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SPEC. NUMBER

PRODUCT GROUP

Rev.P0

ISSUE DATE

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**TITLE :GS133FBB-N10-6RA0 Product Specification
Rev.P0**

Supplier	ORDOS YUANSHENG Optoelectronics Technology CO., LTD
Model	GS133FBB-N10-6RA0

TITLE/SIGNATURE	DATE
_____	_____
_____	_____
_____	_____

ITEM	SIGNATURE	DATE
Approved	_____	<u>2021.09.18</u>
Reviewed	_____	_____
Prepared	_____	_____

ORDOS YUANSHENG OPTOELECTRONICS TECHNOLOGY



PRODUCT GROUP

REV

ISSUE DATE

LTPS- LCD PRODUCT

P0

2021.09.18

SPEC. NUMBER

GS133FBB-N10-6RA0

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REVISION HISTORY

REV.	ECN No.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0		Initial Release	2021.09.18	Haifeng Bi

No.	Detail of the Develop Group	Person in Charge
1	PM	Haifeng Bi
2	Array Parts	Aiyu Ding
3	Cell/CF Parts	Min Zhang
4	Circuit Parts	Tong Zhang

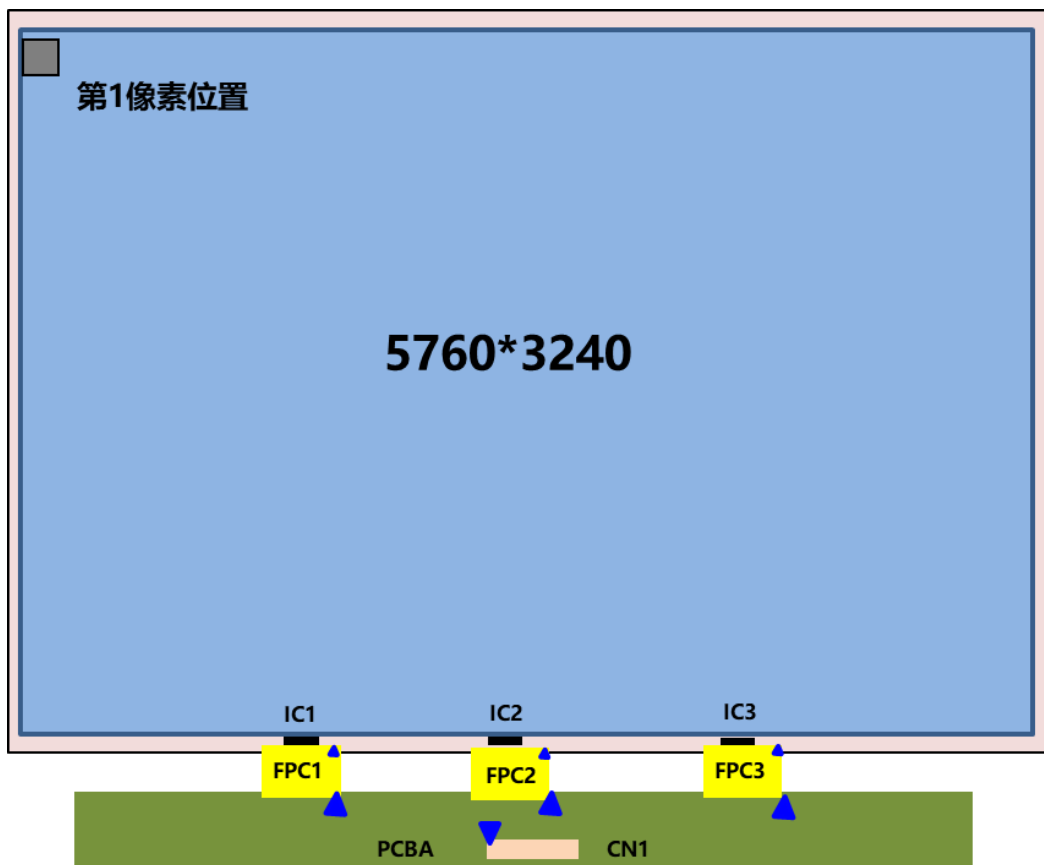
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1.0 GENERAL DESCRIPTION

1.1 Introduction

B6 GS133FBB-N10-6RA0 is a Black & White active matrix LTPS LCD using Low Temperature Poly-silicon TFT's (Thin Film Transistors) as an active switching devices. The LTPS-LCD has a 13.3 inch diagonally measured active area with UHD resolutions (5760 horizontal by 3240 vertical pixel arrays).



