
CLKIN pulse duty	T_{cwh}	40	50	60	%
Output stable time	T_{sst}	-	-	6	us

5.3 DATA INPUT FORMAT
5.3.1 TTL mode data input format
Horizontal timing
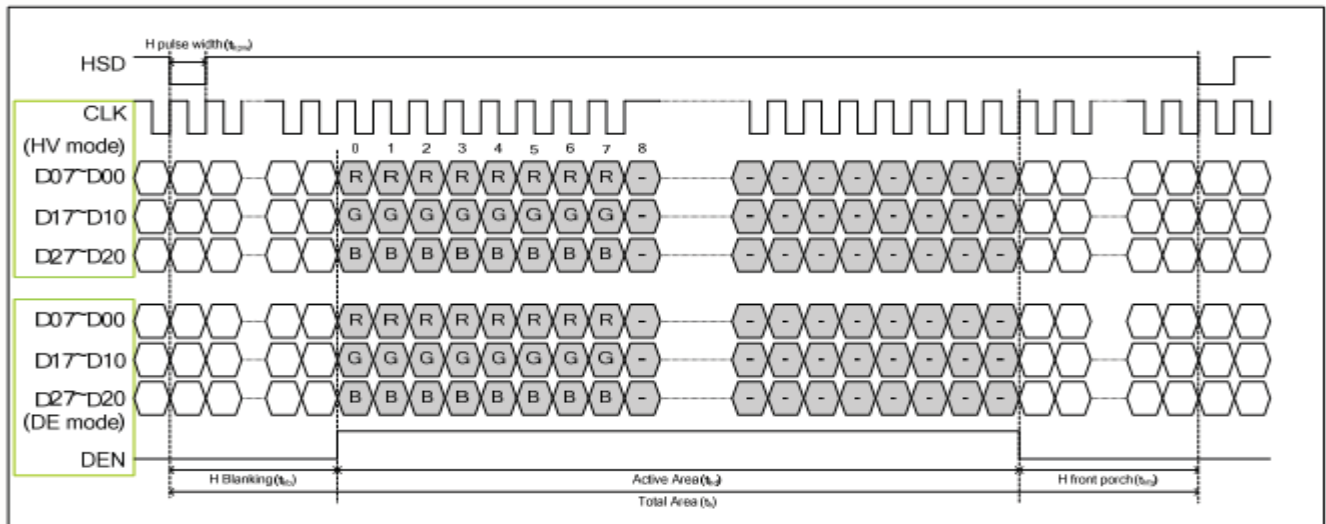
Vertical timing
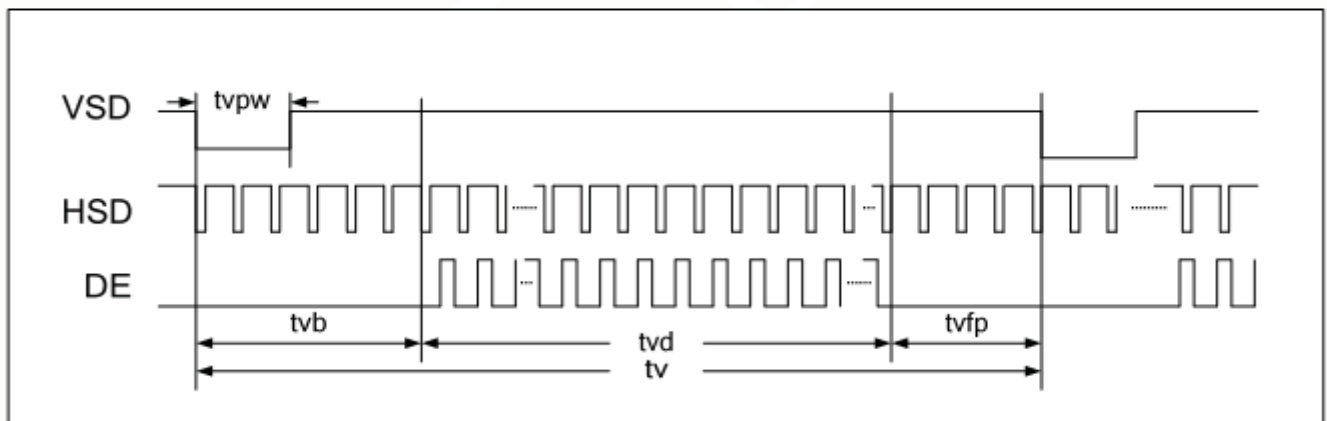
5.3.3 HV mode

Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	typ.	Max.	
Horizontal Display Area	thd		800		DCLK
DCLK frequency	fclk	-	30	50	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width	thpw	16	210	256	DCLK
HS Back Porch (Blanking)	thb		46		DCLK
HS Front Porch	thfp	1	-	40	DCLK

Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	typ.	Max.	
Vertical Display Area	tvd		480		T_H
VS period time	tv	513	525	650	T_H
VS pulse width	tvpw	3	-	20	T_H
VS Back Porch (Blanking)	tvb		23		T_H
VS Front Porch	tvfp	7	22	147	T_H

6. OPTICAL CHARACTERISTICS

Ta = 25 ± 2℃

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response time		Tr +Tf	Point-9	-	25	-	ms	Note1 Note3
Contrast ratio		CR		-	300	-	-	Note1 Note4
Color Chromaticity	White	X	θ=0°	-0.05	0.3117	+0.05		Note1 Note5 Note7
		Y			0.325			
	Red	X			0.5872			
		Y			0.3317			
	Green	X			0.3424			
		Y			0.5797			
	Blue	X			0.1495			
		Y			0.0545			
Luminance		L		500	550	-	cd/m2	Note1 Note6 Note7
Luminance uniformity		YU		70	75	-	%	
Viewing Angle	Up.	θ	Point-9 CR≧10	-	30	-	°	Note2
	Down.	θ		-	50	-		
	Left.	Ø		-	60	-		
	Right.	Ø		-	60	-		
NTSC					50		%	

Note1: Definition of optical measurement system (BM-7)
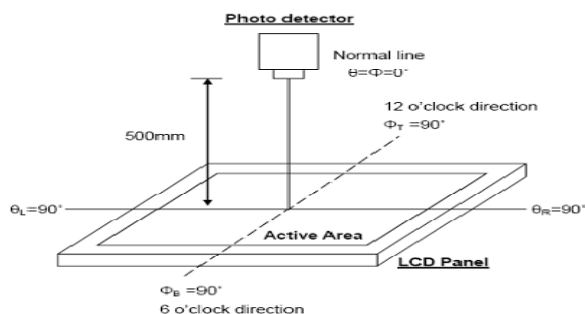
Note2: Definition of viewing angle range and measurement system
Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).
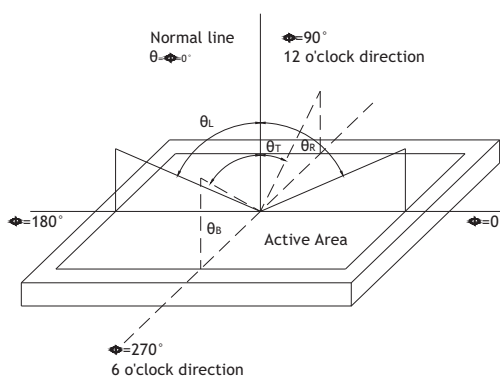
Note3: Definition of Response time

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 outputintensity changed from 90% to 10%. And fall time (TOFF) is the time between photodetector output intensity changed from 10% to 90%.
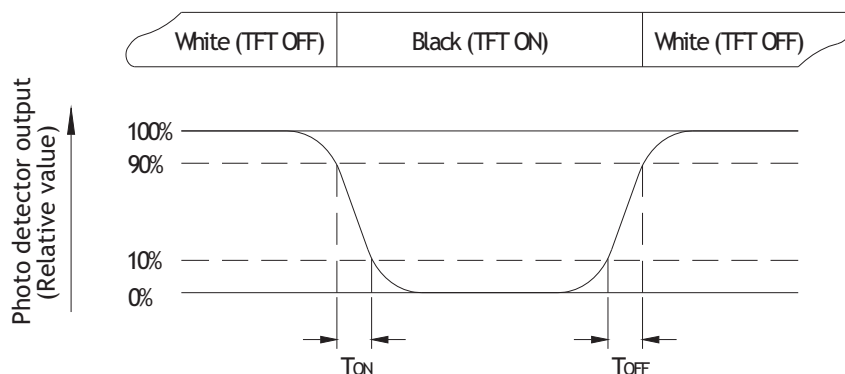
Fig. 6-3 Definition of response time

