SPECIFICATION
FOR
LCD MODULE

Customer : _____

Product Model: YH101MH3101

Sample code: MC10127007-31A

Designed by	Checked by	Approved by

Final Approval by Customer

☐ **LCM Machinery OK** Checked By _____ ☐ **LCM Display OK** Checked By _____	☐ **LCM OK** ☐ **NG，Problem survey:** Approved By _____

※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.

REVISION STATUS

Revision Notice	Description	Page	Rev. Date
Ver. 0.0	First revision	-	2021/07/28

CONTENTS

1. OVERVIEW

YH101MH3101 is a 10.1” color TFT-LCD (Thin Film Transistor Liquid Crystal Display) OLB module(finish outer lead bonding) composed of LCD panel, driver ICs (the backlight is not included in this OLB module).

The 10.1" screen produces 800×RGB (3) ×1280 resolution image. By applying R.G.B. input signal, 16.7M color images are displayed.

1.1 LCD Specifications

ITEM	SPECIFICATION
Display Area (mm)	135.36(H)x216.58(V)
Number of Pixels	800(H) x 3(RGB) x 1280(V)
Pixel Pitch (um)	169.2 (H) x169.2(V)
Color Pixel Arrangement	RGB Vertical stripe
Display Mode	Normally Black
Number of Colors	16.7M
Response Time (ms)	30 (typ)
Optimum Viewing Direction	whole view
Contrast Ratio	1000(typ)
Viewing Angle (CR≧10)	85°/85° / 85°/85°(Typ)
Interface connection	MIPI
Driver IC	
Surface Treatment	-

■ Compatible with ROHS Standard

eR88577

2. ABSOLUTE MAXIMUM RATINGS

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Item	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage for I/O	VDDIO	-0.3	3.6	V	
Power Supply Voltage for	VDD-	-0.3	3.6	V	
Positive Voltage	-	-	-	V	
Negative Voltage	-	-	-	V	

Note1：If users use the product out off the environmental operation range（temperature and humidity）, it will have visual quality concerns.

3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD Power Supply Voltage

(GND=VSSA=VSSD=0V) Ta=25℃

I/O Operating Voltage	VDDIO	1.7	1.8/3.3	3.6	V	
Analog Operatiog Voltage	VDD-	3.0	3.3	3.6	V	
Analog Operatiog Voltage	-	-	--	-	V	
Input Signal Voltage	VIH	0.7* VDD	--	VDD	V	
	VIL	GND	--	0.3* VDD	V	
Output Signal Voltage	VOH	0.8* VDD	--	VDD	V	
	VOL	GND	--	0.2* VDD	V	

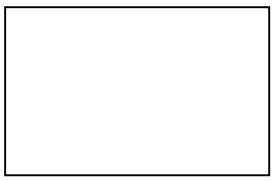
3.2 TFT-LCD Current consumption

(GND=VSSA=VSSD=0V) Ta=25℃

ITEM	SYMBOL	Condition	MIN	TYPE	MAX	UNIT	NOTE
Current For Driving	I_{VDD}	VDDIO	-	26	36	mA	
	I_{VBAT_SYS}	VDD		130	160	mA	
Total Power Consumption	PC		-		592	mW	Note1

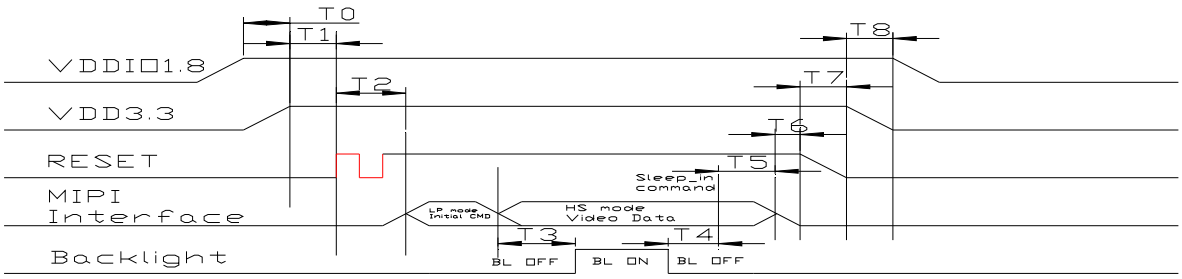
Note1: Typ. specification：: Gray-level test Pattern
Max. specification：White test Pattern

