

PRODUCT SPECIFICATION

Customer: _____
Model Name: YHC034-7.0-MZ01
Date: 2021-03-19
Version: V1.7

☒ Preliminary Specification

☐ Final Specification

For Customer's Acceptance

Approved By	Comment

Approved by	Reviewed by	Prepared by

REVISION STATUS.

Version	ReviseDate	Page	Content	Modified by
V1.0	2020.08.15	all	First Issued	Sky
V1.1	2020.08.20	5	修改液晶屏端子位置, CTP 盖板 R 角	Sky
V1.2	2020.08.25	5	修改 CTP 盖板参数	Sky
V1.3	2020.09.14	4	TFT Module size 修改	Sky
V1.3	2020.09.14	5	正视图 BL OD 改为 LCM OD	Sky
V1.3	2020.09.14	5	背视图 LCD OD 改为 CTP Sensor OD	Sky
V1.3	2020.09.14	5	背视图 BL OD 改为 LCM OD	Sky
V1.4	2020.11.16	4,13	背光亮度: TPY 改为 300 cd/m ² ,色温: 冷色调	Sky
V1.5	2020.12.03	5	盖板增加半透黑孔, 透光率 25%±5%, 修改盖板背胶	Sky
V1.6	2021.03.09	5	更新图纸: 增加盖板 PET 保护膜, 修改双面胶尺寸;	Sky
V1.6	2021.03.09	5, 13	更新色温坐标 Wy 参数, 亮度参数 TPY 改为: 350	Sky
V1.6	2021.03.09	4,5	LCM 模组宽度改为 97.61mm,总成最厚尺寸改为: 6.93±0.3 mm	Sky
V1.6	2021.03.09	5	修改总成 Label 尺寸并增加编码说明	Sky
V1.6	2021.03.09	5, 9	修改背光电压范围, Max 改为 10.2 V	Sky
V1.6	2021.03.09	7	增加 CTP PIN 序供电范围参数, 调整 Vcom 参数	Sky
V1.6	2021.03.09	6	增加 PIN16、PIN22、PIN23 电压范围参数	Sky
V1.7	2021.03.19	6, 7	修改 CTP 通讯接口供电范围参数	Sky

