CHIMEI INNOLUX DISPLAY CORPORATION

LCD MODULE

SPECIFICATION

Customer: _____

Model Name: HJ101NA-02A

Date: 2011/10/28

Version: 01

■ Preliminary Specification

□ Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by
James Yu 2011/11/02	Charlie Chou 2011/11/01	David Lee 2011/10/31

Record of Revision

Version	Revise Date	Page	Content
Pre-Spec.01	2011/10/28		Initial Release.

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	10.1 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1280 × 3(RGB) × 800	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.0565(W) × 0.1695(H) mm	
6	Active area	216.96(W) × 135.6(H) mm	
7	Module size	229.46 (W) ×149.1(H) ×3.4(D) mm	Note 1
8	Surface treatment	Hard Coating	
9	Color arrangement	RGB-stripe	
10	Interface	Digital	
11	View direction(Gray Inversion)	12 O'Clock	
12	Backlight power consumption	TBD (Typ.)	Note 2
13	Panel power consumption	TBD	Note 3
14	Weight	TBD	

Note 1: Refer to Mechanical Drawing.
Note 2: Including LED Driver power consumption.
Note 3: Including T-con Board power consumption.

2. Pin Assignment

FPC Connector is used for the module electronics interface. The model is F62240-H1210A manufactured by Vigorconn.

Pin No.	Symbol	I/O	Function	Remark
1	Dither	I	6/8bit selection	Note1
2	V_{DD}	P	Power Voltage for digital circuit	
3	V_{DD}	P	Power Voltage for digital circuit	
4	NC	---	No connection	
5	NC	---	No connection	
6	L/R	I	Horizontal inversion	Note2
7	U/D	I	Vertical inversion	Note2
8	Rxin0-	I	- LVDS differential data input	
9	Rxin0+	I	+ LVDS differential data input	
10	VSS	P	Ground	
11	Rxin1-	I	- LVDS differential data input	
12	Rxin1+	I	+ LVDS differential data input	
13	VSS	P	Ground	
14	Rxin2-	I	- LVDS differential data input	
15	Rxin2+	I	+ LVDS differential data input	
16	VSS	P	Ground	
17	RxCLK-	I	- LVDS differential clock input	
18	RxCLK+	I	+ LVDS differential clock input	
19	VSS	P	Ground	
20	Rxin3-	I	- LVDS differential data input	
21	Rxin3+	I	+ LVDS differential data input	
22	VSS	P	Ground	
23	G_{LED}	P	Ground for LED circuit	
24	G_{LED}	P	Ground for LED circuit	
25	G_{LED}	P	Ground for LED circuit	
26	NC	---	No connection	

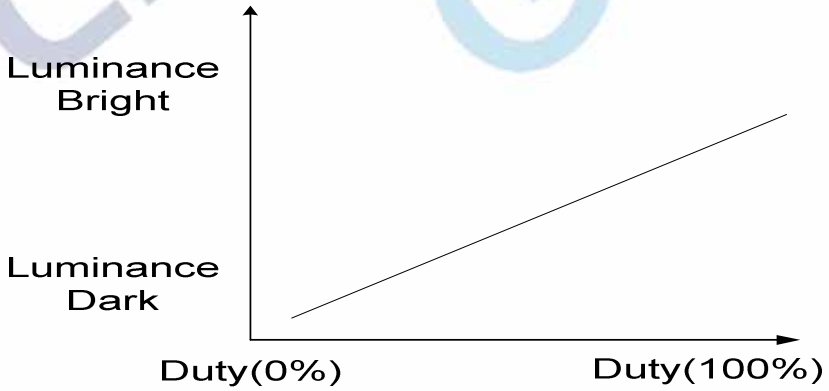
27	ADJ	P	Adjust the Back Light brightness	Note3,4
28	NC	---	No connection	
29	CABC_EN1	I	CABC H/W enable	Note5
30	CABC_EN0	I	CABC H/W enable	Note5
31	V_{LED}	P	Power Voltage for LED circuit	
32	V_{LED}	P	Power Voltage for LED circuit	
33	V_{LED}	P	Power Voltage for LED circuit	
34	NC	---	No connection	
35	NC	---	No connection	
36	NC	---	No connection	
37	NC	---	No connection	
38	NC	---	No connection	
39	NC	---	No connection	
40	NC	---	No connection	

I: input, O: output, P: Power

Note1: If LVDS input data is 6 bits ,DITHER must be set to High;
If LVDS input data is 8 bits ,DITHER must be set to Low.

Note2: When L/R="0", set right to left scan direction.
When L/R="1", set left to right scan direction.
When U/D="0", set top to bottom scan direction.
When U/D="1", set bottom to top scan direction.