(a)Gray-level Pattern



(b)White Pattern

3.3 Power on/off sequence



Parameter	Value Min	Typ	Max	Unit	Remark
T0	5			ms	
T1	5			ms	
T2	–			ms	
T3	100			ms	
T4	50			ms	
T5	100			ms	
T6	0			ms	
T7	5			ms	
T8	5			ms	

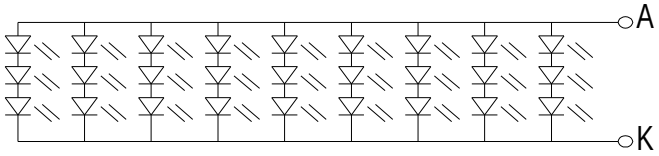
3.4 Backlight

Ta=25 ℃

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
LED current	IL	Ta=25℃	--	180	--	mA	
LED voltage	VL	Ta=25℃	--	9	--	V	
Power consumption	WL	Ta=25℃	--	1.728	--	W	
LED Lifetime	-	Ta=25℃	--	15000	--	Hr	

【Note】

*1)LED Circuit Diagram：



Backlight LED Circuit IF=180mA;Vf=9V

*2) Calculator value for reference $I_F \times V_F \times N = P_{LED}$

*3) Life time means that estimated time to 50% degradation of initial luminous intensity.

*4) In order to prevent module brightness or screen display unstable, LED shall be controlled under constant current.

4. INTERFACE CONNECTION

CN (Interface signal)

Connector type：FP0515-04000ZM or compatible

Pin No.	Pin Name	Description
1	LED+	Power supply for LED[Anode]
2	LED+	Power supply for LED[Anode]
3	LED+	Power supply for LED[Anode]
4	NC	No Connect
5	LED-	Power supply for LED[Cathode]
6	LED-	Power supply for LED[Cathode]
7	LED-	Power supply for LED[Cathode]
8	LED-	Power supply for LED[Cathode]
9	GND	Ground
10	GND	Ground
11	MIPI_2P	MIPI data positive signal(2P)

12	MIPI_2N	MIPI data negative signal(2N)
13	GND	Ground
14	MIPI_1P	MIPI data positive signal(1P)
15	MIPI_1N	MIPI data positive signal(1N)
16	GND	Ground
17	MIPI_CLKP	MIPI CLK positive signal(CLKP)
18	MIPI_CLKN	MIPI CLK positive signal(CLKN)
19	GND	Ground
20	MIPI_0P	MIPI data positive signal(0P)
21	MIPI_0N	MIPI data positive signal(0N)
22	GND	Ground
23	MIPI_3P	MIPI data positive signal(3P)
24	MIPI_3N	MIPI data positive signal(3N)
25	GND	Ground
26	NC	NC
27	RESET	Reset Pin (1.8V)
28	NC	NC
29	VDDIO	Logic power 1.8V
30	VDD	Logic power 3.3V
31	VDD	Logic power 3.3V
NOTE:1		
27	RESET	Reset Pin (H=1.8V)
29	VDDIO	Logic power(1.8V)
NOTE:2		
27	RESET	Reset Pin (H=3.3V)
29	VDDIO	Logic power(3.3V)

5. INTERFACE TIMING CHART

5.1 MIPI Interface Timing Sequence

(a) MIPI interface DC characteristic

DC characteristics for MIPI LP mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Logic 1 input voltage	V_{IH}	880	-	-	mV
Logic 0 input voltage	V_{IL}	0	-	550	mV
Logic 1 output voltage	V_{OH}	1.1	1.2	1.3	V
Logic 0 output voltage	V_{OL}	-50	-	50	mV

