Specification
For
Approval

□ Preliminary specification
■ Final specification

Title	12.8HD ADS TFT-LCD (Module)

Buyer	
Model	

Supplier	Cheng Du BOE Optoelectronics Technology CO., LTD
Model	AV128HDM-NW0

TITLE/SIGNATURE	DATE

Please return one copy confirmation with signature and your comments

ITEM	SIGNATURE/DATE
Approved	
Reviewed	
Reviewed	
Prepared	

BOE CHENG DU
Optoelectronics Technology CO., LTD

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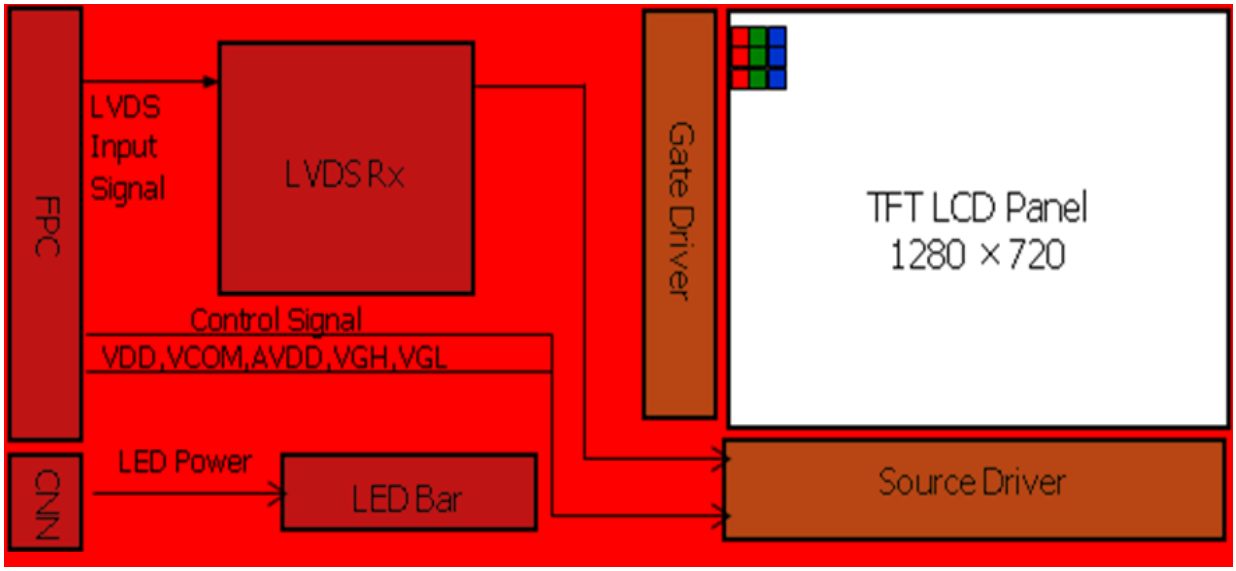
Record of Revisions				
Revision	Date	Page	Description	Released by
Pre.0	2014.11.19		Initial Released	Huangli
Pre.1	2014.12.05	P12	Add LVDS Interface	Huangli
Pre.2	2015.02.15	P21	Add packing method	Wanghengruo
Rev.0	2015.04.15	P19 P21	Figure 6跟新 Packing method更新	Wanghengruo
Rev.1	2015.05.15	P4 ~P18	Update Block picture/Weight /LED connector /Electrical Characteristics etc.	Wanghengruo

1.0 GENERAL DESCRIPTION

1.1 Introduction

AV128HDM-NW0 is a color active matrix TFT-LCD Panel using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This model is composed of a TFT-LCD Panel, a driving circuit and a back light system. It is a transmissive type display operating in the normal black. This TFT-LCD has a 12.8 inch diagonally measured active area with HD resolutions (1280 horizontal by 720 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

- 0.5t Glass (Single)
- Thin and light weight
- High luminance and contrast ratio, low reflection and wide viewing angle
- Module Design
- RoHS Compliant

1.3 Application

- Application

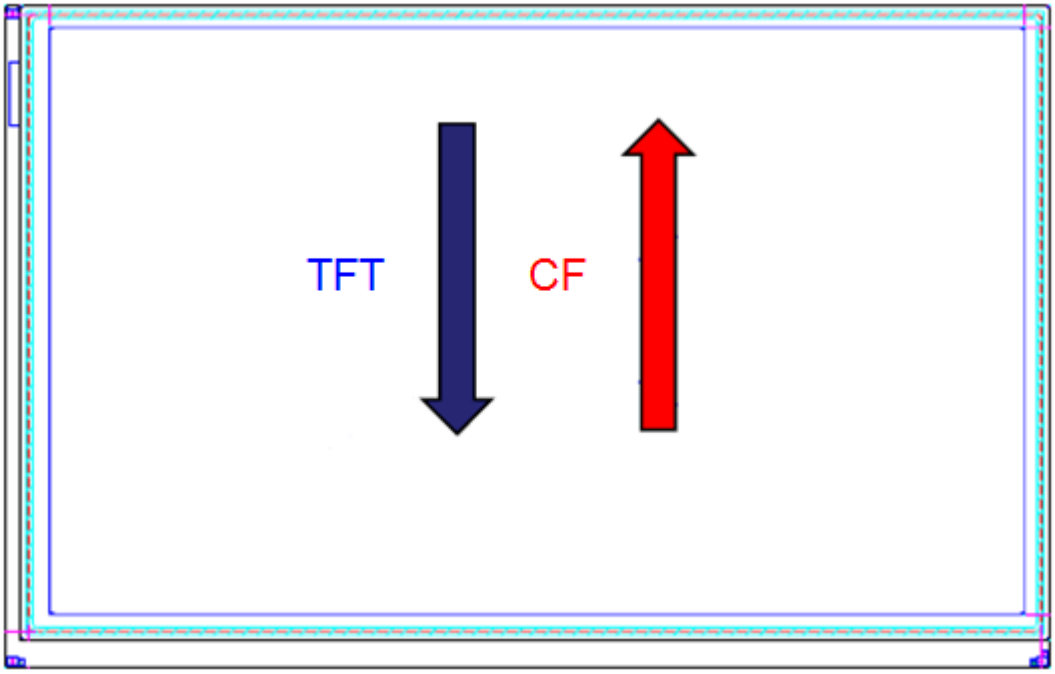
1.4 General Specifications (H: horizontal length, V: vertical length**)**

