JICTECH LCD (HONGKONG) CO.,LTD
DONGGUAN JICTECH LCD CO.,LTD
PROFESSIONAL LCM SUPPLIER

PRODUCT SPECIFICATION FOR LCD MODULE

Model NO.: RH133I8BNC-2A-TFT

Specification Ver.: 01

□APPROVAL FOR SPECIFICATIONS ONLY

■APPROVAL FOR SPECIFICATIONS AND SAMPLE

CUSTOMER：	APPROVED BY：

JICTECH LCM R&D CENTER		
APPROVED BY	CHECKED BY	PREPARED BY

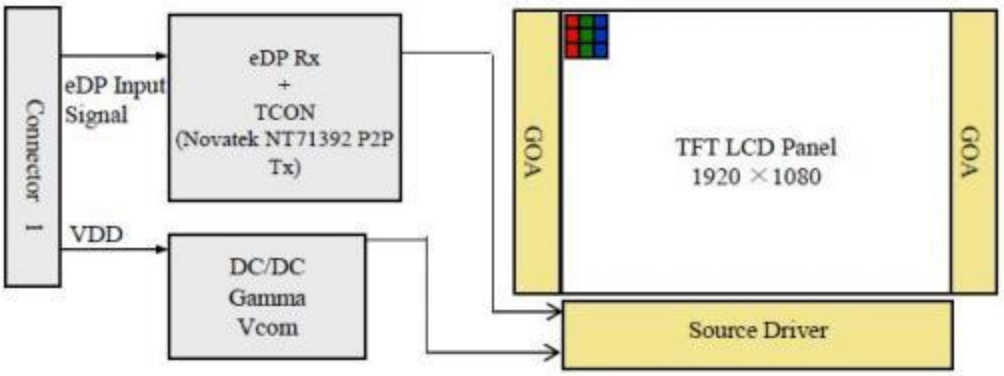
RECORDS OF REVISION

DATE	NO	REVISED No.	PAGE	SUMMARY	NOTE
2023-12-07		Rev01	16	-	

1.0 GENERAL DESCRIPTION

1.0.1 Introduction

HBM133FH11A3 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 13.3 inch diagonally measured active area with Full-HD 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 16.7 M colors.



1.0.2 Features

- 2 lane eDP interface with 2.7Gbps link rates
- Thin and light weight
- 16.7M color depth, color gamut 72%

1.0.3 Application

Video Phone/IP Phone/Smart Key/ e-cigarettes etc.

1.0.4 Gechanical specifications.

Parameter	Specification	Unit	Note
Display size	13.3” (Diagonal)	inch	
Active area	293.76H) ×165.24(V)	mm	
Pixel Format	1920(H) ×1080(V) （1pixel = R + G + B dot）	pixel	
Pixel pitch	0.153(H) x 0.153 (V)	mm	
Pixel configuration	R, G, B vertical stripe		
Display mode	Normally black		
Surface treatment of front polarizer	Anti-glare coating: (3H)		

Outline dimensions

Parameter		Min	Typ	Max	Unit	Remark
Unit outline dimensions	Width	300.06	300.36	300.66	mm	
	Height	177.24	177.54	177.84	mm	
	Depth	2.5	2.7	2.9	mm	w/o PWB.[Note3-2]
Mass		-	-	-	g	

[Note 3- 1]Outline dimensions is shown in page 10

[Note 3-2]Without war page and deflection.

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. Environment Absolute Maximum Ratings> [Ta =25±2 ℃]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Back-light Power Supply Voltage	HV_{DDOUT}	-	26.4	V	Ta = 25 ℃ Note 1&2 Remarks
Back-light LED Current	I_{HVDD}	-	260	mA	
Back-light LED Reverse Voltage	V_R	-	-	V	
Operating Temperature	T_{OP}	0	50	℃	Ta = 25 ℃ Note 1&2
Storage Temperature	T_{ST}	-20	60	℃	
Operating Ambient Humidity	H_{op}	-	80	%RH	
Storage Humidity	H_{st}	-	80	%RH	
Heat Release Requirement	T_{rls}		15	℃	

Note:

1. These range above is maximum value not the actual operating temperature . Actual Operating temperature is no more than 50℃ and temperature refers to the LCM surface temperature ;
2. HSD is not responsible for product problems beyond the use conditions.
3. When the ambient temperature is T ℃, the surface temperature of Panel can not exceed (T+15)℃.