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=60mA

Note7: Definition of Luminance Uniformity

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

Luminance Uniformity (U) = Lmin/ Lmax

L----Active area length, W---- Active area width
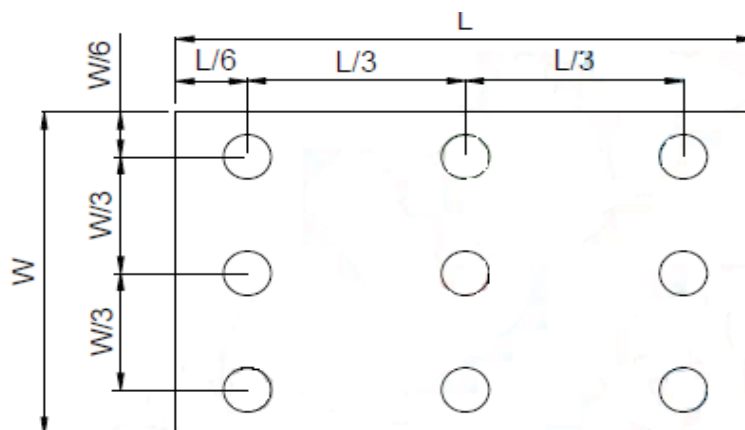
Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

7.QUALITY ASSURANCE SYSTEM

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
HighTemperatureStorage	Ta=60℃; 240hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Storage	Ta=-10℃; 240hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature Operation	Ta=50℃，240Hrs	IEC60068-2-1：2007 GB2423.2-2008
LowTemperatureOperation	Ta=0℃; 240hrs	IEC60068-2-1：2007 GB2423.1-2008
HighTemperatureHighHumidity Operation	Ta=40℃，80%RH，120Hrs(no condensation)	IEC60068-2-78：2001 GB/T2423.3-2006
Thermal Shock	-10℃(0.5h) ~ 60℃(0.5h) / 100cycles	Startwith 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 1hrs,then change to gray pattern
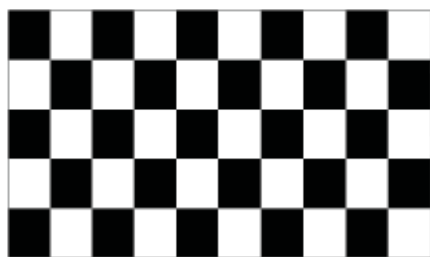
(a) Test Pattern (chess board Pattern)　　　(b) Gray Pattern

immediately.after5 mins,themura must be disappeared completely

7.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s2,6ms, ±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:±4KV,Air:±8KV	1	Class B
	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 ispoisonous.
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±5°C andThehumidity is below 50±20%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 verycarefully.
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 theSurface of plate.
6. Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked witha 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 eyesormouth in case of contact with hands, legs or clothes, it must be washedawaythoroughly 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

包装方式示意图:

将1PCS模组产品装在一个开口塑料袋中,将袋口卷折。

备注:2PCS产品LCD的面对面中间加口珍珠棉

将2PCS产品中间夹1层4mm的珍珠棉后放入珍板格子里,共计60pcs

上面两凹凹槽用2PCS珍珠棉固定产品,下两凹凹槽使用C固定产品纸隔板C固定产品

使用封口胶封口并贴附唛头

封箱胶纸

唛头

备注:LCM模组拆包部分注意事项

LCM模组左上角与右下角的对角易撕膜角离手风枪

1. 拆开纸箱,拿出一包LCM模组,掀起边伸撕折角取出LCM模组

2. 撕取LCM模组表面保护膜;本住易撕贴手柄,沿左上角与右下角的对角线方向撕取保护膜,速度约4S/PCS;撕取时需用离子风机吹同时,风向沿撕取方向模组表面,风向沿撕膜方向

Drawing Of Marks
唛头图

LCM Part No./模组型号:	
Customer Part No/客户料号:	
☑LCM Q'ty/数量:	60 PCS
Production date/生产日期:	XXXX-YY-DD

☆100±0.5

60±0.5☆

图案说明:
模组型号:
客户料号: 由营销提供
数量:按头实际实包装数量打印
YYYY-MM-DD:按照实际生产日期进行打印

1. Incoming inspection right

(1) The Incoming Inspection Standard will be agreed and signed by both sides(Customer an starry)