Parameter	Specification	Unit	Remark
Active Area	283.2(H) × 159.3(V)	mm	
Number of Pixels	1280(H) RGB × 720(V)	pixels	
Pixel Pitch	0.22125(H) × 0.22125(V)	mm	
Pixel Arrangement	RGB 2domain stripe		
Display Colors	16.7 M	colors	6+2(HFRC) bit
Color Gamut	70%(typ.)		
Display Mode	Normally Black, Transmissive mode		
Dimensional Outline	300.8(H) × 179.5(V) × 5.7(D)	mm	Module
Viewing Direction (Human Eye)	U/D/L/R free viewing direction		Note 1,2
D-IC MODEL	Source: HX8292-A05 Gate: HX8695-E01		
Power Consumption	Total 8.2(max.)	W	Logic 1.6max, BLU 6.6max
Weight	585 (Max.)	gram	

Note:

1. At the U/D/L/R direction, the viewing angle is same;

2. The TFT and CF LC Align Direction;



2.0 ABSOLUTE MAXIMUM RATINGS

The absolute maximum ratings are list on table as follows. When used out of the absolute maximum ratings, the LSI may be permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are exceeded during normal operation, the LSI will malfunction and cause poor reliability.

Parameter	Symbol	Value	Unit
Digital Supply voltage	DVDD	3 ~ 3.6	V
Driver supply voltage	AVDD	9.5 ~ 13.5	V
Back-light Power Supply Voltage	VLED	11.6~13.2	V
Back-light LED Current	ILED	Typical: 500	mA
Operating temperature range	TOPR	-20 ~ 70	℃
Storage Temperature range	TSTG	-40 ~ 85	℃
High temperature / Humidity	THO	60℃/ 90%	℃ / %

Note:

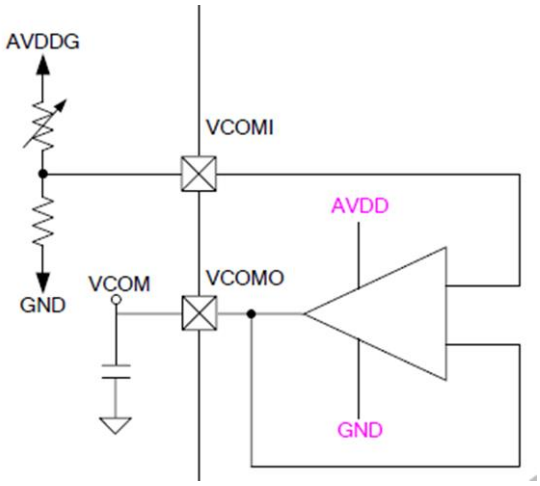
If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

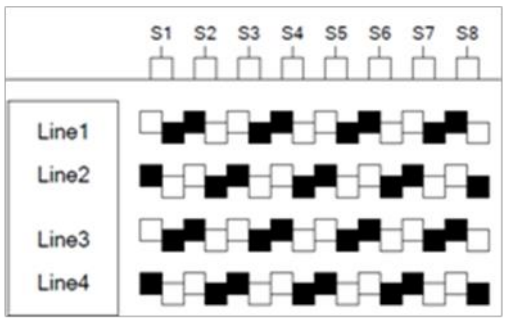
3.0 ELECTRICAL SPECIFICATIONS

3.1 TFT LCD Module Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Input Voltage	DVDD	3	3.3	3.6	V	
Analog Voltage	AVDD	11.3	11.5	11.7	V	
TFT Gate ON Voltage	VGH	21	22	23	V	
TFT Gate OFF Voltage	VGL	-9.6	-9	-8.4	V	
TFT Common Electrode Voltage	VCOM	3.85	4.05	4.25	V	Note1
Digital Supply Current	I_{DVDD}	-	33.2	50	mA	
Analog Voltage Current	I_{AVDD}	-	76	120	mA	
TFT Gate ON Current	I_{VGH}	-	0.81	1	mA	
TFT Gate OFF Current	I_{VGL}	-	0.95	1	mA	
TFT Common Electrode Current	I_{VCOM}	-	0.135	1	mA	
Logic Power Consumption	P_{logic}	-	1.0	1.6	Watt	
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	100	300	mV	Note2
	Differential Input Low Threshold Voltage	VLVTL	-300	-100	mV	
	Common Input Voltage	VLVC	|Vid|/2	VDD-1.2	V	
	Differential in put voltage	|Vid|	0.2	0.6	V	

Note1：
VCOM should be adjusted to make flicker level be minimum. Recommended VCOM circuit and Flicker Pattern (1+2 dot) is showed below.

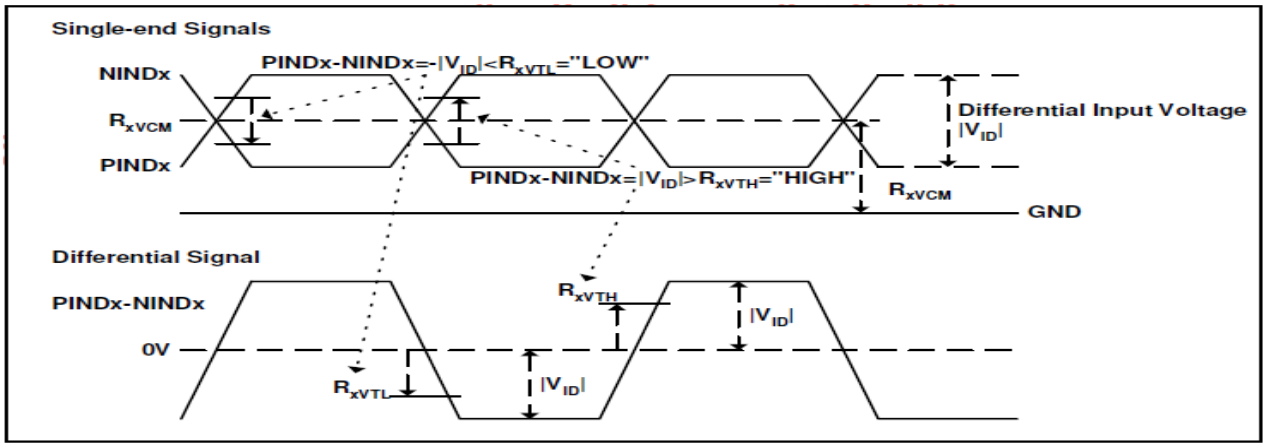




Flicker Pattern

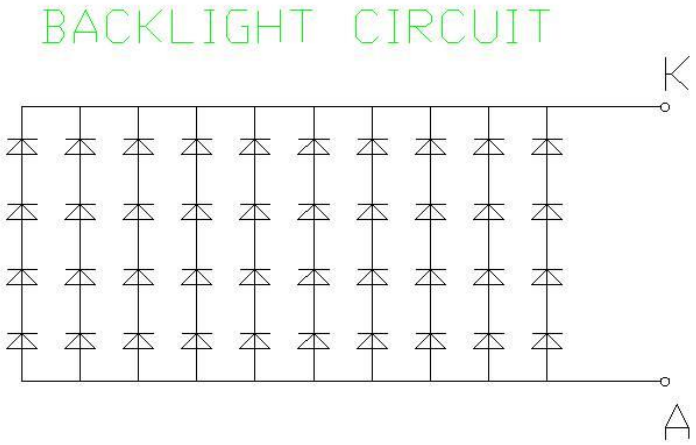
Note2:

Ambient Temperature 25℃, Frame rate=60HZ, Typ. Pattern White pattern, worst case pattern 1×1 checker



3.2 Backlight Driving Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Remark
LED Forward Voltage	VF	11.6	12.4	13.2	V	-
LED Forward Current	IF	-	500	-	mA	-
LED Power Consumption	PLED	5.8	6.2	6.6	W	Note



Note:

1. Calculator Value for reference ILED×VLED×LED Quantity = PLED
2. The LED Life-time define as the estimated time to 50% degradation of initial luminous
3. LED connector is JST: BHSR-02VS-1(N)

4.0 INTERFACE CONNECTION

4.1 Electrical Interface Connection

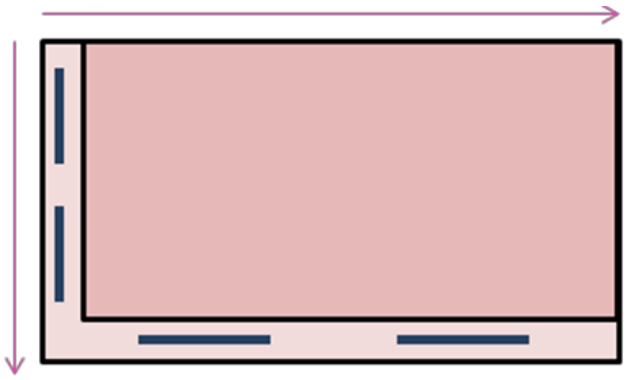
The electronics interface connector is ACES: 50671-05041-001. The connector interface pin assignments are listed as below.

Pin No.	Symbol	Description	Remark
1	VCC	Power supply (3.3V)	
2	VCC	Power supply (3.3V)	
3	NC	Not connected	
4	GND	Ground	
5	GND	Ground	
6	VCOM	LCD Vcom	
7	VCOM	LCD Vcom	
8	UPDN	Up/Down scan control	Note1
9	SHLR	Left/Right shift control	
10	RESET	Global Reset	Note2
11	STBYB	Standby mode control	Note3
12	BIST	BIST enable	Note4
13	GND	Ground	
14	NC	Not connected	
15	VGL	Gate off voltage	
16	VGL	Gate off voltage	
17	VGH	Gate on voltage	
18	VGH	Gate on voltage	
19	AVDD	Analog power	
20	AVDD	Analog power	
21	NC	Not connected	
22	GND	Ground	
23	GND	Ground	
24	CLK_N	LVDS clock-	
25	CLK_P	LVDS clock +	
26	GND	Ground	
27	D0_N	LVDS data 0-	
28	D0_P	LVDS data 0+	
29	GND	Ground	
30	D1_N	LVDS data 1-	
31	D1_P	LVDS data 1+	
32	GND	Ground	
33	D2_N	LVDS data 2-	
34	D2_P	LVDS data 2+	
35	GND	Ground	
36	D3_N	LVDS data 3-	
37	D3_P	LVDS data 3+	
38	GND	Ground	
39	GND	Ground	
40	SCL	SPI interface clock	Note5
41	SDA	SPI interface data	
42	CS	SPI chip select	

43	GND	Ground	
44	DITHER	Dithering setting	Note6
45	AVDD	Analog power	
46	AVDD	Analog power	
47	VCOM	LCD Vcom	
48	VCOM	LCD Vcom	
49	NC	Not connected	
50	NC	Not connected	

Note1

Scan Control Input		Scanning direction
SHLR	UPDN	
High	High	Left to Right, Up to Down (Default)
High	Low	Left to Right, Down to Up
Low	High	Right to Left, Up to Down
Low	Low	Right to Left, Down to Up



Note 2

Global Reset, keep VDD during operation.

Suggest to connect with RC reset circuit stability. Normally pull high.

Note 3

STBYB = “H(3.3V)” normal operation (default);

STBYB = “L(GND)” timing control, source driver will turn off, all output are High -Z;

Note 4

BIST= “H(3.3V)” BIST mode(CLK input is not needed);

BIST = “L(GND)” normal operation (default);

Note 5

SPI interface is only for LCD internal tunning, please keep them NC (Not Connection).

Note 6

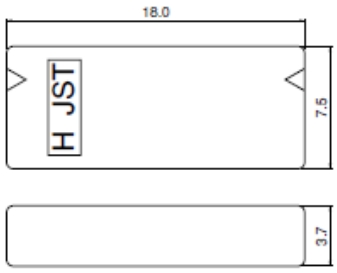
DITHER= “H(3.3V)” Enable internal dithering function(default);

DITHER = “L(GND)” Disenable internal dithering function;

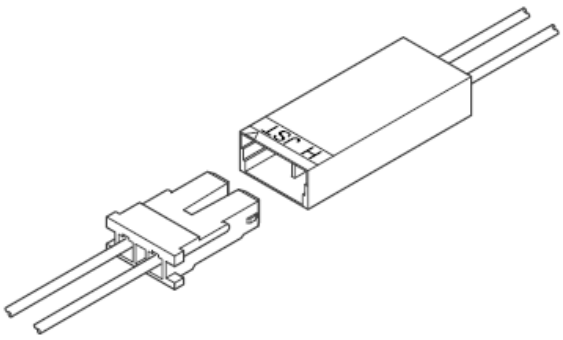
4.2 LED Interface Connection

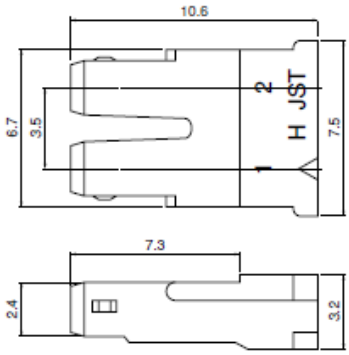
LED connector is JST: BHSR-02VS-1(N)