3.0 ELECTRICAL SPECIFICATIONS

3.1 TFT LCD Module

Parameter	Symbol		Ratings		Unit	Remark
		MIN	TYP	MAX		
Power Supply Input Voltage	V_{DD}	3.0	3.3	3.6	V	Note 1
Power Supply Current	I_{DD}	-	189	-	mA	
LED Driver Power Supply Voltage	H_{VDD}	2.7		24	V	
LED Driver Power Supply Current	I_{HVDD}		20	-	mA	
LED Power Consumption	P_{LED}		7.3		W	
Positive-going Input Threshold Voltage	V_{IT+}			+100	mV	
Negative-going Input Threshold Voltage	V_{IT-}	-100			mV	
Differential input common mode voltage	V_{com}		TBD		V	

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 ℃
Max value at Black Pattern

2. Calculated value for reference ILED × VLED÷0.85 = PLED

3.2 Back-light Unit

< Table 4. LED Driving guideline specifications > [Ta =25±2 ℃]

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	V_{BL}	-	24	-	V	
Power supply Current for Back light	I_{LED}	-	260	-	mA	
Power supply for Back light	P_{LED}	-	6.24	-	W	
Modulated light signal voltage	V_{PWM} H	1.2	-	5.0	V	
	V_{PWM} L	0	-	0.6	V	
Brightness Control Duty Ratio	Duty	1	-	100	%	
Brightness Control frequency	f_{PWM}	100	-	20000	KHz	
LED-BL ON/OFF High voltage	V_{CNT}H	1.2		5.0	V	
LED-BL ON/OFF low voltage	V_{CNT}L	0	-	0.6	V	
LED lifetime	-	20,000	30,000	-	h	LED

Notes :

1. Calculator Value for reference ILED × VLED = PLED
2. The LED Life-time define as the estimated time to 50% degradation of initial luminous under the condition of the ambient temperature of 25℃.
3. Without war page and deflection.

4.0 INTERFACE CONNECTION

4-1 Electrical Interface Connection

CN1 (eDP signals, +3.3V DC power supply and B/L power supply)

Pin No.	Symbol	I/O	Function	Remark
1	NC	-	No connection	
2	H_GND	P	High Speed round	
3	Lane1_N	I	Complement Signal Link Lane 1	
4	Lane1_P	I	True Signal Link Lane 1	
5	H_GND	P	High Speed Ground	
6	Lane0_N	I	Complement Signal Link Lane 0	
7	Lane0_P	I	True Signal Link Lane 0	
8	H_GND	P	High Speed Ground	
9	AUX_CH_P	I	True Signal Auxiliary Channel	
10	AUX_CH_N	I	Complement Signal Auxiliary Channel	
11	H_GND	P	High Speed Ground	
12	LCD_VDD	P	LCD logic and driver power(3.3V)	
13	LCD_VDD	P	LCD logic and driver power(3.3V)	
14	BIST	I	Panel self test enable	
15	LCD_GND	P	LCD logic and driver ground	
16	LCD_GND	P	LCD logic and driver ground	
17	HPD	O	HPD signal pin	
18	LED-1	P	Backlight ground	
19	LED-2	P	Backlight ground	
20	LED-3	P	Backlight ground	
21	LED-4	P	Backlight ground	
22	BL_ENABLE	I	Backlight on/off	
23	BL_PWM_DIM	I	System PWM	
24	NC	-	No connection	
25	NC	-	No connection	
26	BL_PWR	P	Backlight power	
27	BL_PWR	P	Backlight power	
28	BL_PWR	P	Backlight power	
29	BL_PWR	P	Backlight power	
30	NC	-	No connection	

