

DOCUMENT NUMBER AND REVISION  
VL-FS-COG-VLBJT006-06 REV.A  
(COG-VLBJT006-06)DOCUMENT TITLE:  
PRELIMINARY SPECIFICATION  
OF  
TFT MODULE TYPE

CUSTOMER	新通达
CUSTOMER REFERENCE NO.	
MODEL NUMBER	COG-VLBJT006-06
REFERENCE NO.	
CUSTOMER APPROVAL	
DATE	

DISTRIBUTION LIST: MARKETING

# Specification For Approval

- Preliminary specification
- Final specification

<b>Title</b>	<b>7WV ADS TFT-LCD 新通达模组 spec</b>
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Buyer	
Model	

Supplier	Cheng Du BOE Optoelectronics Technology CO., LTD
Model	COG-VLBJT006-05

TITLE/SIGNATURE	DATE	ITEM	SIGNATURE	DATE
_____	_____	Approved	_____	_____
_____	_____	Reviewed	_____	_____
_____	_____	Reviewed	_____	_____
_____	_____	Prepared	_____	_____
Please return one copy confirmation with your signature and your comments		BOE CHENG DU Optoelectronics Technology CO., LTD		

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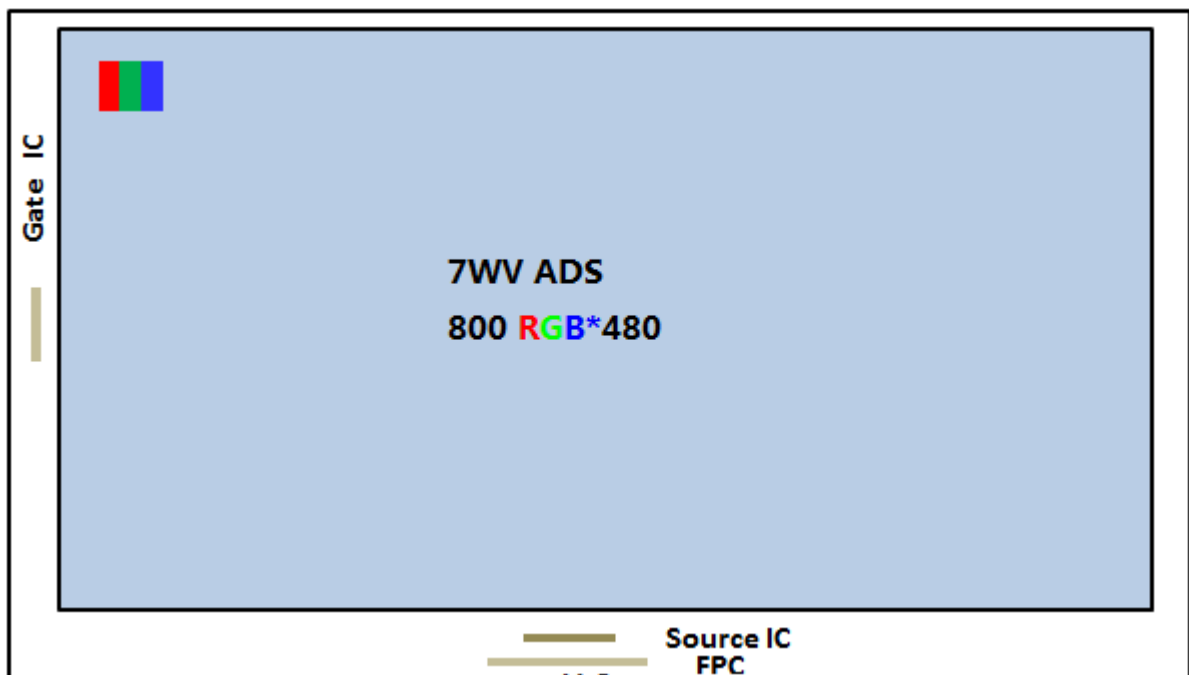
Records Of Revisions

Revision	Date	Page	Description	Released by
Pre.0	2019.11.07		Initial Released	Li zuhua

## 1.0 GENERAL DESCRIPTION

### 1.1 Introduction

COG-VLBJT006-05 is a color active matrix TFT-LCD Panel using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. It is a transmissive type display operating in the normal white. This TFT-LCD has a 7 inch diagonally measured active area with Z7 resolutions (800 horizontal by 480 vertical pixel array). Each pixel is divided into Red, Green, Blue dots which are arranged in 2 domain stripe and this panel can display 16.7M colors.



### 1.2 Features

- 1.0t Glass (Total)
- High luminance and contrast ratio and wide viewing angle
- Anti-glare front polarizer
- 50 pin FPC connection
- RoHS Compliant

### 1.3 Application

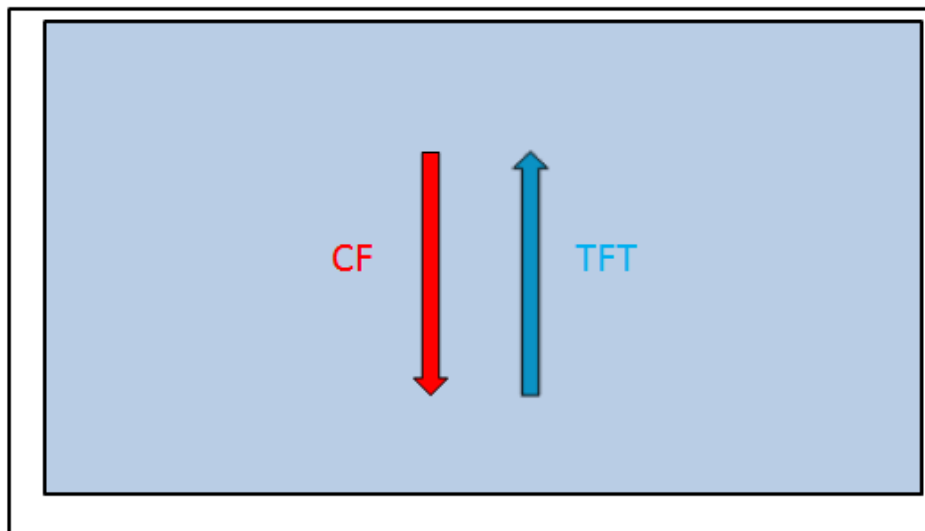
- Automotive

**1.4 General Specifications** (H: horizontal length, V: vertical length)

Parameter	Specification	Unit	Remark
Active Area	152.40(H) x 91.44(V)	mm	
Number of Pixels	800 (H) RGB×480 (V)	pixels	
DOT Pitch	190.5(H) ×190.5(V)	um	
Pixel Arrangement	RGB Vertical Stripe		
Display Colors	16.7M	colors	
Color Gamut	70% (typ.)		
Display Mode	ADS Normal Black		
Dimensional Outline	167.7(H)×109.45 (V) ×9.0(D) Thickness without screw boss holes	mm	
Viewing Direction (Human Eye )	80/80/80/80		Note1,2
D-IC	RM57462 *1(Gate IC) RM5366A *1(Source IC)		Note3

