



INNOLUX DISPLAY CORPORATION

LCD MODULE

SPECIFICATION

Customer: _____

Model Name: EE080NA-06A

Date: 2024/02/02

Version: 06

☐ **Preliminary Specification**

☒ **Final Specification**

Remark
8061 FOG

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by



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Record of Revision

Version	Revise Date	Page	Content
Pre-Spec.01	2011/05/25		Initial Release.
V02	2018/08/24	17	更新 SN Label 位置
V03	2020/08/06	18	Modify Packing Drawing
V04	2022/10/24	2	2. Pin Assignment
		5-11	3. Operation Specifications
		12-14	4. Optical Specifications
		17	7. Mechanical Drawing
	2022/12/01	1	1. General Specifications
		8	3.2 Power Sequence
	2022/12/05	8	3.1 Absolute Maximum Rating
V05	2023/10/17	4	1. General Specifications
		9	3.1.1 Typical Operation Conditions
V06	2024/02/02	21	5. Mechanical Drawing



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1. General Specifications

No.	Item	Specification	Remark
1	LCD size	8.0 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	800 × 3(RGB) × 600	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.0675(W) × 0.2025(H) mm	
6	Active area	162.0(W) × 121.5(H) mm	
7	TFT size	171.0(W) × 132.7(H) × 1.43(D) mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	Digital	
11	Panel power consumption	0.356W(Typ.)	Note 2
12	Weight	0.068± 5%(Typ.)	
13	Framerate	60Hz	

Note 1: Refer to Mechanical Drawing.

Note 2: Refers to 3.1.2 Current Consumption table for detail power consumption.



2. Pin Assignment

2.1. TFT LCD Panel Driving Section

FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	LED+	P	Power for LED backlight(Anode)	
2	LED+	P	Power for LED backlight(Anode)	
3	LED-	P	Power for LED backlight(Cathode)	
4	LED-	P	Power for LED backlight(Cathode)	
5	GND	P	Power ground	
6	V _{COM}	I	Common voltage	
7	V _{CC}	P	Power for Digital circuit	
8	MODE	I	DE/SYNC mode select	Note3
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12	B7	I	Blue data(MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	
19	B0	I	Blue data(LSB)	
20	G7	I	Green data (MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	
26	G1	I	Green data	
27	G0	I	Green data (LSB)	
28	R7	I	Red data (MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	



33	R2	I	Red data	
34	R1	I	Red data	
35	R0	I	Red data (LSB)	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
38	GND	P	Power ground	
39	L/R	I	Right/ left selection	Note2,5
40	U/D	I	Up/down selection	Note2,5
41	V _{GH}	P	Gate ON voltage	
42	V _{GL}	P	Gate OFF voltage	
43	AV _{DD}	P	Power for Analog circuit	
44	RESET	I	Global reset pin.	Note1
45	NC		No connection	
46	V _{COM}	I	Common voltage	
47	DITHB	I	Dithering function	Note 4
48	GND	P	Power ground	
49	NC		No connection	
50	NC		No connection	

I: input, O: output, P: Power

Note 1: Global reset pin. Active Low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.

Note 2: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	R/L	
GND	V _{CC}	Up to down, left to right
V _{CC}	GND	Down to up, right to left
GND	GND	Up to down, right to left
V _{CC}	V _{CC}	Down to up, left to right

Note 3: DE/SYNC mode select, Normally pull high.

H: DE mode.

L: HS/VS mode.

Note4: Dithering function enable control. Normally pull high.

DITHB="1", Disable internal dithering function. For 18bit RGB interface, connect two LSB bits of all the R/G/B data buses to GND.

DITHB="0", Enable internal dithering function, For TTL 24bit parallel RGB image data input.