1.2 Features

- Border (L/R/U/D) : 4.78/4.78/2.0/4.0+5.74
- NTSC : Mono
- Drive IC : TC2090J
- Interface: eDP v1.3 4LANE

1.3 Application

- 3D Print

1.4 General Specification

The followings are general specifications of FOG GS133FBB-N10-6RA0.

<Table 1. General Specifications>

Parameter	Specification	Unit	Remarks
Active area	288.0(H) x 162.0(V)	mm	
CF size	297.56(H) x 168.0(V)	mm	
Number of pixels	5760(H) × 3240(V)	pixels	
Pixel pitch	50.0*50.0	um	
Contrast Ratio	≥300:1 @405nm	-	
Color gamut	Mono	-	
Display colors	256	Gray	
FOG Trans.	6.6	%	不帶APF&Ha ze @405nm
Display mode	Normally black		
Panel Size	297.56(H) x 173.74(V)	mm	
IC	TC2090J		

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	Remarks
LC operating Voltage ^[1]	V _{OP}	-	5.0	V	Ta=25+/-2°C
Operating Temperature (Humidity)	T _{OP}	-30	+80	°C	
Storage Temperature (Humidity)	T _{ST}	-30	+80	°C	

[1] Liquid Crystal driving voltage

Due to the characteristics of LC Material, this voltage varies with environmental temperature.

3.0 ELECTRICAL SPECIFICATIONS**3.1 Electrical Specifications**

< Table 3. Electrical specifications >

[Ta =25±2 °C]

Parameter	Symbol	Min.	Tye.	Max.	Unit	Remarks
I/O Supply Voltage	LCD_VC C	3.0	3.3	3.6	V	
Frame Frequency	f_Frame	-	60	-	Hz	

Notes :

1. VGH is TFT Gate operating voltage.
2. VGL is TFT Gate operating voltage. The low voltage level of VGL signal must be fluctuates with same phase as Vcom.
3. Vcom must be adjusted to optimize display quality, as Crosstalk and Contrast Ratio etc..
4. The value is just the reference value. The customer can optimize the setting value .

4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25 \pm 2^\circ\text{C}$) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) 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 $\theta\phi=0$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta\phi=90$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta\phi=180$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta\phi=270$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or ϕ , the center of the measuring spot on the Display surface shall stay fixed.

Optimum viewing angle direction is 6 o'clock.

4.2 Optical Specifications

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	θ_3	CR > 10	70	80	-	Deg.	
		θ_9		70	80	-	Deg.	
	Vertical	θ_{12}		70	80	-	Deg.	
		θ_6		70	80	-	Deg.	
Luminance Contrast ratio		CR	$\theta = 0^\circ$	300	-	-		@405nm
FOG Transmittance		Tr		-	6.6	-	%	不帶APF&Haze @405nm
White Chromaticity		x	CIE 1931	0.298	0.308	0.318		CF @ C Light
Color Gamut (C light)				Mono			%	
Response Time (Rising + Falling)		T_{RT}	Ta= 25°C $\theta = 0^\circ$	-	-	35	ms	Tr+Tf , @60°C

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 4).
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) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Transmittance is the Value with Polarizer
4. The color chromaticity coordinates specified in Table 5 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.
5. The electro-optical response time measurements shall be made as FIGURE 3 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 .

5.0 INPUT TERMINAL PIN ASSIGNMENT

This LCD employs one interface connections, the 30 pin ZIF connector is used for the LCD module electronics interface.