*1 P: POWER I: Input O: Output

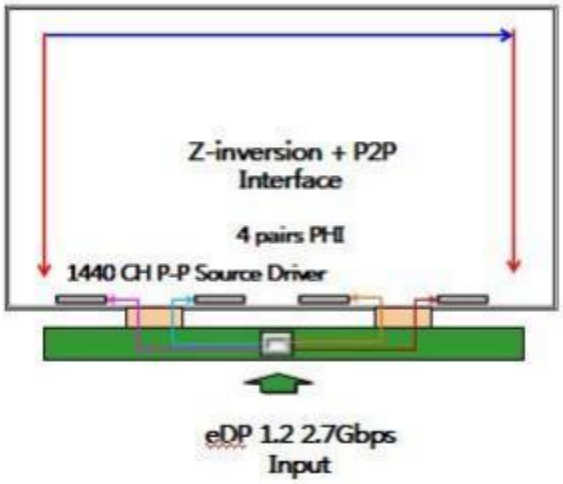
[Note1] Don't input any signals or any powers into a NC pin. Keep the NC pin open.

[Note2] The shielding case is connected with signal GND.

- Connector used :20455-030E-76(I-PEX)
- Corresponding connector : 20453-030T (I-PEX)

4.2 Data Input Format

Display Position of Input Data (V-H)



5.0 SIGNAL TIMING SPECIFICATION

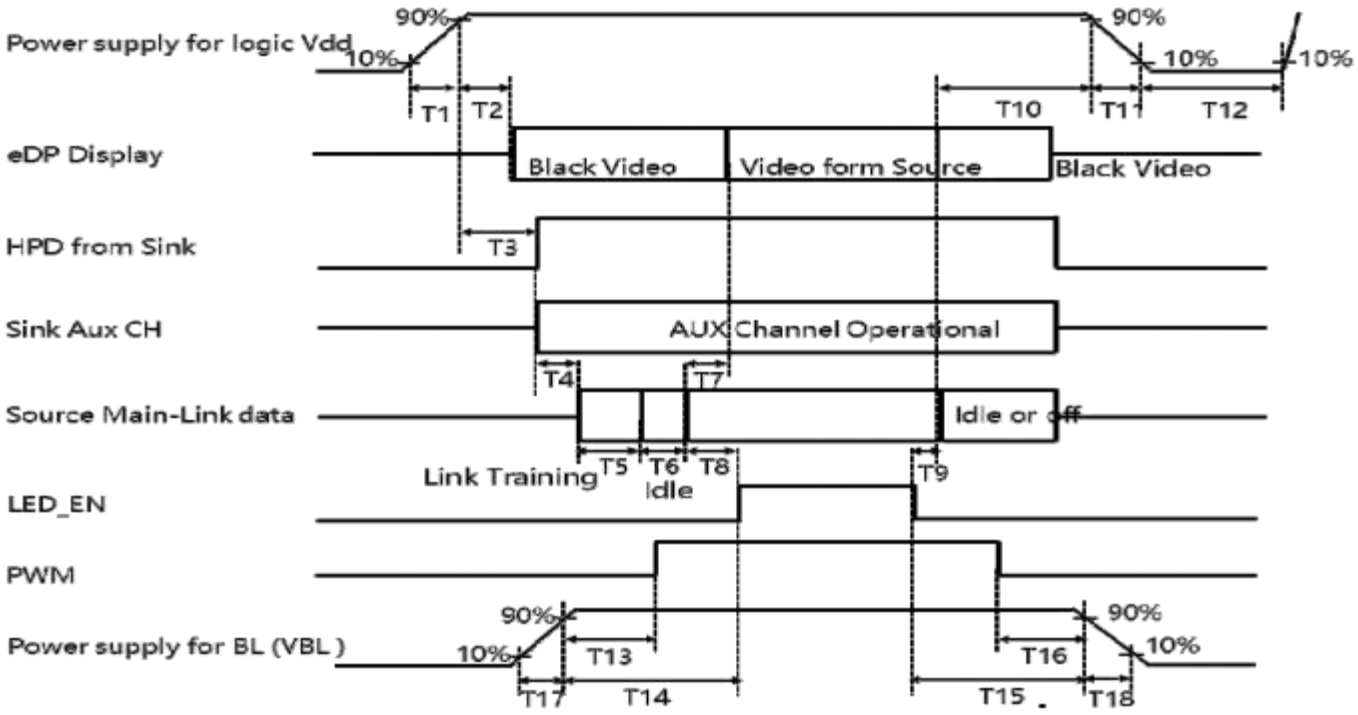
5.0.1 The QV133FHB-N81 is operated by the DE only.