2. Inspection condition is as follows

(1) Viewing distance is approximately 35~40 cm
(2) Viewing angle is normal to the LCD panel as Fig-1(30°)
(3) Ambient temperature is approximately $25\pm5℃$
(4) Ambient humidity is $60\pm5\%RH$
(5) Ambient illuminance is from 300~500 Lux
(6) Input signal timing should be typical value
(7) Mura & Light leakage inspection an ND-Filter 5%
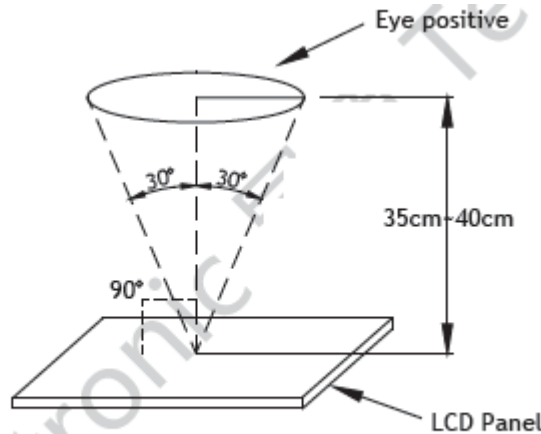
Fig-1

3. Special condtion

(1) Viewing distance is close for inspection of adjacent dots and distance between defect Dots
(2) Viewing condition of " Shot block non-uniformity from oblique angle"is as Fig-2
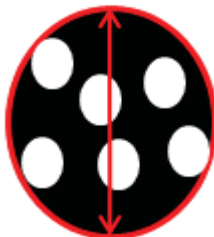(3) Exceptional case:Veiw angle$\pm40°$ while inspected image-sticking
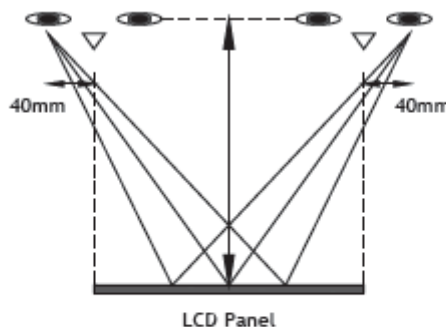
Fig-2

4. INSPECTION CRITERIA

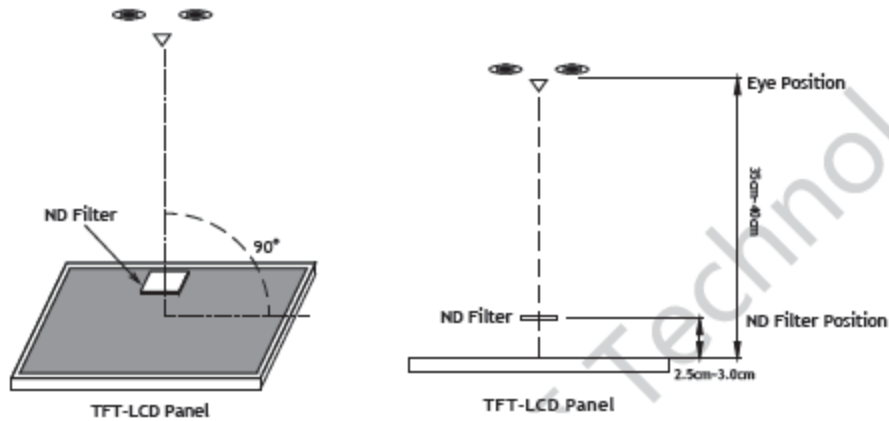| Defecttype			Limit			Note
Visual defect		**Scratch**	W≦0.05mm		lgnore	Note1
			0.05mm≦w≦0.1m L≦10mm		N≦3	
			20mm < l，0.1mm < w		N=0	
	Internal	**Spot**	Φ < 0.2mm		lgnore	Note 1
			0.2mm≦φ≦0.4mm		N≦3	
			0.4≦φ		N=0	
		Fiber	0.1mm≦w≦0.2m L≦2.5mm		N≦4	Note 1
			0.2mm < w，2.5mm < l		N=0	
		Polarizer bubble	Φ < 0.3mm		lgnore	Note 1
			0.25mm≦φ≦0.5mm		N≦2	
			0.5≦φ		N=0	
		Dent	Φ < 0.25mm		lgnore	Note 1
			0.25mm≦φ≦0.5mm		N≦4	
			0.5≦φ		N=0	
Electrical Defect			C area	O area	Total	Note 2 Note 3
	Bright dot		N≦1	N≦2	N≦3	
	Dark dot		N≦2	N≦4	N≦4	**use of ND5 % invisible OK**
	Total dot		N≦3	N≦4	N≦4	
	Dense point		Using ND5 % visible by intensive foreign standard judgement, ND5 % invisible OK			Note 4

