



规格书

Specification Sheet

客户承认 Customer			
Approved by 承认	Checked by 审核	Approved by 承认	
		Checked by 审核	
		Designed by 编写	



深圳市勋瑞光电科技有限公司
Xunrui Shenzhen Optoelectronics Technology Co., Ltd.

TITLE : H238BFH30I3501-CT1

Preliminary Product Specification Rev. P0



Contents

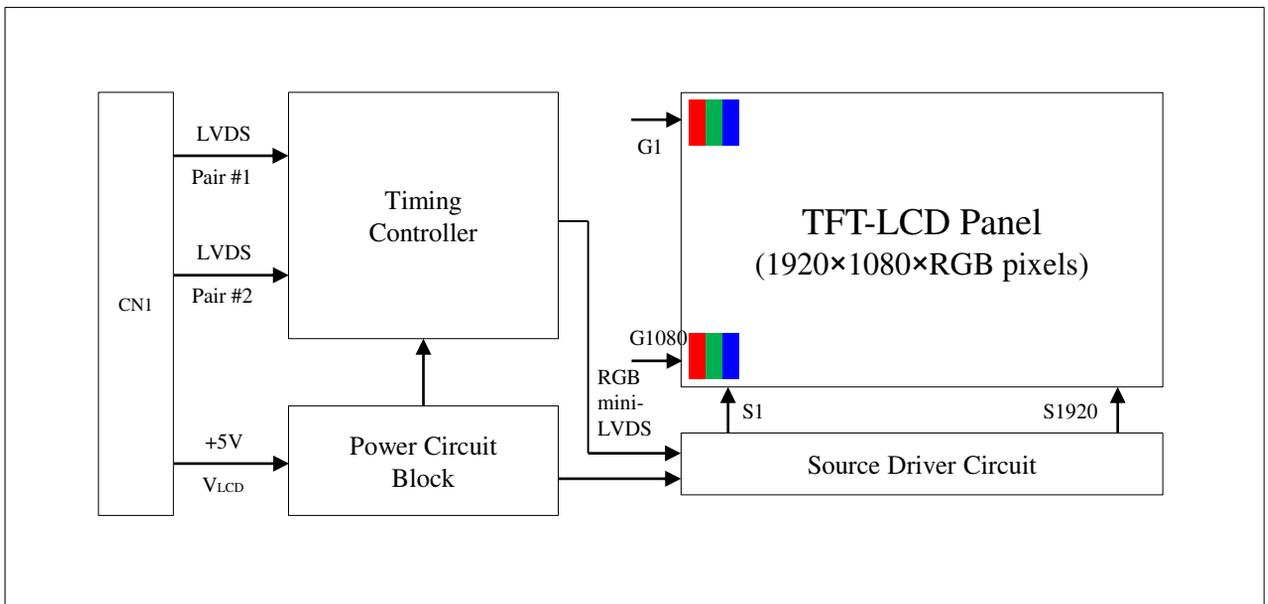
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1.0 GENERAL DESCRIPTION

1.1 Introduction

H238BFH3013501-GT1 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 23.8 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. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.



1.2 Features

- LVDS Interface with 2 pixel / clock
- 6-bit (Hi-FRC) color depth, display 16. 7M colors
- High luminance and contrast ratio, low reflection and wide viewing angle
- DE (Data Enable) only
- RoHS/Halogen Free
- Gamma Correction



1.3 Application

- Desktop Type of PC & Workstation Use
- Slim-Size Display for Stand-alone Monitor
- Display Terminals for Control System
- Monitors for Process Controller

1.4 General Specification

The followings are general specifications at the model H238BFH30I3501-CT1

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	527.04(H) × 296.46(V)	mm	
Number of pixels	1920(H) × 1080(V)	pixels	
Pixel pitch	0.2745 (H) × 0.2745(V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	16.7M	colors	
Display mode	Normally Black		
Weight	538.0(Typ.)	g	
Surface Treatment	Anti-Glare, 3H		



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 >

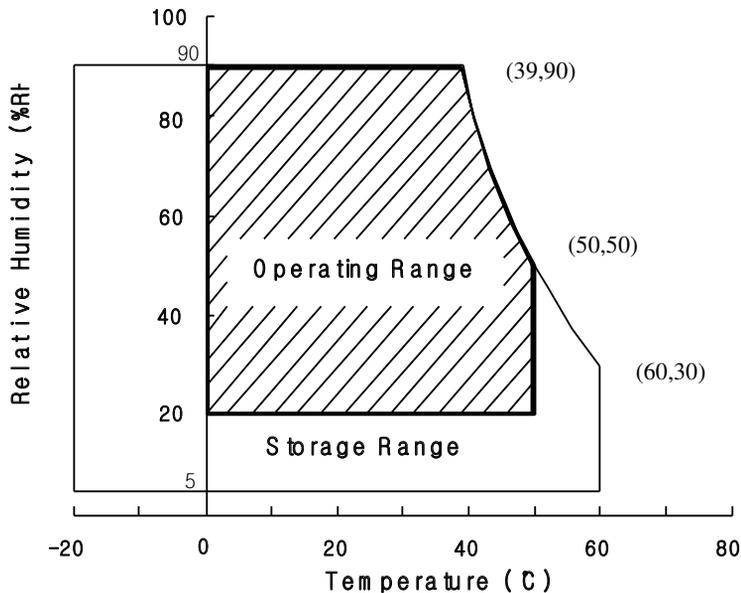
[VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	-0.3	6.0	V	Ta = 25 °C
Logic Supply Voltage	V _{IN}	VSS-0.3	V _{DD} +0.3	V	
Operating Temperature	T _{OP}	0	+50	°C	1)
Storage Temperature	T _{ST}	-20	+60	°C	1)
LCM Surface Temperature (Operation)	T _{surface}	0	+65	°C	2)

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.

2) Panel Surface Temperature should be Min. 0°C and Max. +65°C under the VDD = 5.0V, Frame rate = 60Hz, 25°C ambient Temp. no humidity control and LED string current is typical value.





Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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.
2. Contrast measurements shall be made at viewing angle of $\theta=0^\circ$ 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 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Center Luminance of white is defined as 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.
4. The White luminance uniformity on LCD surface is then expressed as :
$$\Delta Y = (\text{Minimum Luminance of 9points} / \text{Maximum Luminance of 9points}) * 100$$

(See FIGURE 2 shown in Appendix).
5. The color chromaticity coordinates specified in Table 4. 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. 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 3 and shall be measured by switching the input signal for "any level of gray(bright)" and "any level of gray(dark)".
7. Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (Y_A) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (Y_B) of that same area when any adjacent area is driven dark. (See FIGURE 4 shown in Appendix).



