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## JJ121BWXM-L4048 **Product Specification Rev.P0**


BUYER	
SUPPLIER	Shenzhen Wan Hong Zhi Yuan Tech Co.,Ltd
FG-Code	JJ121BWXM-L4048

ITEM	BUYER SIGNATURE	DATE
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ITEM	SUPPLIER SIGNATURE	DATE
Prepared	_____	_____
Reviewed	_____	_____
Approved	_____	_____


Shenzhen Wan Hong Zhi Yuan Tech Co.,Ltd

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REV.	ECN No.	DESCRIPTION OF CHANGES	DATE	PREPARED
0	-	Initial Release	2023.06.16	CHEN

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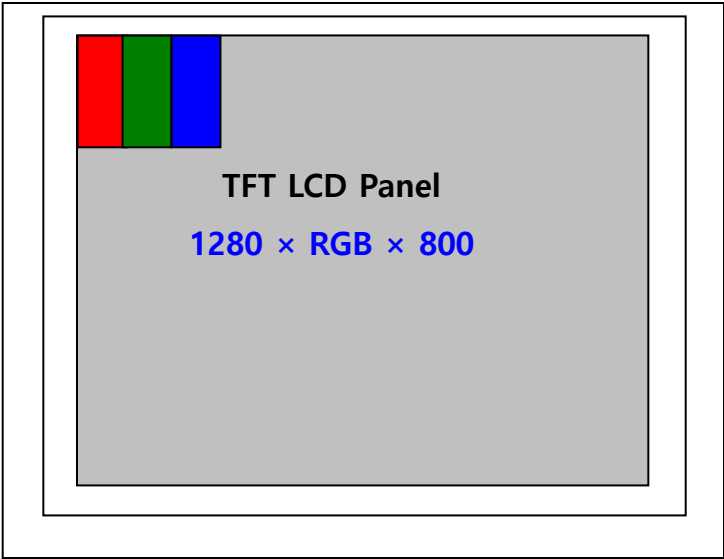
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# 1.0 GENERAL DESCRIPTION

## 1.1 Introduction

JJ121BWXM-L4048 is a color active matrix TFT LCD using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 12.1 inch diagonally measured active area with WXGA resolutions (1280 horizontal by 800 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.





## 1.2 Features

- GOA + dual Gate Design

## 1.3 Application

- Tablet PC & NB

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1.4 General Specification				
<Table 1. LCD Module Specifications>				
Parameter	Specification	Unit	Remarks	
LCD Size	12.1	inch	-	
Active area	262.656(H) ×164.16(V)	mm	-	
Number of pixels	1280(H) ×800 (V)	pixels	-	
Pixel pitch	0.2052 (H) × 0.2052(V)	mm	-	
Pixel arrangement	RGB	-	-	
Display colors	16.7M	colors	-	
Display mode	Normal black	-	-	
LCM Outline Dimension	271.06±0.3(W)×176.42±0.3(V) (W/O PCBA)× 2.66±0.2(D) 271.06±0.3(W)×168.58±0.5(V) (With PCBA)× 2.66±0.2(D)	mm		
Transmittance	6.0%	-	W/O APF	
NTSC	Typ. 50%	-	-	
Inversion Type	Dual Gate 2 Line 2 Dot	-		
Response Time	Typ. 30ms, Max. 35ms	ms		
Power Consumption (TYP) @White pattern	Panel Power: 1.0W BLU Power: 2.4W	W	W/O LED Driver	
CR	Typ. 900 Min:700			
Brightness	Typ:300 Min:270	nits	@center	
Brightness Uniformity ( 9Point )	Typ.75%,70%Min	-		
Viewing angle (CR ≧ 10)	Typ:80/80/80/80			
LCM Weight	290(Max.)	gram	No Digging Hole	
		-	-	
Upper pol size	265.66×167.16	mm	HC	
Lower pol size	265.66×167.16	mm	AG25	
Interface	EDP	-	-	

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## 2.0 ELECTRICAL SPECIFICATIONS

### 2.1 TFT LCD Module

< Table 1 . LCD Module Electrical Specifications > [Ta =25±2 °C]

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V <sub>DD</sub>	3.0	3.3	3.6	V	Note 1
Power Supply Current	I <sub>DD</sub>	-	350	450	mA	Note 1
Positive-going Input Thresh old Voltage	V <sub>IT+</sub>	-	-	100	mV	V <sub>cm</sub> = 1.2V typ.
Negative-going Input Thresh old Voltage	V <sub>IT-</sub>	-100	-	-	mV	
Differential Input Voltage	V <sub>ID</sub>	380	-	1200	mV	
Power Consumption	P <sub>D</sub>	-	1.0	1.2	W	@white pattern
	P <sub>BL</sub>	-	2.8	3.2	W	W/I Driver
	P <sub>total</sub>	-	3.8	4.4	W	@white pattern

- Notes :
1. The supply voltage is measured and specified at the interface connector of LCM. The current draw and power consumption specified is for 3.3V at 25 °C Max value at White Pattern
  2. Calculated value for reference (VLED X ILED)