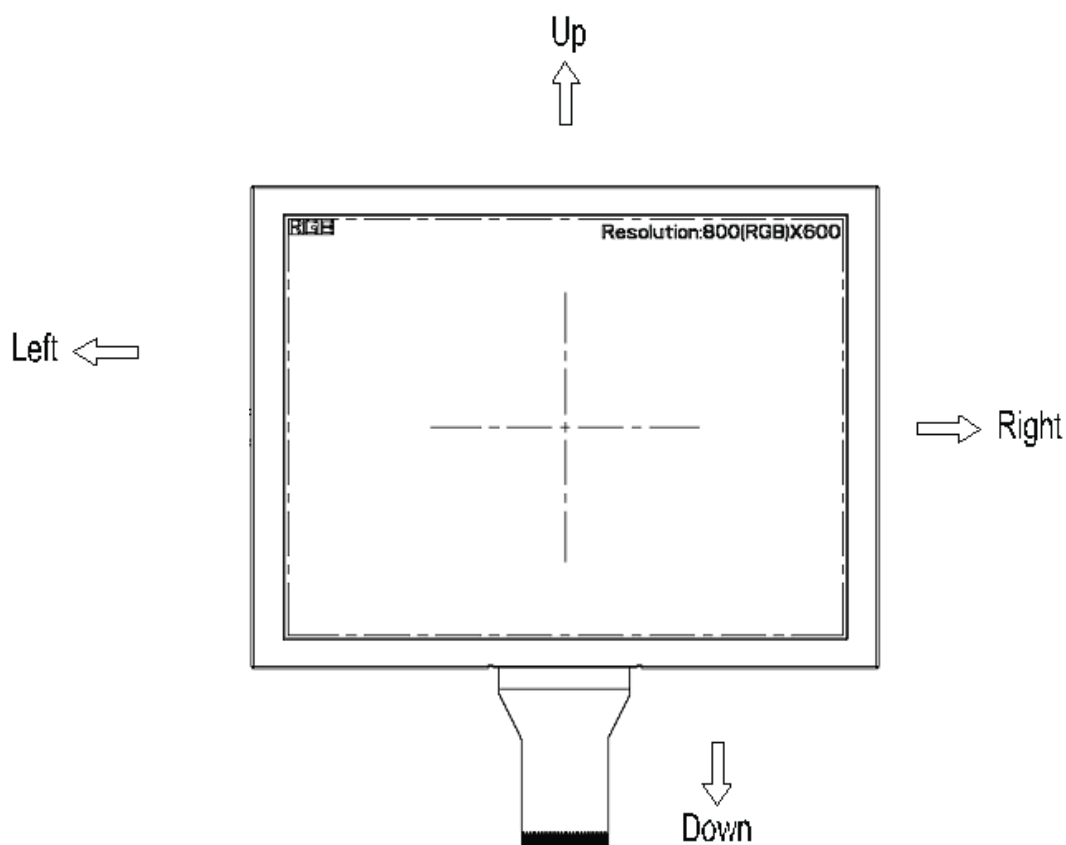
Note 5: Definition of scanning direction.

Refer to the figure as below:

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3. Operation Specifications

3.1. Absolute Maximum Rating

(TA=25°C,GND=AV_{SS}=0V, Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V _{CC}	-0.5	5.0	V	
	AV _{DD}	-0.5	15.0	V	
	V _{GH}	-0.3	42.0	V	
	V _{GL}	-20.0	0.3	V	
	V _{GH} -V _{GL}	-0.3	40.0	V	
Operation Temperature Storage Temperature	T _{OP}	-20	70	°C	
	T _{ST}	-30	80	°C	

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

(GND=AV_{SS}=0V, Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V _{CC}	3.0	3.3	3.6	V	Note 2
	AV _{DD}	10.2	10.4	10.6	V	
	V _{GH}	15.5	16.0	16.5	V	
	V _{GL}	-7.5	-7.0	-6.5	V	
Input signal voltage	V _{COM}	3.5	4.0	4.5	V	Note 5
Input logic high voltage	V _{IH}	0.7V _{CC}	-	V _{CC}	V	Note 4
Input logic low voltage	V _{IL}	0	-	0.3V _{CC}	V	
Ripple voltage	VRP	-	-	150	mV	Note 3

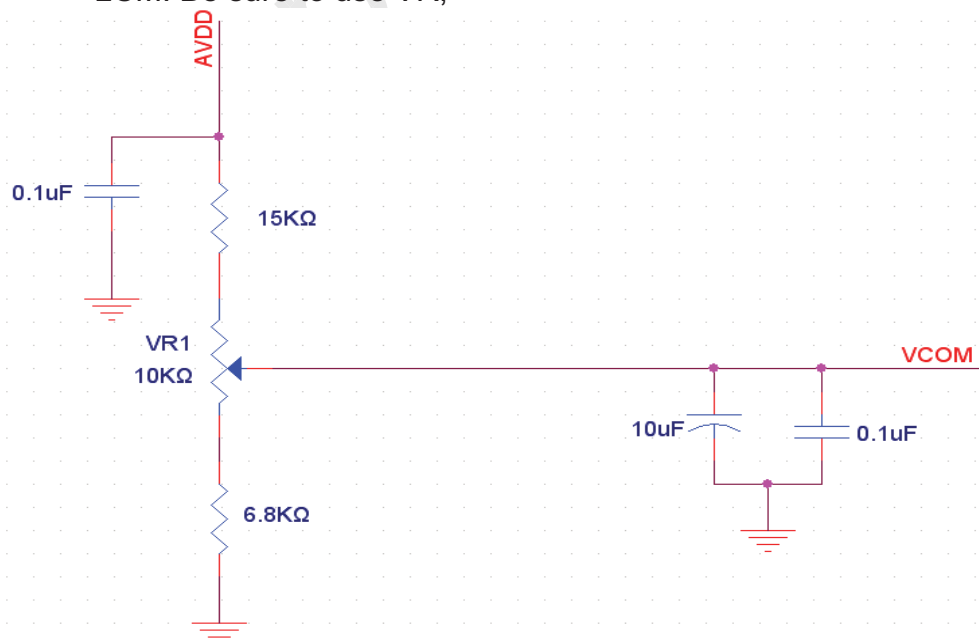
Note 1: Be sure to apply V_{CC} and V_{GL} to the LCD first, and then apply V_{GH}.