5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

- CN101 Module Side Connector : UJU IS100-L300-C23or Equivalent
User Side Connector : JAE FI-X30H or Equivalent

Pin No	Symbol	Function	Remark
1	RXO0-	Negative Transmission data of Pixel 0 (ODD)	
2	RXO0+	Positive Transmission data of Pixel 0 (ODD)	
3	RXO1-	Negative Transmission data of Pixel 1 (ODD)	
4	RXO1+	Positive Transmission data of Pixel 1 (ODD)	
5	RXO2-	Negative Transmission data of Pixel 2 (ODD)	
6	RXO2+	Positive Transmission data of Pixel 2 (ODD)	
7	GND	Ground	
8	RXOC-	Negative Transmission Clock (ODD)	
9	RXOC+	Positive Transmission Clock (ODD)	
10	RXO3-	Negative Transmission data of Pixel 3 (ODD)	
11	RXO3+	Positive Transmission data of Pixel 3 (ODD)	
12	RXE0-	Negative Transmission data of Pixel 0 (EVEN)	
13	RXE0+	Positive Transmission data of Pixel 0 (EVEN)	
14	GND	Ground	
15	RXE1-	Negative Transmission data of Pixel 1 (EVEN)	
16	RXE1+	Positive Transmission data of Pixel 1 (EVEN)	
17	GND	Ground	
18	RXE2-	Negative Transmission data of Pixel 2 (EVEN)	
19	RXE2+	Positive Transmission data of Pixel 2 (EVEN)	
20	RXEC-	Negative Transmission Clock (EVEN)	
21	RXEC+	Positive Transmission Clock (EVEN)	
22	RXE3-	Negative Transmission data of Pixel 3 (EVEN)	
23	RXE3+	Positive Transmission data of Pixel 3 (EVEN)	
24	GND	Ground	
25	NC	No Connection	
26	NC	No Connection	
27	NC	No Connection	
28	VDD	Power Supply: +5V	
29	VDD		
30	VDD		



5.2 LVDS Interface (Tx; THC63LVDF83A or Equivalent)

5.2.1 LVDS Interface

	Input Signal	Transmitter		Interface		HT236F01-100 (CN11)	Remark
		Pin No.	Pin No.	System (Tx)	TFT-LCD (Rx)	Pin No.	
LVDS	OR0	51	48 47	OUT0- OUT0+	RXO0- RXO0+	1 2	
	OR1	52					
	OR2	54					
	OR3	55					
	OR4	56					
	OR5	3					
	OG0	4	46 45	OUT1- OUT1+	RXO1- RXO1+	3 4	
	OG1	6					
	OG2	7					
	OG3	11					
	OG4	12					
	OG5	14					
	OB0	15	42 41	OUT2- OUT2+	RXO2- RXO2+	5 6	
	OB1	19					
	OB2	20					
	OB3	22					
	OB4	23					
	OB5	24					
	Hsync	27	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	Vsync	28					
	DE	30					
	MCLK	31	38 37	OUT3- OUT3+	RXO3- RXO3+	10 11	
	OR6	50					
	OR7	2					
	OG6	8					
OG7	10						
OB6	16						
OB7	18						
RSVD	25						

Note: The order of even data is same with odd data.



6.0 SIGNAL TIMING SPECIFICATION

6.1 The H238BFH30I3501-CT1 is operated by the DE only.

Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	10.47	13.47	17.7	ns	
	Frequency	-	56.75	74.25	95.5	MHz	
Hsync	Period	tHP	1050	1100	1120	tCLK	
	Horizontal Valid	tHV	960	960	960	tCLK	
	Horizontal Blank	tHB	90	140	160		
	Frequency	fH	56	67.5	84.5	KHz	
Vsync	Period	tVP	1110	1125	1251	tHP	
	Vertical Valid	tVV	1080	1080	1080	tHP	
	Vertical Blank	tVB	30	45	171	tHP	
	Frequency	fV	50	60	75	Hz	
LVDS Receiver clock	Input spread spectrum ratio	SSr	-	-	± 3	%	
	Modulation frequency of input clock during SSC	Fmod	-	-	200	Khz	

Note: The DCLK range at last line of V-blanking should be set in 0~987.

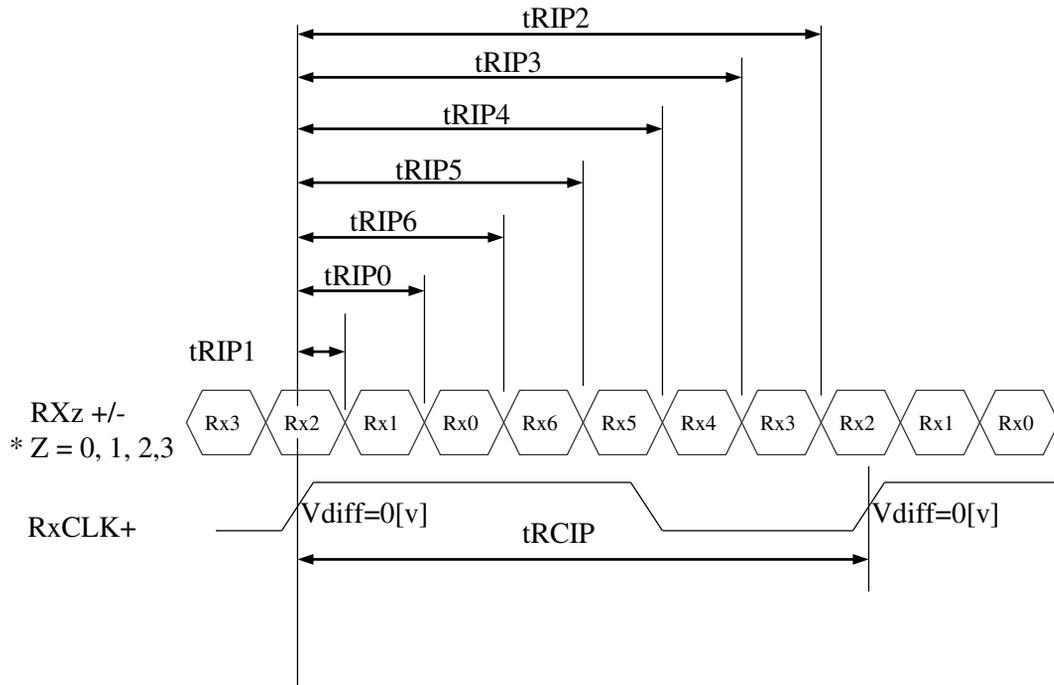


6.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 4.