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1. GENERAL DESCRIPTION

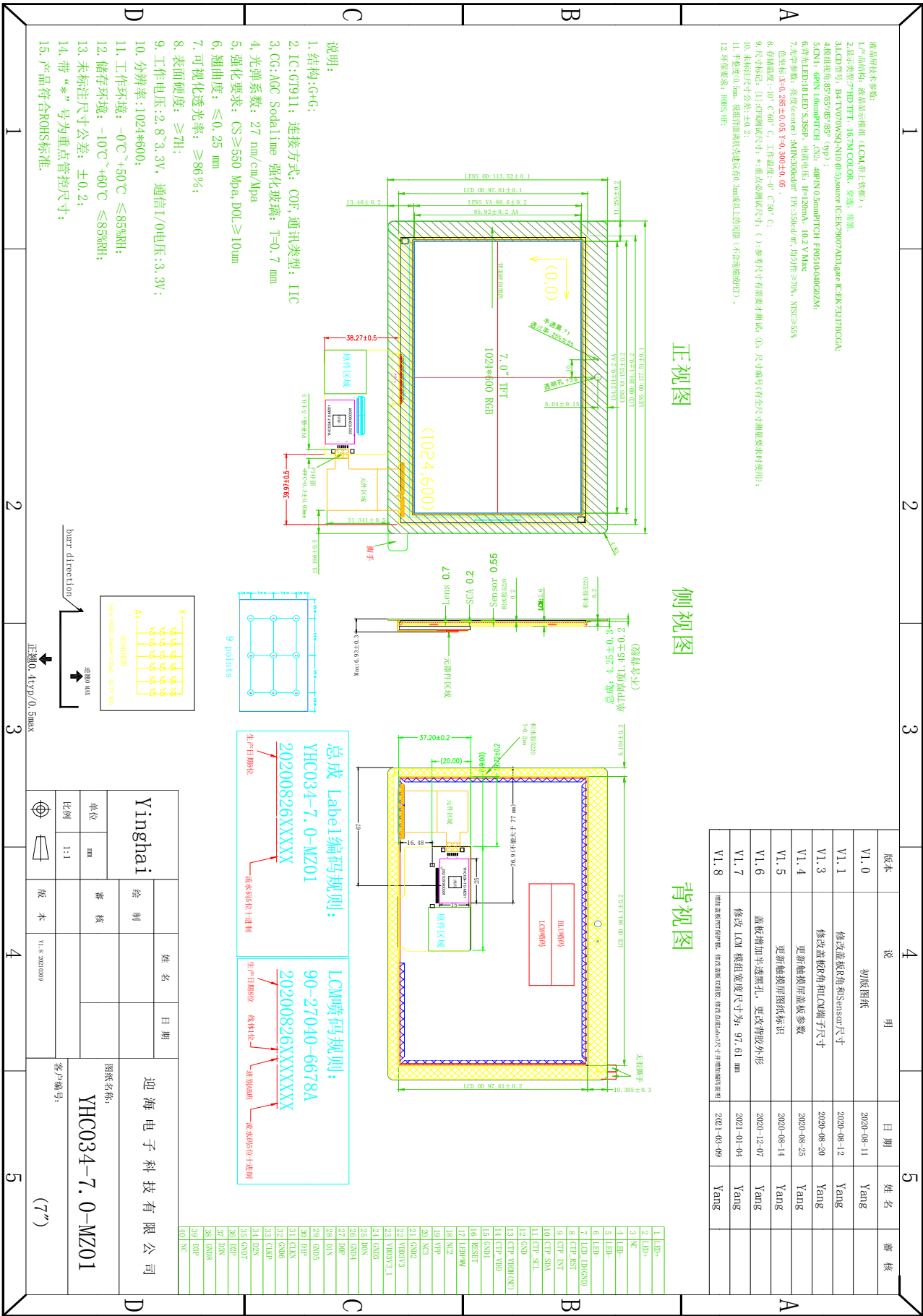
1.1 DESCRIPTION

YHC034-7.0-MZ01 is a TFT LCM with a CTP, LCM is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device with a Capacitive Transparent Touch Panel, CTP is a capacitive-type touch panel; It is composed of a TFT LCD panel, Driver ICs, FPC, Backlight, Cover Lens, ITO sensor, OCA and so.

1.2 GENERAL SPECIFICATION

Item	Specification	Unit	Remarks
Panel Size	7"	Inch	
Number of Pixels	1024(H) x (RGB) x 600(V)	pixels	
Cover LENS Size	177.51(H) x 113.52 (V)	mm	
Touch Sensor Size	162.2(H) x 95.7(V)	mm	
TFT Module size	164.1(H) x 97.61(V) x 2.6(D)	mm	
CTP View Area	155(H) x 86.6 (V)	mm	
Number of Colors	16.7M	-	
Display Mode	Normally Black	-	
Viewing Direction	ALL	-	
Display Format	RGB vertical stripe	-	
Surface Treatment	Anti-Glare	-	
LCM Interface	MIPI	-	
CTP Interface Type	IIC	-	
Backlight	White LED	-	色温:冷色调
CTP Hardness	≥ 7	H	
Weight	TBD	g	

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

3.1 LCM PIN DESCRIPTION

No.	Symbol	I/O	Function
1	LED+	P	LED Anode (Positive)
2	LED+	P	LED Anode (Positive)
3	NC	NC	No connect
4	LED-	P	LED Cathode(Negative)
5	LED-	P	LED Cathode(Negative)
6	LED-	P	LED Cathode(Negative)
7	LCD-ID (GND)	I	LCM Identify,Connect ok to GND
8	CTP-RST	I	External Reset for CTP
9	CTP-INT	O	External interrupt to the host for CTP
10	CTP-SDA	I/O	IIC Data input and output for CTP
11	CTP-SCL	I	Synchronizing clock signal input for CTP
12	GND	P	Power Ground
13	CTP-VDDH(NC)	P	Power supply for communication(OPEN)
14	CTP-VDD	P	Power Supply for Analog Circuit (2.8V~3.3V)
15	GND1	P	Power Ground
16	RESET	P	External Reset for LCM(Min 1.7v, TPY 1.8v, Max:1.9 v)
17	LEDPWM	NC	This signal for brightness of the LED backlight
18	NC2	NC	NO CONNECT
19	VPP	NC	Power supply for OTP
20	NC3	NC	NO CONNECT
21	GND2	P	Power Ground
22	VDD3V3	P	Power Supply for Analog Circuit(Min:3.2v, tpy:3.3v,Max:3.4v)
23	VDD3V3_1	P	Power Supply for Analog Circuit(Min:3.2v, tpy:3.3v,Max:3.4v)
24	GND3	P	Ground
25	D0N	I	MIPI DSI-DATA0- differential data signals(Negative)
26	GND4	P	Ground
27	D0P	I	MIPI DSI-DATA0+ differential data signals(Positive)
28	D1N	I	MIPI DSI-DATA1- differential data signals(Negative)
29	GND5	P	Power Ground
30	D1P	I	MIPI DSI-DATA1+ differential data signals(Positive)
31	CLKN	I	MIPI MIPI differential Clock signals
32	GND6	P	Power Ground
33	CLKP	I	MIPI DSI differential Clock signals
34	D2N	I	MIPI DSI-DATA2- differential data signals(Negative)
35	GND7	P	Power Ground
36	D2P	I	MIPI DSI-DATA2+ differential data signals(Positive)
37	D3N	I	MIPI DSI-DATA3- differential data signals(Negative)
38	GND8	P	Power Ground
39	D3P	I	MIPI DSI-DATA3+ differential data signals(Positive)
40	NC	NC	NO CONNECT

