

深圳市畅世达科技有限公司

INNOLUX7 寸普清模组规格书

SPECIFICATION

承 认 印 Approved by	
审核:	确认:
客户确认结果:	

客 户: _____

品 名: INNOLUX7D普清长排

模组外形: 164.9*100*5.5

日 期: 2018.04.13

Approved 核 准	Checked 审 核	Prepared 制 作

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深圳市畅世达科技有限公司

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规格书更改记录				
序号	日期	内 容	版本	修订者
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深圳市畅世达科技有限公司

1. 适用范围：本承认书适用于畅世达科技有限公司生产的7寸模组

2. 产品规格

2. 1 主要零部件构成

[illegible]

CHIMEI INNOLUX DISPLAY CORPORATION

SPECIFICATION

Customer: _____
Model Name: AT070TN90 V.1
SPEC NO.: A070-90-TT-16
Date: 2011/12/15
Version: 06

☐ Preliminary Specification
☒ Final Specification

Remark
7DD FOG (FPC:47.51mm)

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by
Stanley CW Leung 2011/12/22	Green Fu 2011/12/21	David Lee 2011/12/20

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Record of Revision

Version	Revise Date	Page	Content
Final-spec.01	2010/01/19	All	Initial Release
Final-spec.02	2010/03/22	1	Add the Value of Weight
		17	Add Packaging Material Table & Packaging Quantity
		18	Add Packaging Drawing
Final-spec.03	2010/04/28	All	Add the Model Name, Spec NO., and Update the Logo
Final-spec.04	2010/11/03	6	Modify V_{COM} values and add note 4
Final-spec.05	2011/09/05	16	Modify mechanical drawing from 1+2 to 1+1 IC
		17	Modify Packaging Material Table & Packaging Quantity
Final-spec.06	2011/12/15	16	Update mechanical drawing: the size of Gate IC

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1. General Specifications

No.	Item	Specification	Remark
1	LCD size	7.0 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	800 × 3(RGB) × 480	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.0642(W) × 0.1790(H) mm	
6	Active area	154.08(W) × 85.92(H) mm	
7	Panel size	162.5(W) × 96.62(H) × 1.43(D) mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Display Color	16.7M	
11	Interface	Digital, Parallel 8-bit RGB	
12	Panel power consumption	0.226W (Typ.)	
13	Weight	45g(Typ.)	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

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	NC	-	No connection	Note 8
2	NC	-	No connection	Note 8
3	NC	-	No connection	Note 8
4	NC	-	No connection	Note 8
5	GND	P	Power ground	
6	V _{COM}	I	Common voltage	
7	DV _{DD}	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	Note 1
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	Note 2
19	B0	I	Blue data(LSB)	Note 2
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	Note 2

27	G0	I	Green data(LSB)	Note 2
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	Note 2
35	R0	I	Red data(LSB)	Note 2
36	GND	P	Power Ground	
37	DCLK	I	Sample clock	Note 3
38	GND	P	Power Ground	
39	L/R	I	Left / right selection	Note 4,5
40	U/D	I	Up/down selection	Note 4,5
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.	Note 6
45	NC	-	No connection	
46	V _{COM}	I	Common Voltage	
47	DITHB	I	Dithering function	Note 7
48	GND	P	Power Ground	
49	NC	-	No connection	
50	NC	-	No connection	

I: input, O: output, P: Power

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE="0", DE must be grounded.

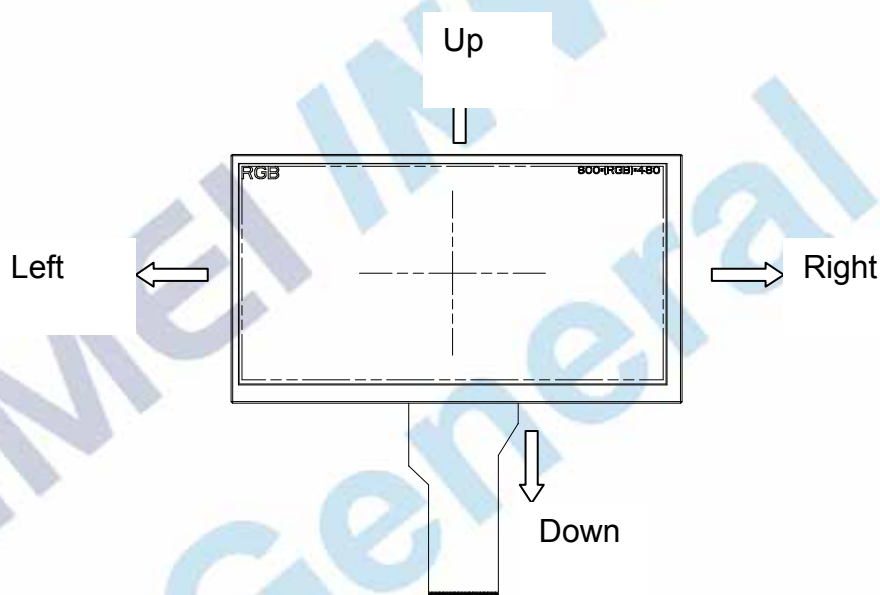
Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode

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

Note 5: Definition of scanning direction.
Refer to the figure as below:



Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.
When DITHB="1", Disable internal dithering function,
When DITHB="0", Enable internal dithering function,

Note 8: Reserve for LED power input.

3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	DV _{DD}	-0.3	5.0	V	
	AV _{DD}	6.5	13.5	V	
	V _{GH}	-0.3	40.0	V	
	V _{GL}	-20.0	0.3	V	
	V _{GH} -V _{GL}	-	40.0	V	
Operation Temperature	T _{OP}	-20	70	°C	
Storage Temperature	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

(Note 1)

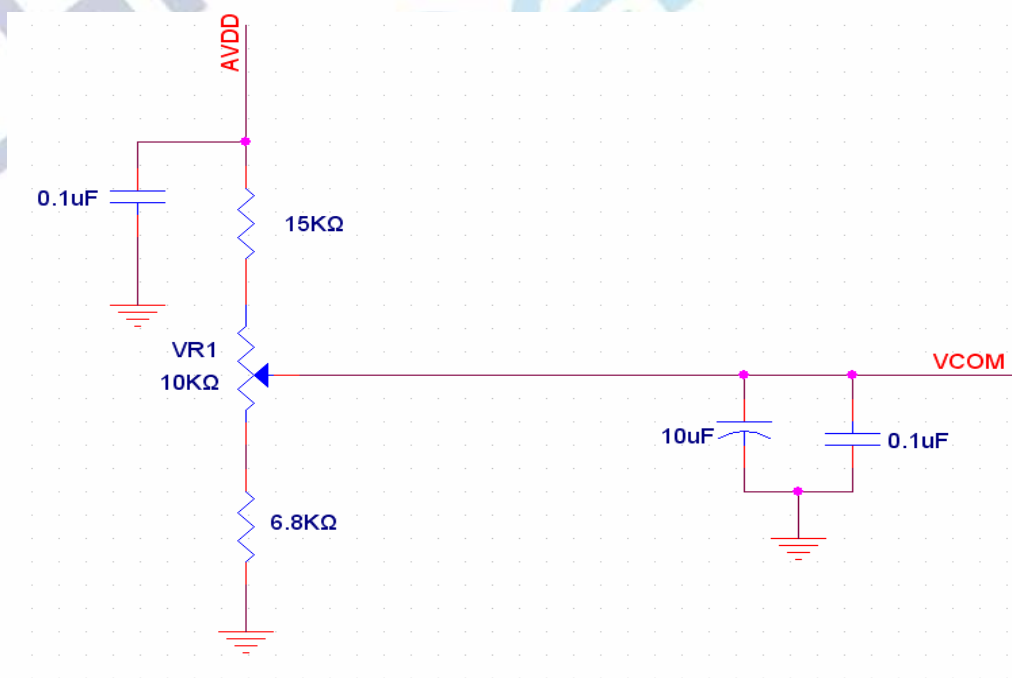
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV _{DD}	3.0	3.3	3.6	V	Note 2
	AV _{DD}	10.2	10.4	10.6	V	
	V _{GH}	15.3	16.0	16.7	V	
	V _{GL}	-7.7	-7.0	-6.3	V	
Input signal voltage	V _{COM}	2.6	(3.6)	4.6	V	Note 4
Input logic high voltage	V _{IH}	0.7 DV _{DD}	-	DV _{DD}	V	Note 3
Input logic low voltage	V _{IL}	0	-	0.3 DV _{DD}	V	

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

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

Note 3: DCLK,HS,VS,RESET,U/D, L/R,DE,R0~R7,G0~G7,B0~B7,MODE,DITHB.