5.1 Pin assignment for LCD module

Connector : eDP_30pin_W05030-P30-H or equivalent

< Table7. Pin Assignment for LCD Module Connector >

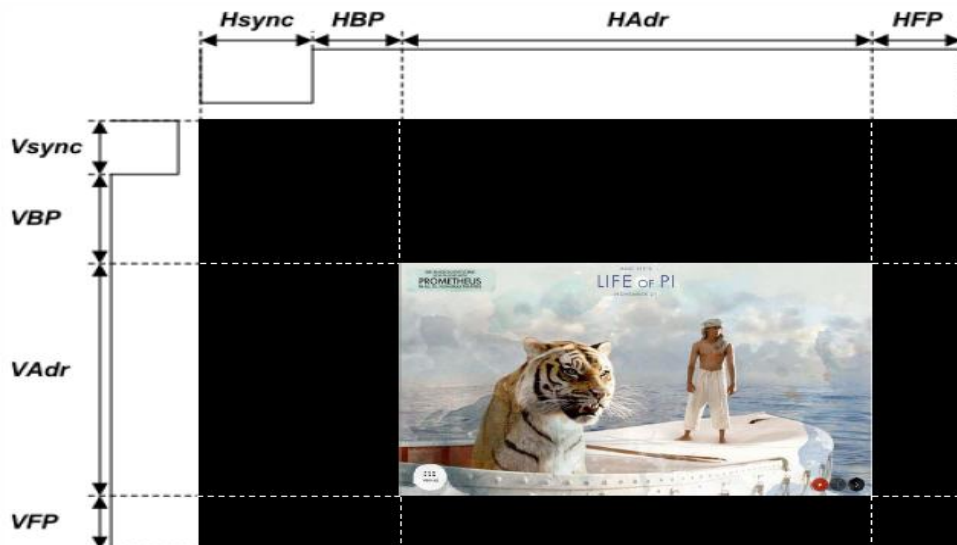
Pin No.	Pin Name	Pin Description
1	DE_EN	NC
2	GND	Ground
3	LANE3_N	Negative Signal For eDP Lane
4	LANE3_P	Positive Signal For eDP Lane
5	GND	Ground
6	LANE2_N	Negative Signal For eDP Lane
7	LANE2_P	Positive Signal For eDP Lane
8	GND	Ground
9	LANE1_N	Negative Signal For eDP Lane
10	LANE1_P	Positive Signal For eDP Lane
11	GND	Ground
12	LANE0_N	Negative Signal For eDP Lane
13	LANE0_P	Positive Signal For eDP Lane
14	GND	Ground
15	AUXCHP	Positive Signal for Auxiliary Chanel
16	AUXCHN	Negative Signal for Auxiliary Chanel
17	GND	Ground
18	LCD_VCC	Power Supply For LCD
19	LCD_VCC	Power Supply For LCD
20	LCD_VCC	Power Supply For LCD
21	LCD_VCC	Power Supply For LCD
22	BIST_EN	BIST Function
23	LCD_GND	Ground
24	LCD_GND	Ground
25	LCD_GND	Ground
26	LCD_GND	Ground
27	HPD	Hot Plug Detection Signal
28	NC	-
29	NC	-
30	NC	-