Receptacle housing (for pin contact)



Socket housing (for socket contact)





Model No.		Q'ty / bag
Receptacle housing	Socket housing	
BHSMR-02VS	**BHSR-02VS-1 (N)**	1,000

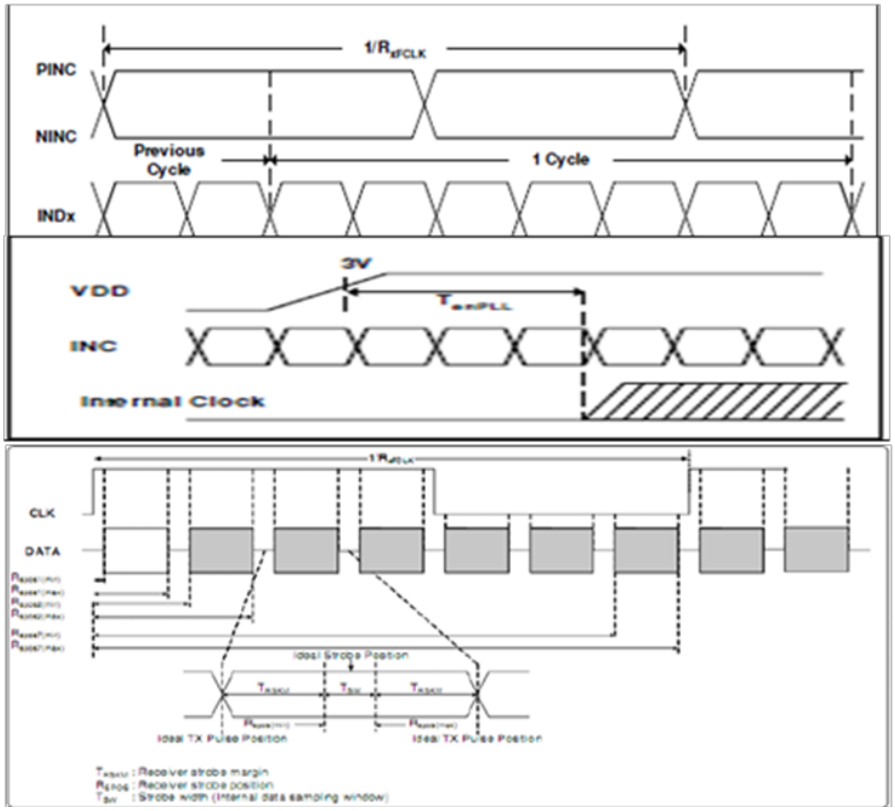
Material
PA 66, UL94V-0, natural (white)

RoHS compliance

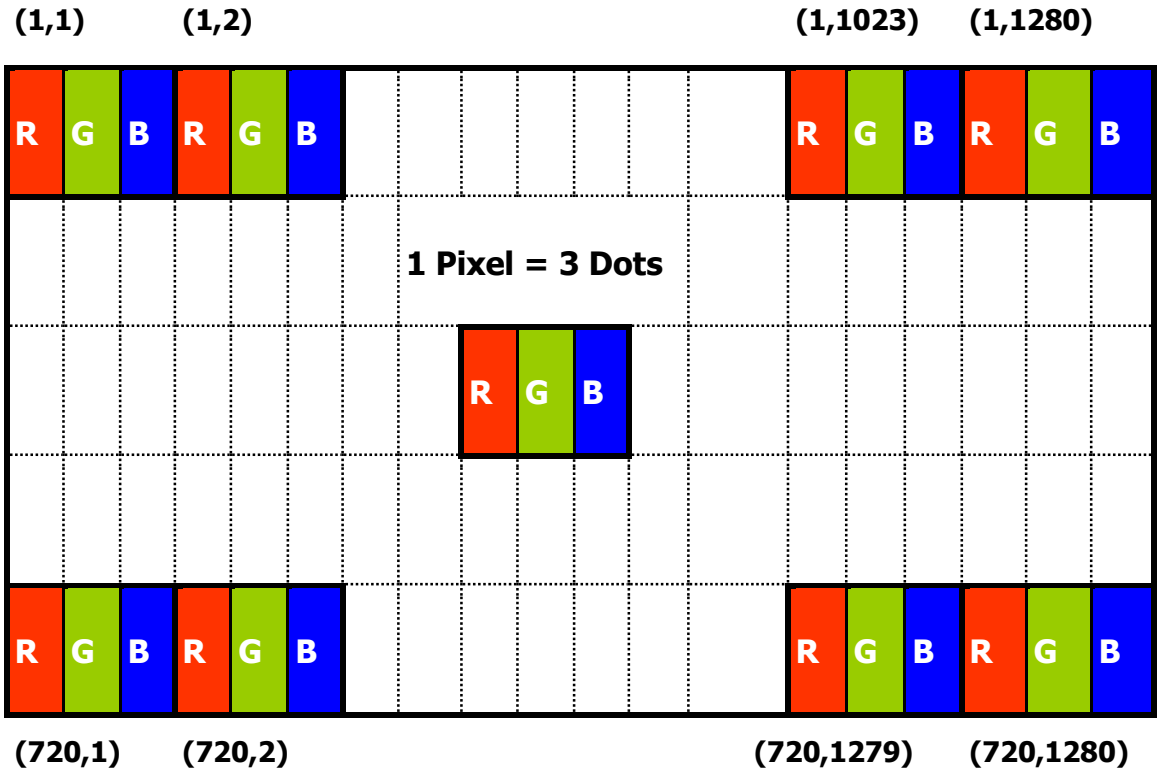
Note: Contact JST for BHSR-02VS-1.