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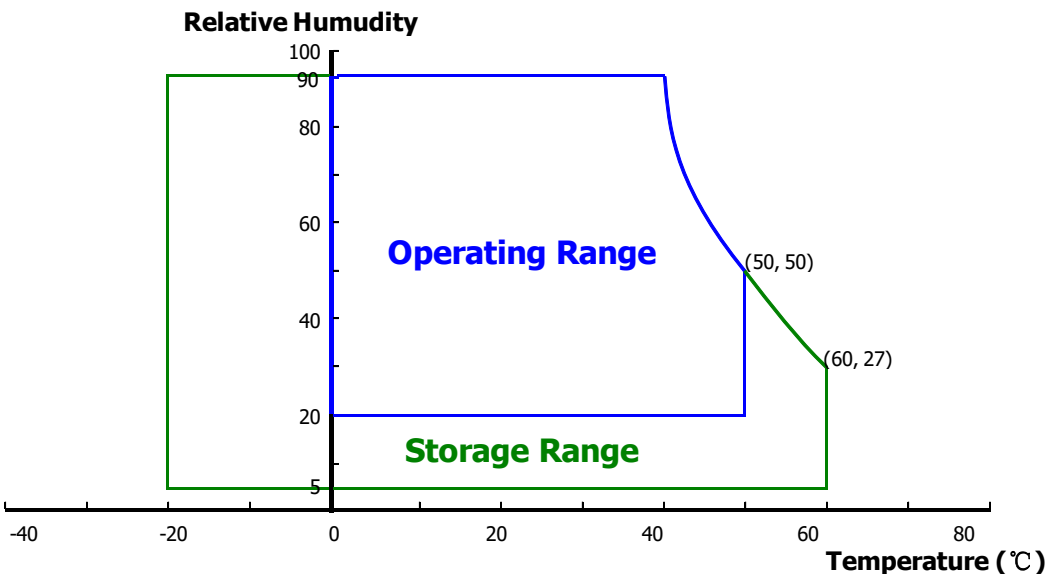
### 2.2 ABSOLUTE MAXIMUM RATINGS


The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2 . LCD Module Electrical Specifications > [Ta =25±2 °C]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V <sub>DD</sub>	-0.3	4.2	V	Note 1
Logic Supply Voltage	V <sub>IN</sub>	V <sub>ss</sub> -0.3	V <sub>DD</sub> +0.3	V	
Operating Temperature	T <sub>OP</sub>	0	+50	°C	Note 1
Storage Temperature	T <sub>ST</sub>	-20	+60	°C	

Note : 1 Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be 39 °C max. and no condensation of water.



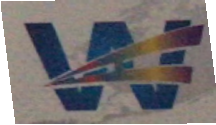
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### 2.3 Power Consumption of Backlight

**Test Condition :** ILED=40mA LED 48PCS  
**Warning:** LCM Brightness must match Optical Spec requirement when ILED=20mA  
**Backlight Unit Schematic:**

Item	Symbol	Value			Unit	Remark
		Min	Typ	Max		
Forward current	IBL	-	100	-	mA	<u>Note 1</u>
Power Consumption	PBL	-	2800	3200	mW	
LED Quantity		48			pcs	
LED Rank		Luminous Flux: 2800			mcd	

**Note 1 :** When ILED=40mA , the VBL must be in the range of above table specified.  
 The FPC wire resistance between LED+ and LED- must be less than 0.15ohm  
 PBL= ILEDX VBL

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## 2.4 INTERFACE CONNECTION

### 2.4.1 Module Input Signal & Power

- FPC Signal interface : 30 Pin.

<Table 3. 1Display Interface>

Pin No.	Symbol	Description
1	GND	High Speed Ground
2	GND	High Speed Ground
3	NC	No Connection
4	NC	No Connection
5	GND	High Speed Ground
6	Lane0_N	Complement Signal Link Lane 0
7	Lane0_P	True Signal Link Lane 0
8	GND	High Speed Ground
9	AUX_CH_P	True Signal Auxiliary Ch.
10	AUX_CH_N	Complement Signal Auxiliary Ch.
11	GND	High Speed Ground
12	LCD_VCC	LCD logic power (3.3V)
13	LCD_VCC	LCD logic power (3.3V)
14	LCD_Self_Test	No Connection (Reserved for CMI)
15	GND	LCD Ground
16	GND	LCD Ground
17	HPD_IN	HPD signal pin
18	PWMI	System PWM signal input
19	PWMO	Panel PWM signal output to system
20	LED_FB1	LED Cathode
21	LED_FB2	LED Cathode
22	LED_FB3	LED Cathode
23	LED_FB4	LED Cathode
24	NC	No Connection
25	I2C_SCL	Reserved for I2C BUS
26	I2C_SDA	Reserved for I2C BUS
27	NC	No Connection
28	Anode	LED Anode
29	Anode	LED Anode
30	GND	High Speed Ground

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2.5 SIGNAL TIMING SPECIFICATION

2.5.1 Signal timing

ITEM	Symbol		Min	Typ	Max	Unit	Note
CLK	Period	$t_{CLK}$	4		4.44	ns	
	Frequency	-	64.8	67.2	70.4	MHZ	
Hsync	Period	$t_{HP}$	-	1380	-	$t_{CLK}$	
	Frequency	$f_H$	97.2	97.4	-	KHz	
Vsync	Period	$t_{VP}$	-	812	-	$t_{HP}$	
	Frequency	$f_V$	55	60	64	Hz	
Horizontal Active Display Term	Valid	$t_{HV}$	-	1280	-	$t_{CLK}$	
	Total	$t_{HP}$	-	1380	1560	$t_{CLK}$	
Vertical Active Display Term	Valid	$t_{VV}$	-	800	-	$t_{HP}$	
	Total	$t_{VP}$	810	812	830	$t_{HP}$	