5.2 Interface timing Parameter

< Table12. Timing Parameter >

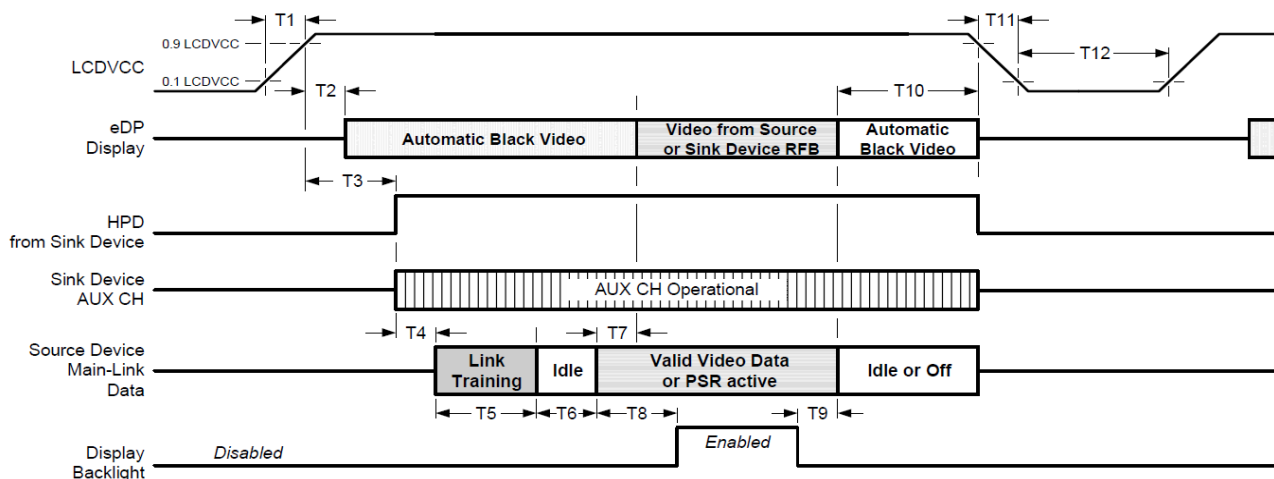
Item		Symbol	min	typ	max	UNIT	
LCD	Frame Rate	-	-	60	-	Hz	
Timing	DCLK	Frequency	fCLK	410	-	MHz	
	Horizontal	Horizontal total time	tHP	-	2080	-	t _{CLK}
		Horizontal Active time	tHadr	1920		-	t _{CLK}
		Horizontal Pulse Width	tHsync	-	32	-	t _{CLK}
		Horizontal Back Porch	tHBP	-	160	-	t _{CLK}
		Horizontal Front Porch	tHFP	-	48	-	t _{CLK}
	Vertical	Vertical total time	tvp	-	3286	-	t _H
		Vertical Active time	tVadr	3240		-	t _H
		Vertical Pulse Width	tVsync	-	10	-	t _H
		Vertical Back Porch	tVBP	-	46	-	t _H
Vertical Front Porch		tVFP	-	3	-	t _H	

- Remarks : 1.This production is 1port
2.The production transmission diagram is 5760x3240(MONO)