5.0 LVDS SIGNAL TIMING SPECIFICATION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	RxFCLK	60	65.5	71.3	MHz	
Horizontal Display Area	thd		1280		DCLK	
HS Period	th	1370	1440	1500	DCLK	
HS Blanking	Thb+thfp	90	160	220	DCLK	
Vertical Display Area	tvd		720		TH	
VS Period	tv	730	758	792	TH	
VS Blanking	Tvbp+tvfp	10	38	72	TH	
Input data skew margin	TRSKM	500	-	-	ps	|VID|=400mV RxVCM=1.2V RxFCLK=65.5MHz
Clock high time	TLVCH	-	4/ (7*RxFCLK)		ns	
Clock low time	TLVCL		3/ (7*RxFCLK)		ns	
PLL wake-up time	TenPLL			150	us	

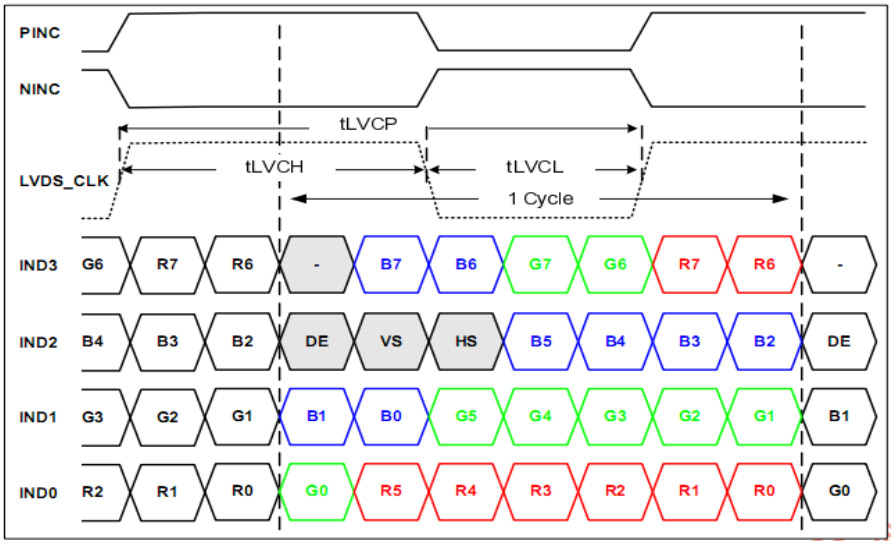

PINC
NINC
Previous Cycle
1 Cycle
INDx
3V
VDD
INC
Internal Clock
CLK
DATA
Ideal Strobe Position
Ideal TX Pulse Position
Ideal TX Pulse Position

6.0 DATA INPUT FORMAT



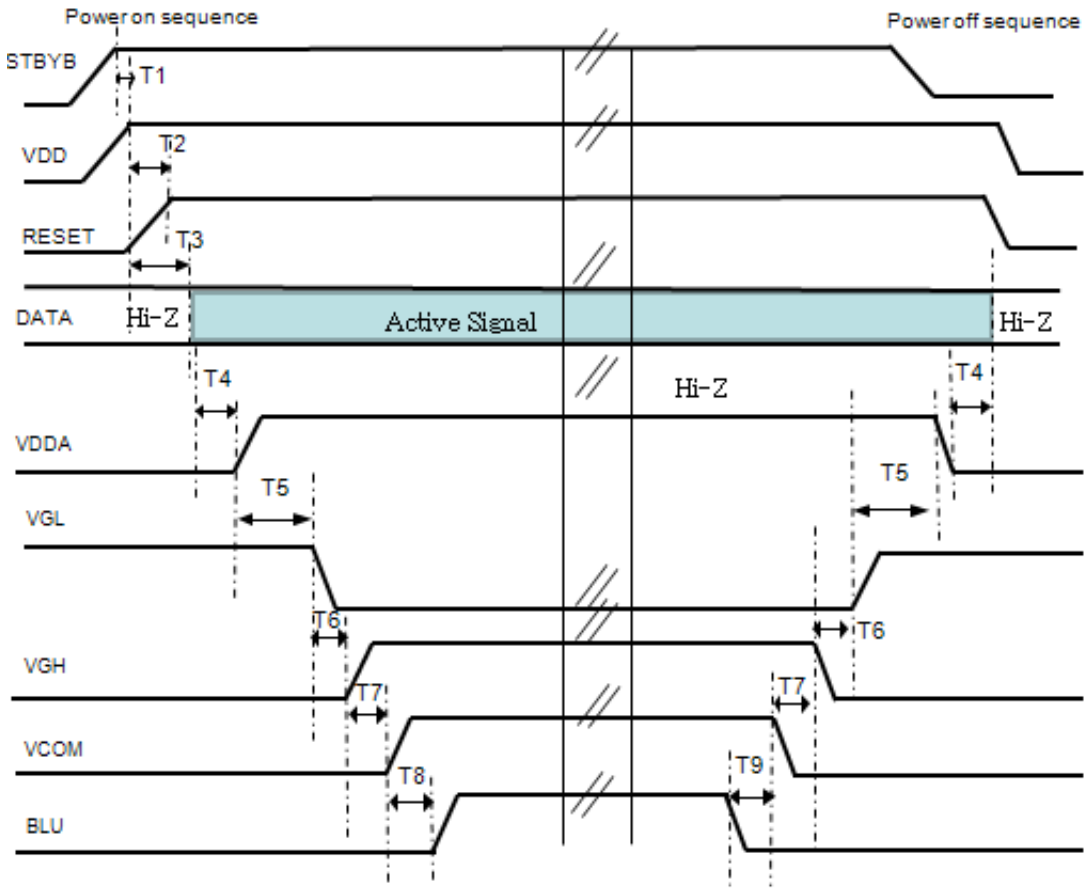
6.2 LVDS Input Signal Format

8-bit LVDS input, VESA MODE.



8-BIT LVDS Input Signal Format – VESA MODE

7.0 POWER ON/OFF SEQUENCE



Parameter	Symbol	Timing			Unit	Notes
		Min	Typ.	Max		
Power On & Off sequence	T1	2	-	-	ms	
	T2	0.5	-	-		
	T3	20	-	-		
	T4	5	-	-		
	T5	5	-	-		
	T6	5	-	-		
	T7	5	-	-		
	T8	200	-	-		
	T9	500		-		

Notes:

1. When the power supply DVDD 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.

8.0 OPTICAL SPECIFICATIONS

8.1 Overview

The test of Optical specifications shall be measured in a dark room(ambient luminance≤ 1 lux and temperature = 25±2℃) 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 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.

8.2 Optical Specifications

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Threshold Voltage		Vsat		4.1	4.3	4.5	V	Fig.1
		Vth		1.6	1.8	2.0	V	
Viewing Angle	Horizontal	Θ3	CR>10	70	80		°	Note 1
		Θ9		70	80		°	
	Vertical	Θ12		70	80		°	
		Θ6		70	80		°	
Contrast Ratio		CR	Θ= 0°	700	900			Note 2
Luminance		cd/m2	Θ= 0°	450	500		nit	Note 3
Uniformity		%	Θ= 0°	75	80			Note 4
NTSC		%	Θ= 0°	65	70			
Reproduction Of color	Red	Rx	Θ= 0°	0.610	0.640	0.670		Note 5 * Module
		Ry		0.310	0.340	0.370		
	Green	Gx		0.280	0.310	0.340		
		Gy		0.610	0.640	0.670		
	Blue	Bx		0.110	0.140	0.150		
		By		0.007	0.100	0.130		
White		Wx	Θ= 0°	0.029	0.320	0.350		
		Wy		0.310	0.340	0.370		
Response Time		Tr+Tf	Θ= 0°		35	40	ms	Note 6

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.2).
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 FIG. 2) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Surface luminance is the center point across the LCD surface 50cm from the surface with all pixels displaying white. This measurement shall be taken at the locations shown in FIG. 2.