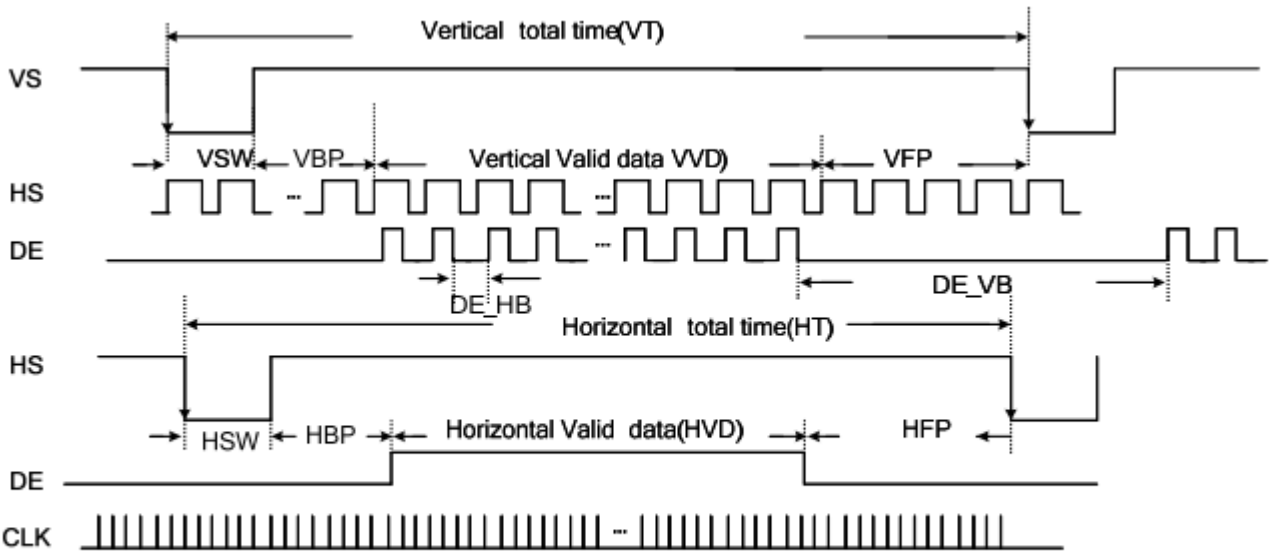



Figure 6.5: Input video signal format

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### 2.5.2 EDP Interface Timing Parameter

The specification of the EDP interface timing parameter

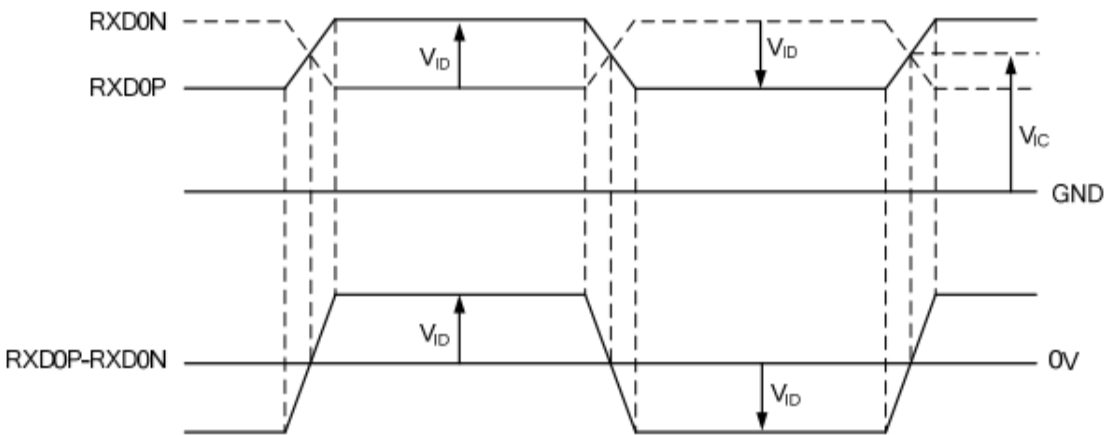
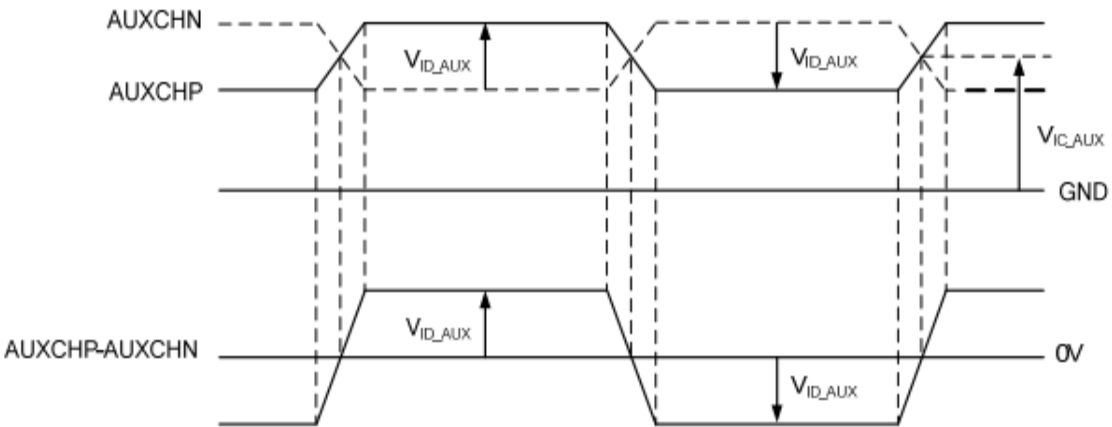