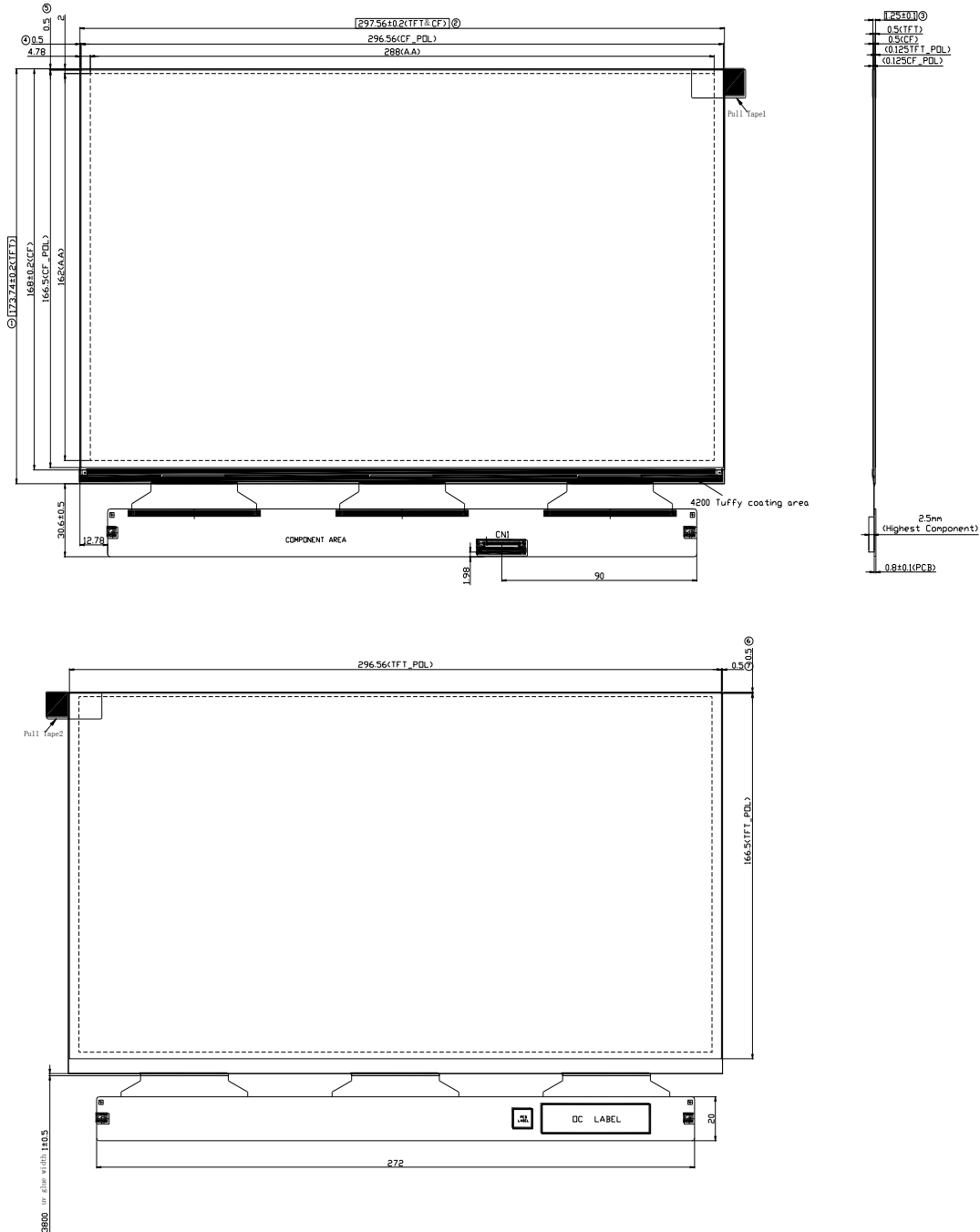
5.3 Power Sequence

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



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	200	ms
T3	0	-	200	ms
T4	-	-	-	ms
T5	-	-	-	ms
T6	-	-	-	ms
T7	0	-	50	ms
T8	-	-	-	ms
T9	-	-	-	ms
T10	0	-	500	ms
T11	-	-	10	ms
T12	500	-	-	ms

Mechanical Drawing Drawing Attachment:



7.0 APPENDIX

Figure 1. Optical Test Equipment Setup

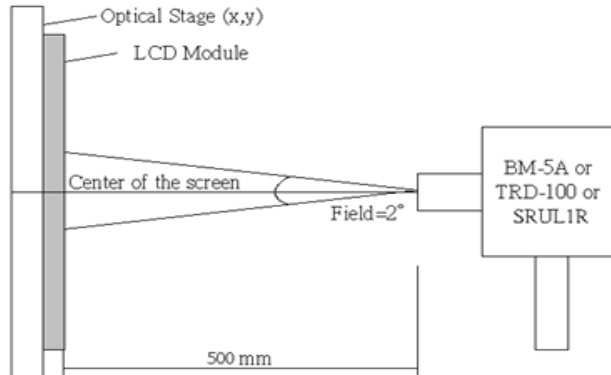


Figure 2. Response Time Testing

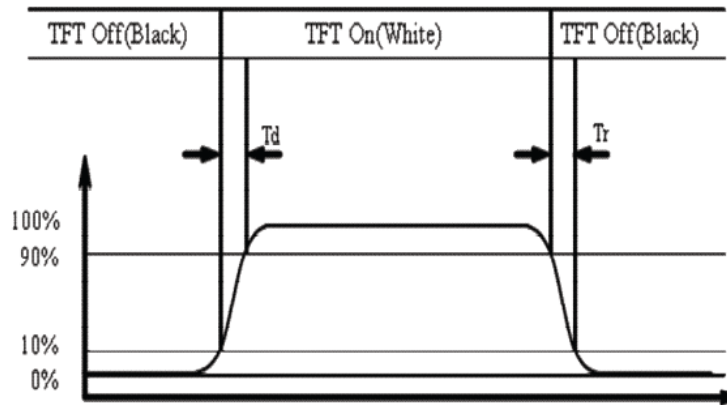


Figure 3. The Definition of V_{th} & V_{sat}

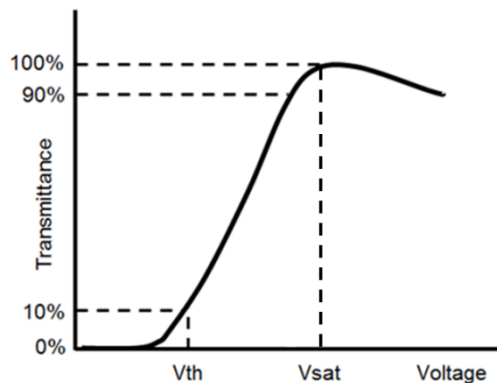


Figure 4. Viewing Angle Range is defined as follows;

