

**DATA MODUL**

**Specification BOE**

**EV173FHM-N81**

17.3" - 1920 x 1080 – eDP

Spec Revision: 0  
Revision Date: 12.10.2023

Note: This specification is subject to change without prior notice

**Passion Displayed**

**PROPRIETARY NOTE**

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## B8 EV173FHM-N81 Product Specification Rev.P0

BUYER	
SUPPLIER	Chongqing BOE Optoelectronics CO., LTD
FG-Code	

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Prepared	_____	_____
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### REVISION HISTORY

( ) preliminary specification

(√) Final specification

REV.	ECN No.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0		Initial Release	2023-07-07	Chen Yuxiao
0		Final Release	2023-10-12	Chen Yuxiao

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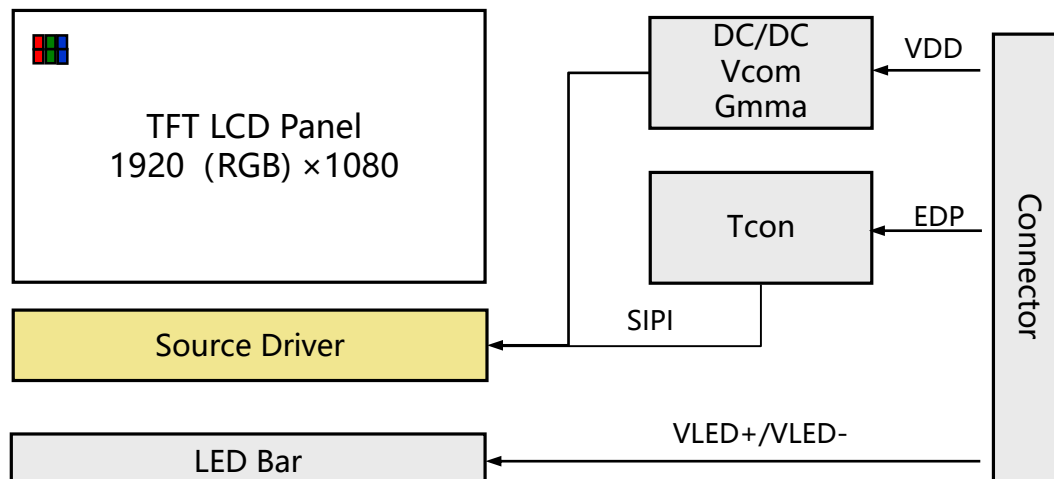
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## 1.0 GENERAL DESCRIPTION

### 1.1 Introduction

EV173FHM-N81 is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 17.3 inch diagonally measured active area with FHD resolutions (1920 horizontal by 1080 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

- 0.4T Glass (Single)
- Real 8Bit color depth, display 16.7M colors
- EDP1.2 Interface
- DE (Data Enable) only
- Reverse Type
- Thin and light weight
- High luminance and contrast ratio, low reflection and wide viewing angle
- RoHS compliant

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### 1.3 Application

- Monitoring
- HMI

### 1.4 General Specification

The followings are general specifications at the EV173FHM-N81

<Table 1. LCD Module Specifications>

Parameter	Specification	Unit	Remarks
Active Area	381.888(H) *214.812(V)	mm	
Number Of Pixels	1920 ×1080	pixels	
Pixel Pitch	198.9(H) ×198.9(V)	mm	
Pixel Arrangement	RGB Vertical stripe		
Display Mode	Normally black		
Display Colors	16.7M	colors	8Bit
Surface Treatment	AG25		
Contrast Ratio	1100:1typ, 800:1min		
Viewing Angle(CR>10)	85/85/85/85typ, 80/80/80/80min	deg.	
Response Time	16ms typ, 25ms max	ms	
Color Gamut	NTSC72%Typ.		
Brightness	Typ.480; Min.384	cd/m2	
Brightness Uniformity	Min. 80%@ 9Points		1/6点位
Power Consumption	1.02W (Tpy.) +6.02W(BLU)	watt	
Outline Dimension	389.888(H) × 227.612(V)*3.2(B)	mm	w/I 背板 Punch
Weight	520Max	gram	
Back-light	Down edge side, one LED Light bar		

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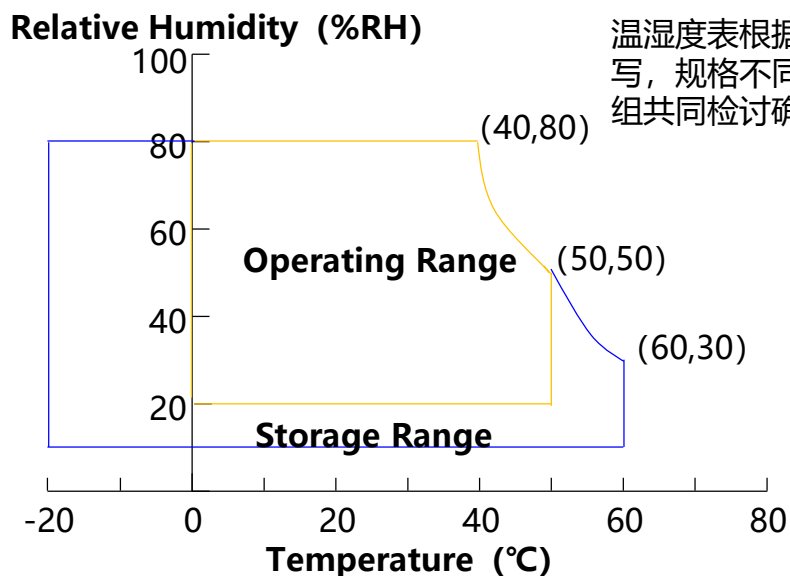
## 2.0 ABSOLUTE MAXIMUM RATINGS

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. Absolute Maximum Ratings >

