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SPEC. NUMBER	**PRODUCT GROUP** TFT-LCD	**REV.** 0	**DATE** 2018.01.19	**PAGE** 1 /23

EV101WXM-N80-3850 Product Specification Rev.0

Buyer	**Mindray**
Supplier	**HEFEI BOE Optoelectronics Technology CO.LTD**
FG-Code	**EV101WXM-N80-3850**

ITEM	SIGNATURE	DATE
Approved		
Reviewed		
Prepared		

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

REVISION HISTORY

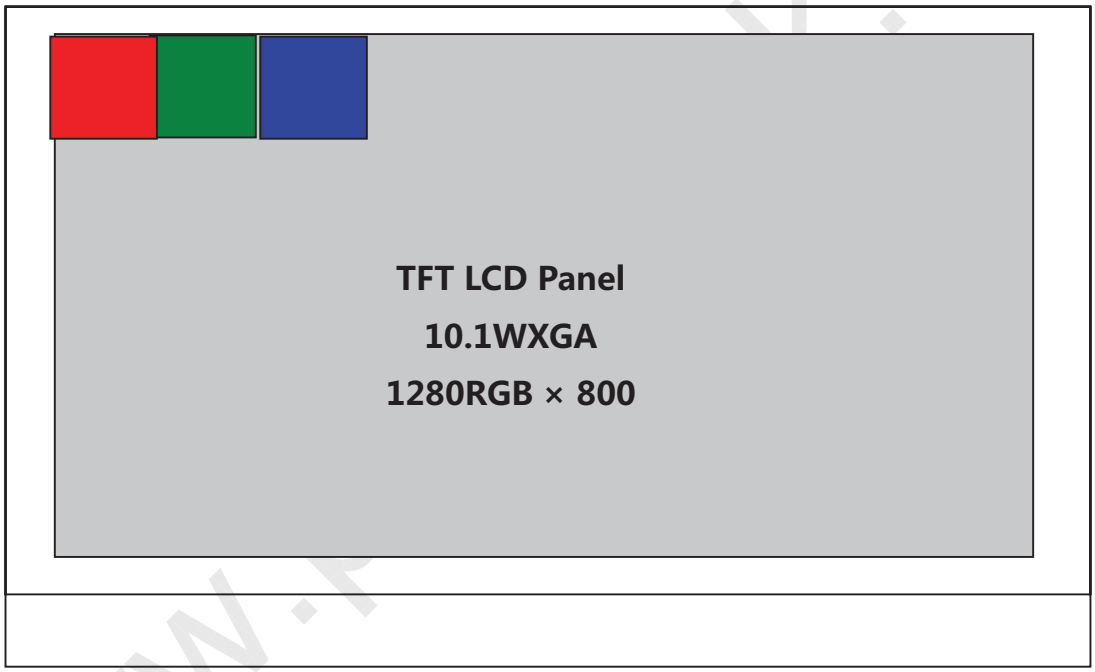
REV.	ECN NO.	PAGE	DESCRIPTION OF CHANGES	DATE	PREPARED
0		23	Initial Release	2018.01.19	Leon Zhang

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

EV101WXM-N10-3850 is a color active matrix TFT LCD Panel using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 10.1inch diagonally measured active area with WXGA resolutions (1280 horizontal by 800 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.



1.2 Features

- Cell Thickness：0.8t
- RoHS Compliant
- Display Mode: ADS
- Interface: LVDS, 1 port 4 pair
- Number of colors: 16.7M, cannot be selected