Note 2: V_{CC} setting should match the signals output voltage (refer to Note 3) of customer's system board .

Note 3: Including signal: VDD, AVDD, VGH, VGL, VCOM

Note 4: DCLK,HS,VS,RSTB,UPDN,STLR,MODE,DITHB.

Note 5: Typical VCOM is only a reference value, it must be optimized according to each LCM. Be sure to use VR;





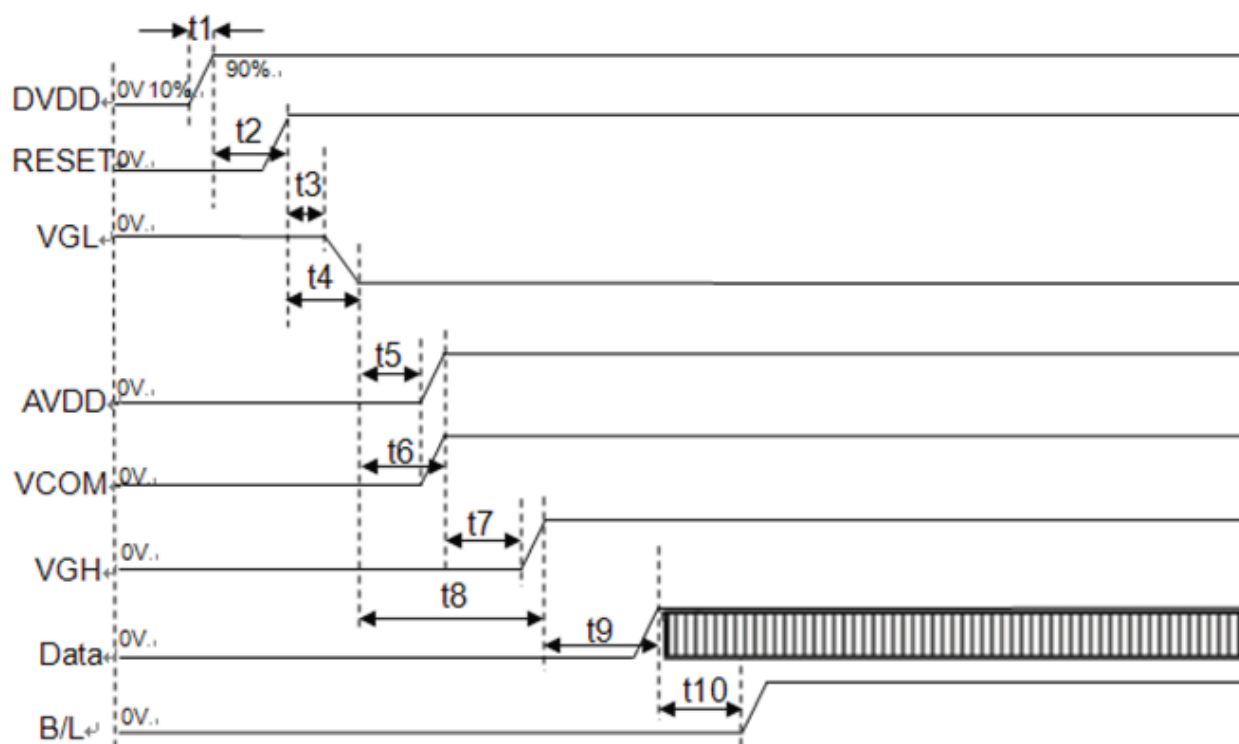
3.1.2. Current Consumption

(GND=AV_{SS}=0V)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	0.05	0.2	0.5	mA	V _{GH} =16.0V
	I _{GL}	0.05	0.2	1.0	mA	V _{GL} = -7.0V
	I _{CC}	1	5.5	10.0	mA	V _{CC} =3.3V
	I _{AVDD}	5	32.0	50.0	mA	AV _{DD} =10.4V