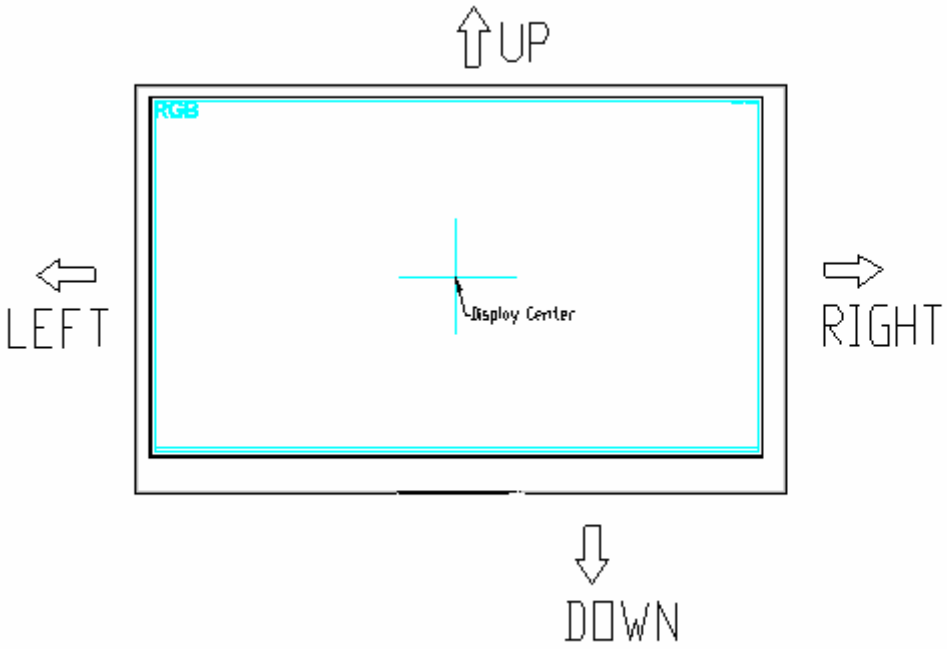
Note3: Pin.3 is used to adjust brightness.



Note 4: ADJ signal=0~3.3V,operation frequency:(TBD)Hz

Note5: When CABC_EN="00", CABC OFF.
When CABC_EN="01", user interface image.
When CABC_EN="10", still picture.
When CABC_EN="11", moving image.
When CABC off, don't connect DIMO, else connect it to backlight.

Note: Definition of scanning direction.
Refer to the figure as below:



3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{DD}	-0.5	5.0	V	
	V_{LED}	2.5	6	V	
Operation Temperature	T_{OP}	-10	50	℃	
Storage Temperature	T_{ST}	-20	60	℃	

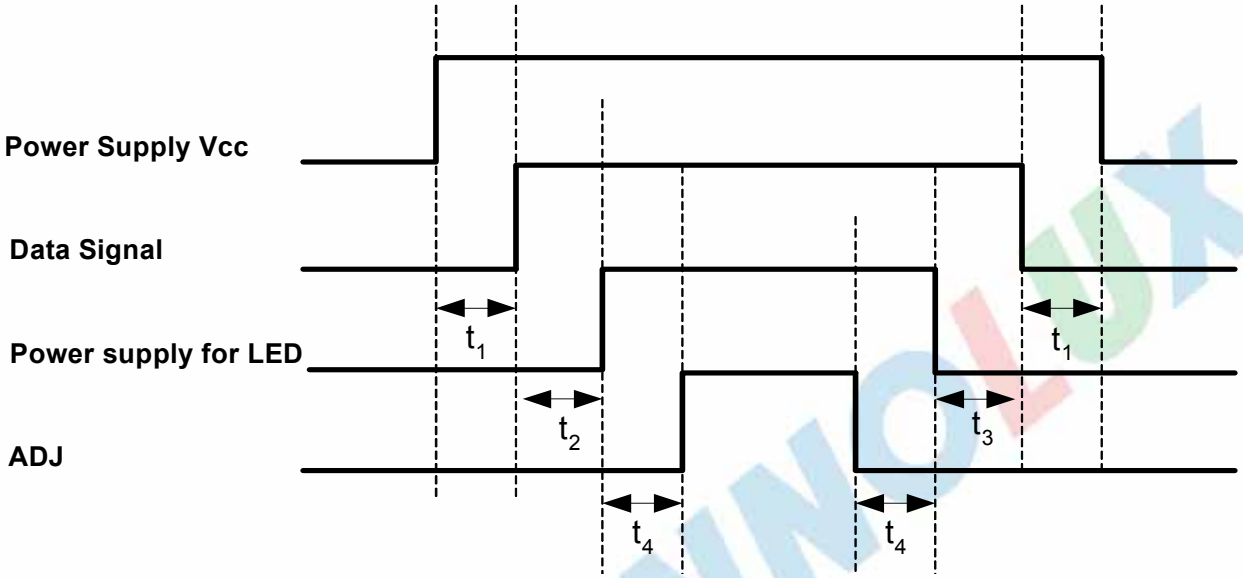
Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.1.1. Typical Operation Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power Voltage	V_{DD}	3.1	3.3	3.5	V	Note 1
	V_{LED}	4.8	5.0	5.2	V	Note 2
Current Consumption	I V_{DD}	-	TBD	TBD	mA	
	I V_{LED}	-	TBD	TBD	mA	Note 3
LED life time	-	-	15,000	-	Hr	Note 4