1.3 Application

- Medical Equipment

1.4 General Specification (H: horizontal length, V: vertical length)

The followings are general specifications at the EV101WXM-N10-3850

<Table 1. General Specifications>

Parameter	ITEMS	Unit	Remark
Active area	216.96 (H) × 135.6(V)	mm	
Dimensional Outline	(W)× (V) × (D)	mm	
Border(L/R/U/D)	2.6/2.7+2.55/2.55/2.8+3.3		
Number of pixels	1280 (H) ×800 (V)	pixels	
Pixel pitch	56.5(H) × 169.5(V)	μm	
Pixel arrangement	1p2d		
Luminance	Typ 400 nit, Min 350 nit	nit	
Transmittance	5.4%(typ) ;4.6%(min)		
Color Gamut	48%(typ) ;43%(min)		
Display colors	16.7M		
Display mode	Normally Black		
Contrast Ratio	900:1(typ) ; 700:1(min)		
Response Time	30(typ); 40(max)	ms	
Optima Viewing Direction (Human Eye)	85/85/85/85(typ) 80/80/80/80(min)	Deg.	CR>10
Driver IC	HX8245-E04		
Weight	-	gram	

2.0 ABSOLUTE MAXIMUM RATINGS

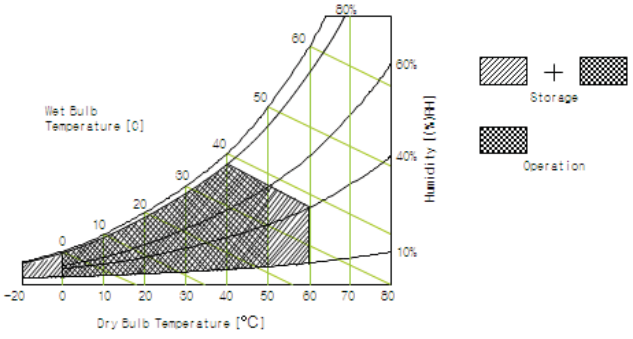
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

<Table 2. Absolute Maximum Ratings >

Parameter	Symbol	Min.	Max.	Unit	Remarks
LC operating Voltage [Note1]	V_{OP}	-	4.2	V	Ta=25+/-5° C
Operating Temperature (Humidity)	T_{OP}	-20	+70	℃	[Note2]
	RH(60°)			%	
Storage Temperature (Humidity)	T_{ST}	-30	+80	℃	
	RH(60°)		90	%	

Note:

1. Liquid Crystal driving voltage
   Due to the characteristics of LC Material, this voltage varies with environmental temperature.
2. Temperature and relative humidity range are shown in the figure below.
   Wet bulb temperature should be 39 ℃ max. and no condensation of water.



3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

<Table 3. Electrical specifications >

Parameter	Symbol	Value	Range	Unit	Remark
TFT Gate ON Voltag	VGH	18	-	V	Note1
TFT Gate OFF Voltage	VGL	-7	-	V	Note2
TFT Common Electrode Voltage	Vcom	3.5		V	Note3
TFT Kick-Back Voltage Max	ΔVp Max	-	-	V	
TFT Kick-Back Voltage Min	ΔVp Min	-	-	V	
LCD Panel Signal Processing Board	VDD	3.3	3.0~3.6	V	
LCD Panel Signal Current	I_{VDD}	0.5	-	A	TYP
Backlight Input Voltage	V_{LED}	12	11.5~12.5	V	
Backlight Input Current	I_{LED}	0.4		A	TYP
LCD Panel Display Power	—	1.65		W	
Backlight Power	—	4.8		W	

Note:

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..

We just kindly recommend the setting-voltages the reference value.

In order to get the optimized display quality, the setting-voltage should be changed according to customer's developing condition. (The display quality could be changed by customer's setting –voltage.)

4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications 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 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°. The center of the measuring spot on the Display surface shall stay fixed.
The backlight should be operating for 30 minutes prior to measurement.