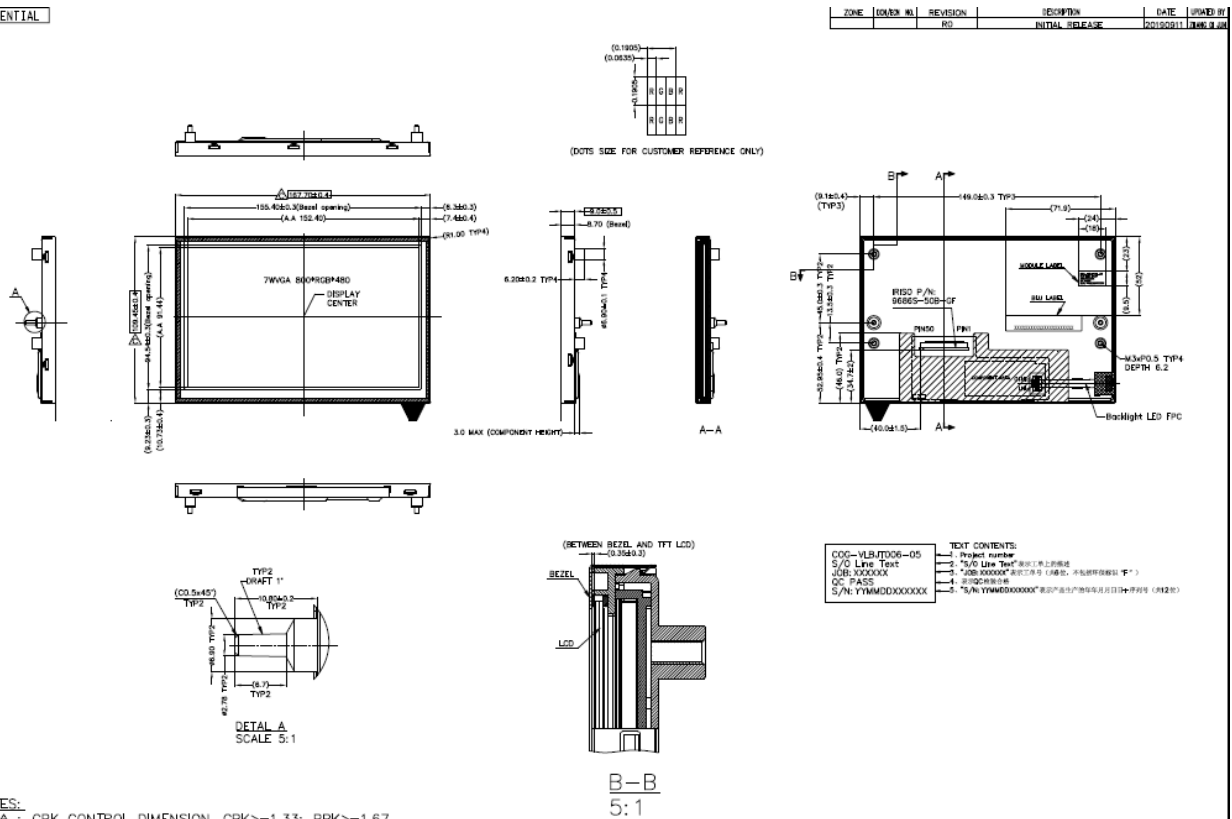
**Note:**

1. At the U/D/L/R direction, the viewing angle is same;
2. The TFT and CF Align Direction;



## 2.0 Module Specifications

CONFIDENTIAL



- NOTES:
1.  $\Delta$ : CPK CONTROL DIMENSION, CPK>=1.33; PPK>=1.67.
  2.  $\square$ : CRITICAL DIMENSION.
  3. (...): REFERENCE DIMENSION.
  4. CONFORMITY WITH RoHS AND HALOGEN FREE.

TOLERANCE TABLE(±)		PART NO.	DESCRIPTION	TITLE	REV
UNSPECIFIED	mm(寸)	BOE	B2-LCM outline (模组)	B2-LCM outline (模组)	1
L50	0.05(0.7)	BOE	BOE	BOE	1
L100	0.1(0.4)	BOE	BOE	BOE	1
L150	0.15(0.6)	BOE	BOE	BOE	1
L200	0.2(0.8)	BOE	BOE	BOE	1
L250	0.25(1.0)	BOE	BOE	BOE	1
L300	0.3(1.2)	BOE	BOE	BOE	1
L350	0.35(1.4)	BOE	BOE	BOE	1
L400	0.4(1.6)	BOE	BOE	BOE	1
L450	0.45(1.8)	BOE	BOE	BOE	1
L500	0.5(2.0)	BOE	BOE	BOE	1
L550	0.55(2.2)	BOE	BOE	BOE	1
L600	0.6(2.4)	BOE	BOE	BOE	1
L650	0.65(2.6)	BOE	BOE	BOE	1
L700	0.7(2.8)	BOE	BOE	BOE	1
L750	0.75(3.0)	BOE	BOE	BOE	1
L800	0.8(3.2)	BOE	BOE	BOE	1
L850	0.85(3.4)	BOE	BOE	BOE	1
L900	0.9(3.6)	BOE	BOE	BOE	1
L950	0.95(3.8)	BOE	BOE	BOE	1
L1000	1.0(4.0)	BOE	BOE	BOE	1

## 3.0 ELECTRICAL SPECIFICATION

### 3.1 Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. Make sure all the design characteristics are adequate before the panel is initialed. All the measurements should be operated with driver IC and experimental FPC mounted.

Item	Symbol	Min.	Max.	Unit
Supply voltage	VCC	-0.3	+3.96	V
Single LED forward current	I <sub>f</sub>	-	150	mA
Total LED forward current	I <sub>f</sub> (Total)	-	300	mA
Relative Humidity (at 60°C, Note 3)	RH	-	90	%
Operating Temperature (Note 2)	Topr	-30	+85	°C
Storage Temperature	Tstg	-40	+90	°C

**Note:**

- \*1) Panel surface temperature should not exceed 85 °C.
- \*2) Function OK, Optical SPEC not guarantee.