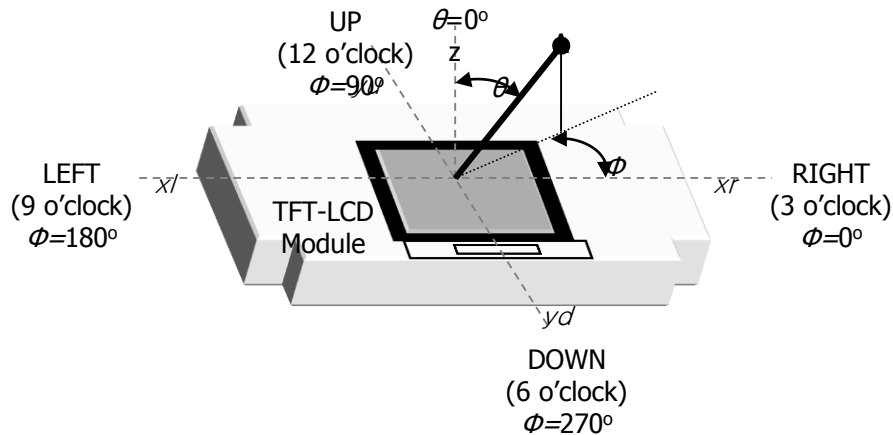
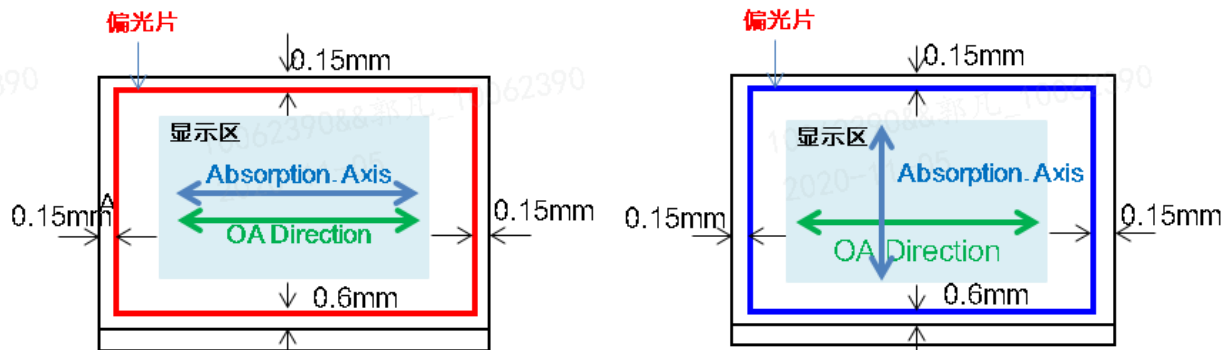


Figure 5. Pol General Spec

UP POL

DOWN POL



	CF Pol	TFT Pol	Remark
Absorption Axis	$90^{\circ} \pm 0.5^{\circ}$	$0^{\circ} \pm 0.5^{\circ}$	住化\日东

8.0 RELIABILITY TEST

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

<Table 8. Reliability test>

No	Test Items	Conditions
1	High temperature storage test	Ta = 80 °C, 240 hrs
2	Low temperature storage test	Ta = -20°C, 240hrs
3	High temperature & high humidity operation test	Ta = 60 °C, 90%RH, 240hrs
4	High temperature operation test	Ta = 80 °C, 240 hrs
5	Low temperature operation test	Ta = -30 °C, 240hrs
6	Thermal shock test	Ta = -30 °C ↔ 80 °C (30min), 100cycle

9 Handling & Cautions

9.1 Mounting Method

- The panel of the LCD consists of two thin glasses with polarizers which easily get damaged. So extreme care should be taken when handling the LCD.
- Excessive stress or pressure on the glass of the LCD should be avoided. Care must be taken to insure that no torsional or compressive forces are applied to the LCD unit when it is mounted.
- 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.
- To determine the optimum mounting angle, refer to the viewing angle range in the specification for each model.
- Mount a LCD module with the specified mounting parts.
- Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD for incoming inspection or assembly.
- This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