Note: The DCLK range at last line of V-blanking should be set in 0-H-active/2.

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	-	477	-	MHz
Horizontal display area	thd		1920		pixel
HSYNC period time	th	-	2142	-	pixel
HSYNC blanking	thb+ thfp	-	222	-	pixel
Vertical display area	Tvd		1080		H
Frequency	fV	48	60	65	Hz
VSYNC period time	Tv	-	1100	-	H

6.0 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



- 0.5ms ≤ T1 ≤10 ms
- 0ms ≤ T2 ≤ 200 ms
- 0ms ≤ T3 ≤ 200 ms
- 0ms ≤ T13
- 0ms ≤ T14
- 0ms ≤ T17
- 80ms ≤ T8
- 0ms ≤T7 ≤50ms
- 0ms ≤T10 ≤500 ms
- 0.5ms ≤T11 ≤10 ms
- 500ms ≤T12
- 0ms ≤T15
- 0ms ≤T16
- 0ms ≤T18

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.

7.0 Optical characteristics

7.0.1 Overview

The test of view angle range shall be measured in a dark room (ambient luminance ≤1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON CS2000/CA310) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0 . We refer to θ Ø=0 (= θ 3) as the 3 o'clock direction (the "right"), θ Ø=90 (= θ 12) as the 12 o'clock direction ("upward"), θ Ø=180 (= θ 9) as the 9 o'clock direction ("left") and θ Ø=270(= θ 6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The luminance, color and uniformity (etc) should be tested by CS2000/CA310. The backlight should be operating for 10 minutes prior to measurement. VDD shall be 3.3 ± 0.3V at 25 C. Optimum viewing angle direction is 6 'clock

Paramete	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	θL	-	85	-	degree	Note1
		θR	-	85	-		
	Vertical	θT	-	85	-		
		θB	-	85	-		
Contrast Ratio	Center		600	800	-	-	Note2
Response Time	Tr+Td		-	30	35	ms	Note 6
CF Color Chromaticity (CIE1931)	Red x		Typ. - 0.03	0.644	Typ. +0.03	-	Note 5
	Red y			0.348		-	
	Green x			0.332		-	
	Green y			0.620		-	
	Blue x			0.133		-	
	Blue y			0.055		-	
	White x			0.29		-	
	White y			0.32		-	
NTSC ratio	%			(72)		-	
Center Luminance of white	YLI		560	650		cd/m^2	

Notes : 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 Θ= 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) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Luminance of white is defined as luminance values of center of the LCDsurface. 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 CS2000/CA310 when the LED current is set at 60mA.
4. The color chromaticity coordinates specified in Table 5. shall be calculatedfrom the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. The electro-optical response time measurements shall be made as FIGURE3 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.

8.0 RELIABILITY TEST

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

No	Test Items	Conditions	Remark
1	High temperature storage test	Ta = 60。C , 72 hrs	
2	Low temperature storage test	Ta = -20。C , 72 hrs	
3	High temperature & high humidity operation test	Ta = 50。C , 80%RH, 72 hrs	
4	High temperature operation test	Ta = 50。C , 72 hrs	
5	Low temperature operation test	Ta = 0。C , 72 hrs	
6	Thermal shock	Ta = -20 。C ↔ 50 。C (0.5 hr), 60%± 3%RH, 100 cycle	
7	Vibration test (non-operating)	Ta = 25。C , 60%RH, 1.5G, 10~500Hz, Sine X,Y,Z / Sweep rate : 1 hour	Note 1
8	Shock test (non-operating)	Ta = 25 。C , 60%RH, 220G, Half Sine Wave 2msec±X, ±Y, ±Z Once for each direction	Note 1
9	Electro-static discharge test (operating)	Air : 150 pF, 330Ω, ±15 KV Contact: 150 pF, 330Ω, ±8 KV Ta = 25。C , 60%RH,	Note 2

Notes :

1. The fixture must be hard enough , so that the module would not be twisted or bent.
2. Self- recovery and restart recovery is allowed. No hardware failures.