<Table 4. LVDS Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	10.47	13.47	17.7	nsec	
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP0	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec	
Input Data 2	tRIP6	2 × tRCIP/7-0.4	2 × tRCIP/7	2 × tRCIP/7+0.4	nsec	
Input Data 3	tRIP5	3 × tRCIP/7-0.4	3 × tRCIP/7	3 × tRCIP/7+0.4	nsec	
Input Data 4	tRIP4	4 × tRCIP/7-0.4	4 × tRCIP/7	4 × tRCIP/7+0.4	nsec	
Input Data 5	tRIP3	5 × tRCIP/7-0.4	5 × tRCIP/7	5 × tRCIP/7+0.4	nsec	
Input Data 6	tRIP2	6 × tRCIP/7-0.4	6 × tRCIP/7	6 × tRCIP/7+0.4	nsec	

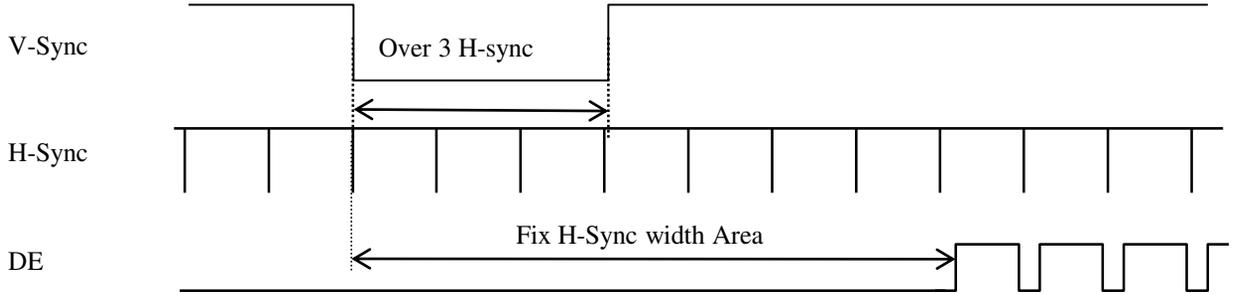


* Vdiff = (RXz+)-(RXz-),..., (RXCLK+)-(RXCLK-)



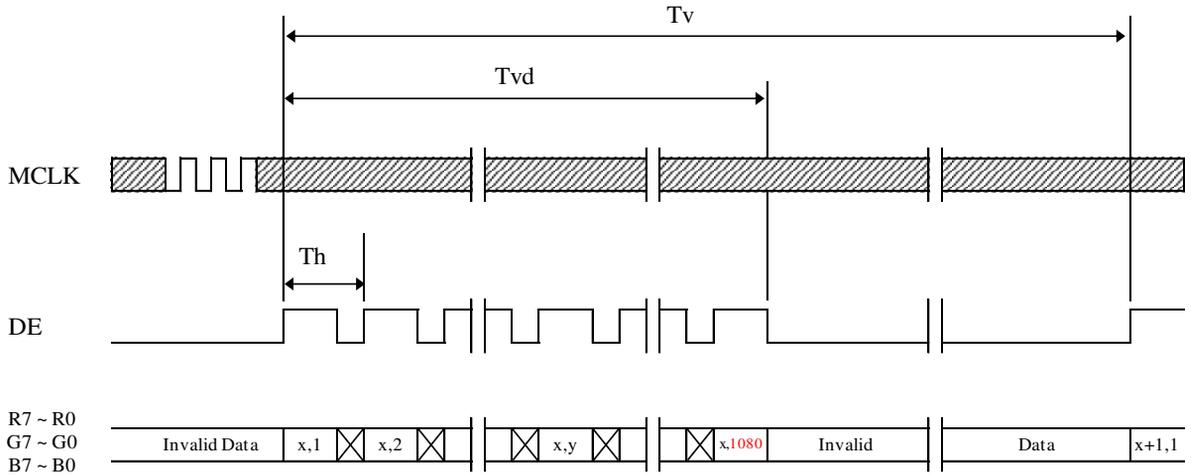
7.0 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

7.1 Sync Timing Waveforms



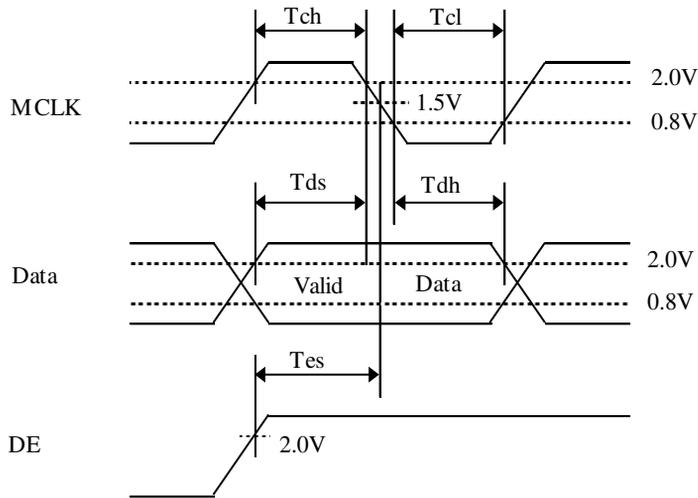
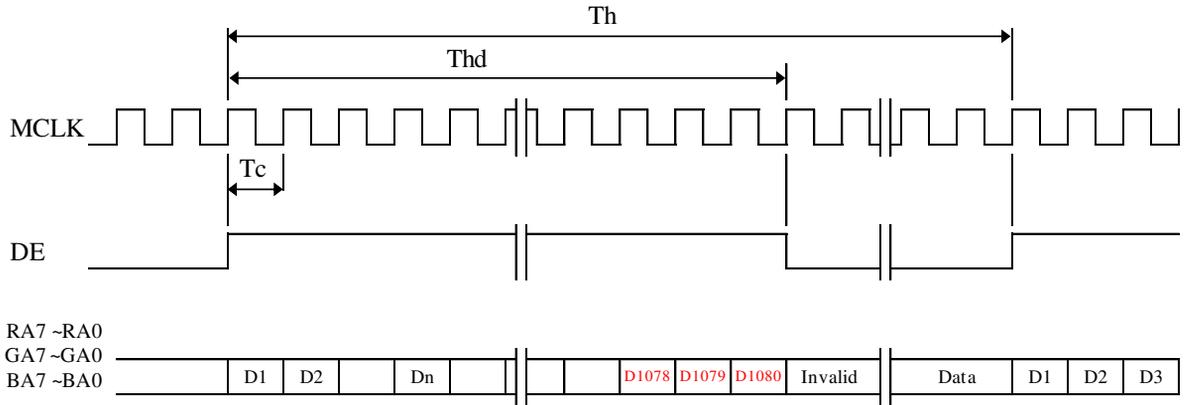
- 1) Need over 3 H-sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