3.2 CTP PIN DESCRIPTION

No.	Symbol	Function
1	CTP-RST	System reset pin(1.7V~1.9 V)
2	CTP-VDD	Analog power positive (2.8V~3.3V)
3	GND	Power ground
4	CTP-INT	Interrupt signal(1.7V~1.9 V)
5	CTP-SDA	IIC data signal(1.7V~1.9 V)
6	CTP-SCL	IIC clock signal(1.7V~1.9 V)

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Digital Supply Voltage	VDD	-0.3	2.5	V	
Analog Supply Voltage	AVDD	-0.5	13.5	V	
Gate On Voltage	VGH	-0.3	20	V	
Gate Off Voltage	VGL	-8	0.3	V	
Gate On-Gate Off Voltage	VGH-VGL	12	40	V	

4.2 TFT LCD MODULE

4.2.1 Operating Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Digital Supply Voltage	VDD	1.6	1.8	2.0	V	
Analog Supply Voltage	AVDD	9.4	9.6	9.8	V	
Gate On Voltage	VGH	17.5	18	18.5	V	
Gate Off Voltage	VGL	-6.5	-6	-5.5	V	
Common Voltage	VCOM	3.1	-	3.3	V	
Logic Input Voltage	VIH	0.7VDD	-	VDD	V	
	VIL	GND	-	0.3VDD	V	

4.2.2 Current Consumption

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Gate on Current	IVGH	VGH=18 V	-	(2)	-	mA	Note1
Gate off Current	IVGL	VGL=-6 V	-	(5)	-	mA	Note1
Digital Current	IVDD	VDD= 1.8V	-	(10)	-	mA	Note1
Analog Current	IAVDD	AVDD= 9.6V	-	(30)	-	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

4.3 POWER、 SIGNAL SEQUENCE

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

4.3.1 Power on/off control



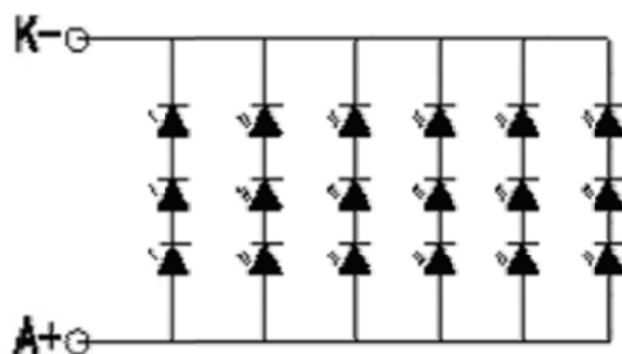
Note: CLK and Data Lanes should keep in LP11(stop state) before GRB.

4.4 BACK LIGHT UNIT

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LEDcurrent	I _{LED}	-	120	-	mA	Total LED
Forward voltage	V _F	-	-	10.2	V	I _F = 120mA
Reverse current	I _R	-	-	50	μA	V _R =5V ,1LED
Power dissipation	P _d	1260			mW	Total LED
Peakforward current	I _{FP}	100			mA	1LED
Reverse Voltage	V _R	5			V	1LED