\*3) Temp≤60°C 90% RH MAX

\*4) Non-condensation

\*5) GND=VSS=0V

### [Caution]

Do not display fixed pattern for prolonged hours because it may develop image sticking on the display.

## 3.2 Electrical Specifications

### 3.2.1 Block Diagram

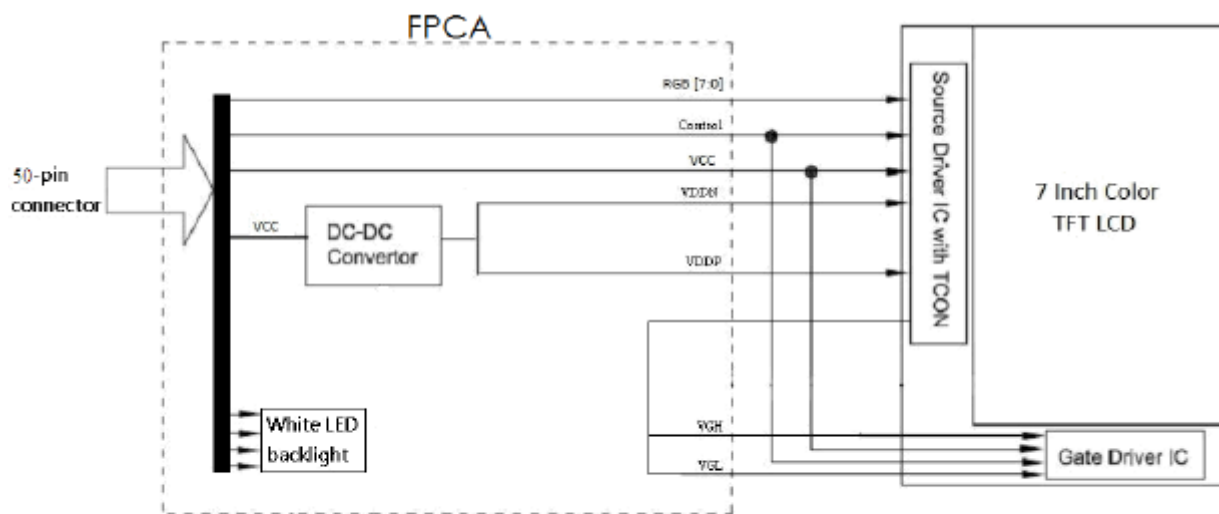


Figure 2: Block Diagram

### 3.2.2 Interface signals

#### TFT-LCD Panel Driving: Connector Pin Assignment

Pin No.	Symbol	I/O	Description	Remarks
1	GND	P	Ground	
2	VCC	P	Power Supply	
3	VCC	P	Power Supply	
4	GND	P	Ground	
5	DE	I	TTL signal data enable	
6	HS	I	TTL signal Horizontal Sync	
7	VS	I	TTL signal Vertical Sync	
8	GND	P	Ground	
9	CLK	I	Clock Signal	
10	GND	P	Ground	
11	B7	I	Blue Data 7	



12	B6	I	Blue Data 6	
13	B5	I	Blue Data 5	
14	B4	I	Blue Data 4	
15	B3	I	Blue Data 3	
16	B2	I	Blue Data 2	
17	B1	I	Blue Data 1	
18	B0	I	Blue Data 0	
19	GND	P	Power Supply	
20	G7	I	Green Data 7	
21	G6	I	Green Data 6	
22	G5	I	Green Data 5	
23	G4	I	Green Data 4	
24	G3	I	Green Data 3	
25	G2	I	Green Data 2	
26	G1	I	Green Data 1	
27	G0	I	Green Data 0	
28	GND	P	Power Supply	
29	R7	I	Red Data 7	
30	R6	I	Red Data 6	
31	R5	I	Red Data 5	
32	R4	I	Red Data 4	
33	R3	I	Red Data 3	
34	R2	I	Red Data 2	
35	R1	I	Red Data 1	
36	R0	I	Red Data 0	
37	GND	P	Ground	
38	RESET	I	Reset	Note 1
39	STBYB	I	Standby	Note 2
40	SDA	I/O	SPI interface data bus	Note 3
41	SCL	I	SPI interface clock	Note 4
42	CSB	I	SPI interface chip select	Note 5
43	GND	P	Ground	
44	TS1	C	Temp. sensor pin1	
45	TS2	C	Temp. sensor pin2	
46	K1	P	LED Cathode1	
47	K2	P	LED Cathode2	
48	NC	-	No connection	
49	A1	P	LED Anode1	
50	A2	P	LED Anode1	

## Remarks:

For I/O, "I" is Input, "O" is Output. "P" is for Power, and "C" is for passive.

Note 1: Global reset pin, active low. (Internally put high)

If it connected to VSS, the controller is in reset state

Note 2: Standby mode setting pin, active low. (Internally put high).

Timing controller, output buffer, DAC all off when STBYB is low.

Note 3: Serial Interface chip enable signal. (Internally put high).

CSB=0: Selected (accessible).

CSB=1: Not selected (inaccessible).

Note 4: Serial Interface clock input. (Internally put low).

Note 5: Serial Interface address and data input/output. (Internally put low).

Note6: The LCD module supports the 3-pin serial peripheral interface (SPI) to set internal register. All registers initial value has been programmed OTP (one-time-programming) by factory

### 3.2.3 LED Backlight Driving

Included in TFT-LCD PCBA, please refer to Sec

### 3.2.4 Typical Electrical Characteristics

At Ta=25 °C, VCC=+3.3V, GND=0V

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	VCC	3.15	3.3	3.45	V
Power supply current	ICC(Note 2)	-	135	202	mA
Driver input high signal voltage	VIH	0.7*VCC	-	VCC	V
Driver input low signal voltage	VIL	GND	-	0.3*VCC	
LED Life Time (50%)	(Note 3)	30000	-	-	hrs

Note 1: There is tolerance in optimum LCD driving voltage during production. Minimum and maximum LCD driving voltages indicate the range of optimum LCD driving voltage shift due to production tolerance. Please adjust LCD driving voltage manually to obtain the best module performance.

Note 2: All white pattern.