7.2 Vertical Timing Waveforms





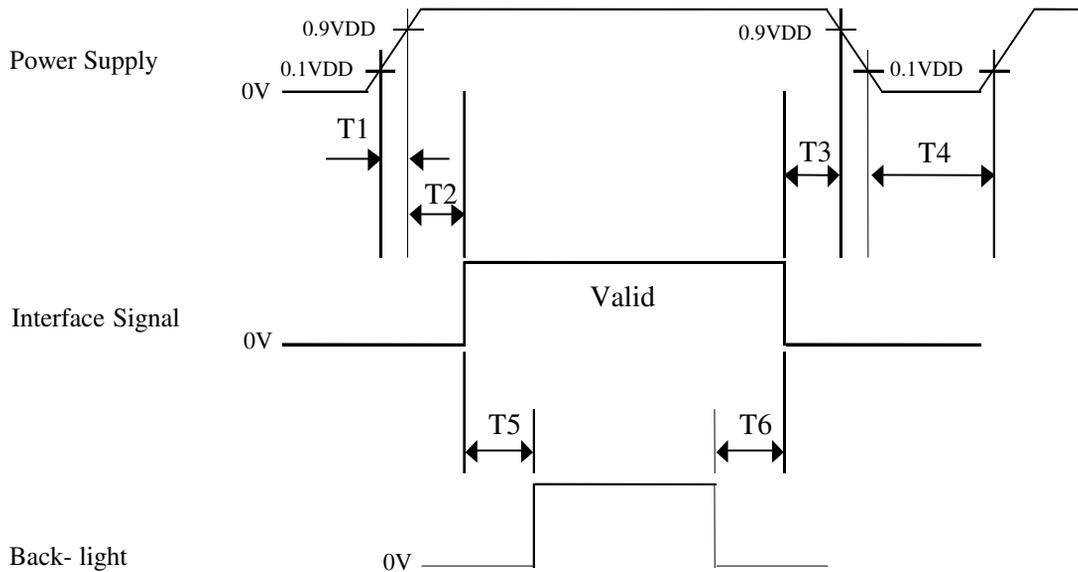
7.3 Horizontal Timing Waveforms





9.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.



- $0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$
- $0 \leq T2 \leq 50 \text{ ms}$
- $0 < T3 \leq 50 \text{ ms}$
- $1 \text{ sec} \leq T4$
- $200 \text{ ms} \leq T5$
- $200 \text{ ms} \leq T6$

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.
3. Back Light must be turn on after power for logic and interface signal are valid.
4. T7 decreases smoothly, there is none re-bouncing voltage.
5. The above power sequence should be satisfied at these case
 - AC/DC power On, DC power off
 - Mode Change (Resolution, frequency, timing, sleep mode, color depth change etc.)If not to follow power sequence, there is a risk of abnormal display.
6. If T3=0ms, there is a risk of flicker when power On/Off.
7. If T6=0ms, there is a risk of abnormal display when power off.



10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

FIGURE 6 (located in Appendix) shows mechanical outlines for the model H238BFH30I3501-CT1
Other parameters are shown in Table 5.

<Table 5. Dimensional Parameters>

Parameter	Specification	Unit
Weight	538.0	gram
Active area	527.04(H) × 296.46(V)	mm
Pixel pitch	0.2745(H) × 0.2745(V)	mm
Number of pixels	1920 (H) × 1080 (V) (1 pixel = R + G + B dots)	pixels

10.2 Mounting

See FIGURE 5. (shown in Appendix)

10.3 Anti-Glare and Polarizer Hardness.

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

10.4 Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 350lux.



11.0 RELIABILITY TEST

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

<Table 6. Reliability Test Parameters >

No	Test Items	Conditions	
1	High temperature storage test	Ta = 60 °C, 240 hrs	
2	Low temperature storage test	Ta = -20 °C, 240 hrs	
3	High temperature & high humidity operation test	Ta = 50 °C, 80%RH, 240hrs	
4	High temperature operation test	Ta = 50 °C, 240hrs	
5	Low temperature operation test	Ta = 0°C, 240hrs	
6	Thermal shock	Ta = -20 °C ↔ 60 °C (0.5 hr), 100 cycle	
7	Vibration test (non-operating)	Frequency	Random, 10 ~ 300 Hz, 30 min/Axis
		Gravity\AMP	1.5 Grms
		Period	X, Y, Z 30 min
8	Shock test (non-operating)	Gravity	50G
		Pulse width	11msec, sine wave
		Direction	± X, ± Y, ± Z Once for each
9	Electro-static discharge test	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV	



12.0 HANDLING & CAUTIONS

(1) Cautions when taking out the module

- Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module

- As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD module is operating.
- Put the module display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation

- When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

(4) Cautions for the atmosphere

- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics

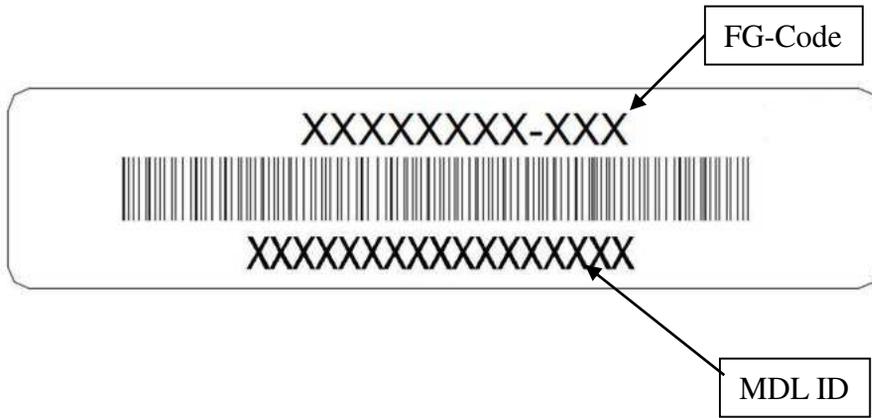
- Do not apply fixed pattern data signal to the LCD module at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions

- Do not disassemble and/or re-assemble LCD module.
- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.



13.0 PRODUCT SERIAL NUMBER



MDL ID Naming Rule:

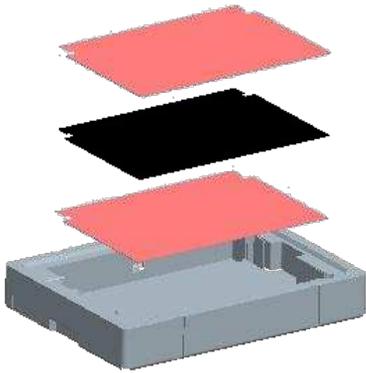
Digit Code	1	2	3	4	5	6	7	8	9	10	11
Description	Model Code GBN		Grade	Line	Year		Month	Model Extension Code			
Digit Code	12	13	14	15	16	17	18				
Description	Serial No						Inner Code				