4.2 Optical Specifications

<Table 4. Optical Specifications >

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ3	CR>10	80	85		Deg.	Note1
		Θ9		80	85		Deg.	
	Vertical	Θ12		80	85		Deg.	
		Θ6		80	85		Deg.	
Contrast ratio		CR	Θ = 0°	700	900			Note2
Transmittance		Tr		4.6	5.4		%	Note3
Color Gamut		CG		43	48	53	%	
Reproduction of color	Red	Rx	Θ = 0°	0.563	0.593	0.623		Note4 (Based on BLU)
		Ry		0.321	0.351	0.381		
	Green	Gx		0.301	0.331	0.361		
		Gy		0.529	0.559	0.589		
	Blue	Bx		0.124	0.154	0.184		
		By		0.079	0.109	0.139		

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
White Chromaticity	Wx	Θ = 0°					
	Wy						
Response Time (Rising + Falling)	$T_r + T_f$	Ta= 25° C Θ = 0°				ms	Note 5

Note:

1.Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o' clock direction and the vertical or 6, 12 o' clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2.Contrast measurements shall be made at viewing angle of 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 FIGUR 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 without APF and without CG.

4.The color chromaticity coordinates specified in the above table 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 2 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 Tf.

Figure1 Measurement Set Up

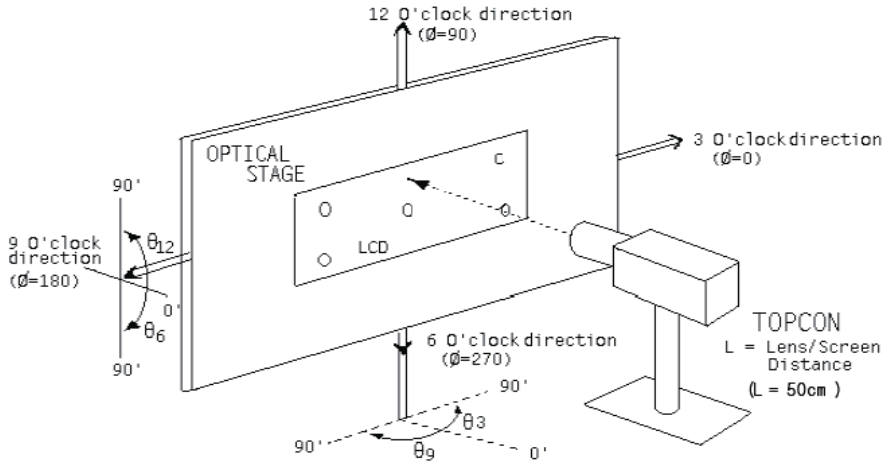
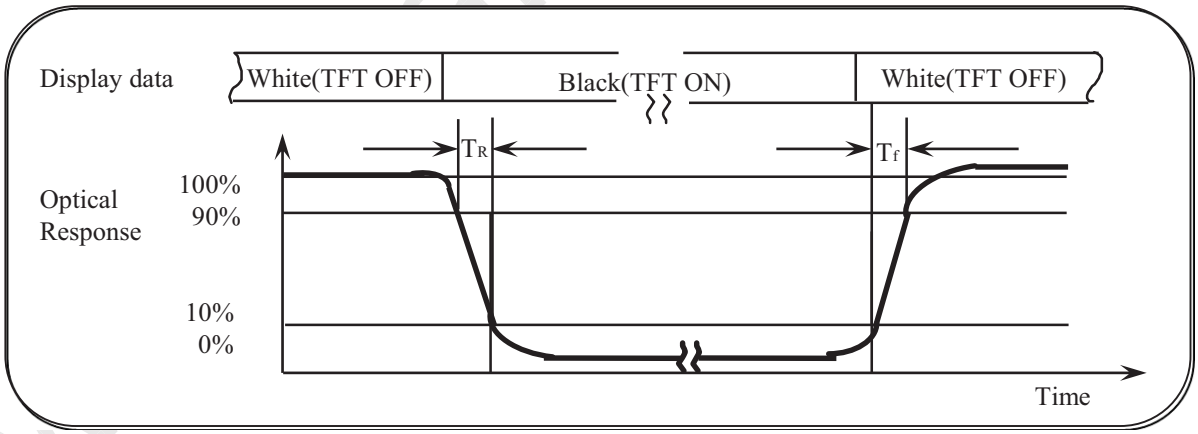