DC characteristics for MIPI HS mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Common-mode voltage HS Receive mode	V_{CMRXDC}	70	-	330	mV
Differential input high threshold[1]	V_{IDTH}	-	-	70	mV
Differential input low threshold[1]	V_{IDTL}	-70	-	-	mV
Single-ended input high voltage	V_{IHHS}	-	-	460	mV
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV
Differential input impedance	Z_{ID}	80	100	125	Ω
HS transmit differential voltage (VDP-VDN)	|VOD|	140	200	270	mV

Note: (1) VIDTH and VIDTL only for reference, related to power and ground noise, this spec need to check on panel performance to fine tune

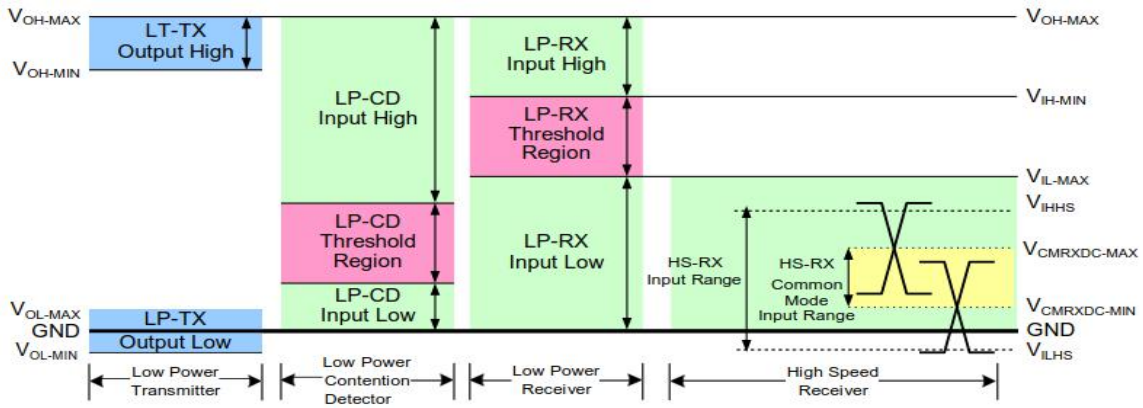


Figure. MIPI signaling and contention voltage levels

(b) MIPI interface AC characteristics

MIPI data-clock timing specification

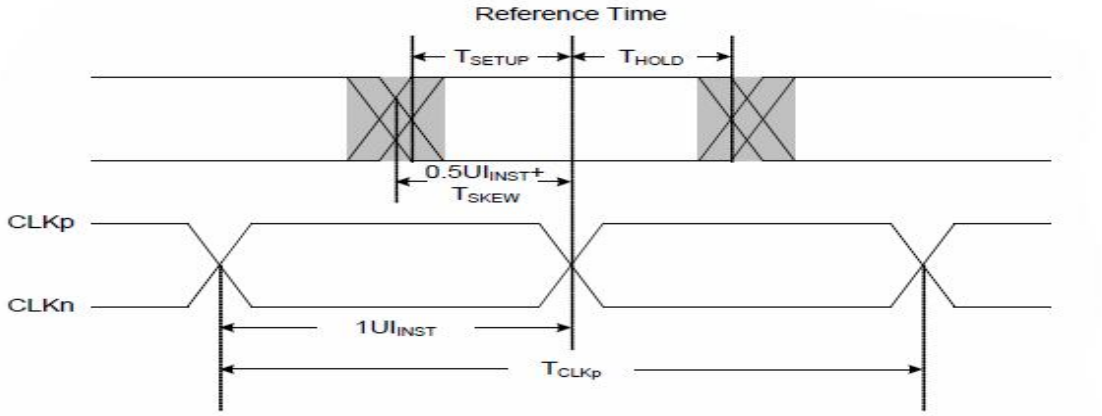


Figure 8.5 : Data to clock timing

Parameter	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit
UI instantaneous	UI_{INST}	1.0	-	12.5[1]	ns
Data to clock setup time	T_{SETUP}	0.15[2]	-	-	UI_{INST}
Data to clock hold time	T_{HOLD}	0.15[2]	-	-	UI_{INST}