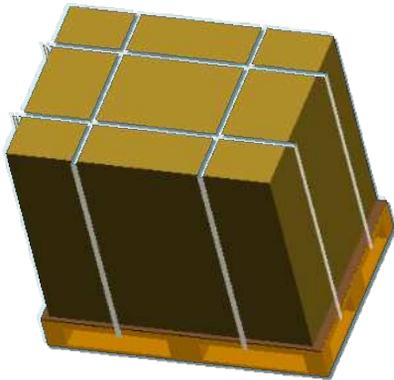
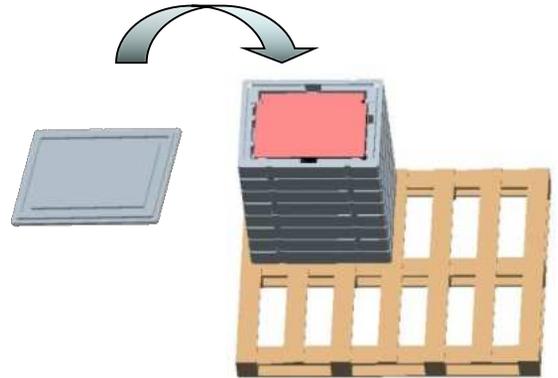
14.0 Packing

14.1 Packing Order

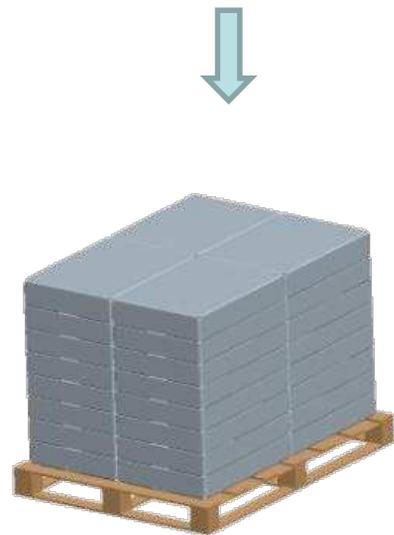
Put EPE pad and OC into the box, 20pcs/per box



Put the box on the pallet, 8ea box per quarter pallet, a cover on the top of the box



Place out box around the boxes. Pack with 4 packing belts.



32 ea box and 4 cover per pallet, Place wrap film around the boxes.

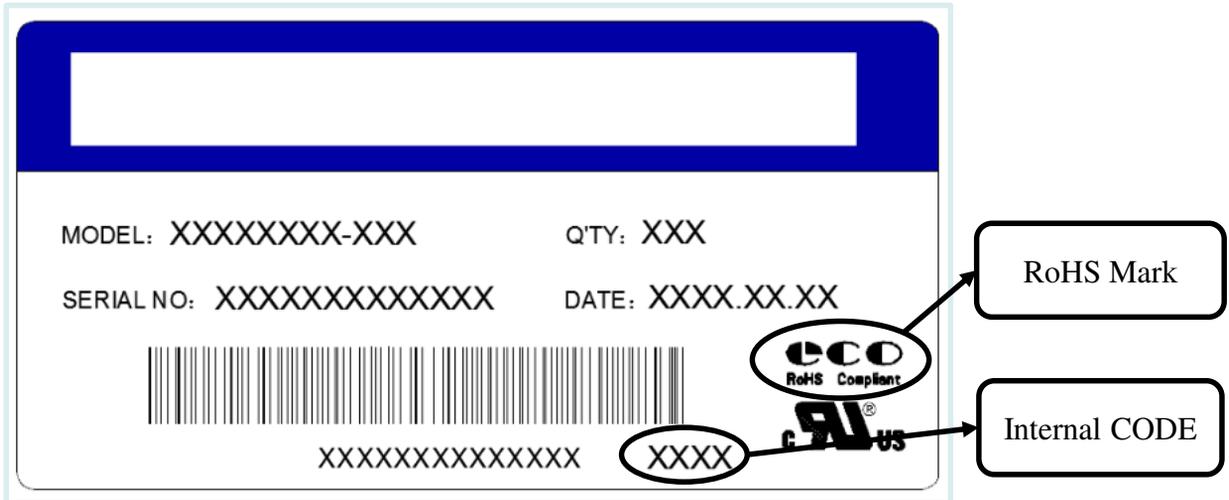


14.2 Packing Note

- Box Dimension : 690mm(L) × 550mm(W) × 135mm(H)
- Package Quantity in one Box : 20pcs

14.3 Box label

- Label Size : 100 mm (L) × 50 mm (W)
- Contents
Model : H238BFH30I3501-CT1
Q`ty : OC 20 Q`ty in one box
Serial No. : Box Serial No. See next page for detail description.
Date : Packing Date



Digit	1	2	3	4	5	6	7	8	9	10	11	12	13
Code													
Description	Products GBN		Grade	Line	Year		Month	Revision Code	Serial No				



15.0 APPENDIX

Figure 1. Measurement Set Up

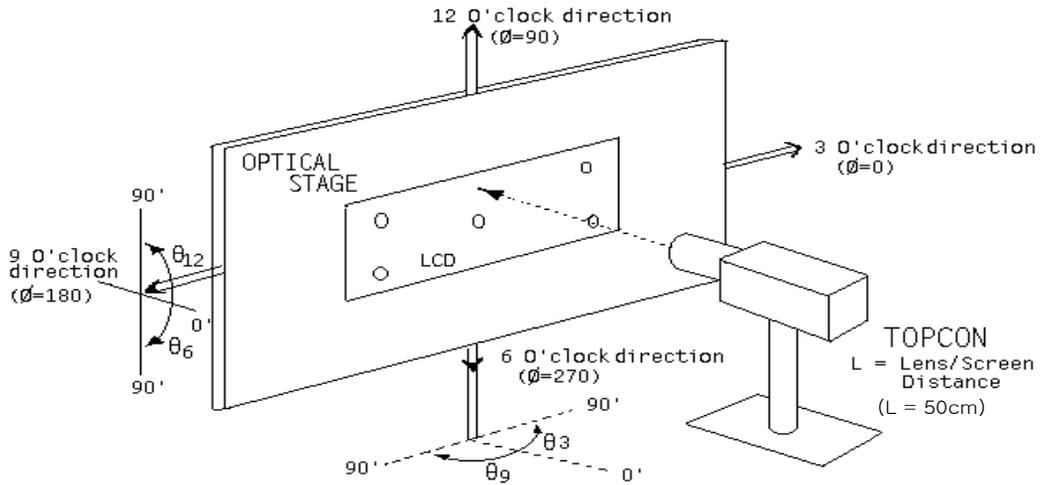


Figure 2. White Luminance and Uniformity Measurement Locations (9 points)