4. Uniformity measurement shall be taken at the locations shown in FIG. 2&3, for a total of the measurements per display, measure surface luminance of these nine points across the LCD surface 50cm from the surface with all pixels displaying white.

$$\text{Uniformity} = \frac{\text{Min Luminance of 9 points}}{\text{Max Luminance of 9 points}} \times 100\%$$

5. 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 Module.

6. The electro-optical response time measurements shall be made as FIG.4 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.

Figure 1. The definition of Vth & Vsat

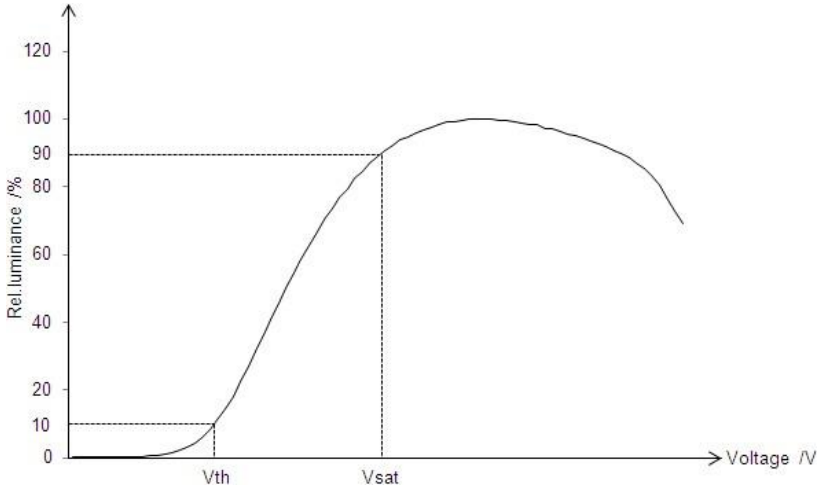


Figure 2. Measurement Set Up

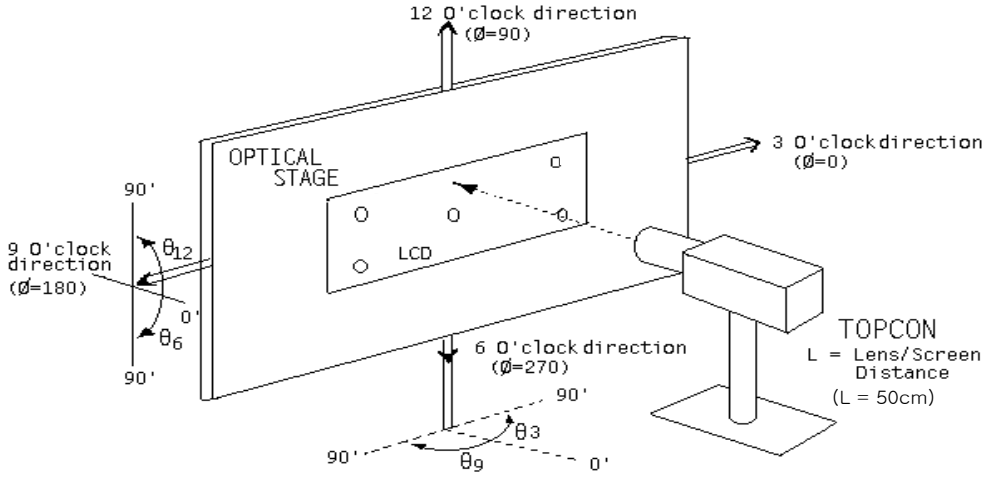


Figure 3. Uniformity Measurement Locations

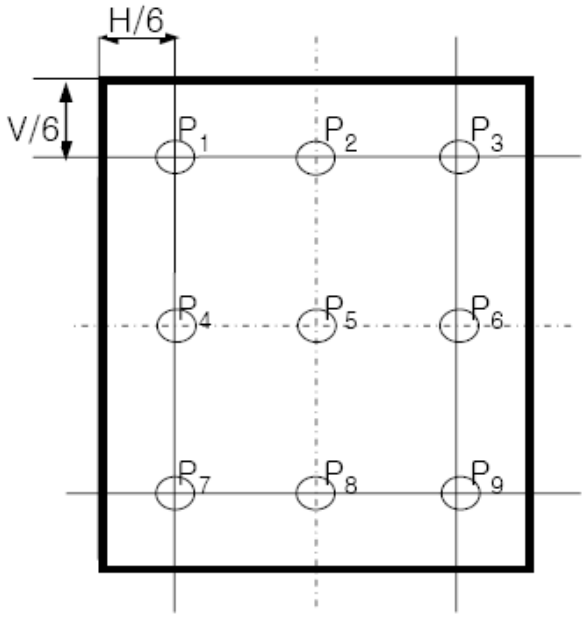
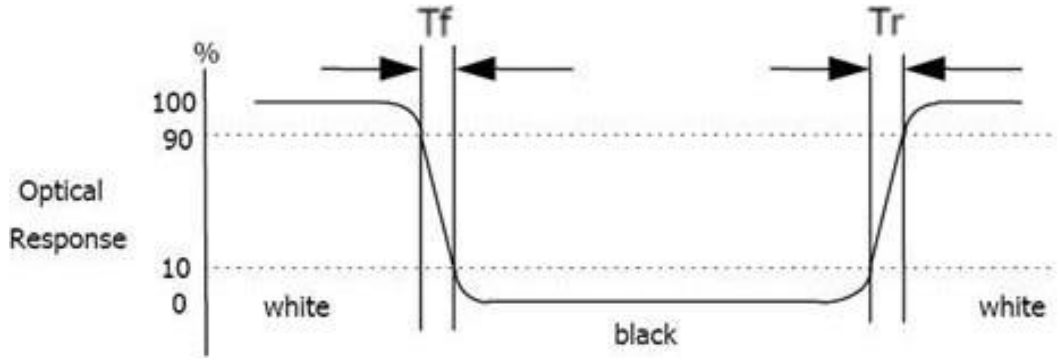