Note 1: V_{DD} setting should match the signals output voltage of customer's system board.
Note 2: LED driving voltage.
Note 3: LED driving current.
Note 4: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and V_{LED} =5.0V. The LED lifetime could be decreased if operating V_{LED} is larger than 5.0V.

3.2. Power Sequence



t_1 > 50 mSec
t_2 ≧ 200 mSec
t_3 ≧ 200 mSec
t_4 ≧ 50mSec

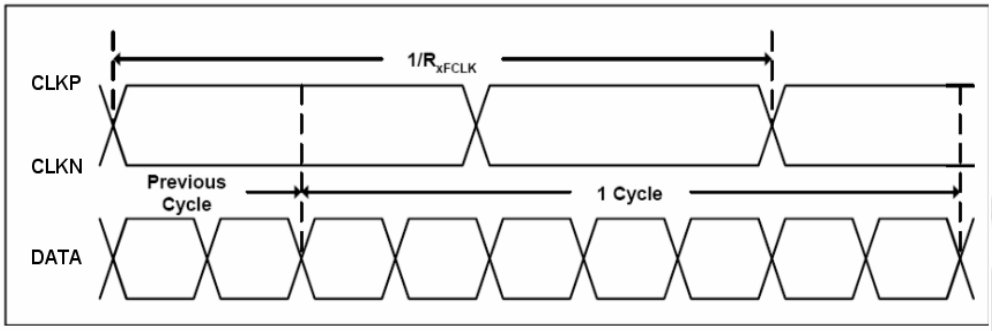
Note: Data Signal includes Rin0- ~ Rin3-,Rin0+ ~ Rin3+,CLKIN- , CLKIN+.