3*6=18EA

I_f=120mA

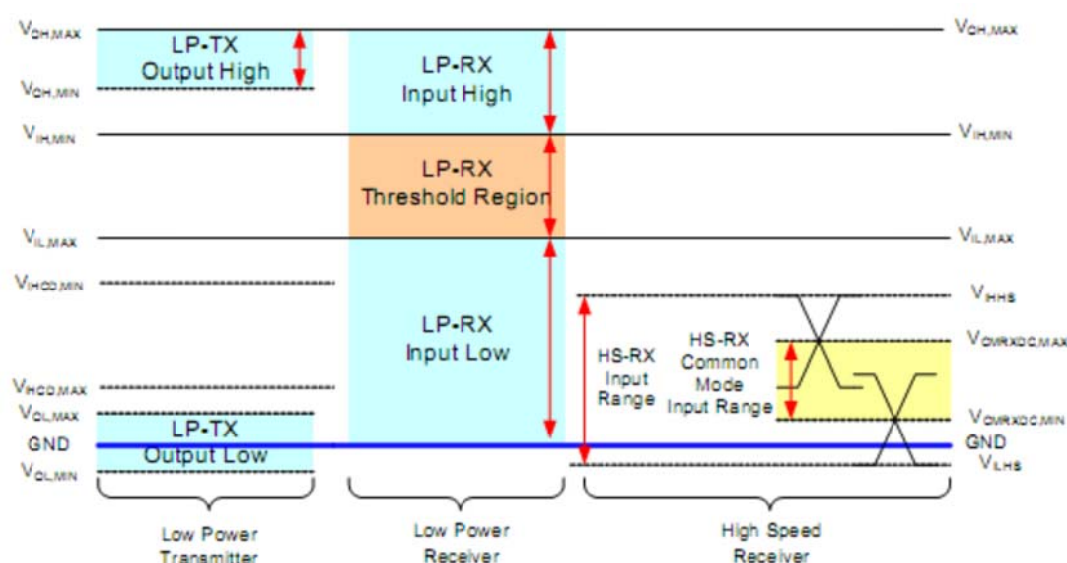


5.INPUT SIGNAL TIMING

5.1 MIPI INTERFACE DC CHARACTERISTIC

(VDD= 3.0V to 3.6V, VCC =1.7V to1.95V, VDDA= 8.0 to 13.5V, GND=GNDA= 0V, TA= -20 to +60°C)

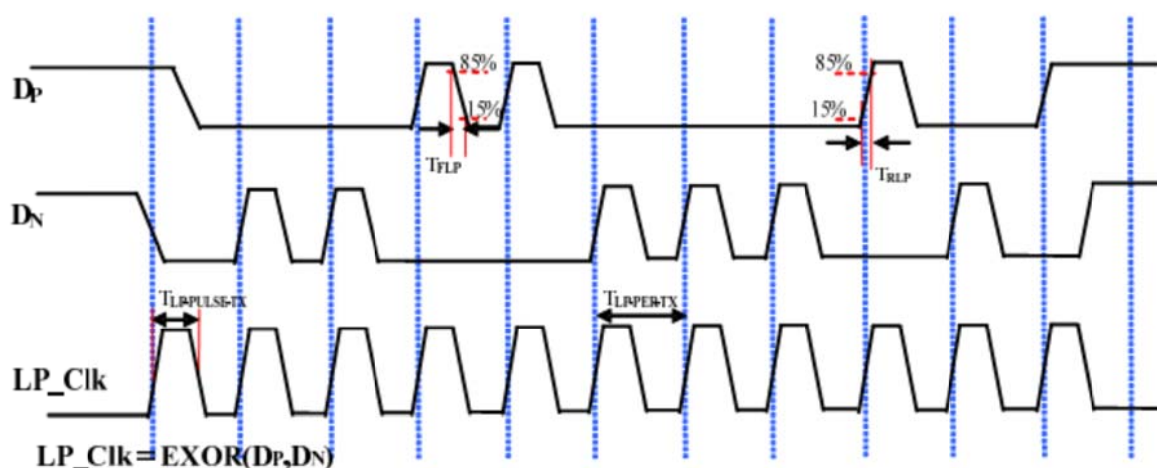
Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
MIPI Characteristics for High Speed Receiver						
Single-endedI input low voltage	VILHS	-40	-	-	mV	-
Single-endedI input highvoltage	VIHHS	-	-	460	mV	-
Common-mode voltage	VCMRXD C	155	-	330	mV	-
Differential input impedance	ZID	80	100	125	Ohm	-
HS transmit differential voltage	VOD	80	200	250	mV	VOD=VDP-VDN
MIPI Characteristics for Low Power Mode						
Pad signal voltage range	VI	-50	-	1350	mV	-
Ground shift	VGNDSH	-50	-	50	mV	-
Logic 0 input threshold	VIL	0.0	-	500	mV	-
Logic 1 input threshold	VIH	1000	-	1350	mV	-
Input hysteresis	VHYST	25	-	-	mV	-
Output low level	VOL	-150	-	150	mV	-
Output high level	VOH	1.1	1.2	1.3	V	-
MIPI Digital Operating Current	IVDDMIPI			TBD	mA	TBD
MIPI Digital Standby Current	ISTMIPI			TBD	μA	TBD