3.2. Power Sequence

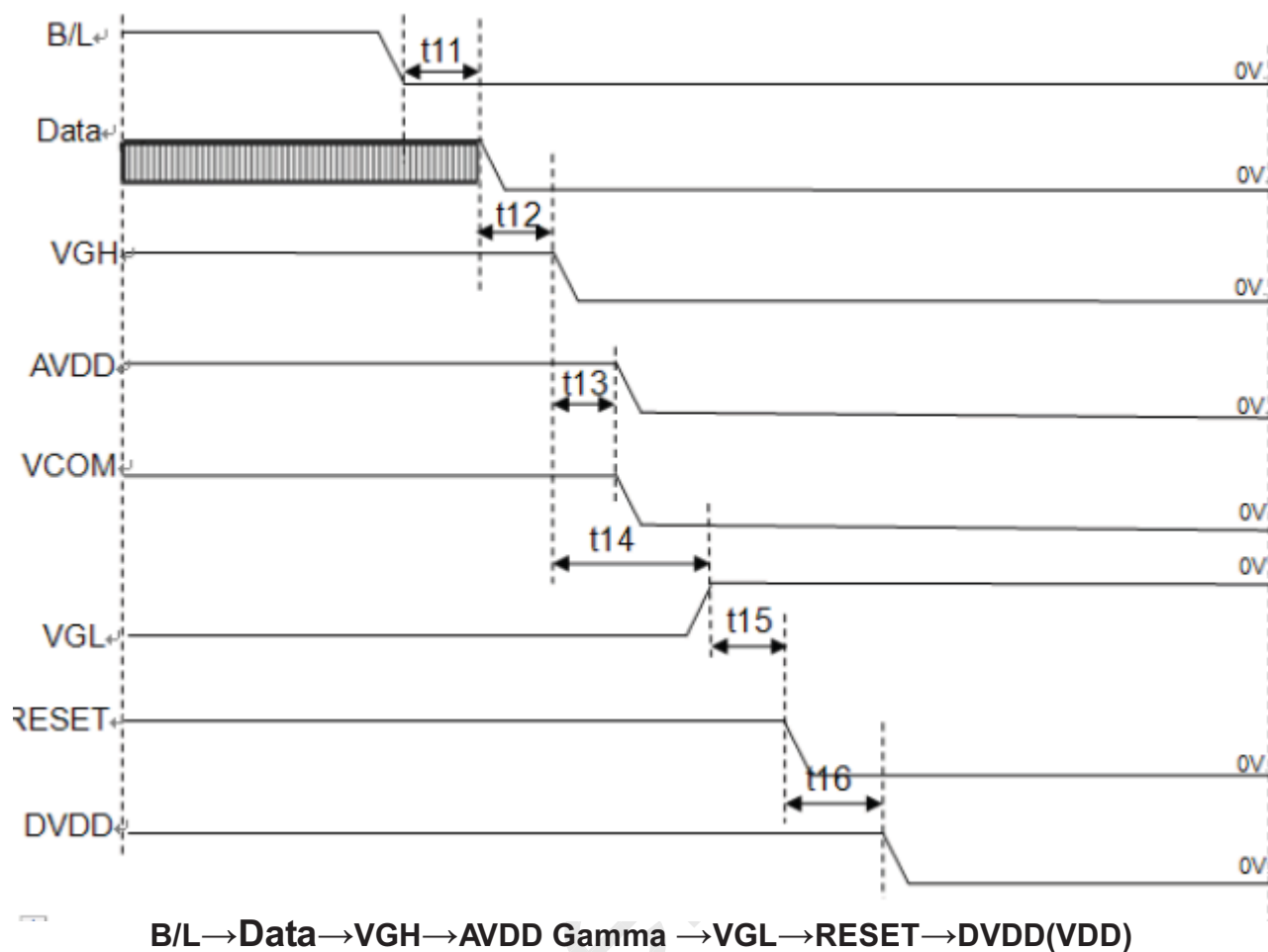
3.2.1. Power on



DVDD(VDD)→RESET→VGL→AVDD Gamma →VGH→Data→B/L

Symbol	SPEC			Unit
	Min.	Typ.	Max.	
T1	0.5	5	20	ms
T2	1	1	1.5	ms
T3	10	15	20	ms
T4	20	22	24	ms
T5	1	2	3	ms
T6	5	6	7	ms
T7	1.5	2	4	ms
T8	10	12	15	ms
T9	150		500	ms
T10	180	190	200	ms

1.1.1. Power off:



Symbol	SPEC			Unit
	Min.	Typ.	Max.	
T11	180	190	200	ms
T12	10	15	20	ms
T13	5	6	7	ms
T14	10	12	15	ms
T15	20	22	24	ms
T16	1	1.5	3	ms

Note: Data include R0~R7, B0~B7, GO~G7, STLR,UPDN, DCLK, HS,VS,DE.



1.2. Timing Characteristics

1.2.1. AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS hold time	T_{vhd}	8	-	-	ns	
Data setup time	T_{dsu}	8	-	-	ns	
Data hole time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
VDD Power On Slew rate	T_{POR}	-	-	20	ms	
RSTB pulse width	T_{Rst}	1	-	-	ms	
CLKIN cycle time	T_{cph}	20	-	-	ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
Output stable time	T_{sst}	-	-	6	us	



1.2.2. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	Th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	600	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