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	VSS-0.3	6	V	Ta = 25 °C
	VBLU	VSS-0.3	23.2	V	Ta = 25 °C
Operating Temperature	T <sub>OP</sub>	0	+50	°C	Note 1
	T <sub>SUR</sub>	-	+65	°C	
Storage Temperature	T <sub>ST</sub>	-20	+60	°C	
Operating Ambient Humidity	Hop	10	80	%RH	
Storage Humidity	Hst	10	80	%RH	

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.  
T<sub>SUR</sub> : Panel surface Temperature is measured at 50°C Dry Condition



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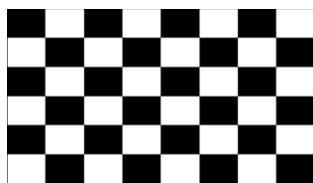
### 3.0 ELECTRICAL SPECIFICATIONS

#### 3.1 TFT LCD Module

< Table 3. LCD Module Electrical specifications > [Ta =25±2 °C]

Parameter		Symbol	Values			Unit	Notes
			Min.	Typ.	Max.		
Power Supply Voltage		VDD	3.0	3.3	3.6	V	Note 1
Power Supply Ripple Voltage		VRP	-	-	300	mV	
Power Supply Current		IDD	-	310	890	mA	
Rush current		IRUSH	-	-	2	A	Note 2
eDP Interface	Main link swing voltage	V <sub>ID</sub>	100	-	1200	mV	
	Common mode voltage	V <sub>cm</sub>	-	0	-	V	
BLU Supply Voltage		V <sub>LED</sub>	-	22.8	-	V	
BLU Supply Current		I <sub>LED</sub>	-	264	-	mA	
Power Consumption		P <sub>D</sub>	-	1.02	2.93	W	Note 1
		P <sub>LED</sub>	-	6.02	6.17	W	
		P <sub>total</sub>	-	7.04	-	W	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.  
The current draw and power consumption specified is for VBAT=3.3V, Frame rate f<sub>v</sub>=60Hz and Clock frequency = 141.6MHz. Test Pattern of power supply current  
a) Typ : Mosaic 8 x 6 Pattern(L0/L255)                      b) Max : H 1line



2. The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)



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### 3.2 Back-Light Unit

**Table 4. LED Bar Electrical Specifications >**

[Ta =25±2 °C]

Parameter	Symbol	Values			Unit	Notes
		Min.	Typ.	Max.		
LED Supply Voltage	V <sub>LED</sub>	-	22.8	23.36	V	
LED Supply Current	I <sub>LED</sub>	-	264	-	mA	Note 1
Power Consumption	P <sub>LED</sub>	-	6.02	6.17	W	
LED Quantity	QLED	-	96	-	EA	
LED Life Time	TLED	30000	-	-	Hrs	Note 2/3

Notes: 1. LED Bar:12Parallel\*8String , I<sub>LED</sub>=22mA\*12=264mA

$$P_{LED} = V_{LED} \times I_{LED} (\text{Without LED converter transfer efficiency})$$

2. The life time of LED, 30,000Hrs, is determined as the time at which luminance of the LED is 50% compared to that of initial value at the typical LED current on condition of continuous operating at 25 ± 2°C.

3. Only under the above operating conditions could the life time of LED be guaranteed.

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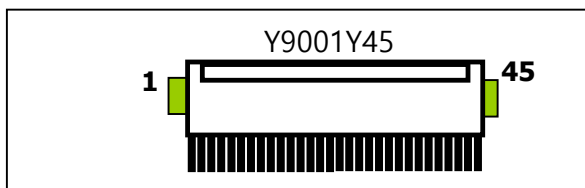
## 4.0 INTERFACE CONNECTION

**4.1 Interface Input Signal & Power** : Cable length suggest less than 60mm  
- Edp Connector Y9001Y45 or equivalent

**< Table5. Pin Assignment for LCD Module Connector >**

No.	Symbol	No.	Symbol
1	GND Ground	27	LED2- LED light bar negative2(current 21mA )
2	Lane1_N eDP RX channel 1 negative	28	LED3- LED light bar negative3(current 21mA )
3	Lane1_P eDP RX channel 1 positive	29	LED4- LED light bar negative4(current 21mA )
4	GND Ground	30	LED5- LED light bar negative5(current 21mA )
5	Lane0_N eDP RX channel 0 negative	31	LED6- LED light bar negative6(current 21mA )
6	Lane0_P eDP RX channel 0 positive	32	NC not connect
7	GND Ground	33	VLED2+ another LED light bar Power Supply 24V
8	AUX_P eDP AUX CH positive	34	VLED2+ another LED light bar Power Supply 24V
9	AUX_N eDP AUX CH negative	35	NC not connect
10	GND Ground	36	LED7- LED light bar negative7(current 21mA )
11	NC Not connect	37	LED8- LED light bar negative8(current 21mA )
12	VCC Power Supply, 3.3V (typ.)	38	LED9- LED light bar negative9(current 21mA )
13	VCC Power Supply, 3.3V (typ.)	39	LED10- LED light bar negative10(current 21mA )
14	VCC Power Supply, 3.3V (typ.)	40	LED11- LED light bar negative11(current 21mA )
15	NC Not connect	41	LED12- LED light bar negative12(current 21mA )
16	GND Ground	42	NC not connect
17	HPD Hot plug detect output	43	GND Ground
18	GND Ground	44	GND Ground
19	VSYNC	45	GND Ground
20	GND Ground		
21	BL_PWM TCON PWMout Signal , Input to AP LED Driver		
22	NC not connect		
23	VLED1+ LED light bar Power Supply 24V max		
24	VLED1+ LED light bar Power Supply 24V max		
25	NC not connect		
26	LED1- LED light bar negative1(current 21mA )		

**Rear view of LCM**



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**4.2 Pin assignment for LED Bar**  
Connector : QING HONG 9001Y20

**< Table6. Pin assignment for LED Bar >**

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	GND		11	LED10-	LED FB
2	LED1-	LED FB	12	LED11-	LED FB
3	LED2-	LED FB	13	LED12-	LED FB
4	LED3-	LED FB	14	NC	
5	LED4-	LED FB	15	VLED1+	Backlight Power
6	LED5-	LED FB	16	VLED1+	Backlight Power
7	LED6-	LED FB	17	NC	
8	LED7-	LED FB	18	VLED2+	Backlight Power
9	LED8-	LED FB	19	VLED2+	Backlight Power
10	LED9-	LED FB	20	NC	