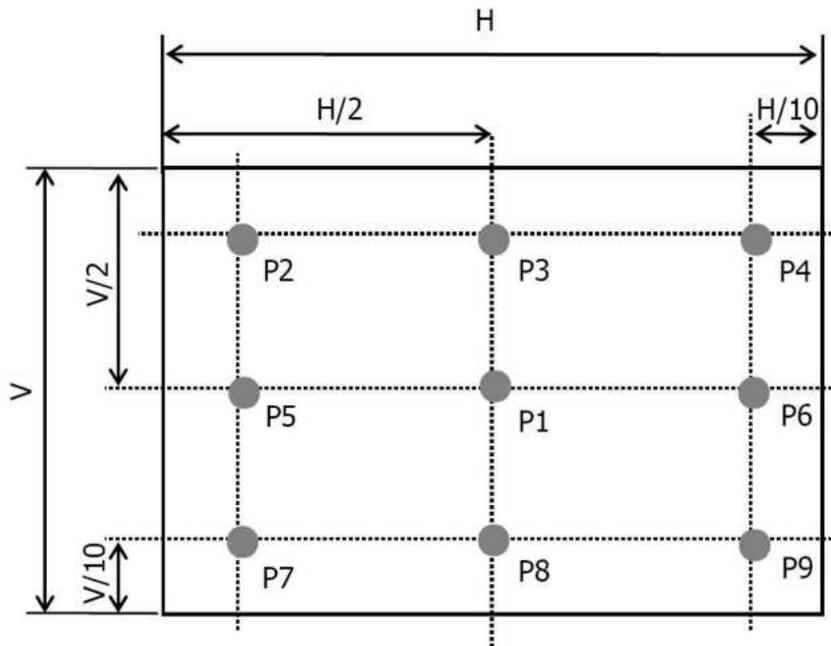




Figure 3. Response Time Testing

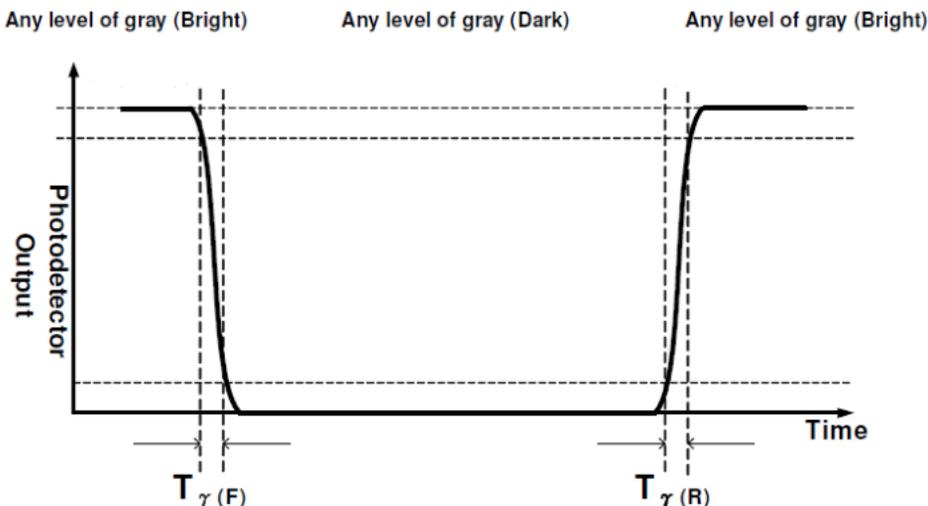
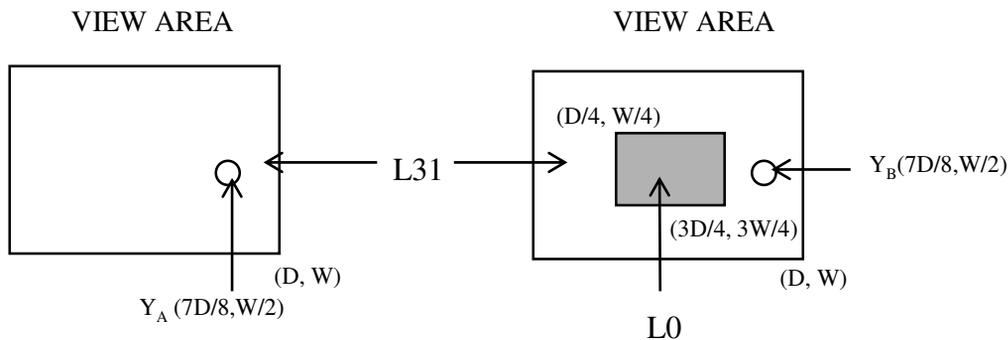


Figure 4. Cross Modulation Test Description



$$\text{Cross-Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_A} \right| \times 100$$

Where: Y_A = Initial luminance of measured area (cd/m^2)

Y_B = Subsequent luminance of measured area (cd/m^2)

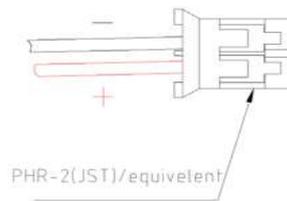
The location measured will be exactly the same in both patterns



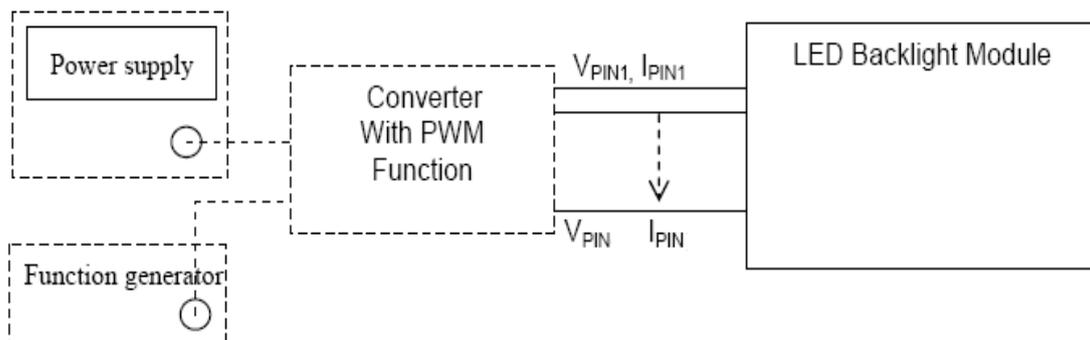
6.1 电气特性

项目 Item	标记 Symbol	条件 Condition	数值 Values			单位 Unit	备注 Remark
			MIN	TYP	MAX		
灯条输入电压 Input lightbar votage	V_{pin}	单条 single		55			NOTE 1/2
灯条输入电流 Input lightbar current	I_{pin}	单条 single		300	320	MA	
LED 寿命 Led life Time	Hours	-----	25000	-----	-----		

NOTE 1:



NOTE 2:





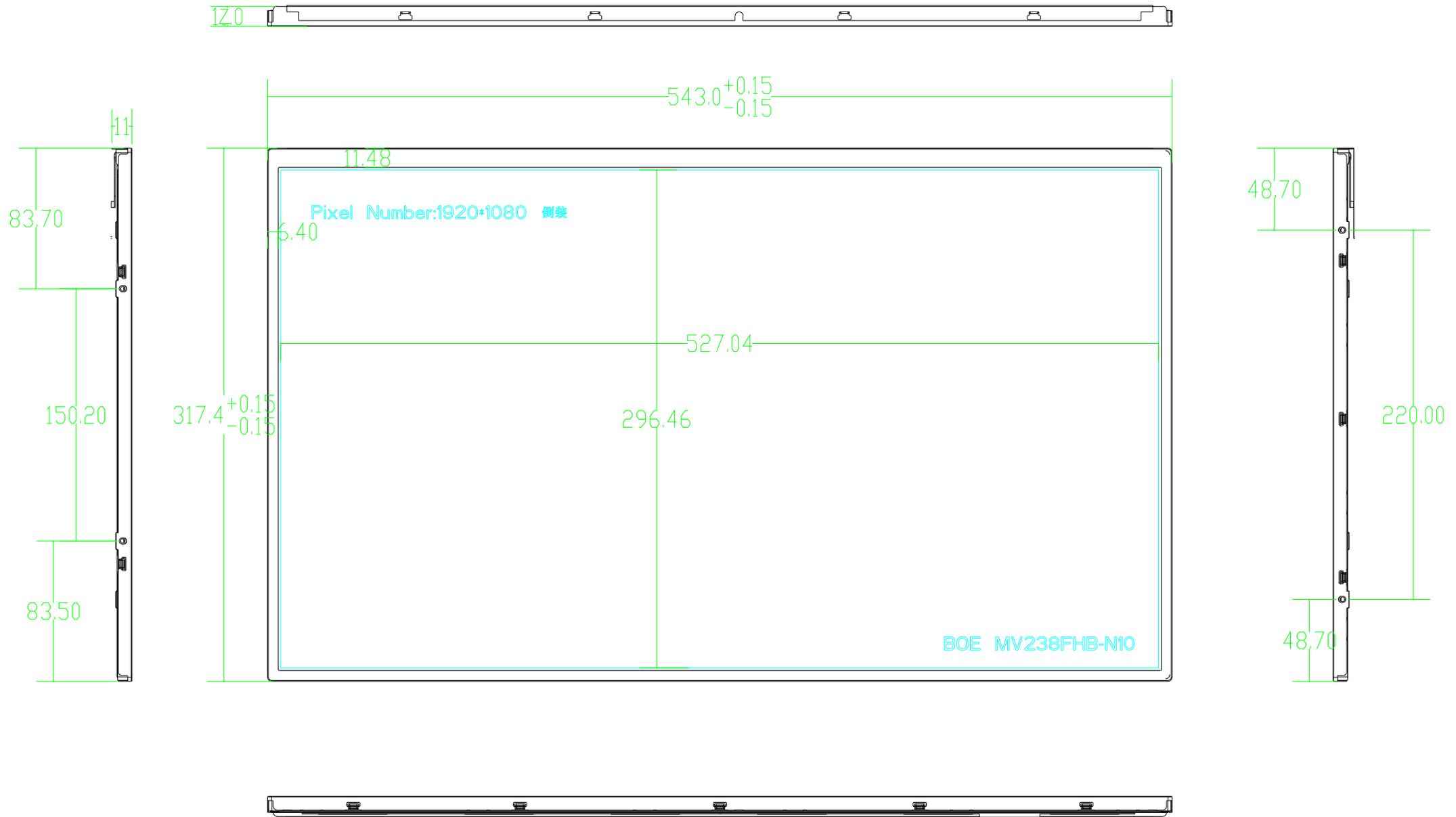
6.2 光学规格

环境温度(Ta)=25°C±2 湿度 HR=65%±10

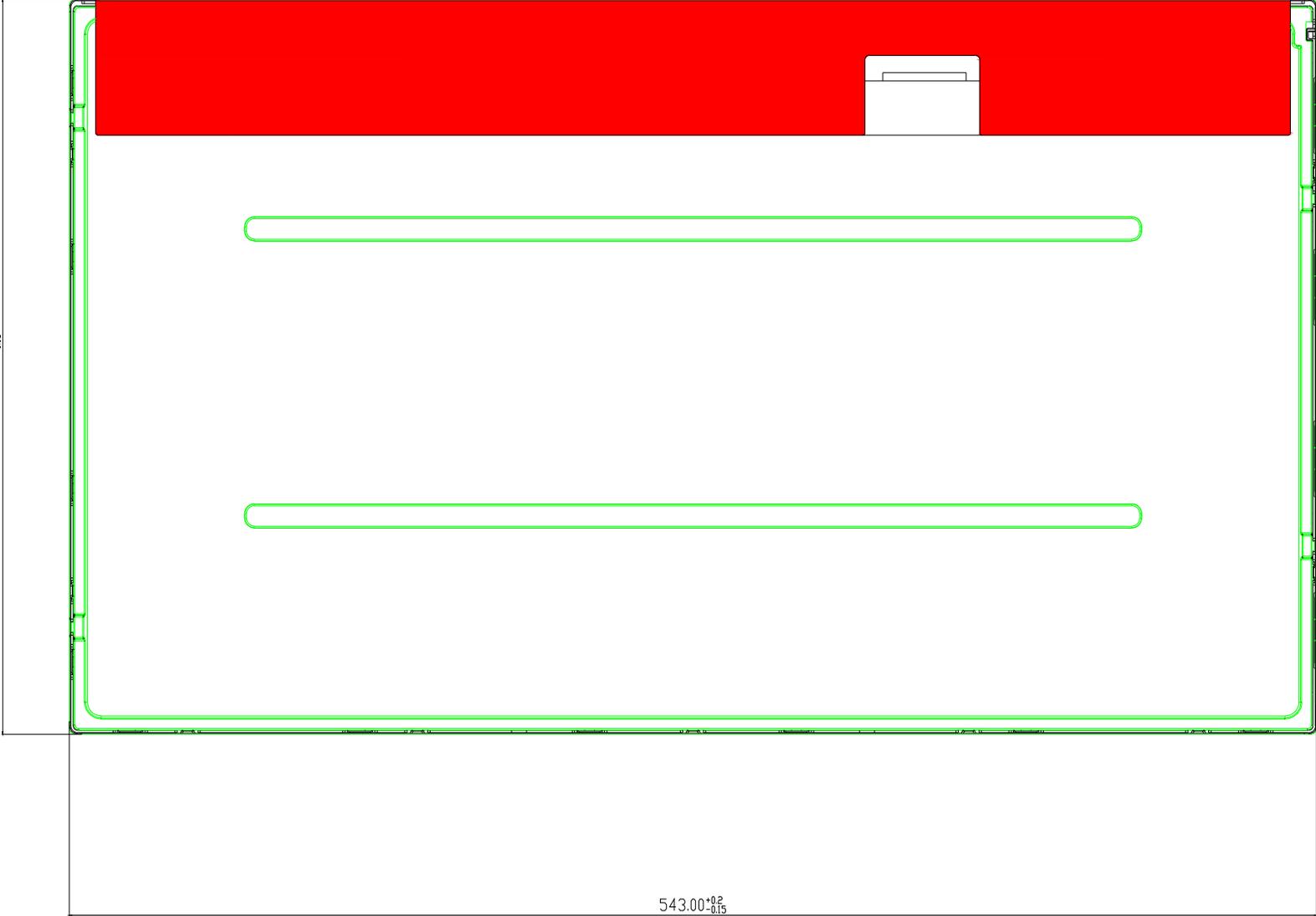
項目 Item		單位 unit	規 格 Spction			备注 Remark	
			MIN	TYP	MAX		
1	模组亮度 (LCM-CTP)	Center point	cd/m ²	200	250	---	Center point (±30)
	均匀性 Uniformity	9 点	%	70	75	---	(NOTE2)
2	模组色度 LCM CIE	x	---	-0.030	0.313	+0.030	Center point
		y	---	-0.030	0.329	+0.030	Center point