Figure 7.1: Main Link  $V_{ID}$  and  $V_{IC}$  definition




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### 2.5.3 DC electrical character

Symbol	Parameter	Condition	Spec.			Unit
			Min.	Typ.	Max.	
CMOS/TTL DC specifications						
V <sub>IH</sub>	High level input voltage	-	0.7VDDIO	-	VDDIO	V
V <sub>IL</sub>	Low level input voltage	-	VSSIO	-	0.3VDDIO	V
V <sub>OH</sub>	High level output voltage	-	0.8VDDIO	-	VDDIO	V
V <sub>OL</sub>	Low level output voltage	-	VSSIO	-	0.2VDDIO	V
I <sub>IN</sub>	Input current	-	-10	-	10	μA
R <sub>PD</sub>	Pull low resistance	CABC_EN (Pin 5) COLOR_EN (Pin 6) AGMODE (Pin 17) PWMI (Pin 18) TEST (Pin 22)	75	150	225	KΩ
DP DC specifications						
V <sub>IC</sub>	Main link common mode voltage - 0 - 2.0 V					
V <sub>ID</sub>	Main link swing voltage	2.7 Gbps	±60	-	±600	mV
		1.62 Gbps	±20	-	±600	mV
V <sub>IC_AUX</sub>	AUX common mode voltage	-	0	-	2.0	V
V <sub>ID_AUX</sub>	AUX swing voltage	transmitting	±0.195	-	±0.69	V
		receiving	±0.16	-	±0.68	V
mini-LVDS DC specifications						
V <sub>OD</sub>	Output differential voltage range	RL=100Ω (T <sub>A</sub> =25°C)	100	-	600	mV
	Output differential voltage deviation		V <sub>OD_CODE</sub> *0.85 <sup>(1)</sup>	-	V <sub>OD_CODE</sub> *1.15 <sup>(1)</sup>	mV
V <sub>OS</sub>	Output offset voltage range		0.6	-	1.3	V
	Output offset voltage deviation		V <sub>OS_CODE</sub> -0.2 <sup>(1)</sup>	-	V <sub>OS_CODE</sub> +0.2 <sup>(1)</sup>	V
PWM DC specifications						
V <sub>LX</sub>	LX pin spike voltage	-	-2	-	3.6	V

**Note:** (1) The  $V_{OD\_CODE}$  and  $V_{OS\_CODE}$  can be programmable by different panel characteristics through ROM code.

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2.5.4 AC electrical character

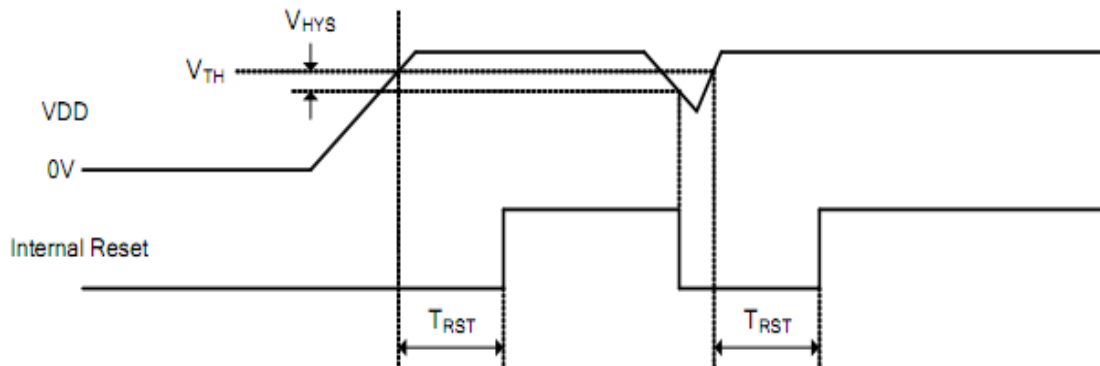


Figure : Power on reset

Symbol	Parameter	Condition	Spec.			Unit
			Min.	Typ.	Max.	
V <sub>TH</sub>	Reset threshold voltage	-	1.7	1.9	2.1	V
V <sub>HYS</sub>	Hysteresis voltage	-	200	-	-	mV
T <sub>RST</sub>	Time constant of RC	-	-	0.8RC	-	s