Note: (1) This value corresponds to a minimum 80 Mbps data rate.
(2) Total SETUP and HOLD window for receiver of 0.3* UI_{INST}

5.2 Timing Chart

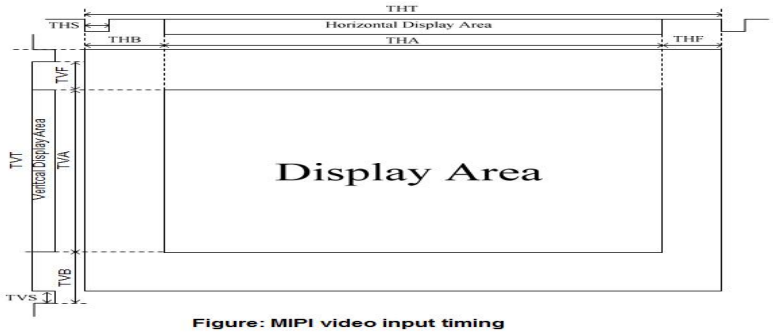
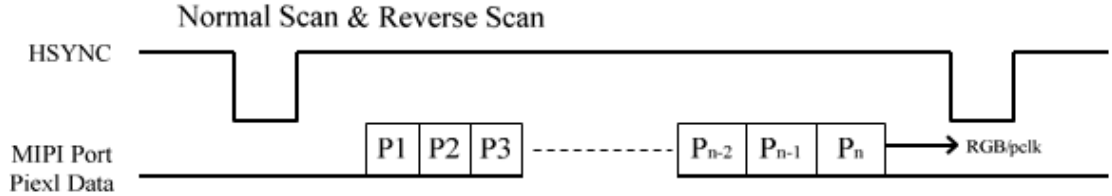


Figure: MIPI video input timing

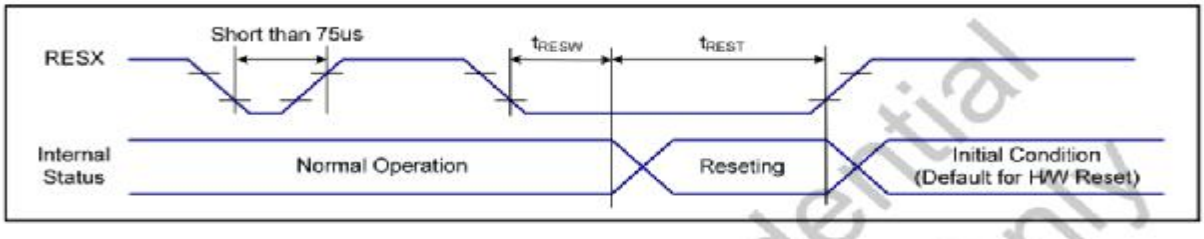
MIPI Multi-Drop type when normal or reverse scan.



Input Timing	Symbol	800RGBx1280			Unit
		Min.	Typ.	Max.	
PCLK Frequency	-	-	77.38		MHz
Horizontal Total	THT		980		DCLK
Horizontal Synchronization	THS		20		DCLK
Horizontal Back Porch	THB		80		DCLK
Horizontal Address	THA		800		DCLK
Horizontal Front Porch	THF		80		DCLK
Vertical Frequency	-		60		Hz
Vertical Total(1)	TVT		1316		THT
Vertical Synchronization	TVS		4		THT
Vertical Back Porch	TVB		12		THT
Vertical Address	TVA		1280		THT
Vertical Front Porch	TVF		20		THT

5.3 Reset Input Timing

t_{RESW} shorter than 75us, Reset will be rejected.