1.2.3. Timing Diagram

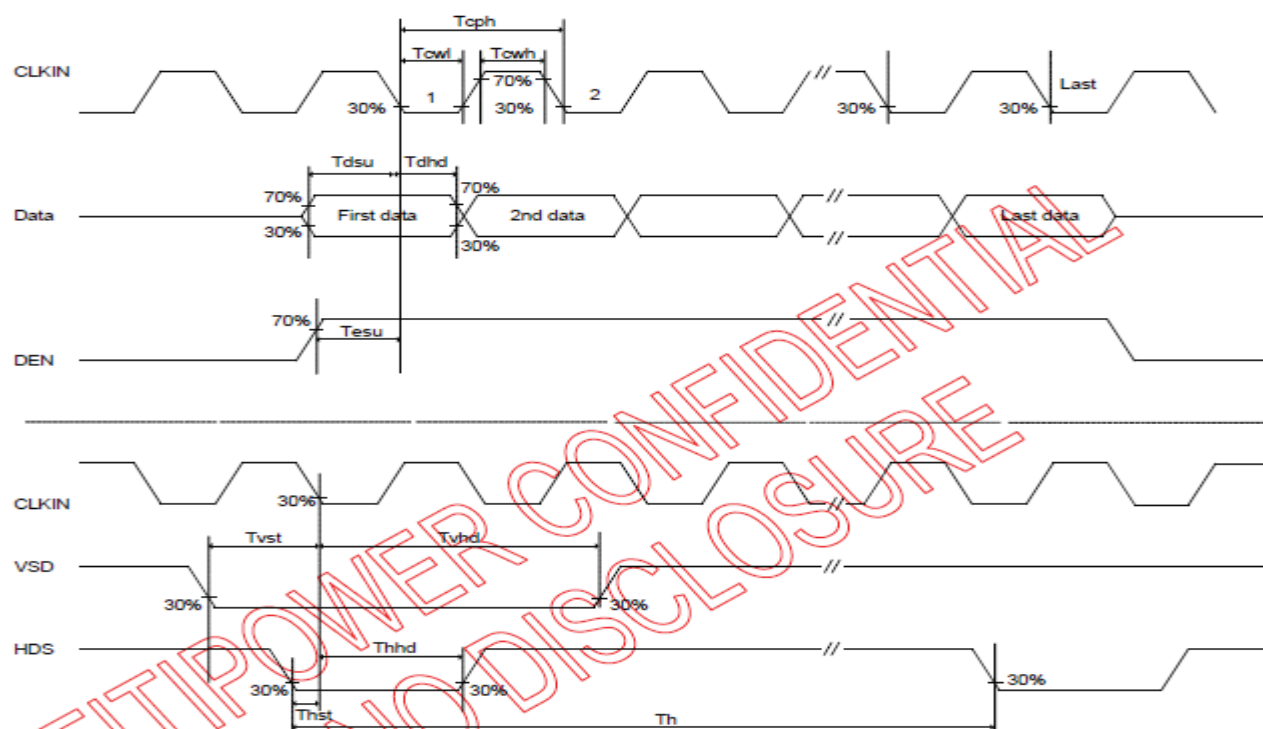


Figure 3.1 Input Clock and Data Timing Diagram

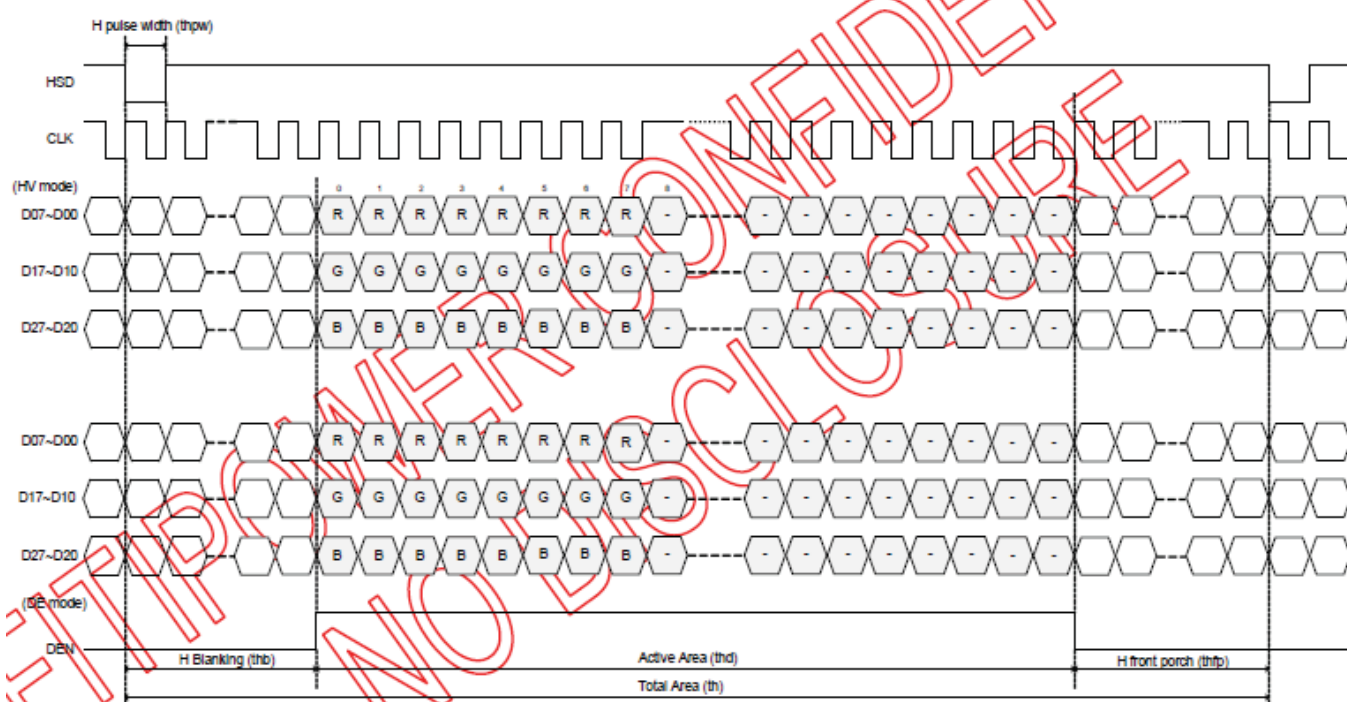


Figure 3.2 Horizontal input timing diagram.