5.2 MIPI AC CHARACTERISTIC

Parameter	Symbol	Min	Typ	Max	Units
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15%-85% rise time and fall time		TRLP / TFLP	-	-	35	ns
30%-85% rise time and fall time		TREOT	-	-	35	ns
Pulse width of the LP exclusive-OR cloc	First LP exclusive-OR clock pulse after STOP state or last pulse before stopstate	TLP-PULSE-TX	50	-	-	Ns
	All other pulses		50	-	-	Ns
Period of the LP exclusive-OR clock		TLP-PER-TX	100	-	-	Ns
Slew Rate@ CLOAD = 0pF		$\delta V/\delta tSR$	20	-	500	mV/ns
Slew Rate@ CLOAD = 5pF			20	-	200	mV/ns
Slew Rate@ CLOAD = 20pF			20	-	150	mV/ns
Slew Rate@ CLOAD = 70pF			20	-	100	mV/ns



LP Transmitter Timing Definitions

5.3 PARALLEL RGB INPUT TIMING TABLE

5.3.1 DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd	1024			DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tv	600			TH
VSD Period	tv	610	635	800	TH
VSD Blanking	tvbp+ tvfp	10	35	200	TH

5.3.2 HV mode

Horizontal timing

Parameter	Symbol	Spec.	Unit
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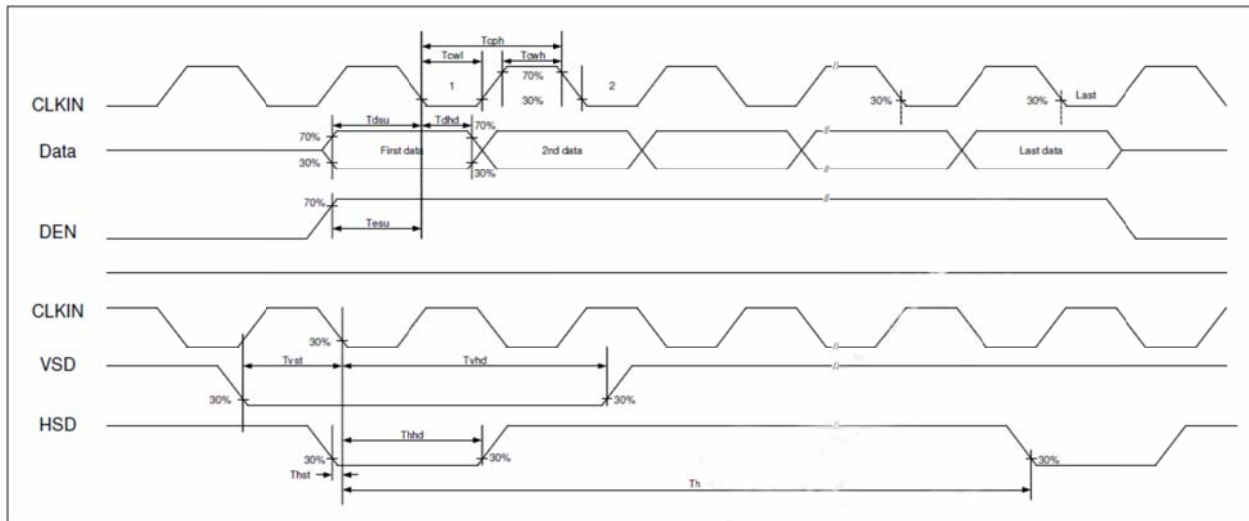
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd	1024			DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp	160			DCLK
HSD Front Porch	thfp	16	160	216	DCLK

Vertical timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd	600			TH
VSD Period	tv	624	635	750	TH
VSD Pulse Width	thpw	1	-	20	TH
VSD Back Porch	thbp	23			TH
VSD Front Porch	thfp	1	12	127	TH