Figure2 Response Time Testing



6.0 FPC/IC Pin Assignment & Mechanical Characteristics

6.1 Dimension Requirements

Mechanical outlines for the panel **(**H: horizontal length, V: Vertical length**)**

<Table 6 Dimensional Parameters>

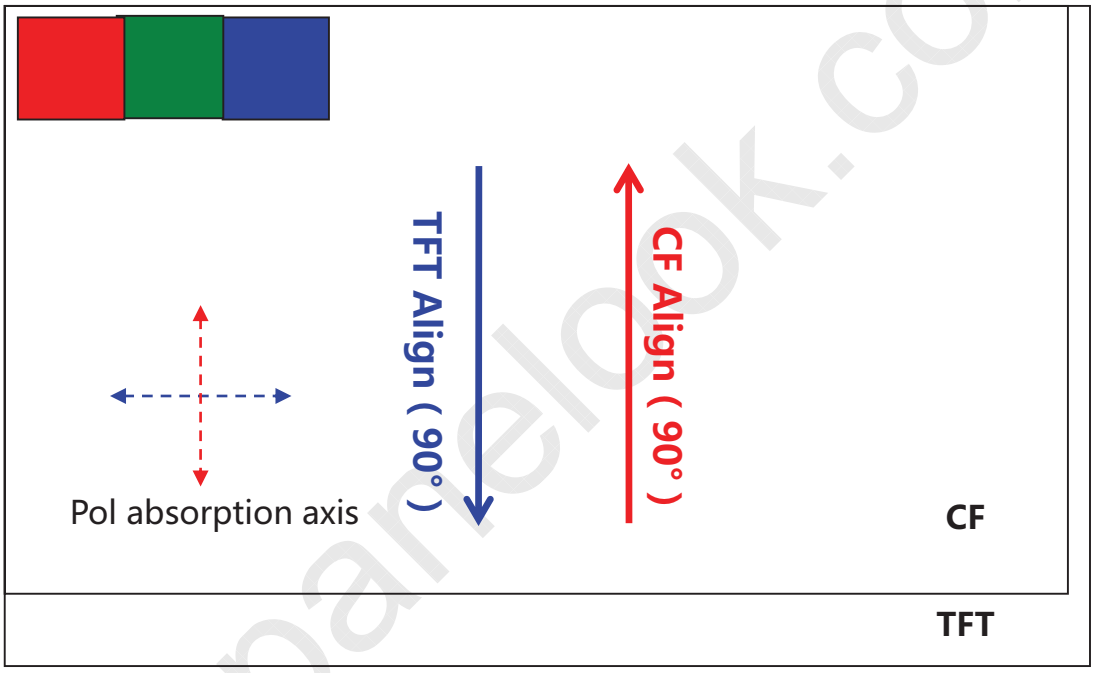
Parameter	ITEMS	Unit	Remark
Dimensional Outline		mm	
CF size	222.26(H) × 140.95(V)	mm	
Active area	216.96 (H) × 135.6(V)	mm	
Border(L/R/U/D)	2.6/2.7+2.55/2.55/2.8+3.3	mm	
Number of pixels	1280 (H) ×800 (V)	pixels	
	1pixel=R+G+B dots		
Pixel pitch	56.5(H) × 169.5(V)	μm	
Pixel Arrangement	1P2D		
Pad Area	G:2.55 S:3.3	mm	
Glass Edge to FPC	0.3	mm	Note1
FPC Pad Width	0.7	mm	
FPC to D-IC	0.6	mm	
D-IC Width	0.844	mm	
D-IC to CF Edge	0.856	mm	

Note:

1. The size specified is calculated by IC–driver HX8394F, the size maybe changed if customer use other IC.

6.2 LC Align Direction & Pol absorption axis

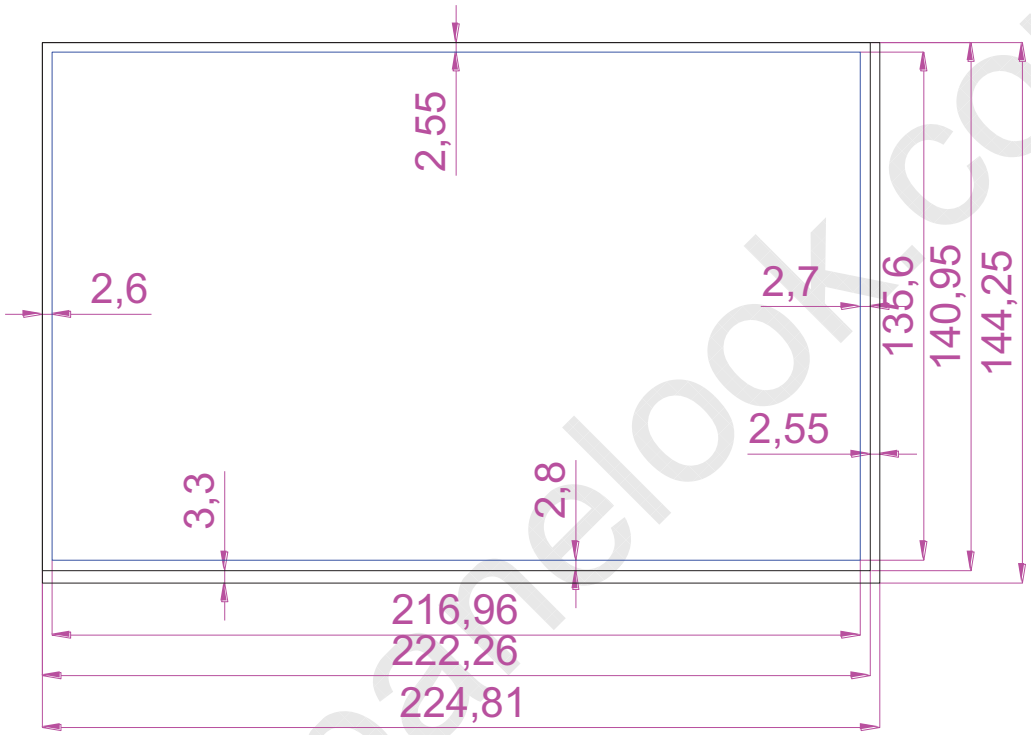
Figure3 The TFT and CF LC Align Direction