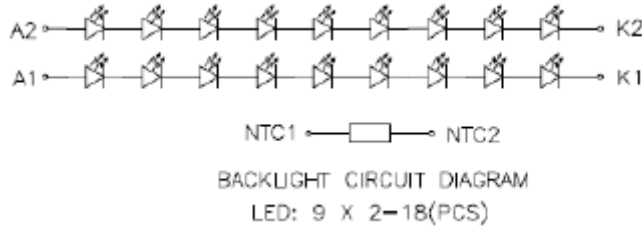
Note 3: The "LED Life Time" is defined as the time period when the brightness decrease to 50% of the initial value under continuous lighting at 25oC (dry condition) with the recommended driving current

### 3.2.5 Recommended Driving Condition for LED Backlight

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Supply voltage of LED backlight	V <sub>LED</sub>	Backlight current = 160 mA Number of LED dies = 18 pcs	25.0	27.0	29.0	V	Note 1
Supply current of LED backlight	I <sub>LED1/2</sub>	Per LED string	-	80	-	mA	Note 2
Total Supply current of LED backlight	I <sub>LED Total</sub>	I <sub>LED1</sub> + I <sub>LED2</sub>	-	160	-	mA	Note 2

Backlight Power Consumption	$P_{LED}$	-	-	4.3	-	W	Note 3
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Note 1: Backlight Circuit Diagram

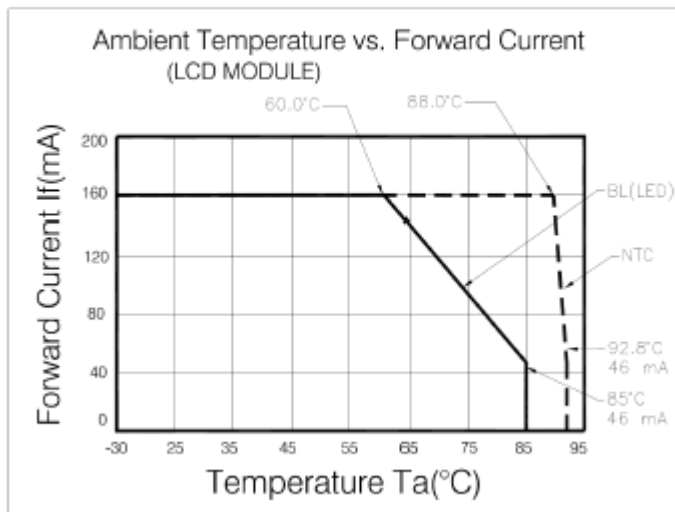


Note 2: The LED driving condition is defined for each LED module.

$$\text{Total input current} = 80 \times 2 = 160 \text{ mA}$$

Note 3: Backlight power consumption is calculated by  $I_{LED} (\text{Total}) \times V_{LED}$

Recommended Derating Curve (Current per LED string)

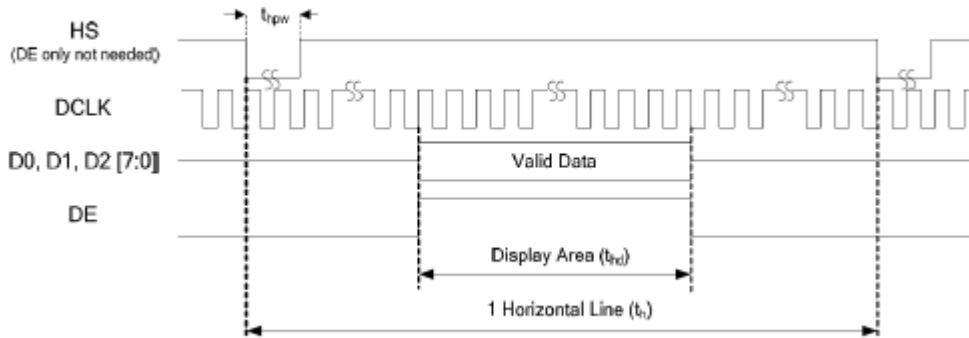


### 3.2.6 Timing Characteristics

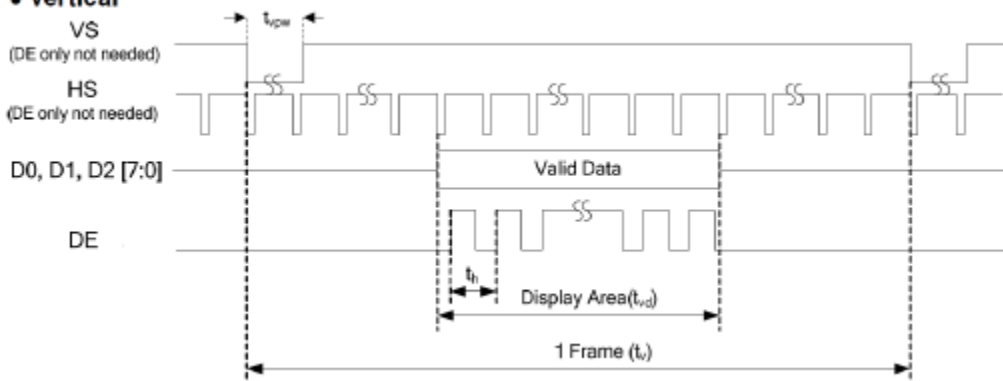
#### 3.2.6.1 Video Signal Timing

Symbol	Parameter	Conditions	Related Pins	Min.	Typ.	Max.	Unit
VT	Vertical Total	-	VS	487	493	624	Line
VD	Vertical Active Area	-	VS	-	480	-	Line
HT	Horizontal Total	-	HS	829	842	1040	CLK
HD	Horizontal Active Area	-	HS	-	800	-	CLK
Fframe	Frame Frequency	-	CLK	-	60	-	Hz
fCLK	CLK frequency	-	CLK	24.2	24.9	38.9	MHz

• **Horizontal**



• **Vertical**



**3.2.6.2 SPI interface (3 wires)**

SPI interface is used to read and write the setting registers of the TFT module and read commands to control the TFT module. Refer to Appendix is for details of the registers setting.