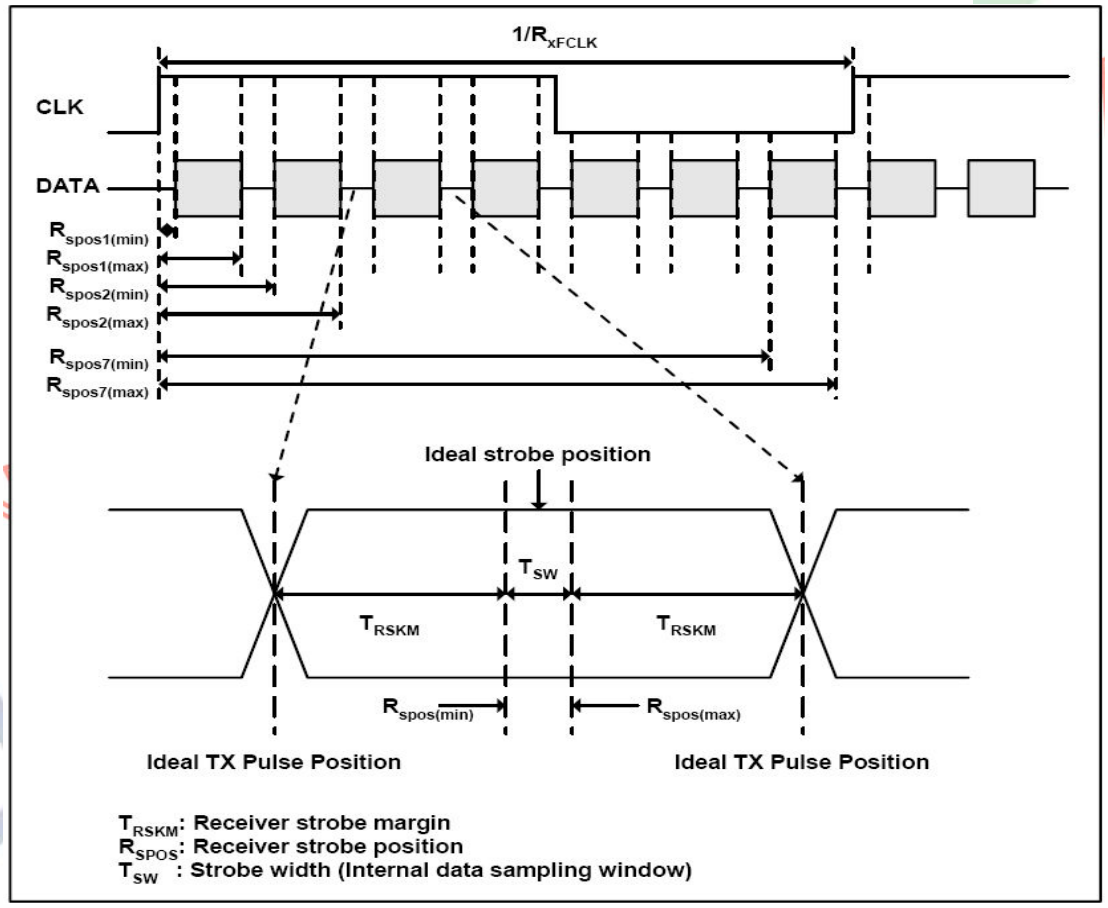
3.3. Timing Characteristics

3.3.1. AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	20	-	81	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	

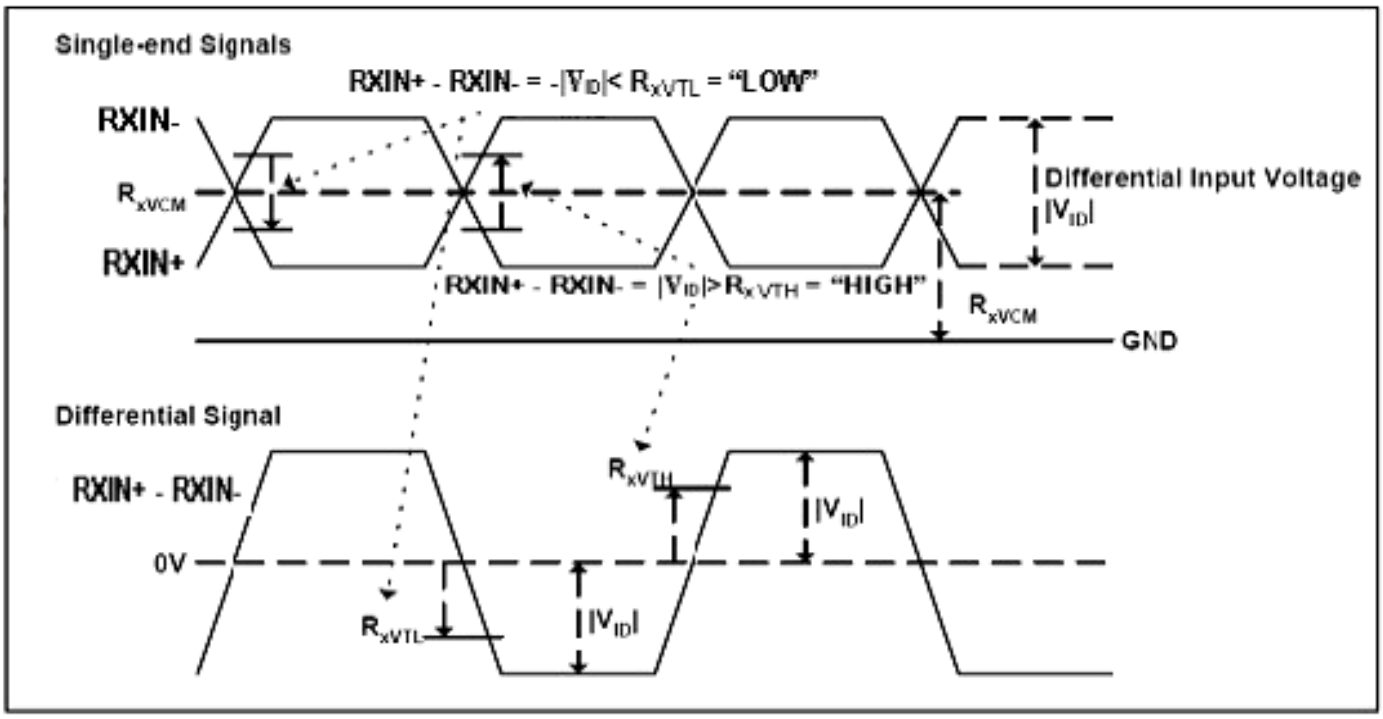
3.3.2. Input Clock and Data Timing Diagram





3.3.3. DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low Threshold voltage	R_{xVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{xVIN}	0	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$\|V_{ID}\|/2$	-	$2.4-\|V_{ID}\|/2$	V	
Differential voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	RV_{xliz}	-10	-	+10	uA	