VSS=0V, VDDI=1.65V to 1.95V, Ta = -30°C to 70°C

Symbol	Parameter	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse minimum width	150	-	-	Reset signal recognized	us
t_{REST}	*2) Reset complete time	5	-	120	Reset action complete	ms

5.4 DATA mapping

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

【Note】

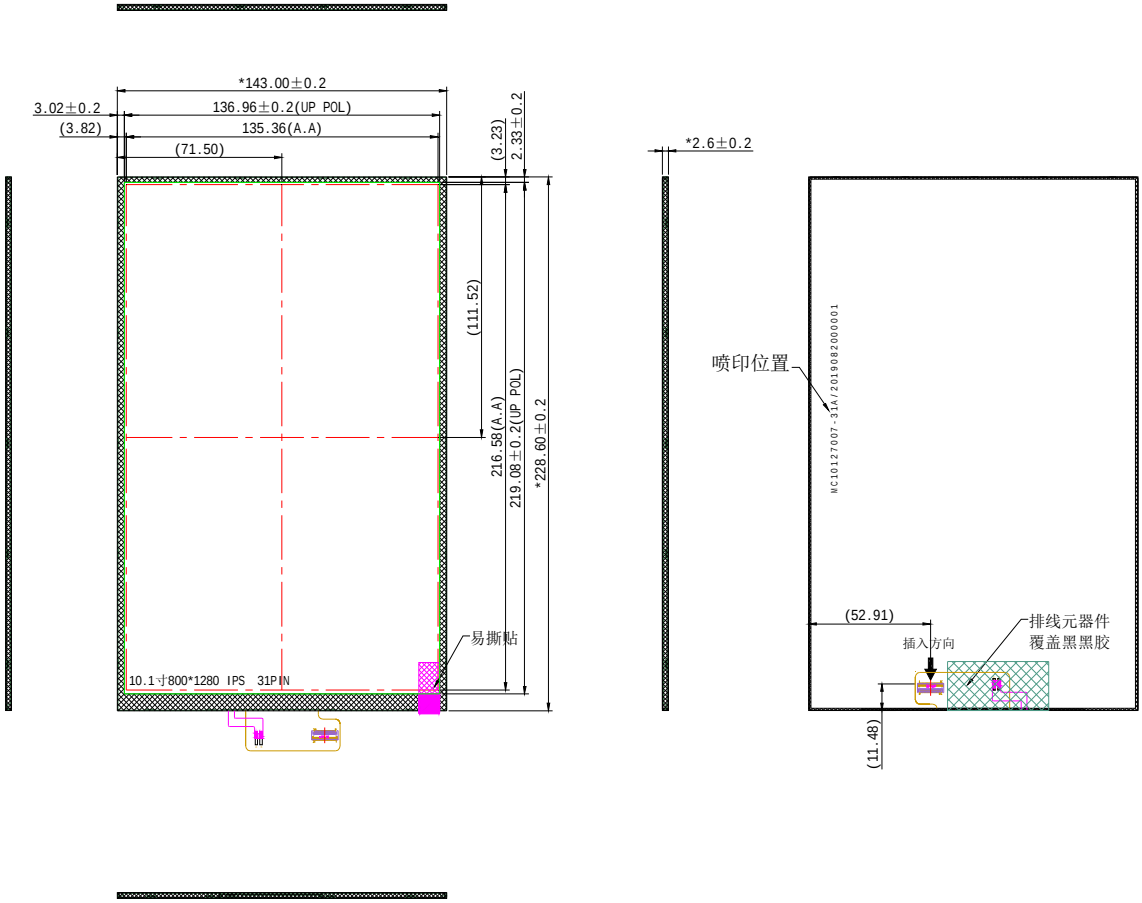
1) Gray level:
Color(n)：n is level order; higher n means brighter level.

2) DATA:
1: high，0: low

6. MECHANICAL DIMENSION

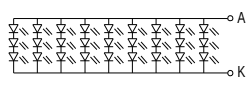
模 组 图

DIMENSIONAL TOLERANCE(±) 尺寸范围(±)						
公差等级	0 ~ 5	5 ~ 15	15 ~ 60	60 ~ 150	150 ~ 300	300 ~ 630
☐ A	0.05	0.10	0.15	0.20	0.25	0.30
☑ B	0.10	0.15	0.20	0.25	0.30	0.35
UNLESS OTHERWISE SPECIFIED 没指定尺寸						