5.4TIMING DIAGRAM

5.4.1 Input Clock and Data Timing Diagram



6.OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\Theta = 0^{\circ}$	-	1000	-		Note1 Note4
Luminance (LCM亮度)		L		300	350	-	cd/m ²	Note1 Note6 Note7
Luminance Uniformity		LU		70	75		%	
Response Time (Rising + Falling)		T _{RT}	Ta= 25℃ $\Theta = 0^{\circ}$		20	40	ms	Note1 Note3
Viewing Angle range	Horizontal	ΘL	CR > 10	-	85	-		Note2
		ΘR		-	85	-		
	Vertical	ΘU		-	85	-		
		ΘD		-	85	-		
Color Chromaticity	White	Wx	TYP- 0.05	TYP+ 0.05	0.285		Note1 Note5 Note7	
		Wy			0.300			
	Red	Rx			TBD			
		Ry			TBD			
	Green	Gx			TBD			
		Gy			TBD			
	Blue	Bx			TBD			
		By			TBD			
NTSC					55		%	

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

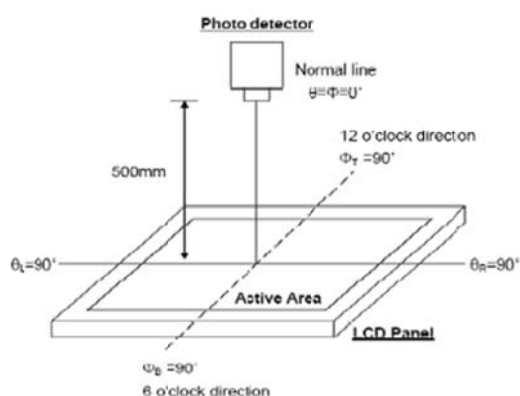


Fig. 6-1

Note2: Definition of viewing angle range and measurement system

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

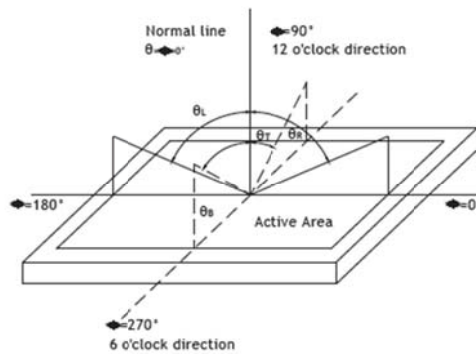


Fig. 6-2

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%.

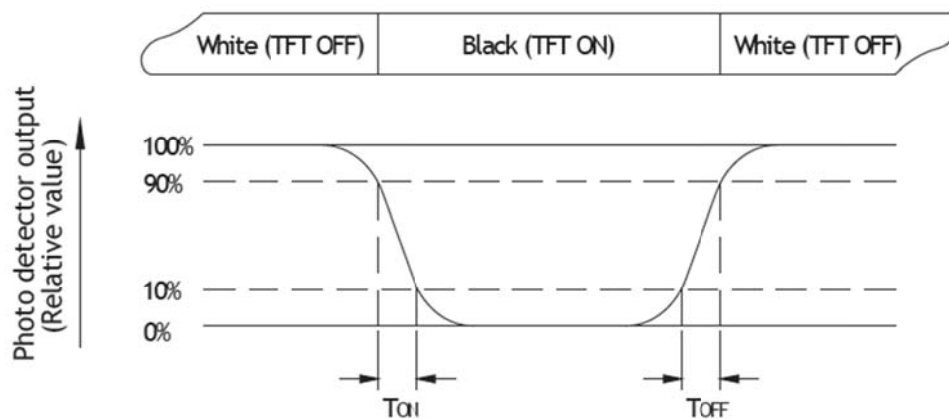


Fig. 6-3 Definition of response time

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 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

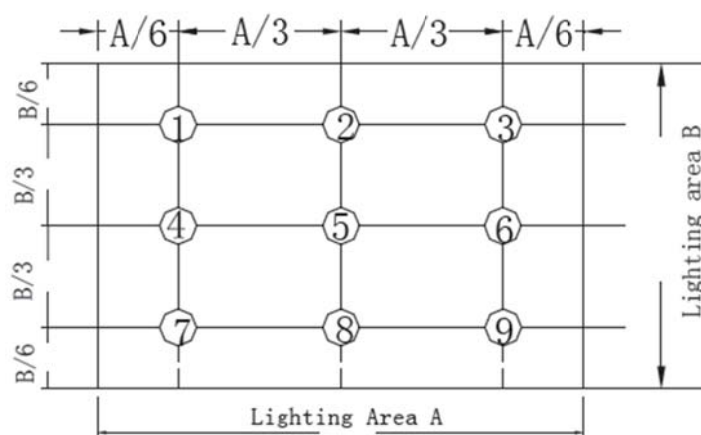
panel. The LED driving condition is $I_L = 120\text{mA}$