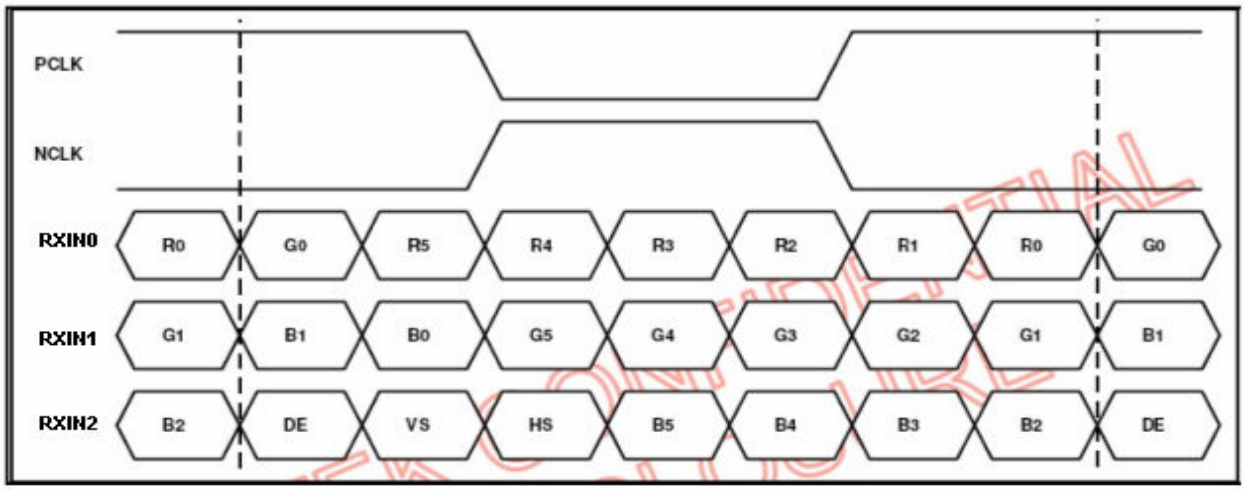


3.3.4. Timing

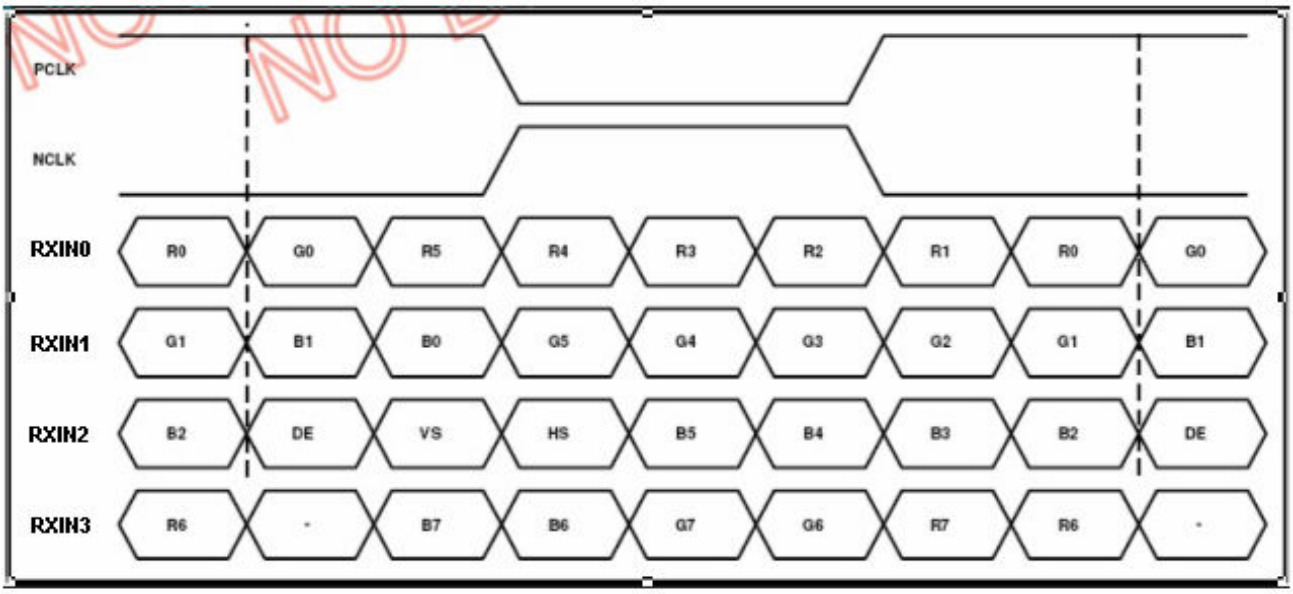
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	66.6	72.4	78.9	MHz	Frame rate =60Hz
Horizontal display area	thd		1280			
HS period time	th	1370	1440	1500	DCLK	
HS Blanking	thb	90	160	220	DCLK	
Vertical display area	tvd		800			
VS period time	tv	810	838	877	H	
VS Blanking	thb	10	38	77	H	

3.3.5. Data Input Format

6bit LVDS input



8bit LVDS input



Note: Support DE timing mode only, SYNC mode not supported.