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## 5.0 SIGNAL TIMING SPECIFICATION

### 5.1 Timing Parameters (DE only mode)

< Table10. Timing Parameter >

Item	Symbol		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	6.93	7.06	7.21	ns	-
	Frequency	-	138.7	141.6	144.2	MHz	-
Horizontal	Horizontal Period (Total)	tHP	2110	2142	2162	tCLK	-
	Horizontal Valid	tHV	1920			tCLK	-
	Horizontal Blank	tHB	90	222	242	-	-
	Frequency	fH	65.76	66	66.72	KHz	-
Vertical	Vertical Period (Total)	tVP	1096	1102	1112	tHP	
	Vertical Valid	tVV	1080			tHP	
	Vertical Blank	tVB	16	22	32	tHP	
	Frequency	fV	58	60	62	Hz	
eDP Receiver Clock	Input spread spectrum ratio	SSr	-0.5	-	+0.5	%	
	Inter-Pair Skew	TRISK_Inter	0	-	0.49	UI	

#### Note

- DE Only Mode, While operation, DE signal should be have the same cycle. The input of HSYNC & VSYNC signal does not have an effect on normal operation.
- Best operation clock frequency is 141.6MHz.
- Frequency] = [H Total] \* [V Total] \* [vertical Frame rate]  
H Total, V Total and Frame rate]should operate within the range between Frequency\_Min and Frequency\_Max
- Except Best operation clock frequency, FOS(Flicker & Brightness & Crosstalk, Etc.) are not guaranteed.
- Main frequency Max is 144.2Mhz MHz without spread spectrum

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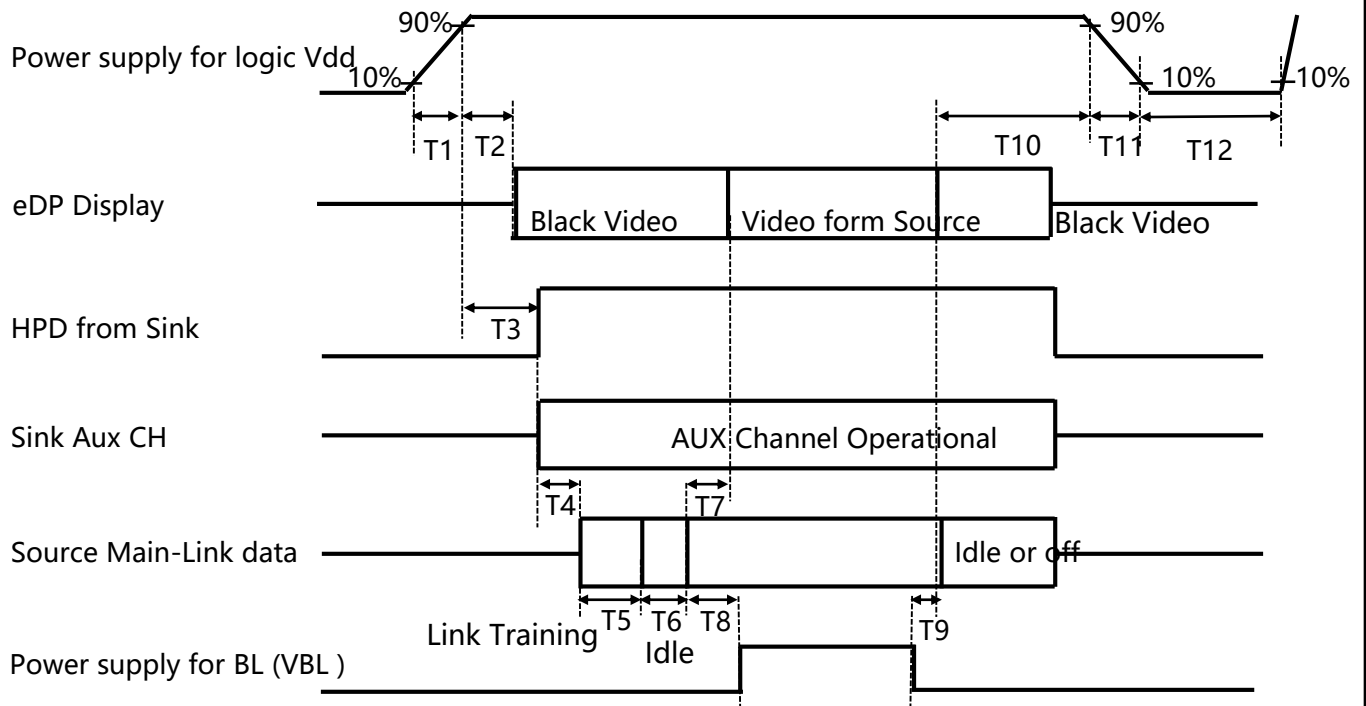
### 5.3 Input Signals, Basic Display Colors and Gray Scale of Colors

< Table 12. Input Signal and Display Color Table >

Color & Gray Scale		Input Data Signal																						
		Red Data						Green Data						Blue Data										
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	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
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	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	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	△	↑						↑						↑										
	▽	↓						↓						↓										
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	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	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	△	↑						↑						↑										
	▽	↓						↓						↓										
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Gray Scale of Blue	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	△	↑						↑						↑										
	▽	↓						↓						↓										
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	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	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
	△	↑						↑						↑										
	▽	↓						↓						↓										
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

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### 5.4 Power Sequence



- 0.5ms ≤ T1 ≤ 10 ms
- 0ms ≤ T2 ≤ 200 ms
- 0ms ≤ T3 ≤ 200 ms
- 80ms ≤ T8
- 0ms ≤ T7 ≤ 50ms
- 0ms ≤ T10 ≤ 500 ms
- 0.5ms ≤ T11 ≤ 10 ms
- 1s ≤ T12

**Notes:**

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

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## 6.0 OPTICAL SPECIFICATIONS

### 6.1 Overview

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 (PR730 & PR810) 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  $\theta=0$  ( $=\theta_3$ ) as the 3 o' clock direction (the "right"),  $\theta=90$  ( $=\theta_{12}$ ) as the 12 O' clock direction ("upward"),  $\theta=180$  ( $=\theta_9$ ) as the 9 O' clock direction ("left") and  $\theta=270$  ( $=\theta_6$ ) 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.