Figure 4. Response Time Testing



9.0 MECHANICAL CHARACTERISTICS

9.1 Dimension Requirements for LCD Part

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

Parameter	Specification	Unit	Remark
Panel size	295.1(H) × 173.5(V)	mm	
CF size	290.5(H) × 166.6(V)	mm	
Active area	283.2(H) × 159.3(V)	mm	
Number of pixels	1280(H)RGB × 720(V)	pixels	
	(1 pixel = R + G + B dots)		
Pixel pitch	0.22125(H) ×0.22125(V)	mm	
Pixel arrangement	RGB 2 domain Stripe		
Panel ID	1.6 × 10	mm	
COG pad area(G/S)	4.6/ 6.9	mm	
D-IC to FPC distance	1.358	mm	Source
D-IC width(G/S)	0.59/ 0.62	mm	
D-IC to CF edge(G/S)	3.01/ 3.522	mm	
FPC to Glass edge	0.3	mm	Source
FPC width	1.1	mm	Source
Seal Area (U/D/L/R)	4.0/3.3/3.3/4.0	mm	Source pad 朝上
Dimensional outline	300.8(H) × 179.5(V) × 5.7(D)	mm	Module
Display mode	Normally Black		

Note:

1. Source pad down
2. The size specified is calculated by IC–driver Source: HX8292-A05, Gate: HX8695-E01, the size maybe changed if customer use other IC.

Figure 5. LCM Outline Dimension (unit: mm)

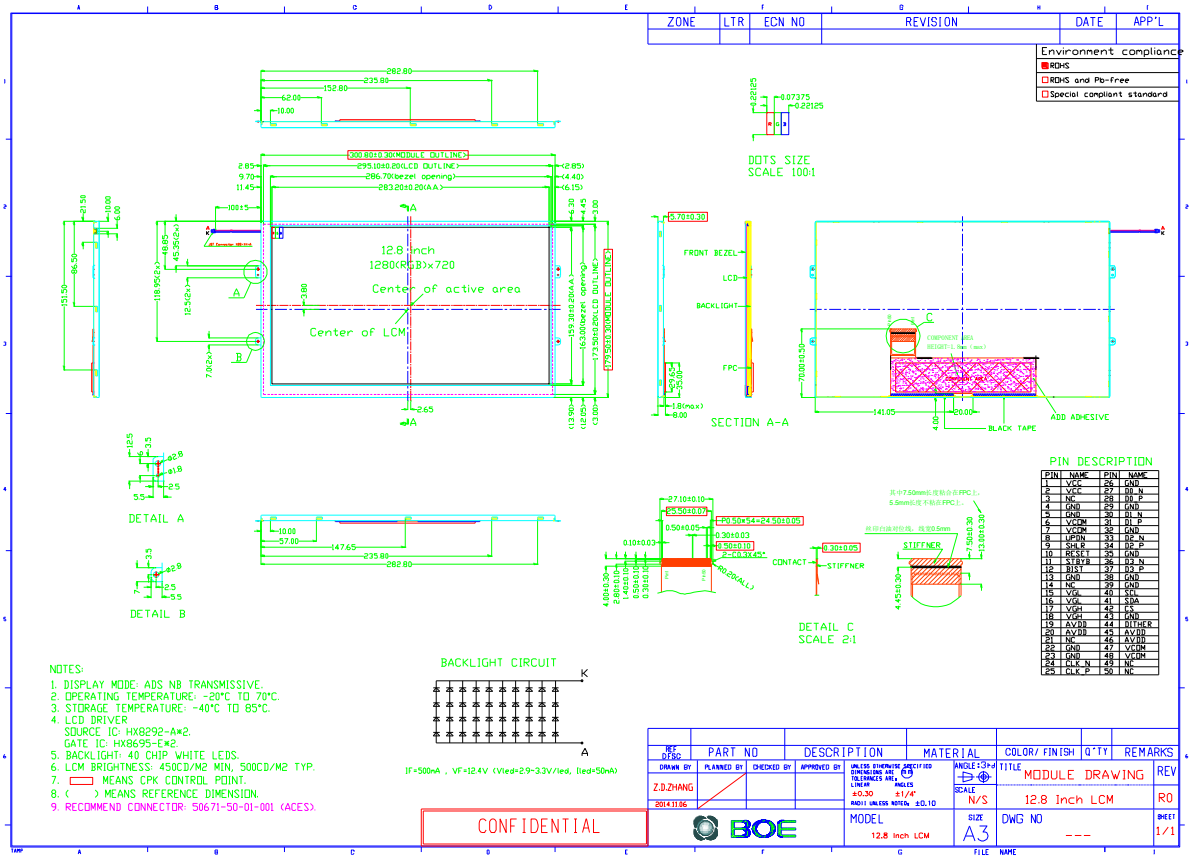
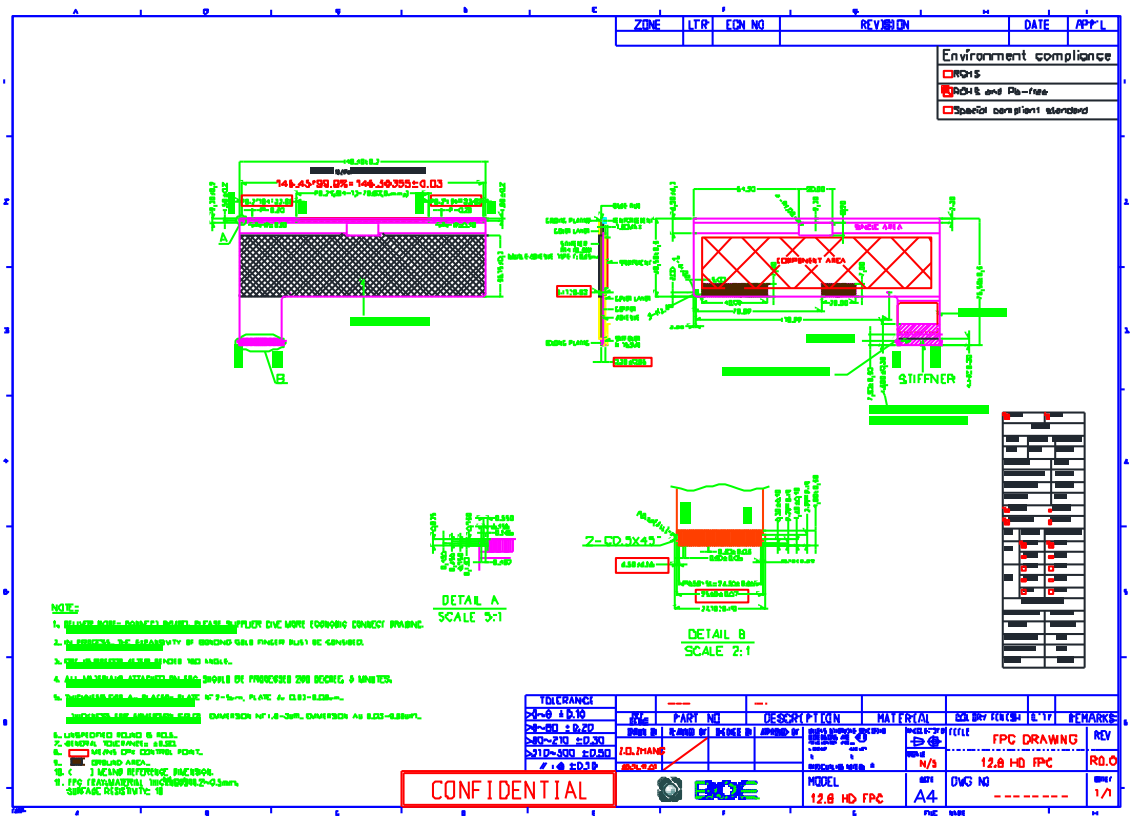