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



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

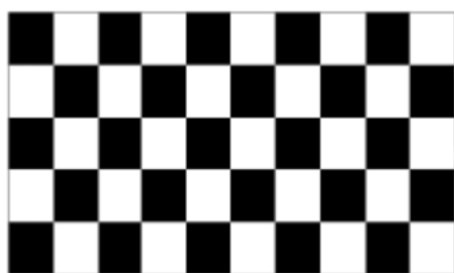
7.RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=60℃; 240hrs	IEC60068-2-1: 2007 GB2423.2-2008
Low Temperature Storage	Ta=-10℃; 240hrs	EC60068-2-1: 2007 GB2423.1-2008
High Temperature Operation	Ta=50℃, 240Hrs	IEC60068-2-1: 2007 GB2423.2-2008
Low Temperature Operation	Ta=-0℃; 240hrs	IEC60068-2-1: 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=60℃, 90%RH, 240Hrs(no condensation)	IEC60068-2-78: 2001 GB/T2423.3-2006
Thermal Shock	-20℃(0.5h) ~ 70℃(0.5h) / 100cycles	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 1hrs,then change to 50%gray pattern immediately.after 5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

7.2 VIBRATIONSHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s ² , 6ms, $\pm x, y, z$ 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 1 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 , 330 Ω , Contact: ± 4 KV, Air: ± 8 KV	1	Class C
	200pF , 0 Ω , ± 200 V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

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 $23 \pm 5^{\circ}\text{C}$ 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.

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

Incoming Inspection Standard

Customer: _____
Model Name: YHC034-7.0-MZ01
Date: 2020-08-15
Version: V1.0

☒ Preliminary Specification

☐ Final Specification

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1. Incoming inspection right

(1) The Incoming Inspection Standard will be agreed and signed by both sides(Customer and 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 $25 \pm 5^{\circ}\text{C}$
- (4) Ambient humidity is $60 \pm 5\% \text{RH}$
- (5) Ambient illuminance is from 300~500 Lux
- (6) Input signal timing should be typical value
- (7) Mura & Light leakage inspection with ND-Filter 5%

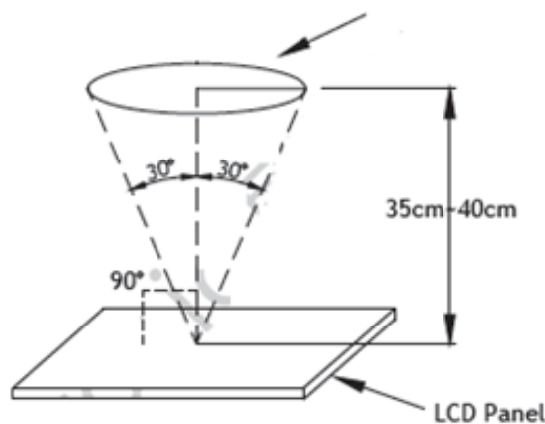


Fig-1

3. Special condition

- (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: Viewing angle $\pm 40^{\circ}$ while inspected image-sticking

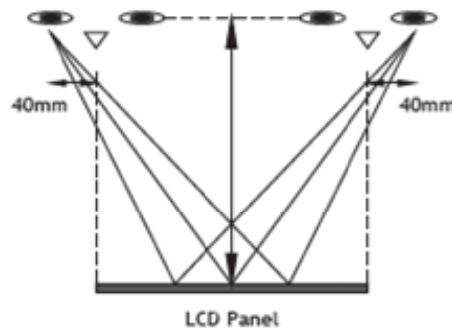
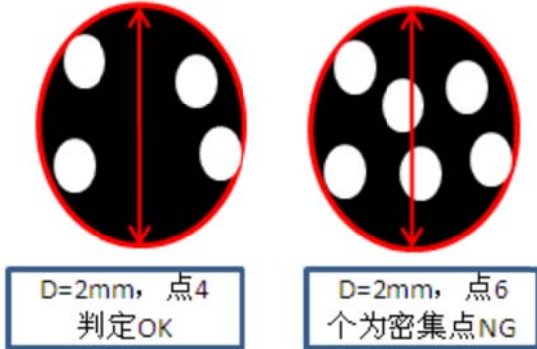