(1) One pixel consists of 3 sub-pixel,including r,g,ang b dot.(sub-pixel=dot)
(2) Panel is acceptable if distance between 2 dot defects are greater or equal to 5mm.
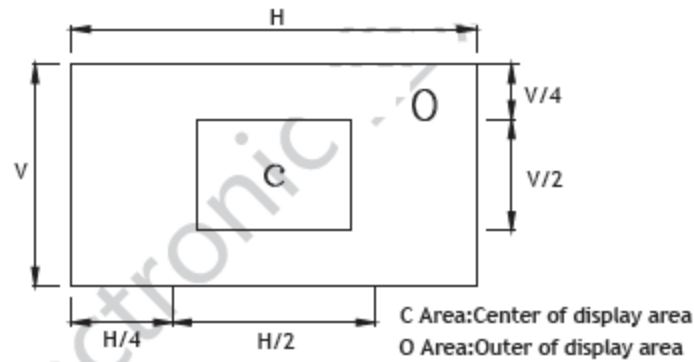
Note1 : W : Width[mm], L : Length[mm], N : Number, φ: Average Diameter

φ=(a+b)/2

1.(White ,Black) Spot
2.Polarizer Bubble

Scratch & Fiber
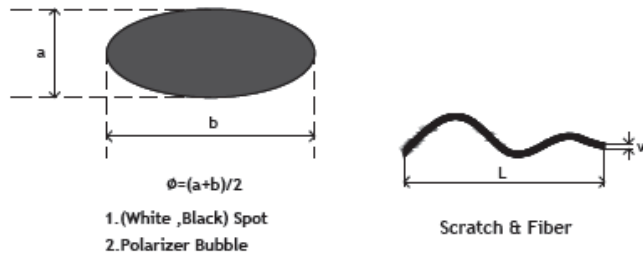
Note2 : Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixelarea.

ND Filter

90°

TFT-LCD Panel

Eye Position

35cm~40cm

ND Filter

ND Filter Position

2.5cm~3.0cm

TFT-LCD Panel

Note3 :

H

V/4

O

V

C

V/2

H/4

H/2

C Area:Center of display area
O Area:Outer of display area

Note4：Judge defect dot and adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dart adjacent dot. And they will be counted 2defect dots in total quantity.
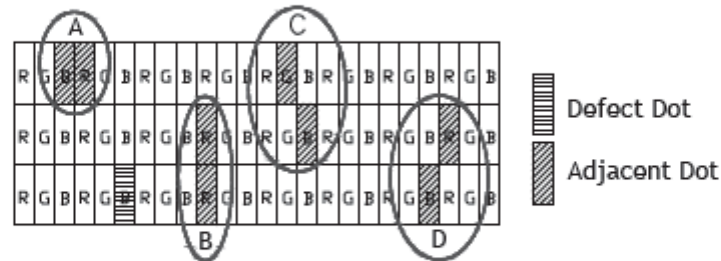
Note5：Other condition

(1) The defects that are not defined above and considered to be problem shall be reviewed anddiscussed by both parties.

(2) Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

5. HANDLING PRECAUTION

(1) Don't disassemble and reassemble the module by self.
(禁止自行拆解)

(2) Acid, alkali, alcohol or touched directly by hand will damage the display.
(酸性、碱性、酒精或手的直接接触将会损伤显示面)

(3) Static electricity will damage the module. Please configure grounding device.
(静电会损伤模组，请装配接地设备)

(4)The strong vibration, shock, twist or bend will cause material damage, even module broken.
(强烈的撞击、震动、扭转或弯曲将会造成原材损伤，甚至面板破裂)

(5) It is easy to cause image sticking while displaying the same pattern for very long time.
(长期显示同一画面会造成影像残留)

(6) The response time, brightness and performance will vary from different temperature.
(响应时间、亮度与均匀性会因温度而有所改变)

(7)The Period is within 12 months since the date of shipping out under normal using and Storage conditions.
(从出货之日开始,在正常使用和存储条件下，产品保质期为12个月)