### 6.2 Optical Specifications

< Table15. Optical Table >

Item	Symbol	Condition	Min	Typ.	Max	Unit	Note
Brightness Center	Lv	$\theta=0^{\circ}$	384	480	--	cd/m <sup>2</sup>	Note 1
<b>Brightness Uniformity</b>	$\Delta Bp$		80		--	%	Note 2
<b>Viewing Angle</b>	$\theta_L$	Cr $\geq 10$	80	85	--	deg	Note 3
	$\theta_R$		80	85	--		
	$\psi_T$		80	85	--		
	$\psi_B$		80	85	--		
<b>Contrast Ratio</b>	Cr	$\theta=0^{\circ}$	800	1100		-	Note 4
<b>Response Time</b>	Tr+Tf	FF=0 $^{\circ}$	-	16	25	ms	Note 5
<b>Color Coordinate of CIE1931</b>	Rx	$\theta=0^{\circ}$	0.618	0.648	0.678	-	Note 6
	Ry		0.315	0.345	0.375		
	Gx		0.292	0.322	0.352		
	Gy		0.588	0.618	0.648		
	Bx		0.119	0.149	0.179		
	By		0.031	0.061	0.091		
	Wx		0.283	0.313	0.343		
	Wy		0.299	0.329	0.359		
<b>NTSC Ratio</b>	NTSC	CIE1931	68	72	--	%	Note 7
<b>Gray inversion angle</b>				6点钟			Note 8
<b>Gamma Scale</b>			2.0	2.2	2.4		

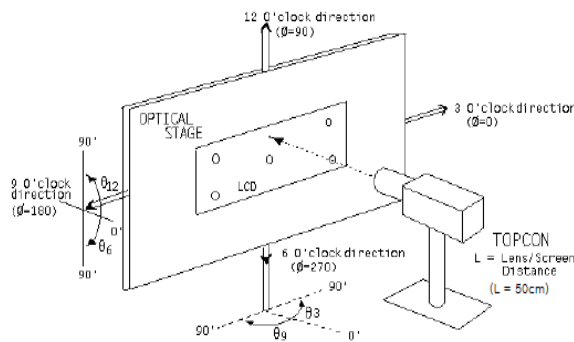


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**Note1:Luminance measurement**

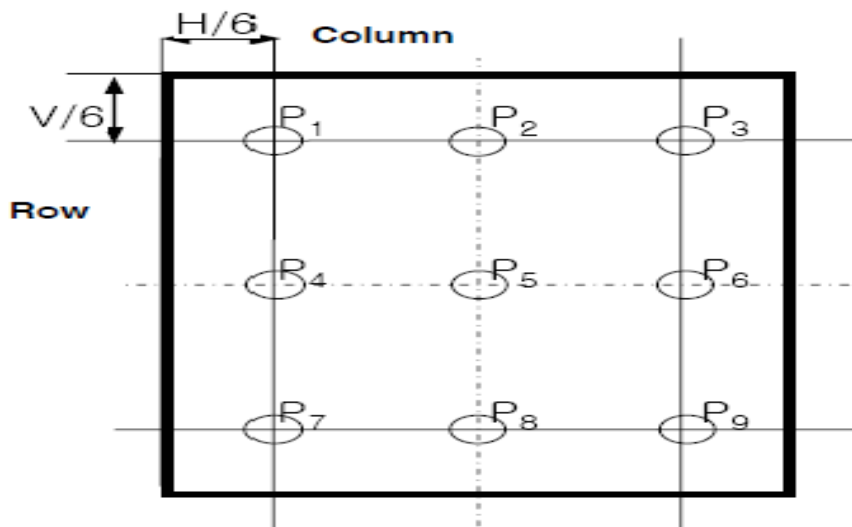
The test condition is at ILED=264mA and measured on the surface of LCD module at 25°C.

- The data are measured after LEDs are lighted on for more than 5 minutes and LCM displays are fully white. The brightness is the center of the LCD. Measurement equipment OTS/CA310/410 or similar equipments(Field of view:1deg,Distance:50cm)
- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25°C.
- Adjust operating voltage to get optimum contrast at the center of the display.
- Measured value at the center point of LCD panel must be after more than 5 minutes while backlight turning on.



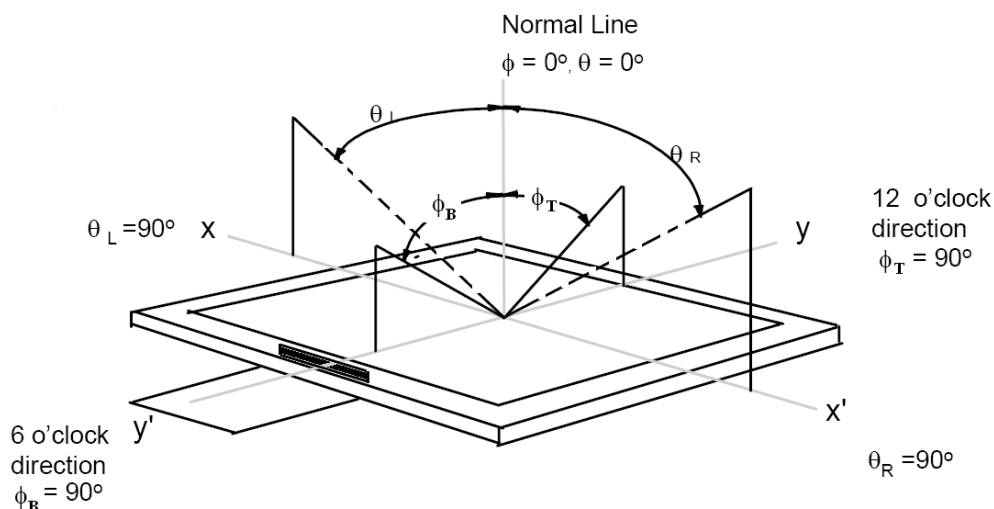
**Note2:Uniformity**

- The test condition is at ILED=264mA and measured on the surface of LCD module at 25°C.
- Measurement equipment: OTS/CA310/410 or similar equipments
- The luminance uniformity is calculated by using following formula:
- $\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$
- Bp (Max.) = Maximum brightness in 9 measured spots
- Bp (Min.) = Minimum brightness in 9 measured spots.