Figure 6. LCM FPC main structure (unit: mm)



10.0 RELIABILITY TEST

NO.	Test Item	Test Condition	Duration
1	High temperature, high humidity operation test(THO)	60℃, 90%RH	72hrs
2	Low temperature operation test(LTO)	-20℃	72hrs
3	High temperature operation test(HTO)	70℃	72hrs
4	High temperature storage test(HTS)	85℃	72hrs
5	Low temperature storage test(LTS)	-40℃	72hrs
6	Thermal shock test(Non-operation)	-30℃ → 80℃ (Per 30min)	100cycles
7	Vibration (Non-operation)	Frequency: 10 ~55Hz(1.5G) Stroke: 2.0mm X,Y,Z direction, 2Hr/6 time	12hrs
8	ESD	150pF 330Ω ±15KV(Air) / ±8KV(Contact) 200pF 0Ω ±200V(Contact)	20points

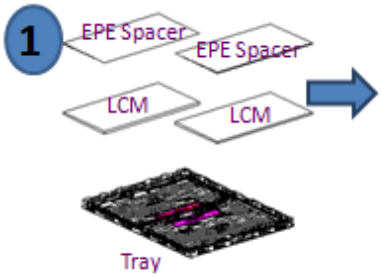
-

11.0 PACKING METHOD

-. Put a LCM into a Tray

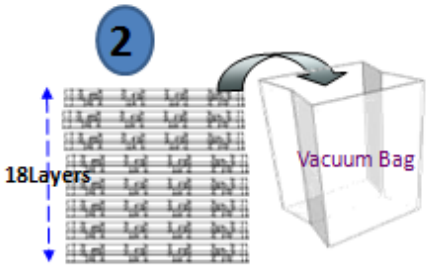
Put an EPE Spacer on surface of each LCM

-. Capacity: 2pcs / Tray

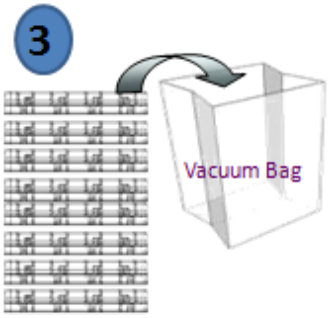


-. Put 18pcs PET Trays into a Vacuum Bag

-. (Include: put an empty Tray on top)



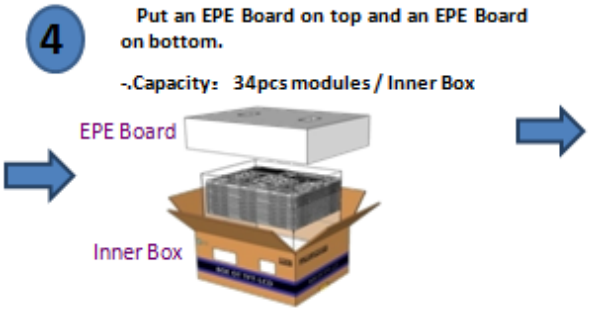
-.Put all PET Trays with Vacuum Bag into another Vacuum Bag.



-.Put all PET Trays with Vacuum Bags (Total two vacuum bags) into an Inner Box.

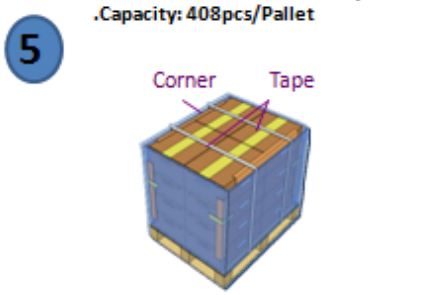
Put an EPE Board on top and an EPE Board on bottom.

-.Capacity: 34pcs modules / Inner Box



-. 12 (2*2*3) Inner Boxes / Pallet

.Capacity: 408pcs/Pallet



Item	Specification
Product Label	18mm×6mm
PET Tray	420mm ×328mm×17mm
	2 pcs / Tray
EPE Spacer	297mm×176mm × 2mm
EPE Board	480mm×380mm×140mm
Inner Box	500mm×400mm×300mm
Vacuum Bag	700mm×615mm×0.1mm
Paper Corner	1000mm×60mm×60mm
Pallet	1030mm×830mm×130 mm

12.0 PRODUCT ID RULE

A V 128 HD M – N W 0

1 2 3 4 5 6 7 8

1 <Application area>

Code	Description
A	Automotive
N	Notebook
B	Mobile

2 <Mode>

Code	Description
V	ADS-a Si
T	TN-a Si
S	ADS-LTPS

3 <Size>

Code	Description
128	12.8”
055	5.5”
060	6.0”

4 <Resolution>

Code	Description
HD	HD
FH	FHD
WH	WQHD

5 <Production type>

Code	Description
M	Module
Q	Q-Panel
S	Q-Panel SLM

6 <Product state>

Code	Description
N	Normal
E	In Cell Touch
A	Add On Touch

7 <Product THK>

Code	Description
W	Semi-Auto

8 <Product Rev>

Code	Description
0	First Mode
1	Second Mode
2	Third Mode

13.0 HANDDLING & CAUTIONS

13.1 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.

13.2 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 handle FPC with care.

13.3 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.

13.4 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

13.5 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.

13.6 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.

13.7 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 an 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.

14.0 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.