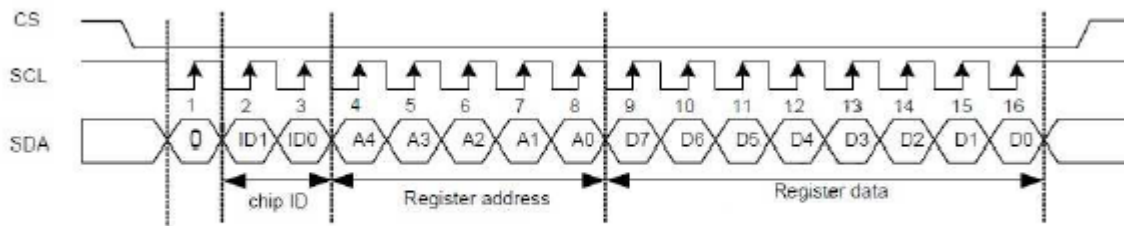


Figure 4: SPI write data format

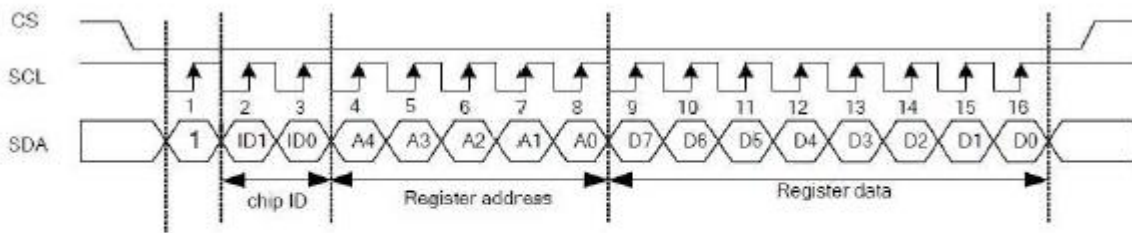


Figure 5: SPI read data format

### 3.2.7 SPI interface timing chart

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Setup Time	tS0	CS to SCL	60	-	-	ns
	tS1	SDA to SCL	60	-	-	ns
Hold Time	tH0	CS to SCL	60	-	-	ns
	tH1	SDA to SCL	60	-	-	ns
Pulse Width	tW1L	SCL pulse width	75	-	-	ns
	tW1H		75	-	-	ns
	tW2	CS pulse width	1	-	-	us
Clock duty		SCL	40	50	60	%

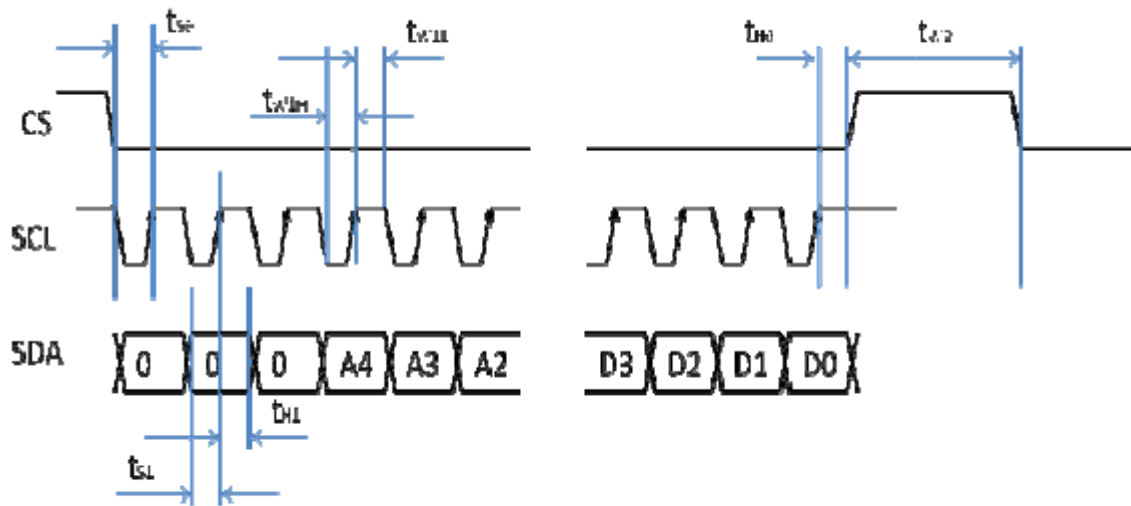
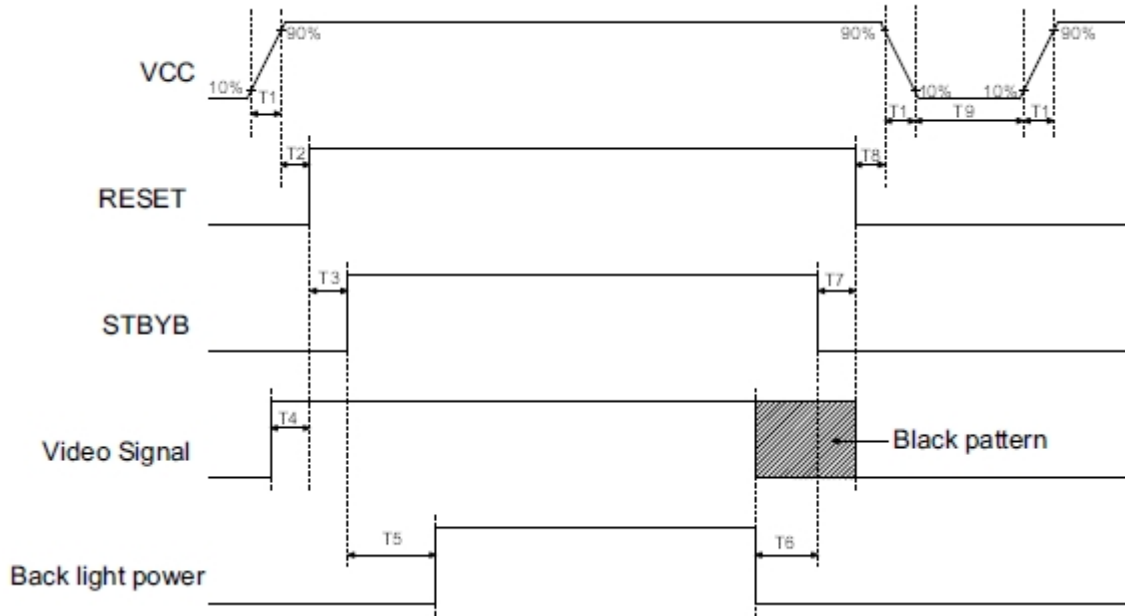


Figure 6: SPI timing

**3.2.8 Power On/Off Sequence**



Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	5	ms
T2	1.5	-	-	ms
T3	50	-	-	ms
T4	1	-	-	ms
T5	150	-	-	ms
T6	50	-	-	ms
T7	70	-	-	ms
T7	0	-	-	ms
T9	200	-	-	ms

## 4.0 OPTICAL SPECIFICATIONS

### 4.1 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 (Topcon SR-UL1R and Westar TRD-100A) 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  $0^\circ$ . The center of the measuring spot on the Display surface shall stay fixed.

The backlight should be operating for 30 minutes prior to measurement.