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**Note 3: The definition of Viewing Angle**  
Refer to the graph below marked by  $\theta$  and  $\phi$ .



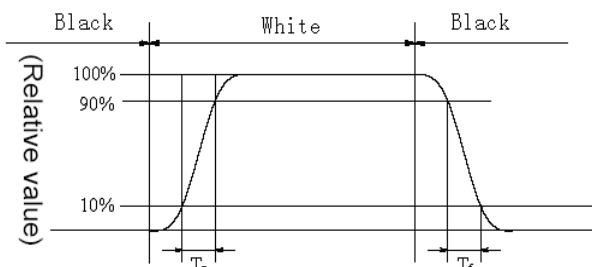
**Note 4: The definition of Contrast Ratio** (Test LCM using OTS/CA310/410 or similar equipments):

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance When LCD is at "White" state}}{\text{Luminance When LCD is at "Black" state}}$$

(Contrast Ratio is measured in optimum common electrode voltage)

**Note 5: Definition of Response time.** (Test LCD using OTS or similar equipments):

The output signal also photo detector are measured when the input signal also are changed from "black" to "white" (Voltage falling time) and from "white" to "black" (Voltage rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figures below.



Measured Response Time	0	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255	
Start																		

Response time of gray to gray:

Response time  $T_g$  is the average time required for display transition by switching the input signal as below table and is based on Frame rate  $f_V = 60\text{Hz}$  to optimize. Each time in below table is defined as Figure 2 and shall be measured by switching the signals for "any level of gray (bright)" and any level of gray (dark)

5. The output signals of photodetector are measured when the input signals are changed from "Lx" to "Ly",  $x, y = [0, 7]$ . The response time is defined as the time interval between the 10% and 90% of amplitudes. The result of the test can be noted as below:

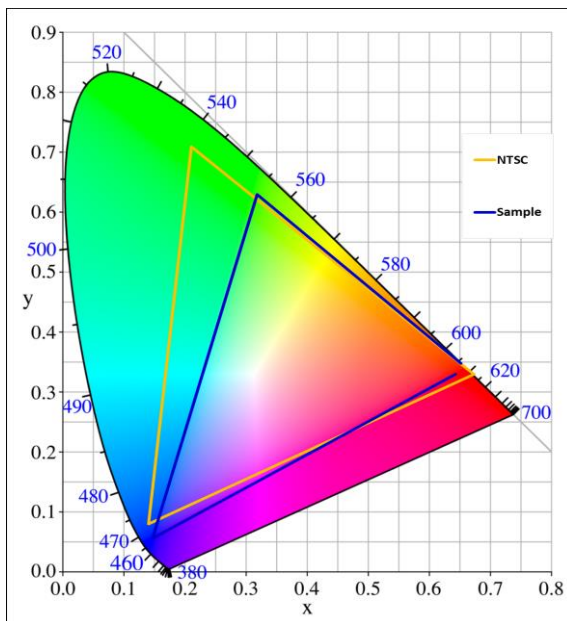
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**Note 6: Color Coordinates of CIE 1931**

The test condition is at ILED=264mA and measured on the surface of LCD module at 25°C.  
 Measurement equipment: OTS/CA310/410 or similar equipments  
 The Color Coordinate (CIE 1931) is the measurement of the center of the display shown in below figure.

**Note 7: Definition of Color of CIE Coordinate and NTSC Ratio.**

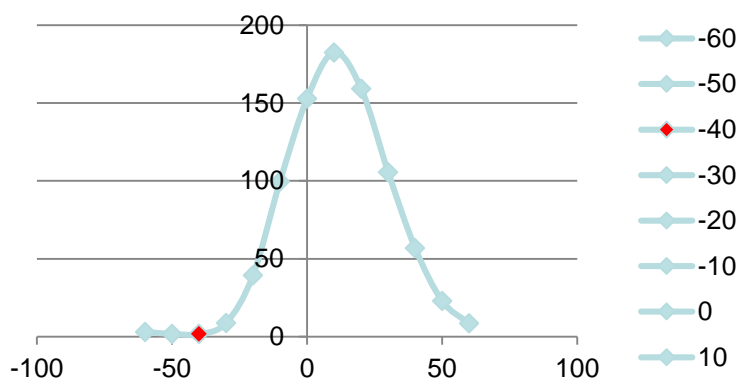
$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$



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**Note 8: Definition of gray inversion angle**

- Refer to the graph of note 9.
- Using luminance test method.
- Test pattern : 128 gray
- If the viewing direction is 12 o' clock ,then test the luminance while  $\theta = -60^\circ, \theta = -50^\circ, \theta = -40^\circ, \theta = -30^\circ, \theta = -20^\circ, \theta = -10^\circ, \theta = 0^\circ, \theta = 10^\circ, \theta = 20^\circ, \theta = 30^\circ, \theta = 40^\circ, \theta = -50^\circ, \theta = 60^\circ$ . The luminance test as figure below:



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## 7.0 MECHANICAL CHARACTERISTICS

### 7.1 Dimensional Requirements

Parameters are shown in Table 13.