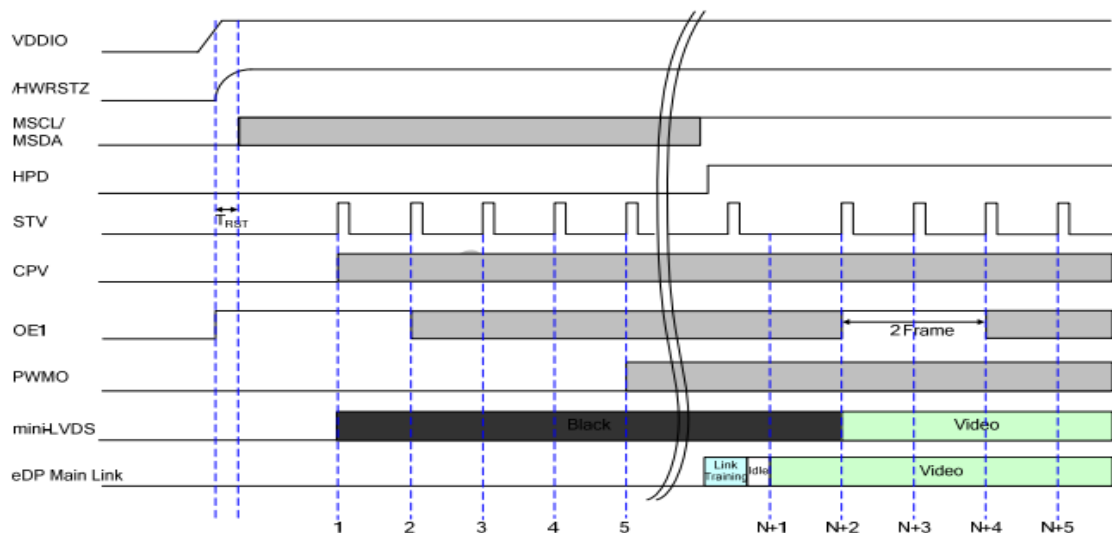




Figure : Power up sequence

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### 3.0 Optical Specifications

The test of Optical specifications shall be measured in a dark room (ambient luminance  $\leq 1$  lux and temperature =  $25\pm 2^{\circ}\text{C}$ ) with the equipment of Luminance meter system (CA-310、B M-5A) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of  $\theta$  and  $\Phi$  equal to  $0^{\circ}$ . We refer to  $\theta_{\theta=0}$  ( $=\theta_3$ ) as the 3 o'clock direction (the "right"),  $\theta_{\theta=90}$  ( $=\theta_{12}$ ) as the 12 o'clock direction ("upward"),  $\theta_{\theta=180}$  ( $=\theta_9$ ) as the 9 o'clock direction ("left") and  $\theta_{\theta=270}$  ( $=\theta_6$ ) as the 6 o'clock direction ("bottom"). While scanning  $\theta$  and/or  $\Phi$ , the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 3.3V +/-10% at  $25^{\circ}\text{C}$ . Optimum viewing angle direction is 6 'clock.

Item		Symbol	Condition	Value			Unit	Note
				Min	Typ	Max		
luminance		Bp	θ=0 Φ=0	400	500	--	cd/m2	Note 3
Maximum Brightness of Black Pattern		Bblk		---	---	0.65	cd/m2	
Uniformity		Δ9Bp		70	75	--	%	Note 4
Color Uniformity		Δu'Δ v'-A				TBD		
		Δu'Δ v'-B				TBD		
		ΔE*ab				TBD		
Viewing Angle	Left	θ <sub>L</sub>	Cr≥10	75	80	--	deg	Note 1
	Right	θ <sub>R</sub>		75	80	--		
	Top	ψ <sub>T</sub>		75	80	--		
	Bottom	ψ <sub>B</sub>		75	80	--		
Contrast Ratio		Cr	θ=0 Φ=0	700	900	--	-	Note 2
Response Time		Tr+Tf		--	25	35	ms	Note 6
		Tgray		-	45	55	ms	
Color Coordinate of CIE1931 1	Red	x	θ=0 Φ=0	—	—	—	-	Note 5
		y		—	—	—		
	Green	x		—	—	—		
		y		—	—	—		
	Blue	x		—	—	—		
		y		—	—	—		
	White	x		0.25	0.30	0.35		
		y		0.27	0.32	0.37		
NTSC Ratio		NTSC	CEI1931		50		%	

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### Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).
2. Contrast measurements shall be made at viewing angle of  $\Theta = 0$  and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 1)

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as luminance values of 1point average across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display. The luminance is measured by CA310 when the LED current is set at 16.8mA.
4. The White luminance uniformity on LCD surface is then expressed as :  $\Delta Y = \text{Minimum Luminance of 9points} / \text{Maximum Luminance of 9points}$  (see FIGURE 2).
5. The color chromaticity coordinates specified shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
6. The color chromaticity coordinates specified shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
7. The electro-optical response time measurements shall be made as FIGURE 4 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is  $T_r$ , and 90% to 10% is  $T_d$ .


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Figure 1. Measurement Set Up