4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	65	75	-	degree	Note 1
	θ_R	Φ=0°(3 o'clock)	65	75	-		
	θ_T	Φ=90°(12 o'clock)	65	75	-		
	θ_B	Φ=270°(6 o'clock)	60	70	-		
Response time	T_{ON}	Normal θ=Φ=0°	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		500	700	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5 Note 6
	W_Y		0.28	0.33	0.38	-	
Luminance	L		240	300	-	cd/m²	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 7

Test Conditions:

1. V_{DD}=3.3V, V_{LED}=5.0V, the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

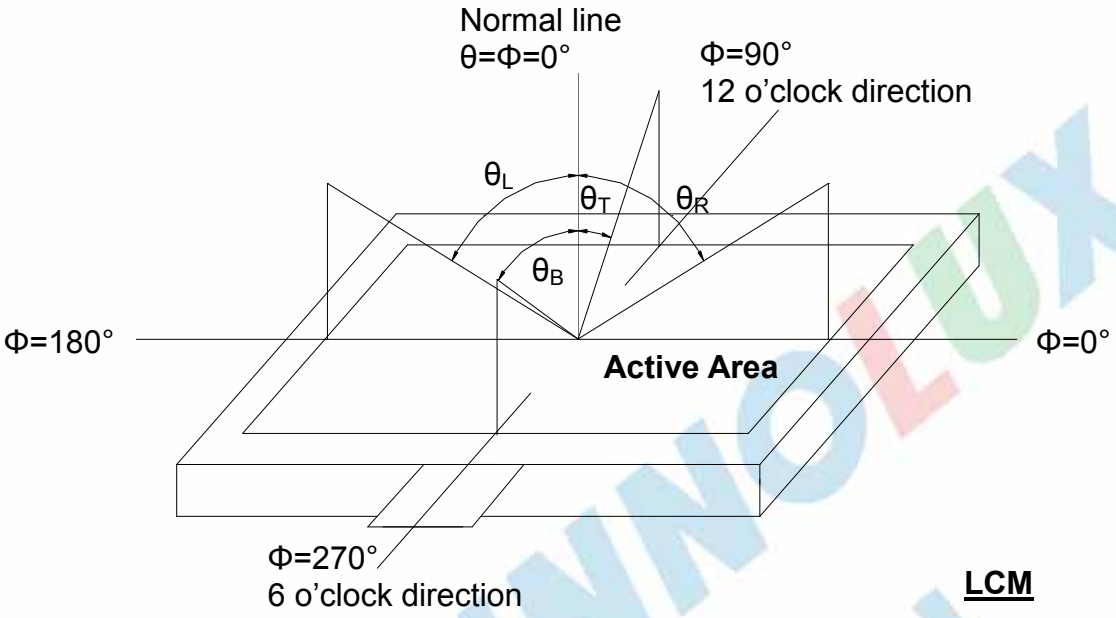


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

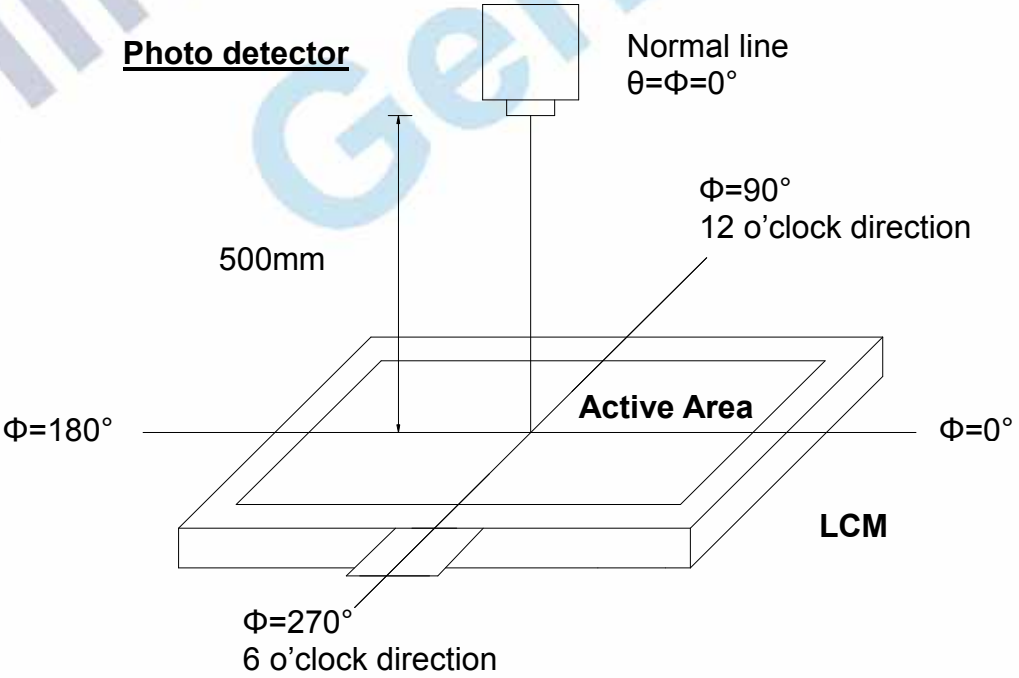


Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

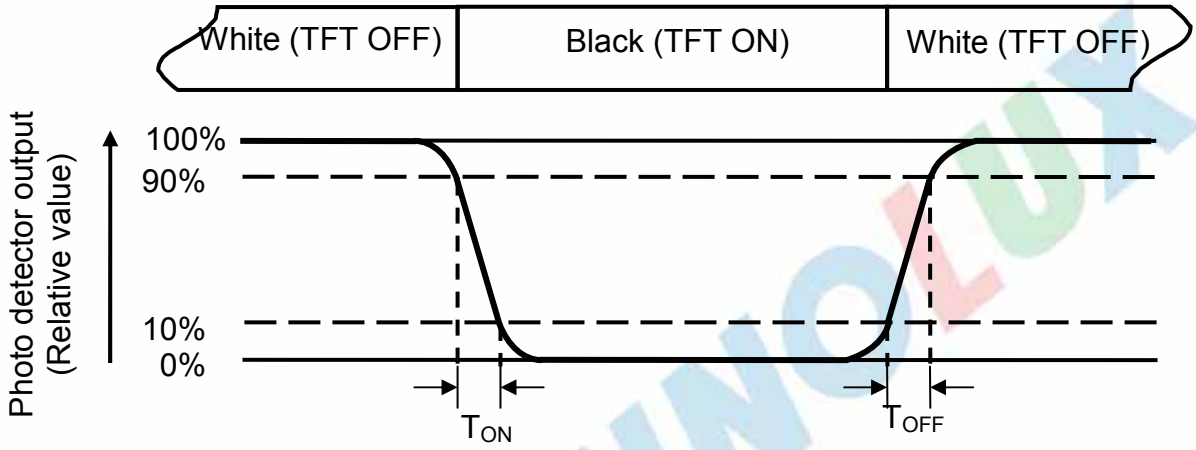


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is V_{LED}=5.0V.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L-------Active area length W----- Active area width

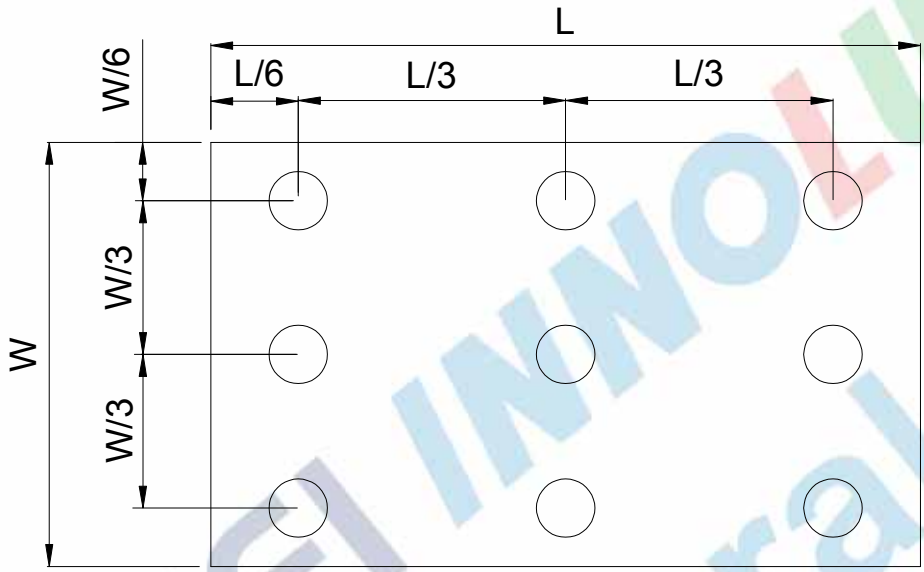


Fig. 4-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.
B_{min}: The measured minimum luminance of all measurement position.