### 3.2 Optical Specifications

Conditions unless specified otherwise:

- $T_a = 25^\circ\text{C}$
- Supply voltage = 3.3 volts
- Elapsed time from switch on is greater than 30 minutes
- RGB, white and black test patterns only
- Factory settings
- Brightness = 100% unless specified

Measurements are conducted at ambient temperature and perpendicular unless specified

Items		Symbol	Condition		Min.	Typ.	Max.	Unit	Note
Response Time		$T_R + T_F$	$T_a = 25^\circ\text{C}$	Viewing normal angle $\theta = \phi = 0^\circ$	--	20	--	ms	(Note 1)
			$T_a = 25^\circ\text{C}$		--	20	--		
Viewing angle	12'	$\theta_2$	$T_a = 25^\circ\text{C}$	Center $CR \geq 10$	--	80	--	deg.	(Note 2)
	6'	$\theta_1$			--	80	--		
	9'	$\phi_2$			--	80	--		
	3'	$\phi_1$			--	80	--		
Contrast Ratio		CR	$T_a = 25^\circ\text{C}$	Viewing normal angle $\theta = \phi = 0^\circ$	700	900	--	-	(Note 3)
Brightness		Br	$T_a = 25^\circ\text{C}$		900	1100	--	$\text{cd/m}^2$	
Chromaticity	White	$x_w$	$T_a = 25^\circ\text{C}$		0.274	0.304	0.334	-	(Note 4)
		$y_w$			0.282	0.312	0.342	-	
	Red	$x_R$			0.606	0.636	0.666	-	
		$y_R$			0.305	0.335	0.365	-	
	Green	$x_G$			0.290	0.320	0.350	-	
		$y_G$			0.585	0.615	0.645	-	
	Blue	$x_B$			0.120	0.150	0.180	-	
		$y_B$			0.026	0.056	0.086	-	
Luminance Uniformity		$\Delta Y_9$	$T_a = 25^\circ\text{C}$	9 Points	75	--	--	%	(Note 5)
NTSC Ratio		-	$T_a = 25^\circ\text{C}$	-	--	70	--	%	-

**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 (see FIG.1). Viewing angle measuring is based on WV Pol attached.

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 FIG. 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 Table1 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 C/F.

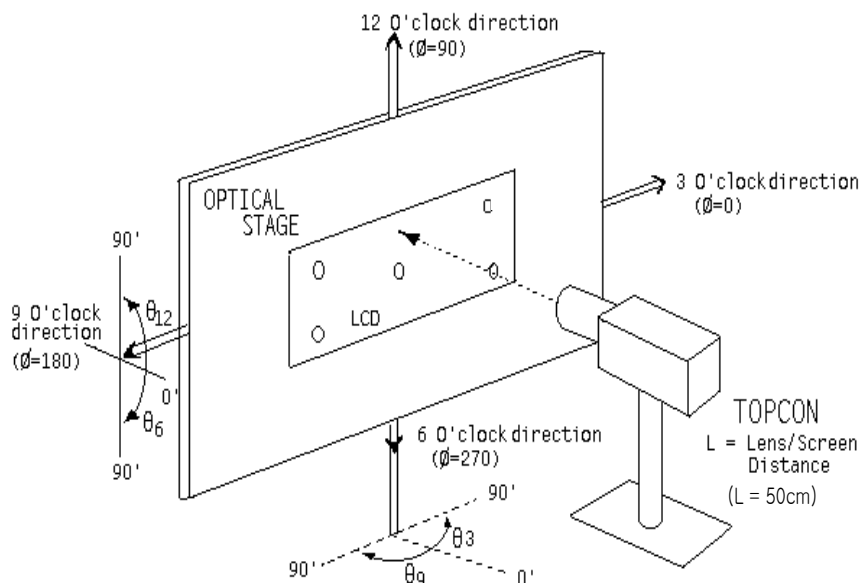
Measurement condition is C - light source & Halogen Lamp

5. The electro-optical response time measurements shall be made as FIG.2 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is  $T_f$ , and 90% to 10% is  $T_r$ .

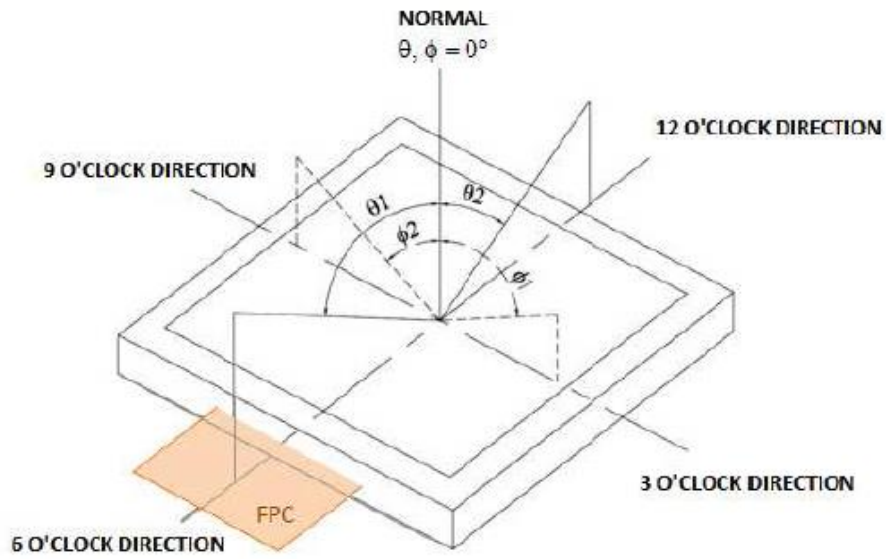
6. The White luminance uniformity on LCD surface is measured per VESA standard over 9 points and is then expressed as

$$\text{Uniformity } \Delta Y = \frac{\text{Minimum Luminance of 9 points}}{\text{Maximum Luminance of 9 points}} \times 100 (\%)$$