BM-7测试（以撕掉上FOG保护膜为准）

参数	SYMBOL	MIN	TYP	MAX	单位	备注
中心点亮度	Iv ■ LCM	200	250		cd/m2	
背光色坐标范围	X					IF=180mA
	Y					
模组色坐标范围	X	0.260	0.310	0.360		
	Y	0.280	0.330	0.380		
驱动电压	VF	8.4	9.0	9.6	V	
反向电流	IR			50	uA	VR=10V, ※1
均匀性	Iv-m	75	80		%	(min/max)*100
最大额定功率				1260	mW	



3*9=27PCS

电路原理图:

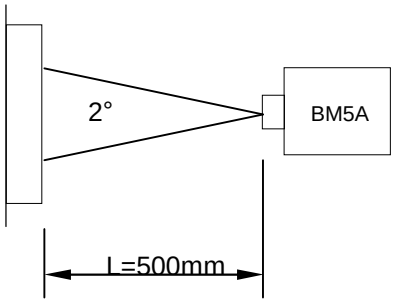
REVSION 版 本	A0	☑ 正式规格 ☐ 临时规格	REVISE 修订人	MODEL NO 产品料号	APPROVED BY 批 准	CHECKED BY 审 核	DRAWN BY 绘 图
DATE 日 期	2021.08.18		张亚明	YH101MH3101			
PAGE 页 码	2/3						

7. OPTICAL CHARACTERISTICS

Ta = 25°C, VCC=3.3V

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Luminance		L		200	250	--	cd/m2	Note 1
Contrast		CR		800	1000	--	--	Note2
Response Time		Tr+Tf	θ=ϕ= 0°	--	30	40	ms	Note 3
Viewing Angle	Vertical	U	CR≧10	80	85	--	degree	Note 4
		D		80	85	--	degree	
	Horizontal	L		80	85	--	degree	
		R		80	85	--	degree	
Color Filter Chromaticity	W	x	θ=ϕ= 0°	(0.272)	(0.302)	(0.332)	--	Note 5
		y		(0.310)	(0.340)	(0.370)	--	
	R	x		(0.615)	(0.645)	(0.675)	--	
		y		(0.294)	(0.324)	(0.354)	--	
	G	x		(0.278)	(0.308)	(0.338)	--	
		y		(0.549)	(0.579)	(0.609)	--	
	B	x		(0.116)	(0.146)	(0.176	--	
		y		(0.117)	(0.147)	(0.177)	--	
	NTSC			55	60	---	%	
Flicker					-30	-15	dB	Note 6
Crosstalk					2	3	%	

Note1: Measure condition：25℃±2℃，60±10%RH，under10 Lux in the dark room.BM-7 (TOPCON)，viewing angle2°，IL=90mA（Backlight current） measurement after lighting on 10 mins.



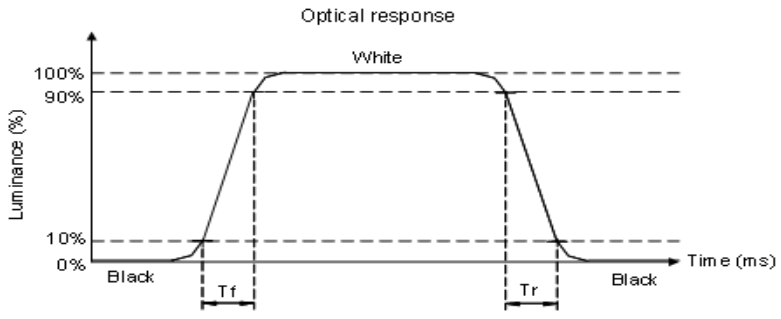
Note 2 Definition of Contrast Ratio：

Contrast ratio is calculated with the following formula.