2. Optical Specifications

Note: Base on INNOLUX LCM.

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	60	70	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	60	70	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	40	50	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	60	70	-		
Response time	T_{ON+} T_{OFF}	Normal $\theta=\Phi=0^\circ$	-	25	50	ms	Note 3
Contrast ratio	CR		800	1000	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5
	W_Y		0.28	0.33	0.38	-	
Color Saturation (NTSC)	NTSC	Normal $\theta=\Phi=0^\circ$ CLE 1931	45%	50%	-	-	Note 2 Note 5 Note 6 Note 7
Transmittance	Tr	Normal $\theta=\Phi=0^\circ$	5.28	6	-	%	Note 2 Note 6 Note 7

Test Conditions:

1. $V_{CC}=3.3V$, the ambient temperature is $25^\circ C$.
2. The test systems refer to Note 2.
3. The optical specification are measured base on Innolux LCM.

Note 1: Definition of viewing angle range

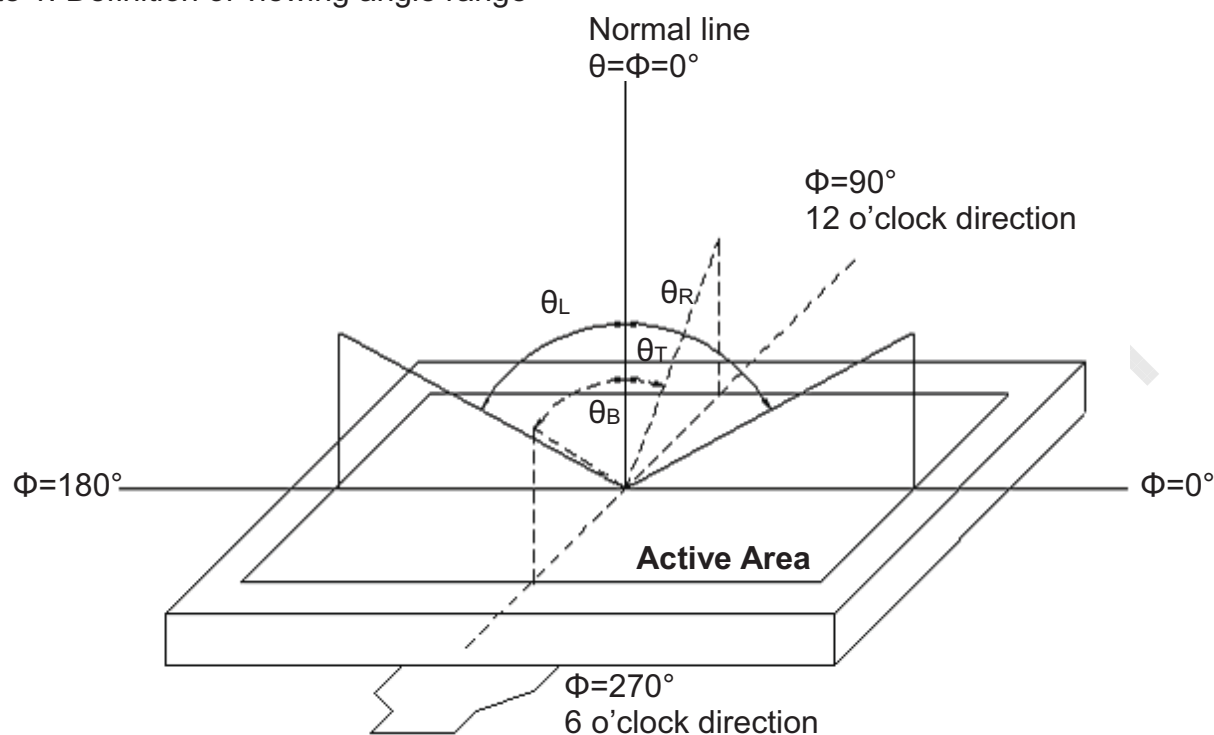


Fig. 4-1 Definition of viewing angle

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 (Optical items are measured by CS2000/Field of view: 1° /Height: 500mm.)