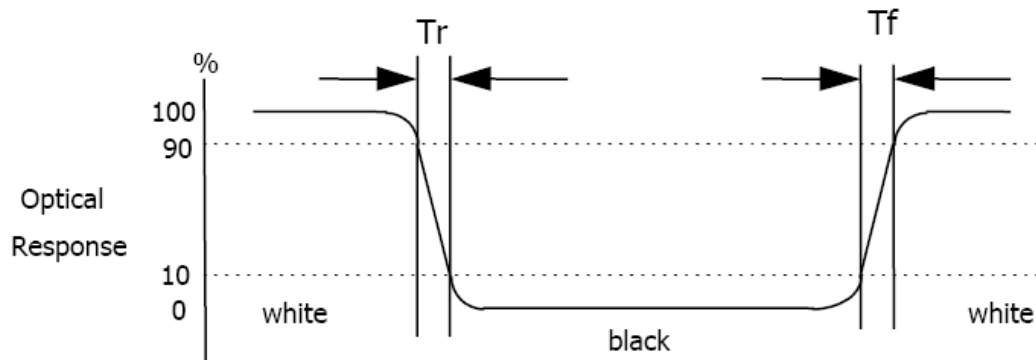
**Figure 1. Measurement Set Up**







**Figure 2. Response Time Testing**



**5.0 RELIABILITY TEST**

Test	Symbol	Condition	Reference	Sample Qty.
1 High Temperature Storage	HST	+90 °C / 240 hrs	IEC 60068-2-2 Bb	4PCS
2 Low Temperature Storage	LST	-40 °C / 240 hrs	IEC 60068-2-1 Ab	4PCS
3 High Temperature Operating (Note 1)	HOT	+85 °C / 240 hrs	IEC 60068-2-2 Bb	4PCS
4 Low Temperature Operating	LOT	-30 °C / 240 hrs	IEC 60068-2-1 Ab	4PCS
5 Accelerated Humidity Test Operating	AHTO	+60 °C / 90% RH / 240 hrs	IEC60068-2-78 Cab	4PCS
6 Temperature Shock Test	TST	-30 °C <> +85 °C, 30min/5min/30min,100cycles Non-Operating	IEC 60068-2-14Na	4PCS
7 UV exposure resistance	UV	1KW Xenon / 100 hrs Power off.		2PCS
8 Mechanical Shock (Note 2)	-	3 directions: X,Y,Z axes Repeats:6 Peak acc.:100 G Pulse duration: 6 ms (half sine wave) Non-Operating		2PCS
9 Mechanical Vibration (Note 2)	-	3 directions: X,Y,Z axes Sweep time: 10 (1Oct/ min) Frequency: 10 -> 150->10 Hz 10-58 Hz: constant amplitude 0.75mm peak. 58-150Hz: constant acceleration 10g peak Sinusoidal , Non-Operating		2PCS

Note.

Note 1: LCD panel surface temperature should not exceed 85 °C.

Note 2: For module internal structure robustness test purpose only. Customer application cluster design should take care of overall mounting robustness with display module.

## 6.0 Electrostatic Discharge (ESD)

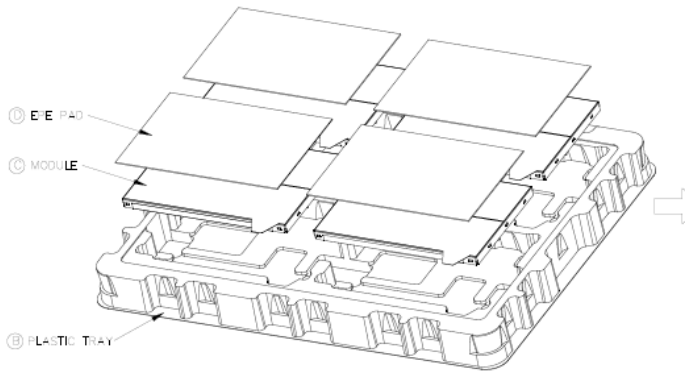
Test	Condition	Method	Remark	Sample Qty.
Human body model	R = 330Ω, C = 150pF, Air discharge: ±15 KV to display surface Contact discharge: ±8 KV to metal frame	IEC61000-4-2	Not operating	2PCS
Machine model	R = 0Ω, C = 200pF, ±200V to I/O pins	MIL-STD-883, method 3015	Not operating	2PCS

Note 1: The TFT-LCD panel and IC on module are sensitive to electrostatic discharge; please make sure equipments and operators are properly ground before and during handling

Note 2: As different customer application have different interfacing designs and assembly processes, the display module has no ESD protection circuitry. Customer is required to take special care on ESD level control in the assembly and test processes.

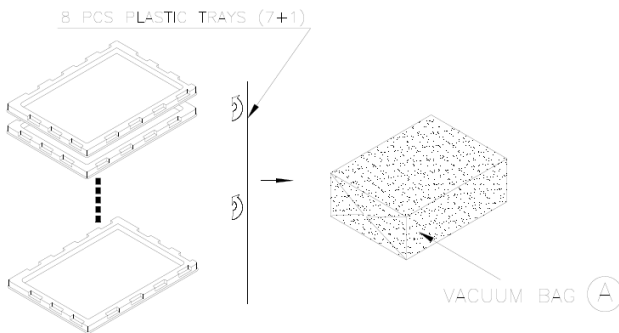
## 7.0 PACKING METHOD

Step 1: one tray for 4pcs Module, display surface upside, every module with 1pcs foam

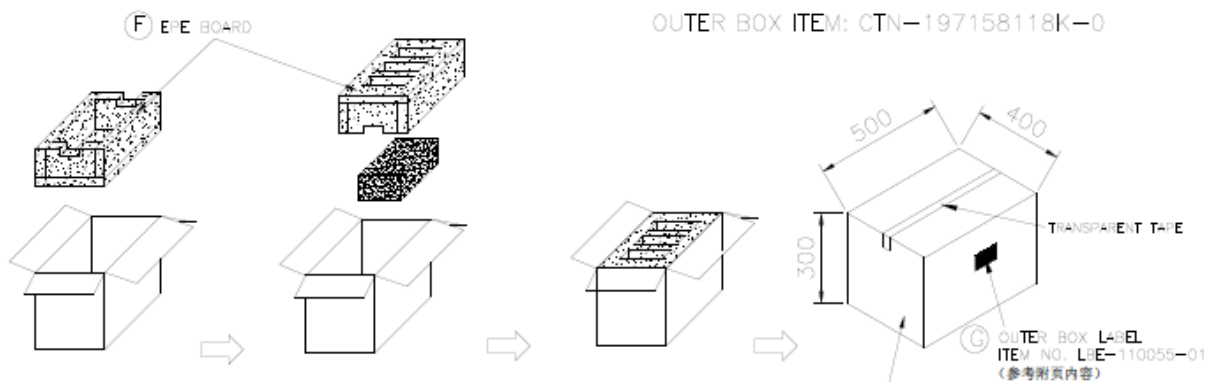


(DISPLAY SURFACE UPSIDE)  
 (显示屏朝上)