5. Reliability Test Items

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 60℃ 240hrs	Note 1，Note 4
Low Temperature Storage	Ta = -20℃ 240hrs	Note 1，Note 4
High Temperature Operation	Ts = 50℃ 240hrs	Note 2，Note 4
Low Temperature Operation	Ta = -10℃ 240hrs	Note 1，Note 4
Operate at High Temperature and Humidity	+40℃, 90%RH 240hrs	Note 4
Thermal Shock	-20℃/30 min ~ +60℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

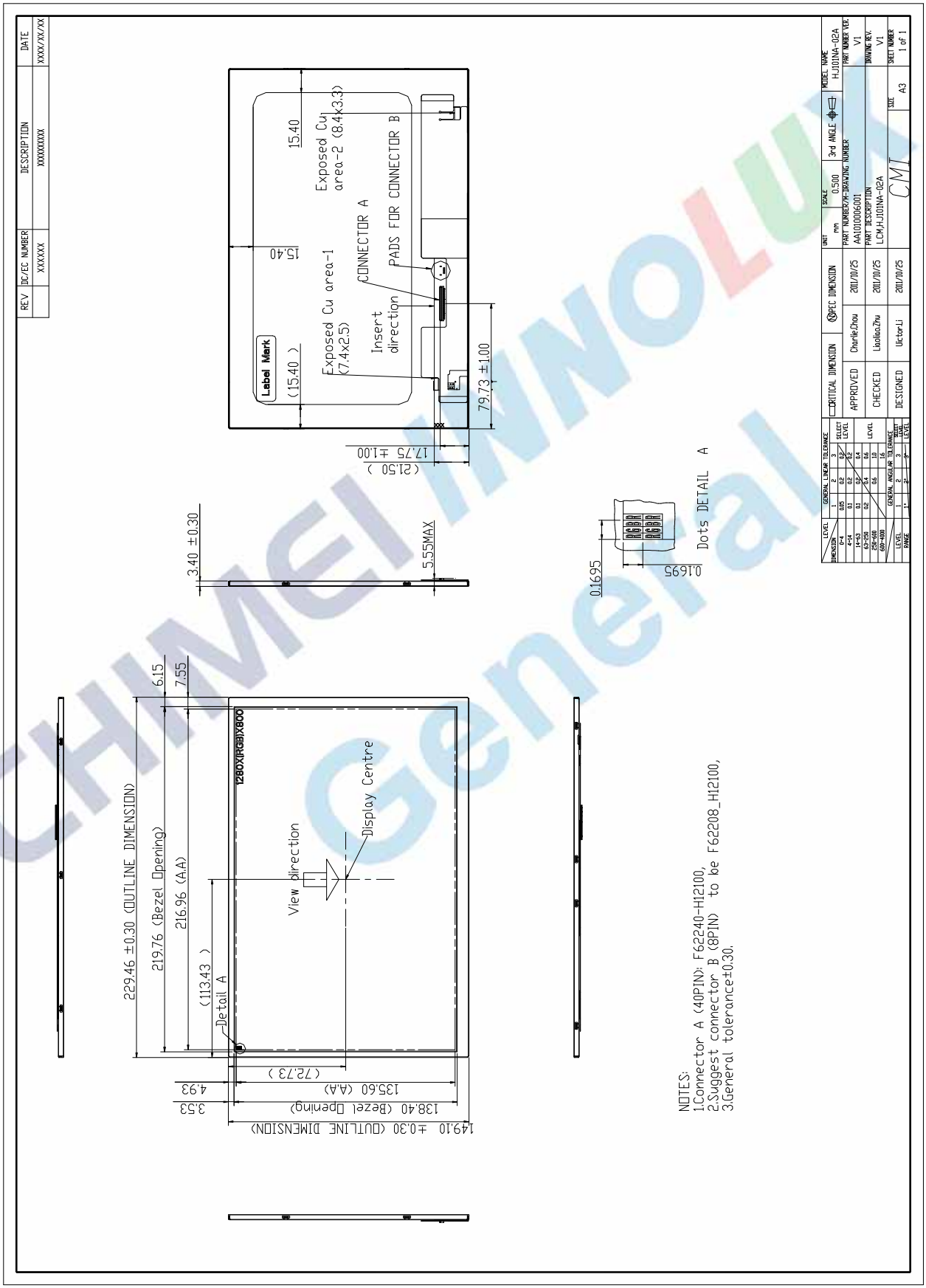
6.4. Storage

1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

7. Mechanical Drawing



8. Package Drawing

8.1. Packaging Material Table

No.	Item	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity	Remark
1	LCM Module	HJ101NA-02A	229.46 × 149.2 × 3.4	TBD	25pcs	
2	Anti-Static Bag	PE	240 × 204	TBD	25pcs	
3	Corrugated Paper	B Corrugated paper	513 × 177 x 35	TBD	2pcs	
4	Partition	BC Corrugated paper	512 × 349 × 228	TBD	1set	
5	Dust-Proof Bag	PE	700 × 530	0.048	1pcs	
6	Carton	Corrugated paper	530 × 355 × 255	1.100	1pcs	
8	Total weight	TBD				

8.2. Packaging Quantity

Total LCM quantity in Carton: no. of Partition 1 Rows × quantity per Row 15 =25

8.3. Packaging Drawing

TBD