中心点为最亮点 The center brightness data ia the maximum

下图示中 9 点之最小数值点比中心点，均匀性定义：Minimum(1-9)/Maximum(5)
mum value of 9 point divided by the center ,



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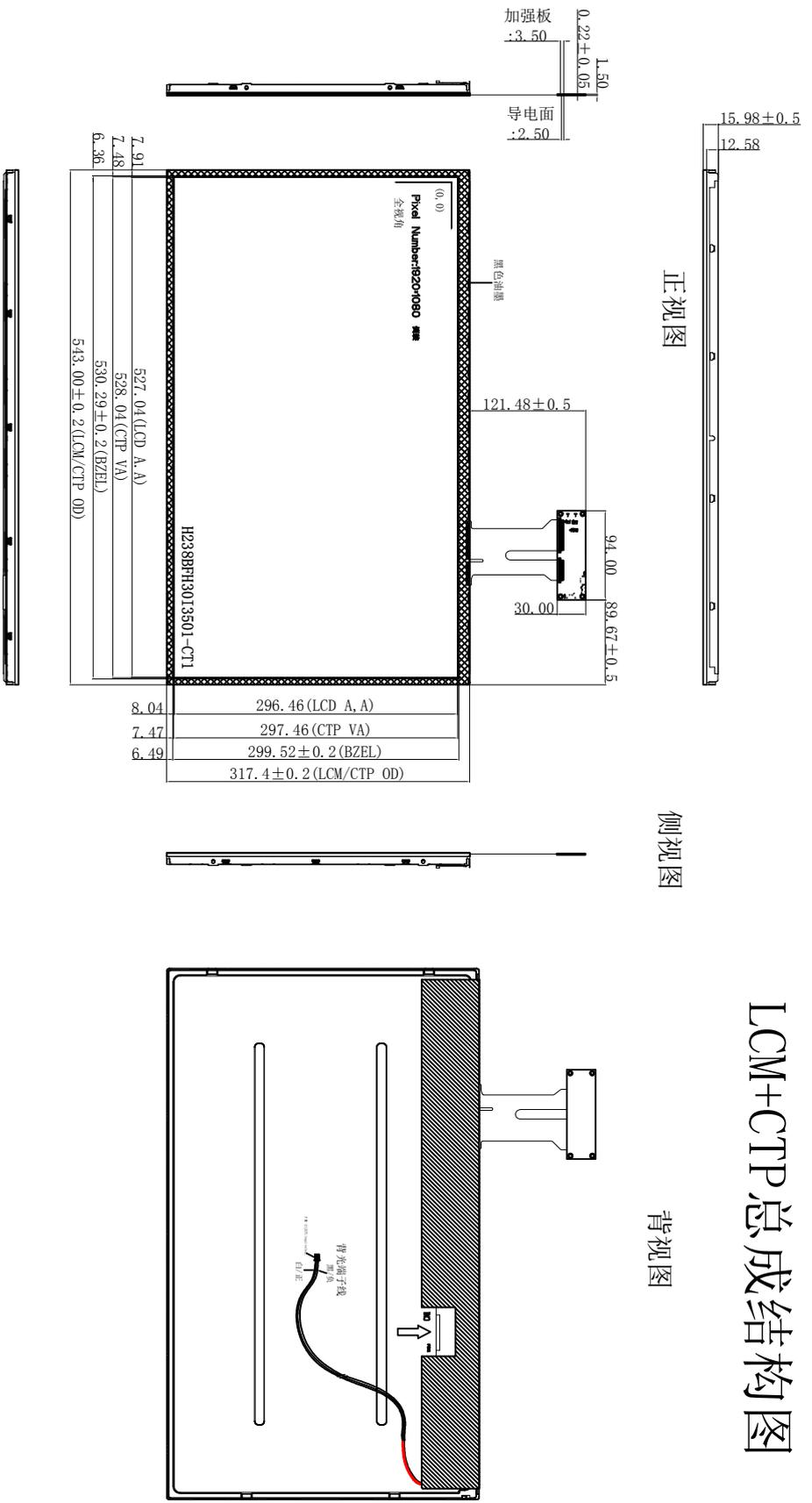
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1	2	3	4	5	6	7	8	
客户确认:			序号	更改记录			记录人	日期
			A					
			B					

LCM+CTP总成结构图



技术参数:

1. Cover G+ITO GLASS+Adhesive+PPC
- ITO GLASS: 1.1mm
- Cover: 玻璃: 1.1mm
- Adhesive: 0.2mm
- 引线: PPC (PINCH=0.22mm)
- 总厚度: 2.4±0.1mm
- SENSOR 工艺: 丝印
1. 工作电压: USB 5V
3. 透光率: ≥87%
4. 表面硬度: 6H
5. 工作环境: -20℃~+70℃, ≤90%RH
6. 储存环境: -30℃~+80℃, ≤90%RH
7. 未注尺寸公差按±0.2mm

配置型号: LC-23802GB05

1	GLASS	LC-23802GNP
2	ITO GLASS	1.1MM 238GB05
3	背光端子线	背光端子线

Touchlc 深圳市勋瑞光电科技有限公司

DRAWN BY: 绘图: zhang s l	TITLE: 产品型号: H238BPH3013501-CT1	VIEW: 投影方式:
CHECKED BY: 审核:	CUSTOMER ID: 客户编号:	UNITS 单位: mm
APPROVED BY: 批准:	VERSION NUMBER: A	SCALE 比例: 1:1
Standard tolerance: 公差:	DATE: 日期:	