< Table 13. Dimensional Parameters >

Parameter	Specification	Unit
Dimensional outline	389.888(H) × 227.612(V)*3.2(B)	mm
Weight	520Max	gram
Active area	381.888(H) × 214.812(V)	mm
Pixel pitch	198.9(H) × 198.9(V)	um
Number of pixels	1920*1080	pixels
Back-light	Down edge side 1-LED Light bar Type	

### 7.2 Mounting

See FIGURE 5. (shown in Appendix)

### 7.3 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an anti-glare coating to minimize reflection and a coating to reduce scratching.

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## 8.0 RELIABILITY TEST

The Reliability test items and its conditions are shown in below.

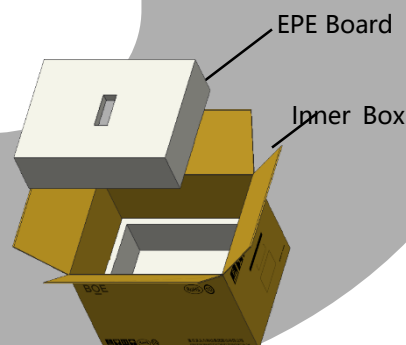
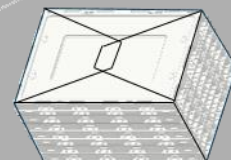
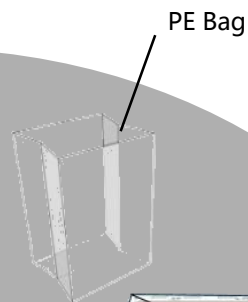
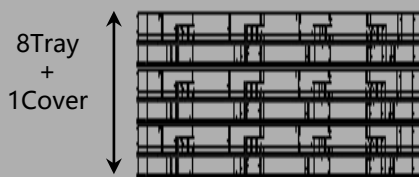
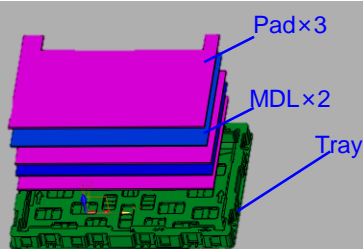
<Table 12. Reliability Test Parameters >

No	Test Items	Conditions
1	High temperature storage test	60°C, 240hr
2	Low temperature storage test	-20°C, 240hr
3	High temperature & high humidity (operation test)	50°C, 80%RH, 240hr
4	Low temperature operation test	0°C, 240hr
5	High temperature operation test	50°C, 240hr
6	Thermal Shock Test	-20°C~60°C, 1hr/cycle, 100cycle
7	ESD	150pF, 330Ω, ±8kV(Contact), ±15kV (Air)
8	Packing VIB	1.47G, 1-200hz, X, Y, ±Z, 30min/Axis

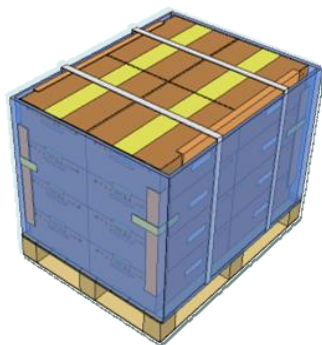
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## 9.0 PACKING INFORMATION(产品形态: MDL )

### 14.1 Packing Order



- Put 1 pcs spacer in tray and 1 pcs MDL on spacer.  
2 pcs MDL/Tray, 3 pcs Spacer/Tray.
- Put 8 pcs tray and 1 pcs tray cover in PE bag.
- Put PE bag with 2 EPE cover in the inner box.
- 16 pcs/Box, 12 Box/Pallet, 192 pcs MDL/Pallet.



### 9.1 Packing Note(产品形态: MDL)

- Box dimension: 522mm\*392mm\*294mm
- Package Quantity in one Box: 16 pcs
- Total weight: 11.9 kg/Box

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## 9.2 Box label



Box Label

Serial number marked part needs to print, show as follows:

1. FG-CODE(Before 12 bit)
2. Product quantity
3. Box ID
4. Date
5. The client section material number(The client)
6. FG-Code After four
7. The supplier code

Total Size:100×60mm

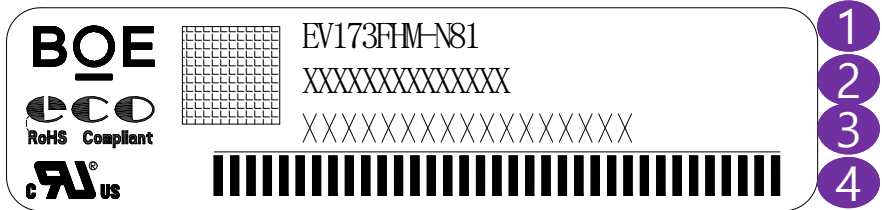
< Table 17 Box Label Naming Rule >

Digit Code	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	X	X	X	X	X	X	X	X	X	X	X	X	X
Description	Product Name		Product Grade	Facility Code	Year	Month	Revision	Box Serial NO.					



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### 9.3 Product Label



Label Size: 48mmx12mmx0.07mm,  
44-9231007

1. FG-CODE First 12 digits
2. Customer Code
3. LCM ID
4. LCM ID bar code

#### BOE MDL ID rule

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Code	X	X	B	8	3	6	X	8	R	A	0	X	X	X	X	X	X
Description	GBN 代码		等级	B3	年	月	日	FG Code后四位				序列号					

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## 10.0 Handling & Cautions

Please pay attention to the followings when you use this TFT LCD Module.

### 10.1 Mounting Precautions

- Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
  - You must mount a module using specified mounting holes (Details refer to the drawings).
  - You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
  - Do not apply mechanical stress or static pressure on module; Abnormal display cause by pressing some parts of module during assembly process, do not belong to product failure, the press should be agreed by two sides.
  - Determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
  - Do not apply mechanical stress or static pressure on module, and avoid impact, vibration and falling.
  - Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
  - Protection film for polarizer on the module should be slowly peeled off before display.
  - Be careful to prevent water & chemicals contact the module surface.
  - You should adopt radiation structure to satisfy the temperature specification.
  - Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- Do not touch the surface of polarizer for bare hand or greasy cloth.(Some cosmetics are detrimental to the polarizer.)