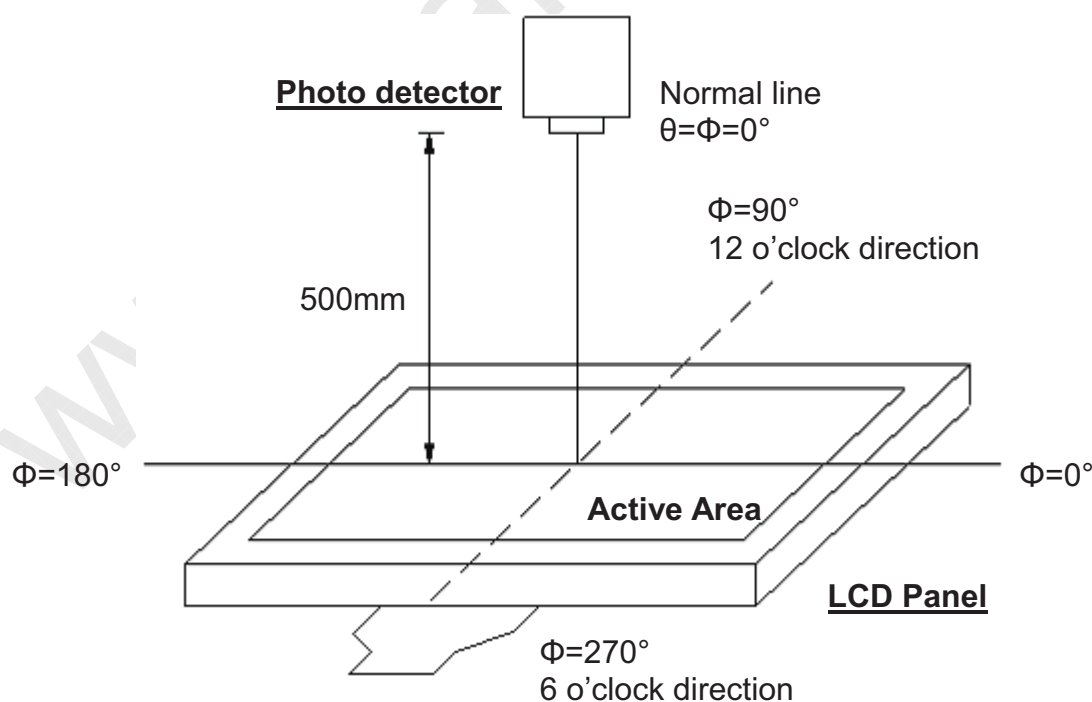


Fig. 4-2 Optical measurement system setup

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%.

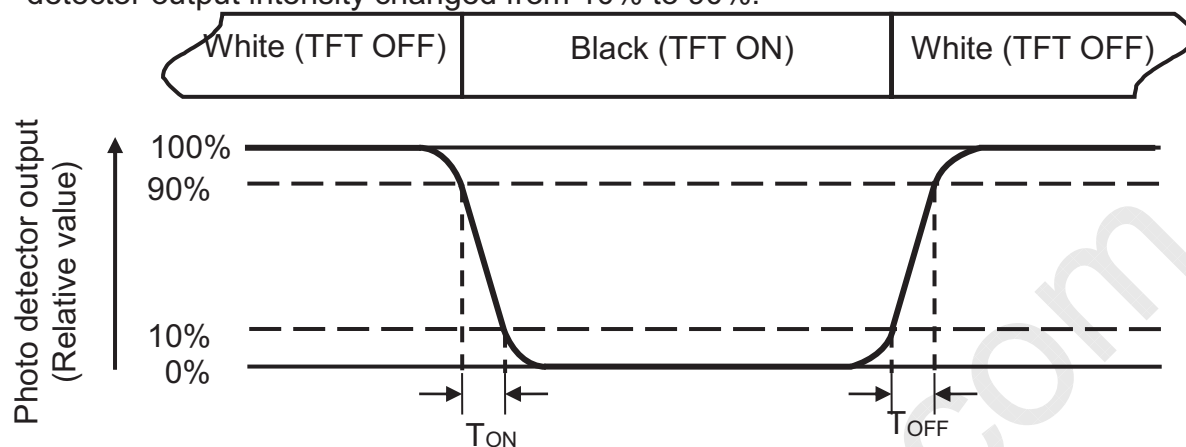


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

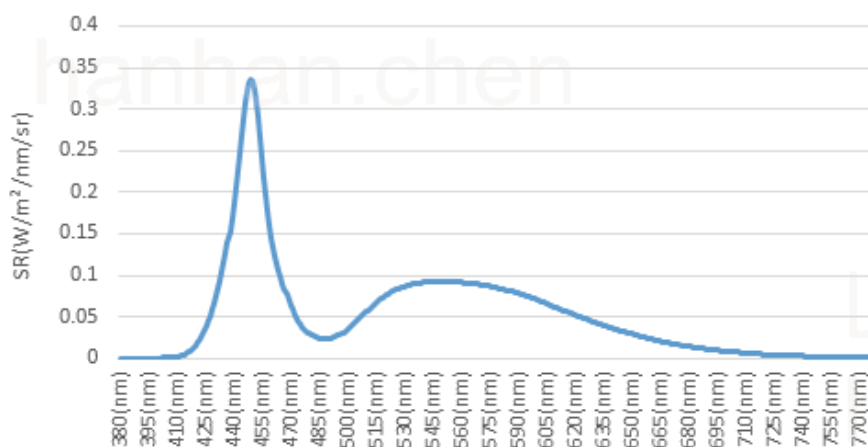
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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. (Reference : Backlight's brightness is 5500nits)