9.0 Precautions

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

9.1 Mounting Precautions

(1) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(2) You must mount a module using specified mounting holes (Details refer to the drawings).

(3) Please make sure to avoid external forces applied to the Source PCB or FPC and D-IC during the process of handling or assembling. If not, It causes panel damage or malfunction.

(4) Note that polarizers are very fragile and could be easily damaged. 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.

(5) Do not pull or fold the source D-IC which connect the source PCB or FPC and the panel. Do not pull or fold the LED wire.

(6) After removing the protective film, when the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with alcohol or purified water.

Do not strong polar solvent because they cause chemical damage to the polarizer.

(7) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(8) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
(9) Since the LCD is made of glass, do not apply strong mechanical impact or static load onto it. Handling with care since shock, vibration, and careless handling may seriously affect the product. If it falls from a high place or receives a strong shock, the glass may be broken.
(10) Do not disassemble the module.
(11) To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
(12) If the customer's set presses the main parts of the LCD, the LCD may show the abnormal display. But this phenomenon does not mean the malfunction of the LCD and should be pressed by the way of mutual agreement.
(13) Do not drop water or any chemicals onto the LCD's surface.

9.2 Operating Precautions

1) 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.
2) 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.
3) The electrochemical reaction caused by DC voltage will lead to LCD degradation, so DC drive should be avoided.
4) 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 equipments to protect against static electricity.
5) 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.
6) Design the length of cable to connect between the connector for back-light and the converter as short as possible and the shorter cable shall be connected directly.
7) The longer cable between that of back-light and that of converter may cause the luminance of LED to lower and need a higher startup voltage(Vs).
8) Connectors are precise devices for connecting PCB and transmitting electrical signals. Operators should insert and unplug MDL in parallel when assembling MDL.
9) Do not connect or disconnect the cable to/ from the module at the "Power On" condition.
10) When the module is operating, do not lose CLK, ENAB signals. If any one these signals is lost, the LCD panel would be damaged.
11) Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.
12) Do not re-adjust variable resistor or switch etc.

9.3 Electrostatic Discharge Control

1) 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. And don't touch interface pin directly. Keep products as far away from static electricity as possible.
2) Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivitytreated fibers.

9.4 Precautions for Strong Light Exposure

It is not allowed to store or Operate directly in strong light or in high temperature and humidity for a long time; Strong light exposure causes degradation of polarizer and color filter.

9.5 Storage Precautions

When storing modules as spares for a long time, the following precautions are necessary.

1) Control of ventilation and temperature is necessary.
2) Please make sure to protect the product from strong light exposure, water or moisture. Be careful for condensation.

3) Store in a polyethylene bag with sealed so as not to enter fresh air outside in it.
4) Do not store the LCD near organic solvents or corrosive gasses.
5) Please keep the FOB at a circumstance shown below Fig.

9.6Precautions for Protection Film

1) 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.
2) In handling the LCD, wear non-charged material gloves. And the conducting wrist to the earth and the conducting shoes to the earth are necessary.

9.7Appropriate Condition for Display

1) Normal operating condition

Temperature: 0 ~ 40℃
Operating Ambient Humidity : 10 ~ 90 %
Display pattern: dynamic pattern (Real display)
-Long-term lighting products recommended regular shutdown

2) Special operating condition
If the product will be used in extreme conditions such as high temperature, humidity, display patterns or 7*24hrs operation time etc.., It is strongly recommended to contact BOE for Application engineering advice. Otherwise, its reliability and function may not be guaranteed.
3) 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) Please contract BOE in advance when you want to switch between portrait and landscape screen
6) Please contact BOE in advance for outdoor operation.
7) Please contact BOE in advance when you display the same pattern for a long time.
8) If the Module keeps displaying the same pattern for a long period of time, the image may be "sticked" to the screen. To avoid image sticking, it is recommended to use a screen saver.
9) 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.
10) Dew drop atmosphere should be avoided.
11) The storage room should be equipped with a good ventilation facility and avoid to expose to corrosive gas , which has a temperature controlling system.
12) When expose to drastic fluctuation of temperature (hot to cold or cold to hot) ,the LCD may be affected; Specifically, drastic temperature fluctuation from cold to hot ,produces dew on the LCD's surface which may affect the operation of the polarizer and the LCD.
13) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD may turn black at temperature above its operational range. However those phenomena do not mean malfunction or out of order with the LCD. The LCD will revert to normal operation once the temperature returns to the recommended temperature range for normal operation

9.8Other

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.
- 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.