9 Handling & Cautions

9.2 Caution of LCD Handling and Cleaning

- 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.
- The polarizers on the surface of panel are made from organic substances. Be very careful for chemicals not to touch the polarizers or it leads the polarizers to be deteriorated.
- If the use of a chemical is unavoidable, use soft cloth with solvent (recommended below) to clean the LCD's surface with wipe lightly.
-IPA(Isopropyl Alcohol), Ethyl Alcohol, Trichlorotrifluoroethane
- Do not wipe the LCD's surface with dry or hard materials that will damage the polarizers and others. Do not use the following solvent.
-Water, Ketone, Aromatics
- It is recommended that the LCD be handled with soft gloves during assembly, etc. The polarizers on the LCD's surface are vulnerable to scratch and thus to be damaged by sharp particles.
- Do not drop water or any chemicals onto the LCD's surface.
- A protective film is supplied on the LCD and should be left in place until the LCD is required for operation.
- The ITO pad area needs special careful caution because it could be easily corroded. Do not contact the ITO pad area with HCFC, Soldering flux, Chlorine, Sulfur, saliva or fingerprint. To prevent the ITO corrosion, customers are recommended that the ITO area would be covered by UV or silicon.
- Please use suction cup to grab the Q-Panel. Please use suction ball to grab the Cell. It is forbidden to touch the ITO pad area and Active Area.
- Repeatedly bonding will result in film peeling.
- The special tray should be used to avoid Q-panel bending while the placement, flipping, etc.
- When the LCD needs to be returned, please use special tray.
- When disposing LCD, obey the local environmental regulations.
- The ion wind blowing is the unique way to clean ITO pad area. No wipe.
- The LCD should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

9.3 Caution Against Static Charge

- 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.
- 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.
- Avoid the use work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.
- 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.
- To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.4 Caution For operation

- It is indispensable to drive the LCD within the specified voltage limit since the higher Voltage than the limit causes the shorter LCD's life. An electro-chemical reaction due to DC causes undesirable deterioration of the LCD so that the use of DC drive should avoid.
- Do not connect or disconnect the LCD to or from the system when power is on.
- Never use the LCD under abnormal conditions of high temperature and high humidity.
- 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.
- 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.
- Do not display the fixed pattern for a long time because it may develop image sticking due to the LCD structure. If the screen is displayed with fixed pattern, use a screen saver.
- The ET standard timing is required. Abnormal power-down will cause jitter.

9.5 Packaging

- Modules use LCD element, and must be treated as such.
 - Avoid intense shock and falls from a height.
 - To prevent modules from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity for long periods.

9.6 Storage


- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Relative humidity of the environment should therefore be kept below 60%RH.
- Original protective film should be used on LCD's surface (polarizer). Adhesive type protective film should be avoided, because it may change color and/or properties of the polarizers.
- Do not store the LCD near organic solvents or corrosive gasses.
- Keep the LCD safe from vibration, shock and pressure.
- Black or white air-bubbles may be produced if the LCD is stored for long time in the lower temperature or mechanical shocks are applied onto the LCD.
- In the case of storing for a long period of time for the purpose or replacement use, the following ways are recommended.
 - Store in a polyethylene bag with sealed so as not to enter fresh air outside in it.
 - Store in a dark place where neither exposure to direct sunlight nor light is.
 - Keep temperature in the specified storage temperature range($25 \pm 10^{\circ}\text{C}$).
 - Store with no touch on polarizer surface by the anything else. If possible, store the LCD in the packaging situation LCD when it was delivered.
 - The LCD should be stored in the room without acid, alkali and harmful gas.

9.7 Safety

- For the crash damaged or unnecessary LCD, it is recommended to wash off liquid crystal by either of solvents such as acetone and ethanol and should be burned up later.
- In the case the LCD is broken, watch out whether liquid crystal leaks out or not. If your hands touch the liquid crystal, wash your hands cleanly with water and soap as soon as possible.
- If you should swallow the liquid crystal, first, wash your mouth thoroughly with water, then drink a lot of water and induce vomiting, and then, consult a physician.
- If the liquid crystal should get in your eyes, flush your eyes with running water for at least fifteen minutes.
- If the liquid crystal touches your skin or clothes, remove it and wash the affected part of your skin or clothes with soap and running water.