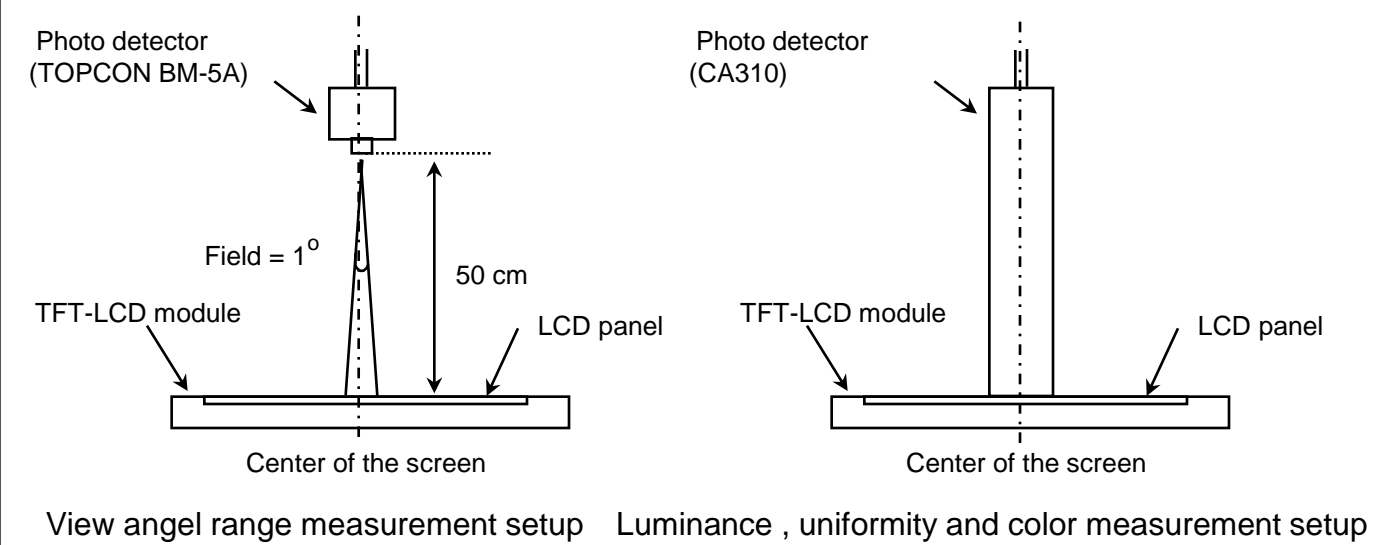
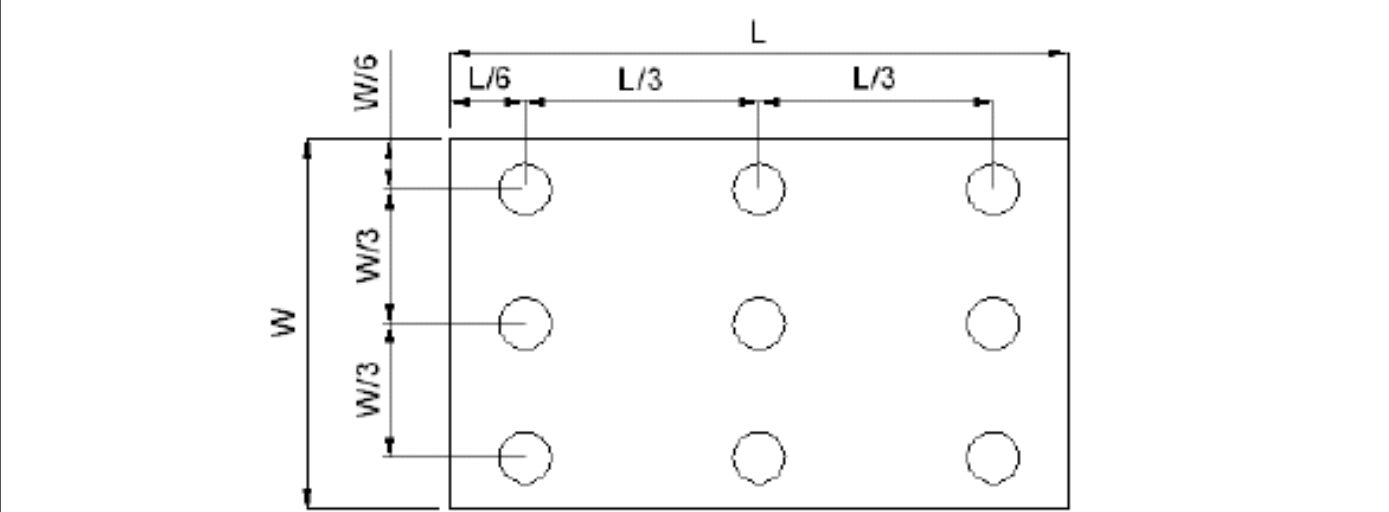


Figure 2. White Luminance and Uniformity Measurement Locations (9 points)



Center Luminance of white is defined as luminance values of center points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.

The White luminance uniformity on LCD surface is then expressed as :  $\Delta Y9 = \text{Minimum Luminance of 9points} / \text{Maximum Luminance of 9points}$  (see FIGURE 2).