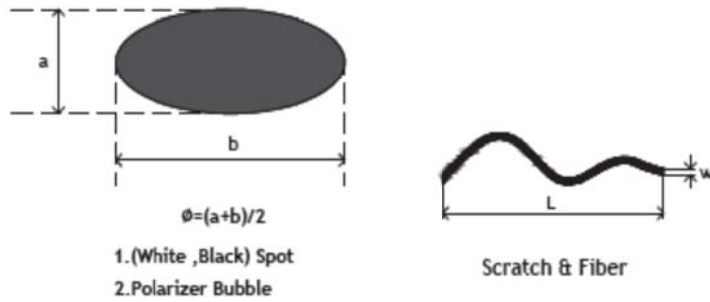
Fig-2

4. INSPECTION CRITERIA

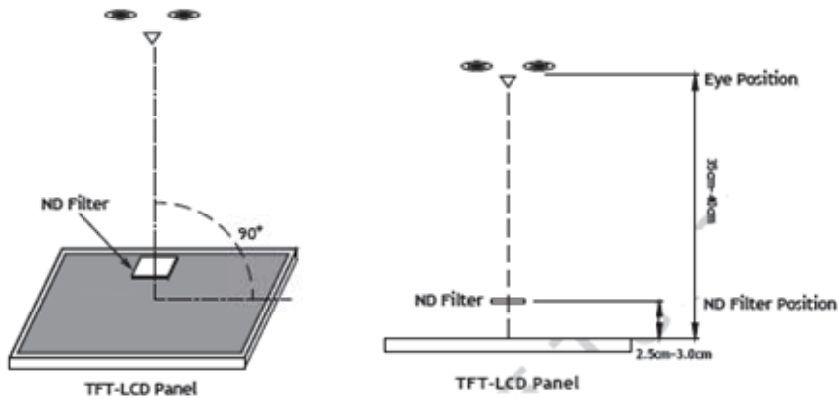
Defecttype			Limit			Note
Visual defect	Scratch		W ≤ 0.05mm		Ignore	Note1
			0.05mm ≤ w ≤ 0.1m		N ≤ 3	
			L ≤ 10mm			
			20mm < l, 0.1mm < w		N=0	
	Internal	Spot	Φ < 0.2mm		Ignore	Note 1
			0.2mm ≤ φ ≤ 0.4mm		N ≤ 3	
			0.4 ≤ φ		N=0	
		Fiber	0.1mm ≤ w ≤ 0.2m		N ≤ 4	Note 1
			L ≤ 2.5mm			
		Polarizer bubble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

(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.

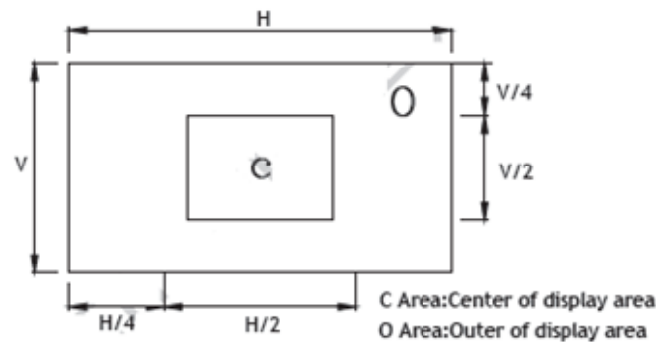
Note1 : W : Width[mm], L : Length[mm], N : Number, ϕ : Average Diameter



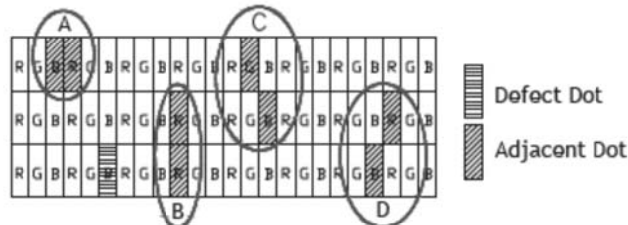
Note2 : Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixel area.



Note3 :



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



Note5 : Other condition

(1) The defects that are not defined above and considered to be problem shall be reviewed and discussed 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)