10.0 LABEL

(1) High voltage caution label

	HIGH VOLTAGE CAUTION	COLD CATHODE FLUORESCENT LAMP IN LCD PANEL CONTAINS A SMALL AMOUNT OF MERCURY. PLEASE FOLLOW LOCAL OR- DINANCES OR REGULATIONS FOR DISPOSAL.
	RISK OF ELECTRIC SHOCK. DISCONNECT THE ELECTRIC POWER BEFORE SERVICING	

(2) Box label

Label Size: 110 mm (L) 56 mm (W)

Contents

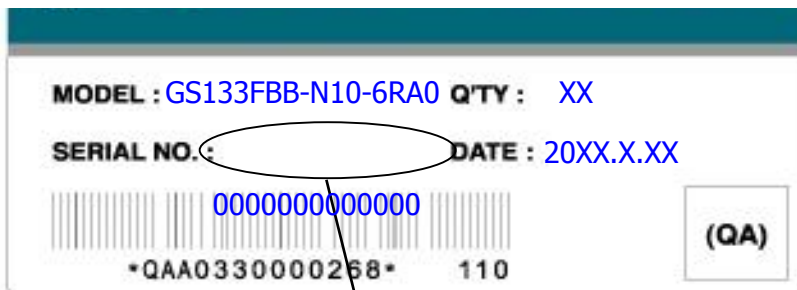
Model: GS043FHB-N10-DHP0

Q`ty: Cell Q`ty in one box

Serial No.: Box Serial No. See next figure for detail description.

Date: Packing Date

Internal use of Product



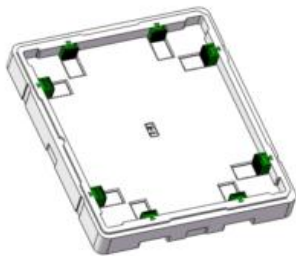
<u>00</u>	<u>0</u>	<u>0</u>	<u>00</u>	<u>0</u>	<u>0000</u>	<u>000000</u>
Type	Grade	Line	Year	Month	Internal use	Serial No

10.1 PACKING INFORMATION

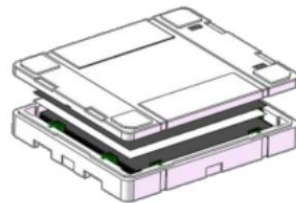
参照Box 挡块匹配图，正确将AB S挡块放到EPO Bottom的相应位置

将20ea Q依次平放入，每个Q上下均放置珍珠棉垫片，共计21pcs，最后盖上EPO Cover

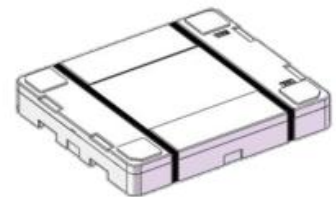
利用绑带沿着凹槽将Cover与Bottom捆绑打包。
20 Q-Panel/EPO Box



Step1



Step2



Step3

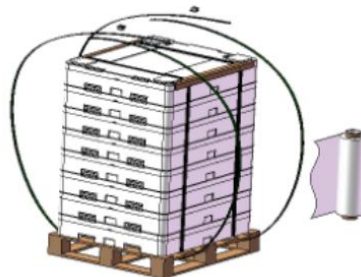
将BOX堆叠在栈板上；
最大堆叠箱数：8 BOX/栈板（通常陆运8BOX，空运2BOX）
8 EPO Box/Pallet

在最上方BOX的长边侧放纸护角，打绑带并用打包扣扣紧，缠缠绕膜（2层/BOX），顶部加盖缠绕膜160 Q-Panel/Pallet

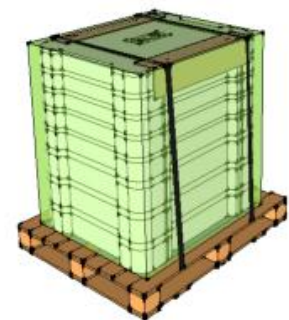
整托入库
陆运：≤8BOX（160片Q）
空运：≤2BOX（40片Q）



Step4



Step5



Step6