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- When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzine. Normal-hexane & alcohol is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene , because they cause chemical damage to the polarizer.
- Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- This module has its circuitry PCBs on the rear side and Driver IC, should be handled carefully in order not to be stressed.
- Avoid impose stress on PCB and Driver IC during assembly process ,Do not drawing, bending, COF package & wire.
- Do not disassemble the module.

## 10.2 Operating Precautions

- Do not connect or disconnect the cable to/from the Module at the "Power On" Condition.
- When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the module would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.
- Do not allow to adjust the adjustable resistance or switch.
- The electrochemical reaction caused by DC voltage will lead to LCD module degradation, so DC drive should be avoided.
- The LCD modules use C-MOS LSI drivers, so customers are recommended that any unused input terminal would be connected to Vdd or Vss, do not input any signals before power is turn on, and ground you body, work/assembly area, assembly equipment to protect against static electricity.
- Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.
- Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimized the interference.

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- The cables should be as short as possible between System Board and PCB interface.
- Connectors are precision devices to transmit electrical signals, and operators should plug in parallel.
- Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- For long-term lighting products, it is recommended to shut down periodically.
- If the product is used for a long time under the condition of 7\*24 hrs, it is strongly recommended to contact BOE for filed application engineering advice.
- Long time and large angle forward use or unconventional use , It is strongly recommended to contact BOE for filed application engineering advice.
- Products exposed to low temperature environment for a long time, need to carry out necessary protection , low temperature environment is usually refrigerators , vending machine Etc...

### 10.3 Electrostatic Discharge Precautions

- Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.
- Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc.
- Do not close to static electricity to avoid product damage.
- Do not touch interface pin directly.

### 10.4 Precautions for Strong Light Exposure

- Do not leave the module operation or storage in Strong light . Strong light exposure causes degradation of polarizer and color filter.

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## 10.5 Precautions for Storage

### A. Atmosphere Requirement

ITEM	UNIT	MIN	TYP	MAX
Storage Temperature	(°C)	5	25	40
Storage Humidity	(%rH)	40	50	75
Storage Life	6 months			
Storage Condition	<ul style="list-style-type: none"> <li>• The storage room should be equipped with a dark and good ventilation facility.</li> <li>• Prevent products from being exposed to the direct sunlight, moisture and water.</li> <li>• The product need to keep away from organic solvent and corrosive gas.</li> <li>• Be careful for condensation at sudden temperature change.</li> <li>• Storage condition is guaranteed under packing conditions.</li> </ul>			

### B. Package Requirement

- The product should be placed in a sealed polythene bag.
- Product Should be placed on the pallet, Which is away from the floor, Be cautions not to pile the product up.
- The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.
- As the original protective film, do not use the adhesive protective film to avoid change of Pol color and characteristic.

## 10.6 Precautions for protection film

- Remove the protective film slowly, keeping the removing direction approximate 30-degree not vertical from panel surface, If possible, under ESD control device like ion blower, and the humidity of working room should be kept over 50%RH to reduce the risk of static charge.
- People who peeled off the protection film should wear anti-static strap and grounded well.

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## 10.7 Appropriate Condition for Commercial Display

-Generally large-sized LCD modules are designed for consumer applications . Accordingly, long-term display like in Commercial Display application, can cause uneven display including image sticking. To optimize module's lifetime and function, several operating usages are required.

### 1. Normal operating condition

- Temperature:  $20\pm 15^{\circ}\text{C}$
- Operating Ambient Humidity :  $55\pm 20\%$
- Display pattern: dynamic pattern (Real display)
- Well-ventilated place is recommended to set up Commercial Display system

### 2. Special operating condition

#### a. Ambient condition

- Well-ventilated place is recommended to set up Commercial Display system.

#### b. Power and screen save

- Periodical power-off or screen save is needed after long-term display.

c. As the low temperature, the response time is greatly delayed. As the high temperatures (higher than the operating temperature) the LCD module may turn black screen. The above phenomenon cannot explain the failure of the display. When the temperature returns to the normal operating temperature, the LCD module will return to normal display.

d. When expose to drastic fluctuation of temperature (hot to cold or cold to hot ) ,the LCD module may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD module 's surface which may affect the operation of the polarizer and LCD module .

e. Do not exceed the absolute maximum rating value. (supply voltage variation, input v oltage variation, variation in part contents and environmental temperature, and so on) Otherwise the Module may be damaged.

f. Product reliability and functions are only guaranteed when the product is used under right operation usages. If product will be used in extreme conditions such as high temperature, high humidity, high altitude, highlight, special display images, running time, long time operation, outdoor operation, etc. It is strongly recommended to contact BOE for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, banks, stock market and controlling systems.

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3. Operating usages to protect against image sticking due to long-term static display.
  - a. Suitable operating time: under 20 hours a day.
  - b. Static information display recommended to use with moving image.
    - Cycling display between 5 minutes' information(static) display and 10 seconds' moving image.
  - c. Background and character (image) color change
    - Use different colors for background and character, respectively.
    - Change colors themselves periodically.
  - d. Avoid combination of background and character with large different luminance.
    - 1) Abnormal condition just means conditions except normal condition.
    - 2) Black image or moving image is strongly recommended as a screen save
4. Lifetime in this spec. is guaranteed only when Commercial Display is used according to operating usages.
5. Module should be turned clockwise based on front view when used in portrait mode. (MDL支持横竖兼容时按照实际情况填写,不支持横竖兼容时删除此条)

## 10.8 Other Precautions

### A. LC Leak

- If the liquid crystal material leaks from the panel, it is recommended to wash the LC with acetone or ethanol and then burn it.
- 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, skin or clothes, it has to be washed away thoroughly with soap.
- If LC in mouth, mouth need to be washed, drink plenty of water to induce vomiting and follow medical advice.
- If LC touch eyes, eyes need to be washed with running water at least 15 minutes.