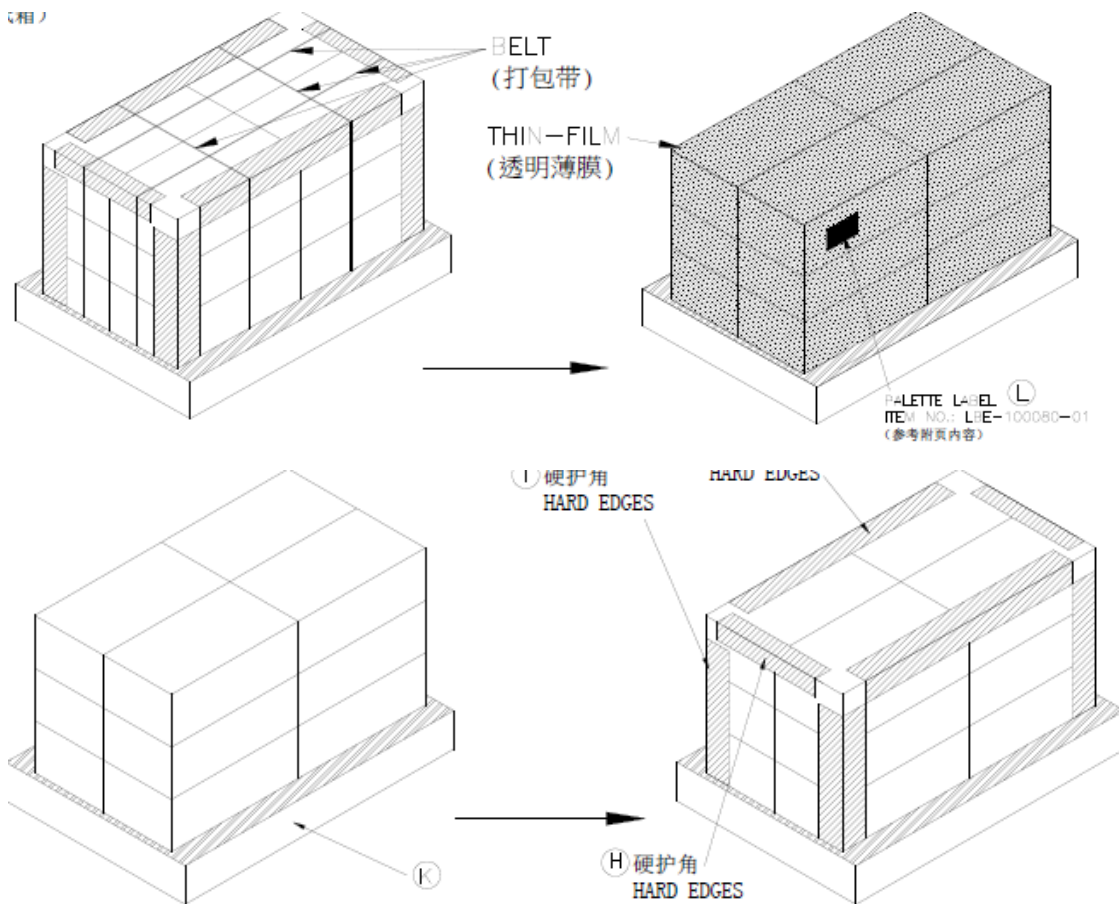
Step2: 7pcs+1pcs (empty tray) =8pcs/tray every carton, with 28pcs module, then put them into the ESD bag



Step3: put the ESD bag into the carton with 2pcs cushion, stick the out box laber



Step4: put 4 cartons in one layer, total 3 layer is one pallet, stick the pallet label on it



## 8.0 HANDDLING & CAUTIONS

### 8.1 Mounting Method

- The panel of the LCM consists of two thin glasses with polarizer which easily get damaged. So extreme care should be taken when handling the LCM.
- Excessive stress or pressure on the glass of the LCM should be avoided. Care must be taken to insure that no torsional or compressive forces are applied to the LCM unit when it is mounted.
- If the customer's set presses the main parts of the LCM, the LCM may show the abnormal display. But this phenomenon does not mean the malfunction of the LCM 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 LCM with the specified mounting parts.

### 8.2 Caution of LCM Handling and Cleaning

- Since the LCM 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 maybe broken.
- The polarizer on the surface of panel are made from organic substances. Be very careful for chemicals not to touch the polarizer or it leads the polarizer to be deteriorated.
- If the use of a chemical is unavoidable, use soft cloth with solvent recommended below to clean the LCM's surface with wipe lightly.  
-IPA (Isopropyl Alcohol), Ethyl Alcohol, Tri-chloro, tri-florothane.
- Do not wipe the LCM's surface with dry or hard materials that will damage the polarizer and others. Do not use the following solvent—Water, acetone, Aromatics.
- It is recommended that the LCM be handled with soft gloves during assembly, etc. The polarizer on the LCM's surface are vulnerable to scratch and thus to be damaged by shape particles.
- Do not drop water or any chemicals onto the LCM's surface.
- A protective film is supplied on the LCM and should be left in place until the LCM 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 from the ITO corrosion, customers are recommended that the ITO area would be covered by UV or silicon.
- Please clean the LCD without ultrasonic to avoid line open.

### 8.3 Caution Against Static Charge

- The LCM 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 LCM, 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 LCM within the specified voltage limit since the higher voltage

than the limit causes LCM's life shorter. An electro-chemical reaction due to DC causes undesirable deterioration of the LCM so that the use of DC drive should avoid.

- Do not connect or disconnect the LCM to or from the system when power is on.
- Never use the LCM under abnormal conditions of high temperature and high humidity.
- When expose to drastic fluctuation of temperature(hot to cold or cold to hot), the LCM may be affected; specifically, drastic temperature fluctuation from cold to hot, produces dew on the LCM's surface which may affect the operation of the polarizer on the LCM.
- Response time will be extremely delay at lower temperature than the operating temperature range and on the other hand LCM may turn black at temperature above its operational range. However those phenomenon do not mean malfunction or out of order with the LCM. The LCM 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 LCM structure. If the screen is displayed with fixed pattern, use a screen saver.
- Do not disassemble and/or re-assemble LCM module

### 8.5 Packaging

- Modules use LCM 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 LCM's surface (polarizer). Adhesive type protective film should be avoided, because it may change color and/or properties of the polarizer.
- Do not store the LCM near organic solvents or corrosive gasses.
- Keep the LCM safe from vibration, shock and pressure.
- Black or white air-bubbles may be produced if the LCM is stored for long time in the lower temperature or mechanical shocks are applied onto the LCM.
- 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 LCM in the packaging situation when it was delivered.

### **8.7 Safety**

- For the crash damaged or unnecessary LCM, 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 of LCM 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 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.

### **9.0 Applicable Scope**

- This product specification only applies to the products manufactured and sold by our company.
- Any specification, quality etc. about other parts mentioned in this product spec are no concern of our company.