Contrast ratio (CR)= White Luminance (ON) / Black Luminance (OFF)

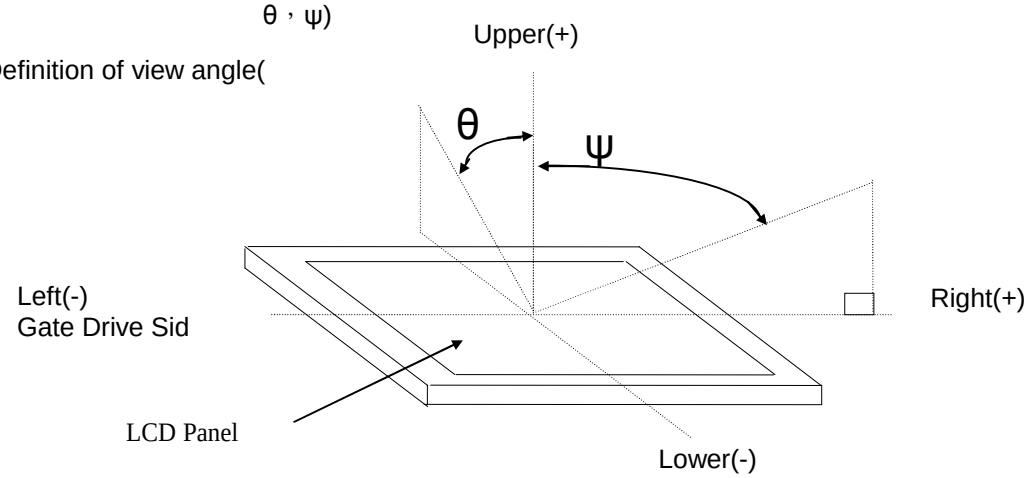
Note 3 Definition of response time

The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively. Definition of response time：The response time is defined as the time interval between the 10% and 90% amplitudes.



θ，ψ)

Note 4 Definition of view angle(

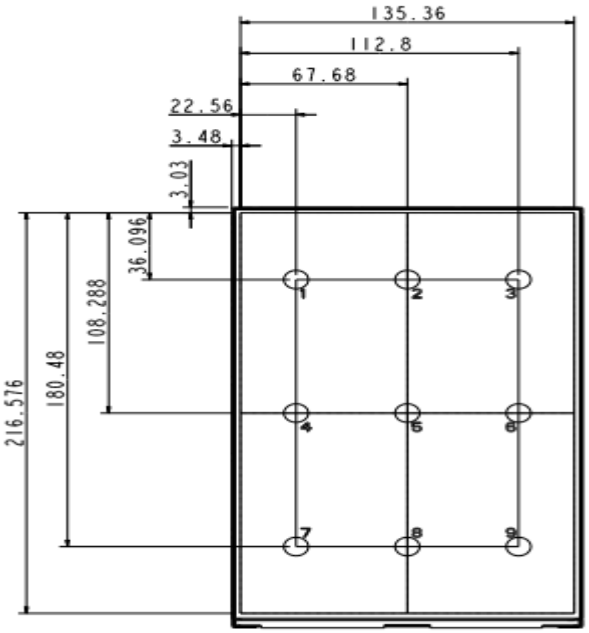


Note 5. (a) CF Glass light source: C light.
(b) Chromaticity & NTSC spec is for reference. (Different polarizer & backlight will both affect the MODULE chromaticity.)

Note 6. Definition of Luminance and Luminance uniformity

Central luminance: The white luminance is measured at the center position “5” on the screen, see Fig below.

9P Uniformity: ∆ L = (Lmin / Lmax) ×100% at measuring points 1 &9 see Fig below.



8. RELIABILITY TEST

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	50℃,96hrs	1
High Temperature Storage	60℃,96hrs	1
High Temperature High Humidity Operation	50℃,90%RH,96hrs	No condensation
Low Temperature Operation	-10℃,96hrs	1
Low Temperature Storage	-20℃,96hrs	1
Thermal Shock	–20℃(0.5hr) ~ 60℃(0.5hr) ,50 Cycles	Non-Operating

NOTE

1. All judgement of display are performed after temperature of panel return to room temperature.
2. Display function should be no change under normal operating condition.
3. Under no condensation of dew.
4. HNH only guarantee the above 6 test items, and without guarantee the others.