10. Label (TBD)

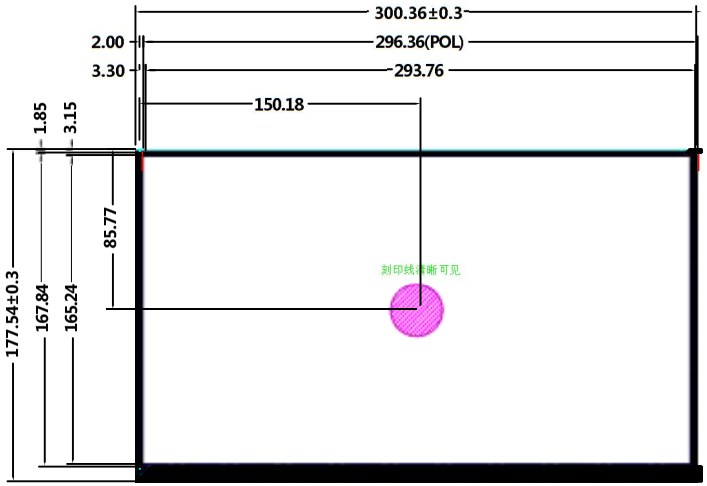
1) Module Bar code label：TBD
2) Packing bar code label：TBD

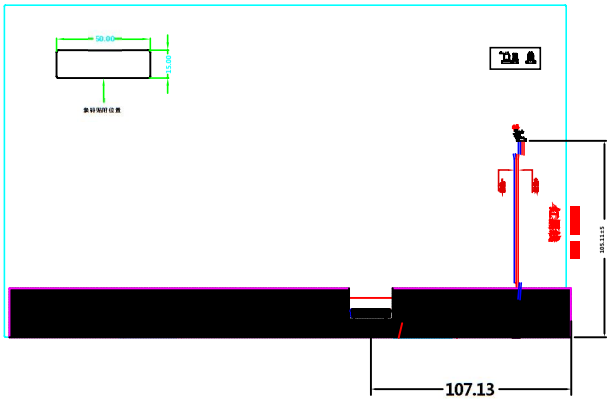
11. PACKING INFORMATION

TBD

12.mechanical drawing

DESIGN	CHECKED	APPROVED	SPECIFICATION FOR BACKLIGHT 规 格	
			LCM COD(E模:组型号)	EDITION: (版本号)
Date: (日期)	Page: (页数)	View: (视 角)	DRAWNO(.:出图编号)	EDITION: (版本号)

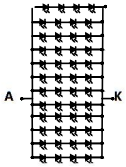




NOTES:

1. LED CIRCUIT DIAGRAM:

所使用的LED不带反向二极管



LED 电路图

2. Do not scale drawing.Unit:mm.

3. Modification rev.number.

4. Genral Tolerance:(±0.2) reference dimension.带*的尺寸为重点管控尺寸

5. Draft angle 1.5°

6. Operating Temperature: 0~+50°C , Storage Temperature: -20~+60°C

7. possession materials are insulated (ex FPC ,LED)

8. 同一片背光色度坐标x/y要求：最大值与最小值相差不超过0.03;

9. 平面度≤0.6.mm；变形方向为

REV(标记	Date (日期)	Description (描述)
1	2023. 05. 06	首次发行

Electrical-Optical Characteristics(Ta=25°C):

Item		Symbol	min.	typ.	max.	Unit	Condition
Main screen	Luminance	Lv	560	650	---	cd/m.	If= 260 mA (恒定电流测试)
	Uniformity	Avg	75	80		%	
	Colour Coordinate X	X	0.26	0.29	0.32		
	Colour Coordinate Y	Y	0.29	0.32	0.35		
Forward Voltage		Vf	22.4	24	26.4	V	

视角要求:

Customer Name: 客户名称	Check by: 确认	Approved by: 承认	Please Confirm This Drawing On/Before 请 签 回 此 图