### B. Rework

- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

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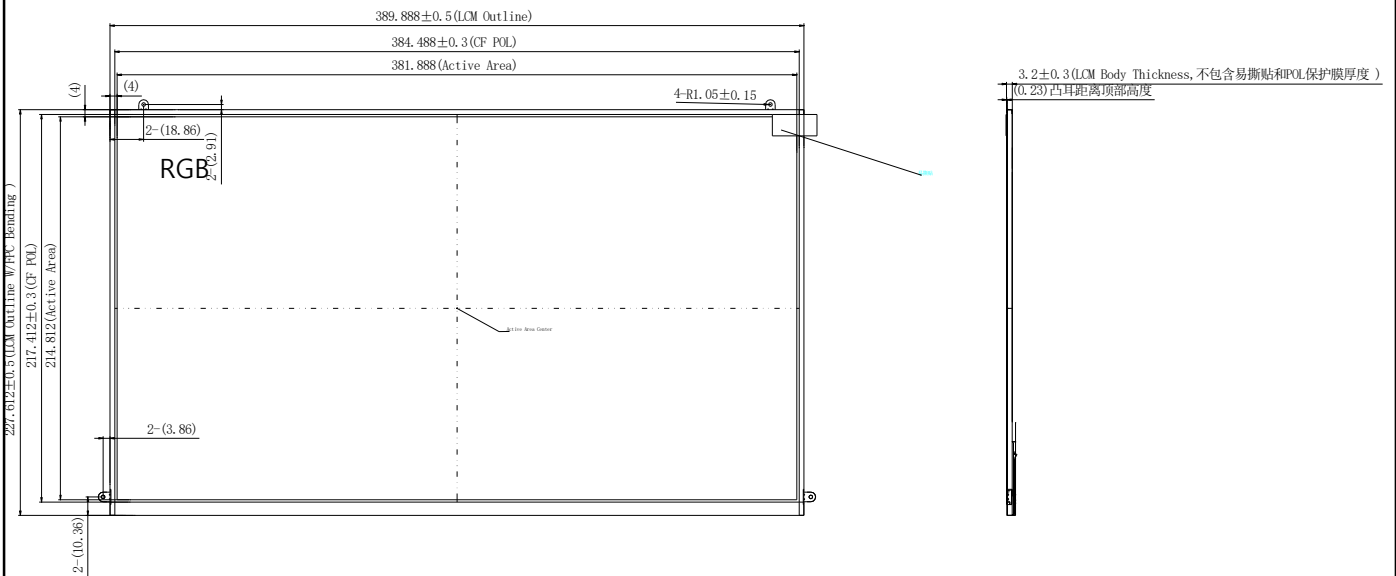
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### 11.0 APPENDIX

#### Mechanical Drawing

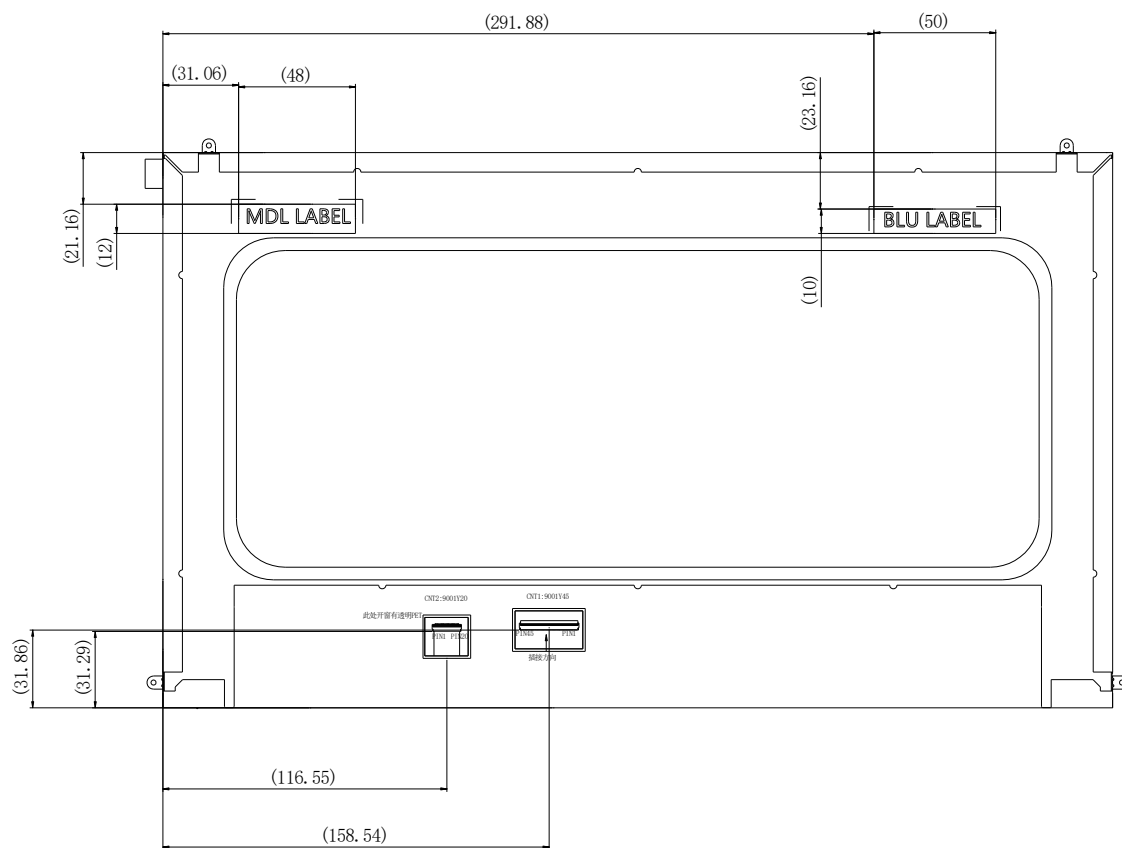
Drawing Attachment: Landscape Front View





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**Mechanical Drawing**  
Drawing Attachment: Landscape Back View



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