Note 7: Base on the following INX BLU data evaluation



3. Reliability Test Items

Item	Test Conditions		Remark
High Temperature Storage	80℃	240hrs	Note 1, 2
Low Temperature Storage	-30℃	240hrs	Note 1, 2
High Temperature Operation	70℃	240hrs	Note 1, 2
Low Temperature Operation	-20℃	240hrs	Note 1, 2
Operate at High Temperature and Humidity	+40℃, 90%RH	240hrs	Note 1, 2

Note 1: The test samples have recovery time need more than 2 hours at room temperature before the function check. In the standard conditions , there is no abnormal display function occurred .

Note 2: After the reliability test , the product only guarantees operational function , but don't guarantee all of the cosmetic specification.



4. General Precautions

4.1. 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.

4.2. 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.

4.3. 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.

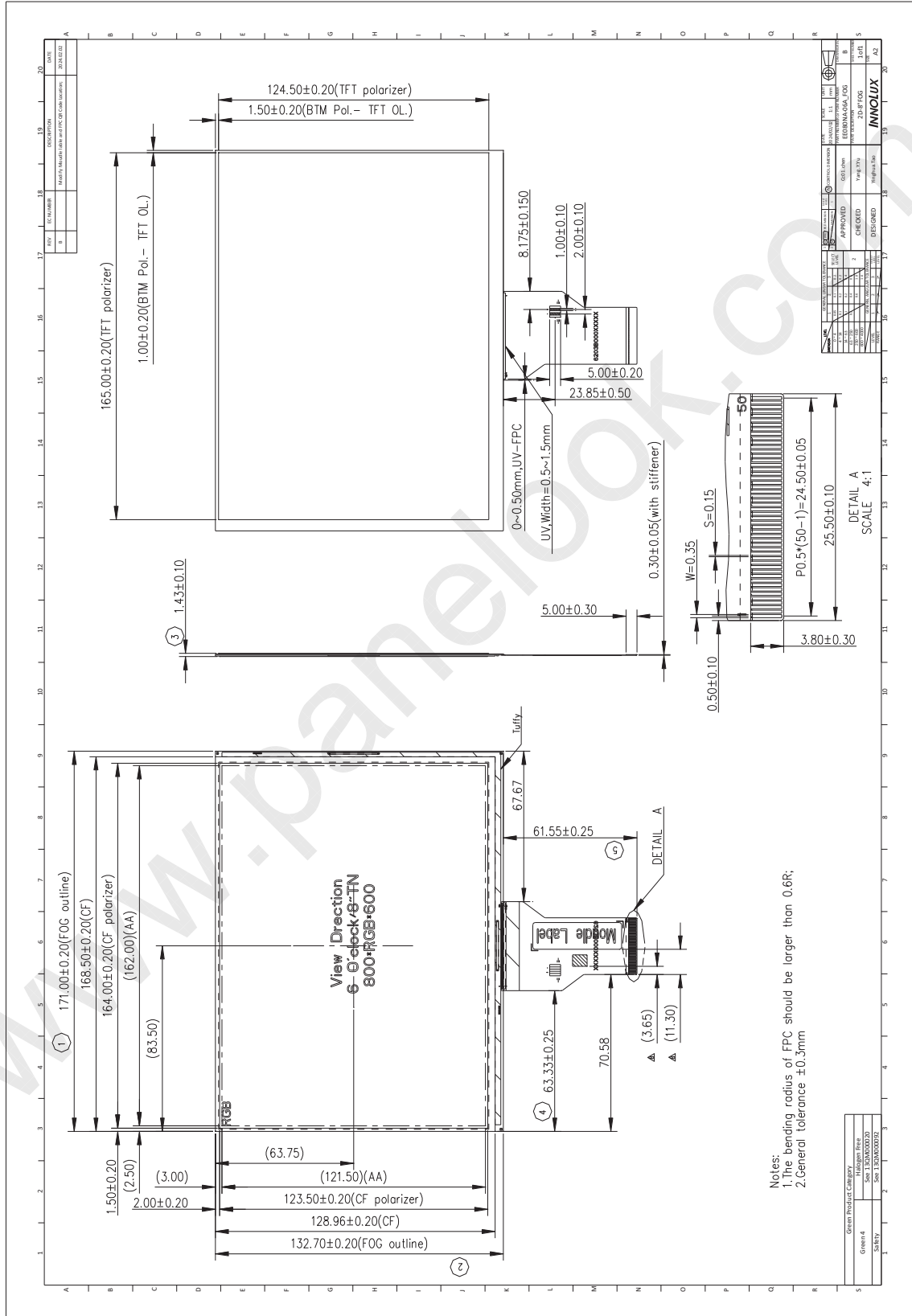
4.4. Storage

1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ 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.

4.5. 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.

5. Mechanical Drawing





8. Package Drawing

8.1 Packaging Drawing