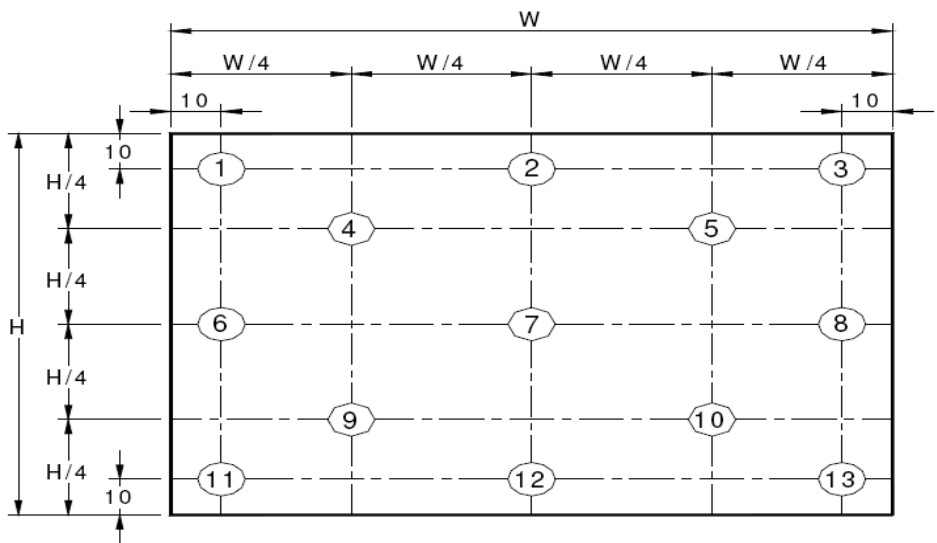
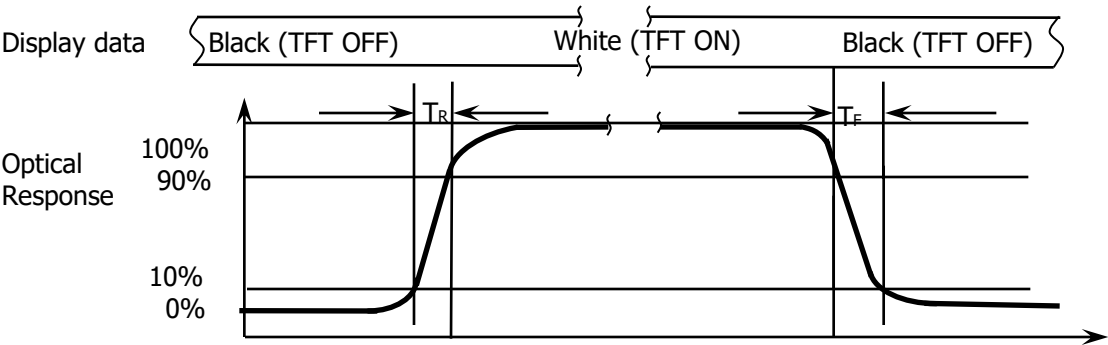
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Figure 3. Uniformity Measurement Locations (13 points)




The White luminance uniformity on LCD surface is then expressed as :  $\Delta Y_{13}$  = Minimum Luminance of 13 points /Maximum Luminance of 13 points (see FIGURE 3).  
The White luminance uniformity of 5 point is the same test method as 13 point u sing FIGURE 3.

Figure 4. Response Time Testing




The electro-optical response time measurements shall be made as shown in FIGURE 3 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr and 90% to 10% is Td.

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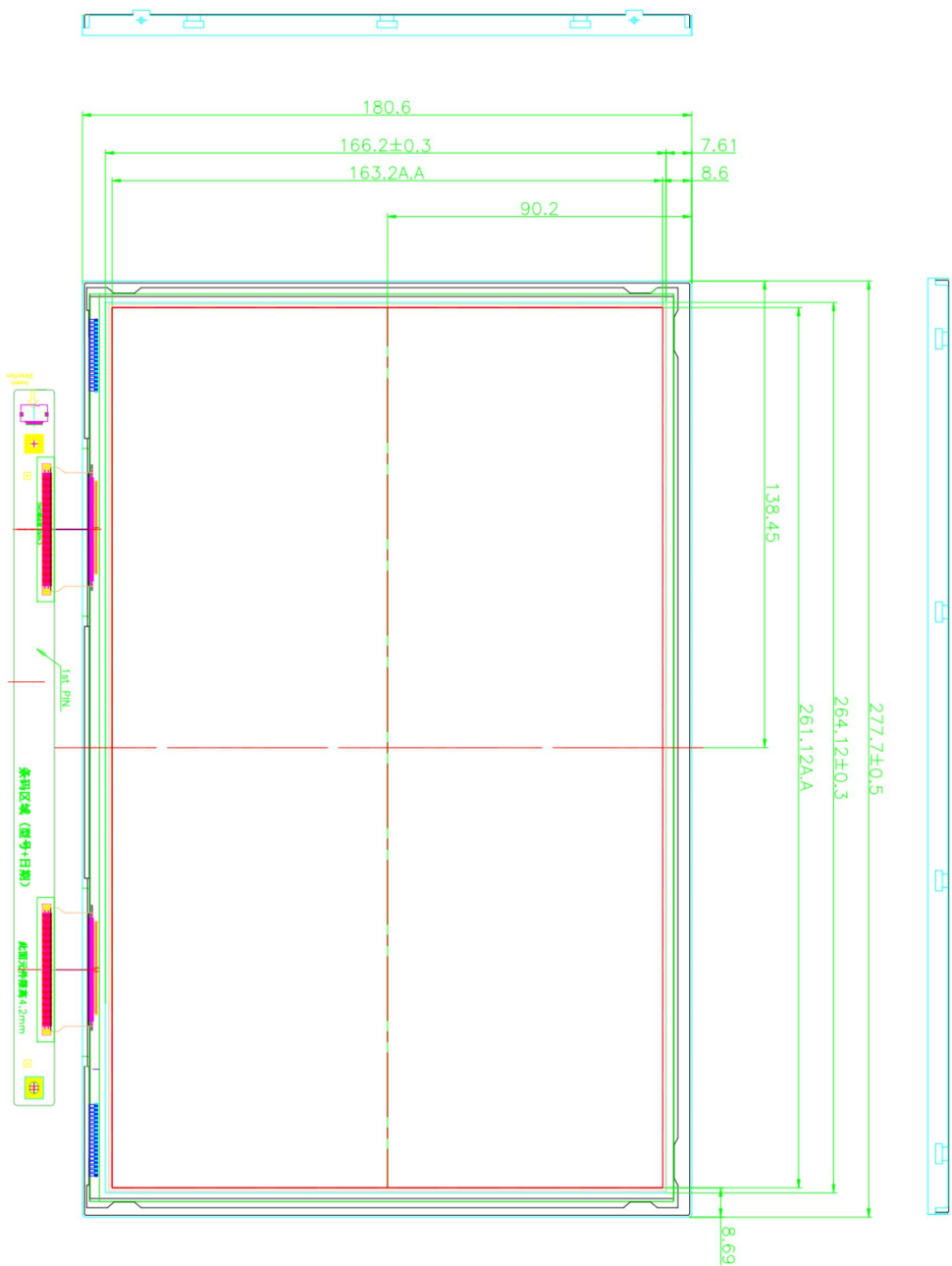
4.0 Reliability Test