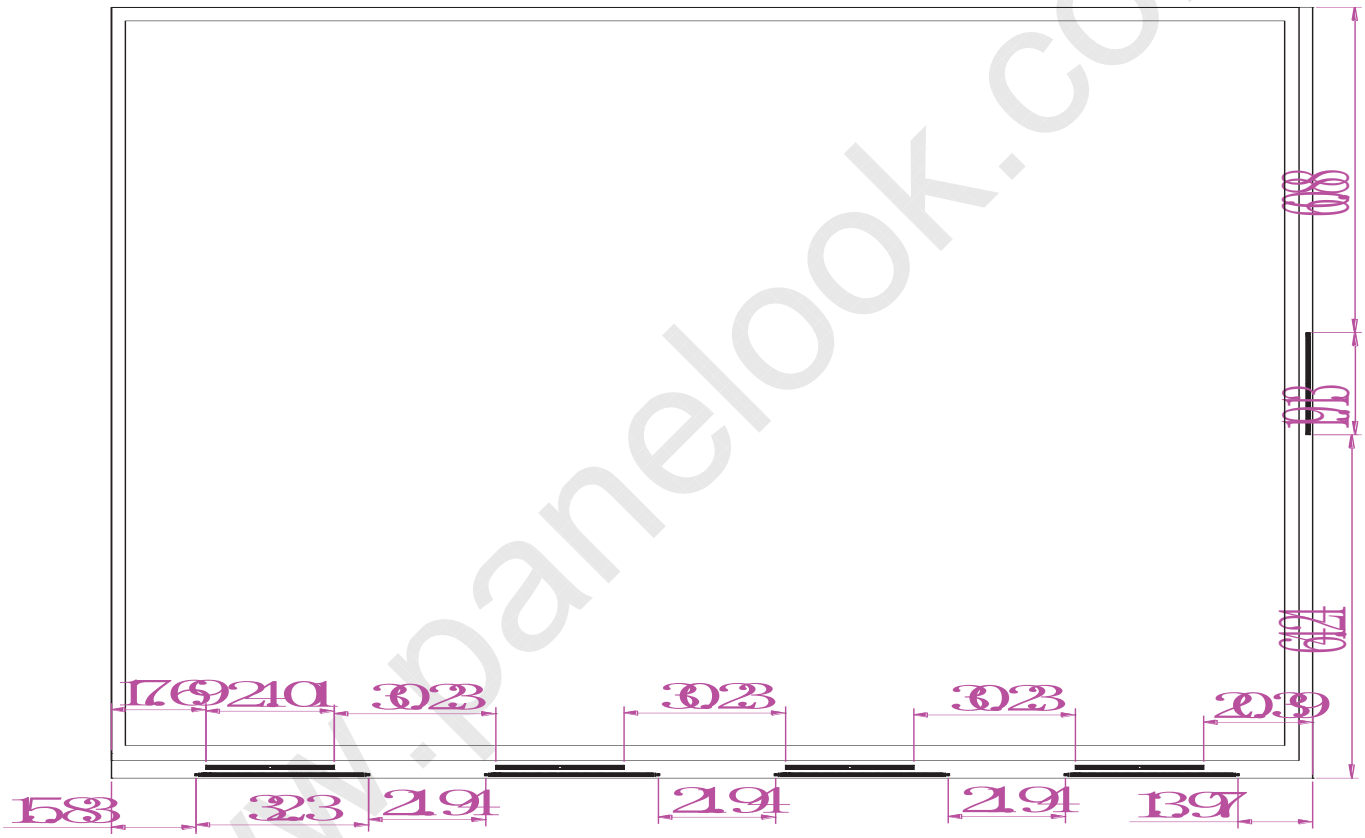
Pol absorption axis

Shown in Figure3, CF pol absorption axis is parallel with CF align direction(0°) , TFT pol absorption axis is vertical with TFT align direction (90°)

6.3 Outline Dimension (unit : mm)



6.4 IC & FPC Position Information(unit : mm)



6.5 Cell Test Pad(unit : mm)

6.6 Connector Pin Assignment

6.6.1 LCD panel signal

CN1 SOCKET: DF19G-20P-1H (54) (HIROSE ELECTRIC CO., LTD (HRS))
Adaptable plug: DF19G -20S-1C(05) (HIROSE ELECTRIC CO., LTD (HRS))