No	Test Item	Test Condition	Remark
1	High temperature storage	60C/96h	-
2	Low temperature storage	-20C/96h	
3	High temperature/High humidity operating	50C/90%RH/96h	
4	High temperature operating	50C/96h	
5	Low temperature operating	-10℃/96h	
6	Thermal Shock Storage	-20℃ (30 min)~ +60 ℃(30 min) , 10 cycles	
7	ESD test (Component-LCD MDL)	Air +/-8KV ,contact +/-8KV , Criteria B	

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## 5.0 MECHANICAL OUTLINE DIMENSION

Figure 1. LCM Module Outline Dimension (Front View)




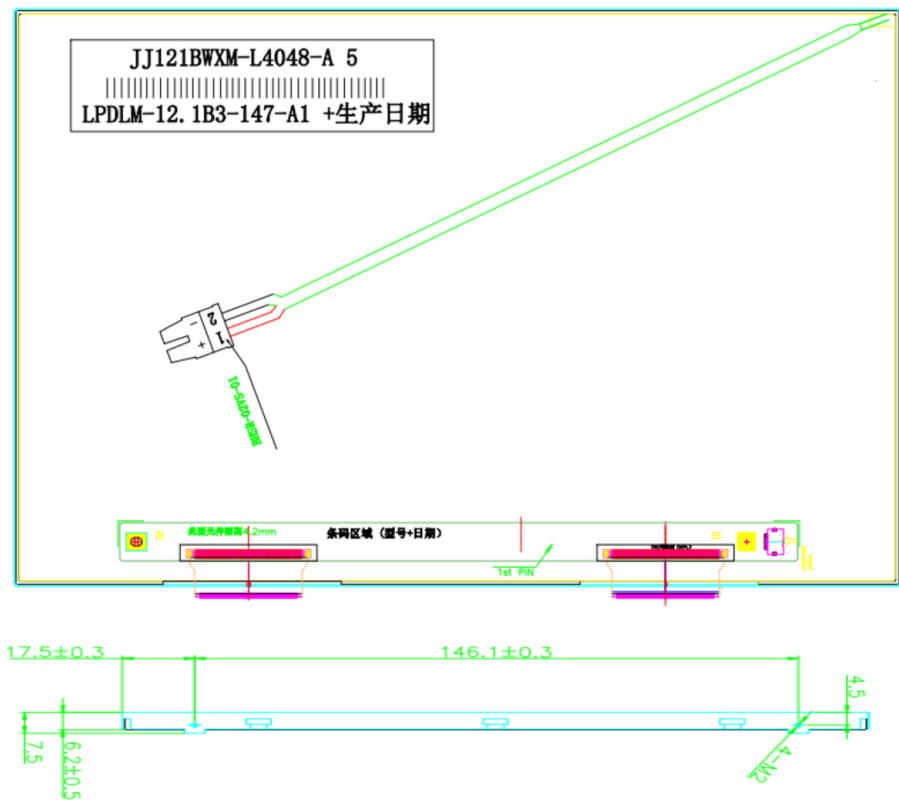
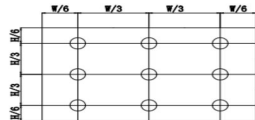

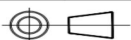
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Figure 2. TFT-LCD Module Outline Dimensions (Rear view)



测试点示意图				Backlight LED Circuit			
							
				Backlight LED Circuit If=240mA; Vf=23-26.5V			
PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Center luminance		Lv	400	500		cd/m <sup>2</sup>	中心点
Color ranks		X	0.270	0.0290	0.350		If=40mA/SMD
		Y	0.270	0.0300	0.360		If=40mA/SMD
Forward Voltage		Vf	23		26.5	V	If=240mA, 8※6=48
Luminance uniformity		/	80	85		%	(Min/MAX)*100%
Measuring Instrument:BM-7(测试镜头与产品距离500±10mm);测量视场度为1°;温度25±3°;环境照度不大于1LUX;测试点为9点.							
UNIT 单位	mm	EDITION 版本	A1		PART NO. 产品型号		APPROVED 核准
 THIRD ANGLE PROJECTION 第三角法		SCALE 比例	1:1		SHL'S P/N(exclude wrapper): LPDL-12. 1B3-147-A1		
		DATE 日期	2023. 06. 25		SHL'S P/N: (include wrapper)		
		PAGE 页码	1/3		LPDLM-12. 1B3-147-A1		