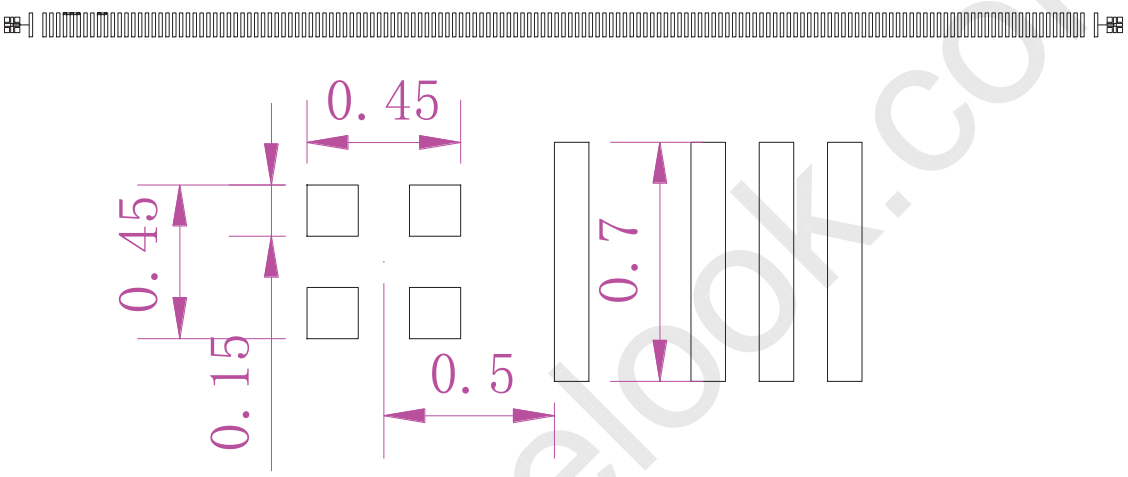
Pin NO.	Pin name	Description
1	VCC	Power supply
2	VCC	
3	N.C.	Not connect
4	GND	Ground
5	D0-	Pixel data
6	D0+	
7	GND	Ground
8	D1-	Pixel data
9	D1+	
10	GND	Ground
11	D2-	Pixel data
12	D2+	
13	GND	Ground
14	CLK-	Pixel data
15	CLK+	
16	GND	Ground
17	SDA	Not connect
18	SCL	Not connect
19	D3-	Pixel data
20	D3+	

6.6.2 LED Driver

CN2 SOCKET: MSA24038P6 (SIN SHENG TERMINAL & MACHINE INC. (SMT))
Adaptable plug: P24038P6 (SIN SHENG TERMINAL & MACHINE INC. (SMT))

Pin NO.	Pin name	Description	Remark
1	PWM	Luminance control	
2	BRTC	Backlight ON/OFF control	High or Open： Backlight ON Low： Backlight OFF
3	GND	Ground	
4	GND	Ground	
5	VDD	Power supply	
6	VDD	Power supply	

6.7 FPC Pin Assignment



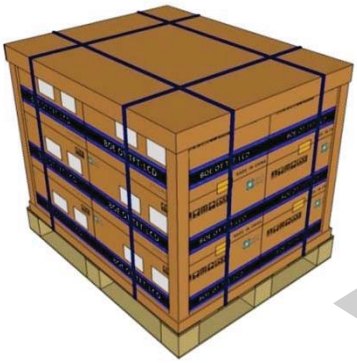
7.0 PACKING INFORMATION(Module)

-. 将1 pcs Module平放入PET Tray,
CF 侧向上放置

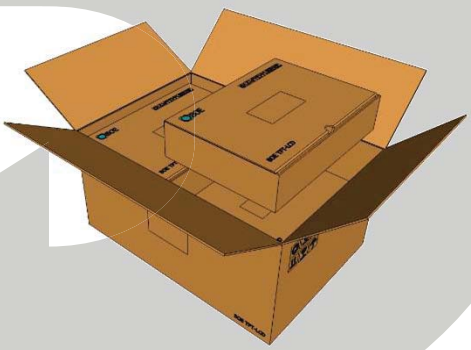
-. 将5 pcs PET Tray 平放入Shielding Bag 进行抽真空处理；然后放入Inner Box；

-.容量：200pcs/Inner Box

-. Tray 无需区分旋转码放



-. 每个Pallet上放3层Box，每层4箱
-. Pallet 缠绕膜包装
-. 288 pcs / Pallet



-.将Inner Box放入Outer Box，每个Outer Box容纳6个Inner Box
-.容量：24 pcs/Outer Box

7.1 PACKING NOTE

- Box Dimension : 545mmL× 380mmW× 270mmH
- Package Quantity in one Box : 24 pcs

8.0 Handling & Cautions

8.1 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.

8.2 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, Trichlorotriflorothane
- 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.

8.3 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.

8.4 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.

8.5 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.

8.6 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.
  -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.

8.7 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 an 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 an 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.