Note 4: Typical V_{COM} is only a reference value. It must be optimized according to each LCM. Please use VR and base on below application circuit.

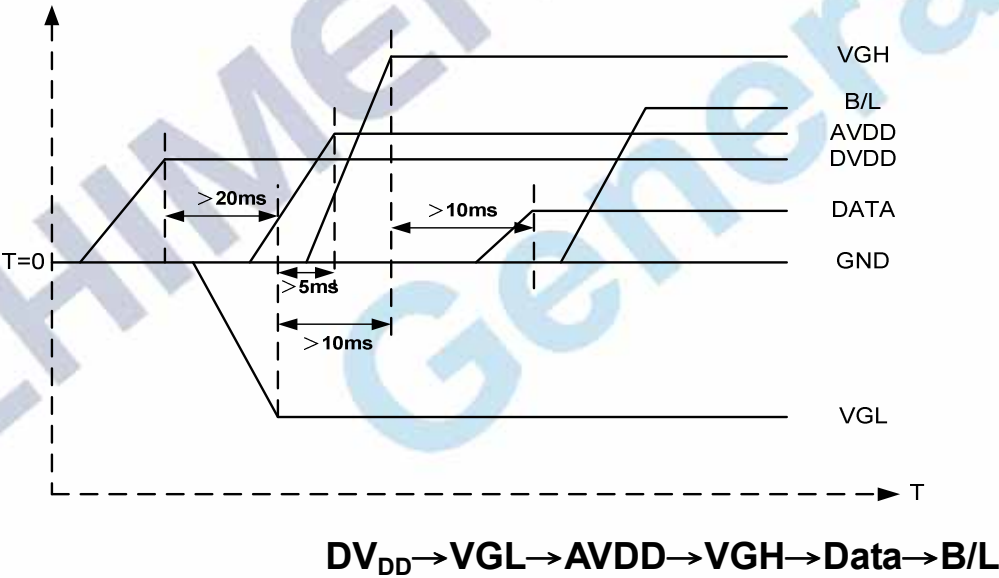


3.1.2. Current Consumption

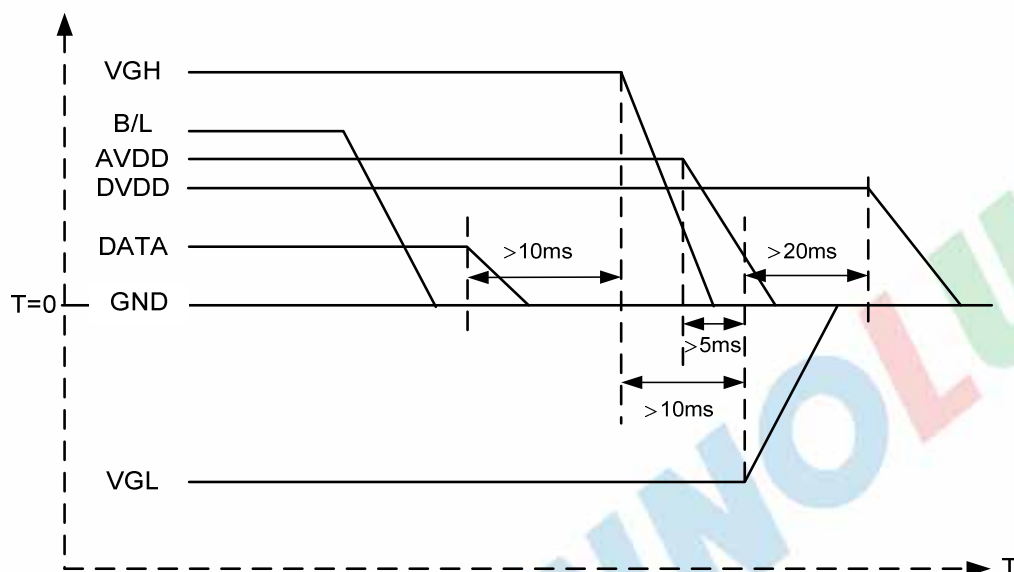
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	-	0.2	1.0	mA	V _{GH} =16.0V
	I _{GL}	-	0.2	1.0	mA	V _{GL} = -7.0V
	IDV _{DD}	-	4.0	10	mA	DV _{DD} =3.3V
	IAV _{DD}	-	20	50	mA	AV _{DD} =10.4V

3.2. Power Sequence

a. Power on:



b. Power off:



B/L→Data→VGh→AVDD→VGL→DV_{DD}

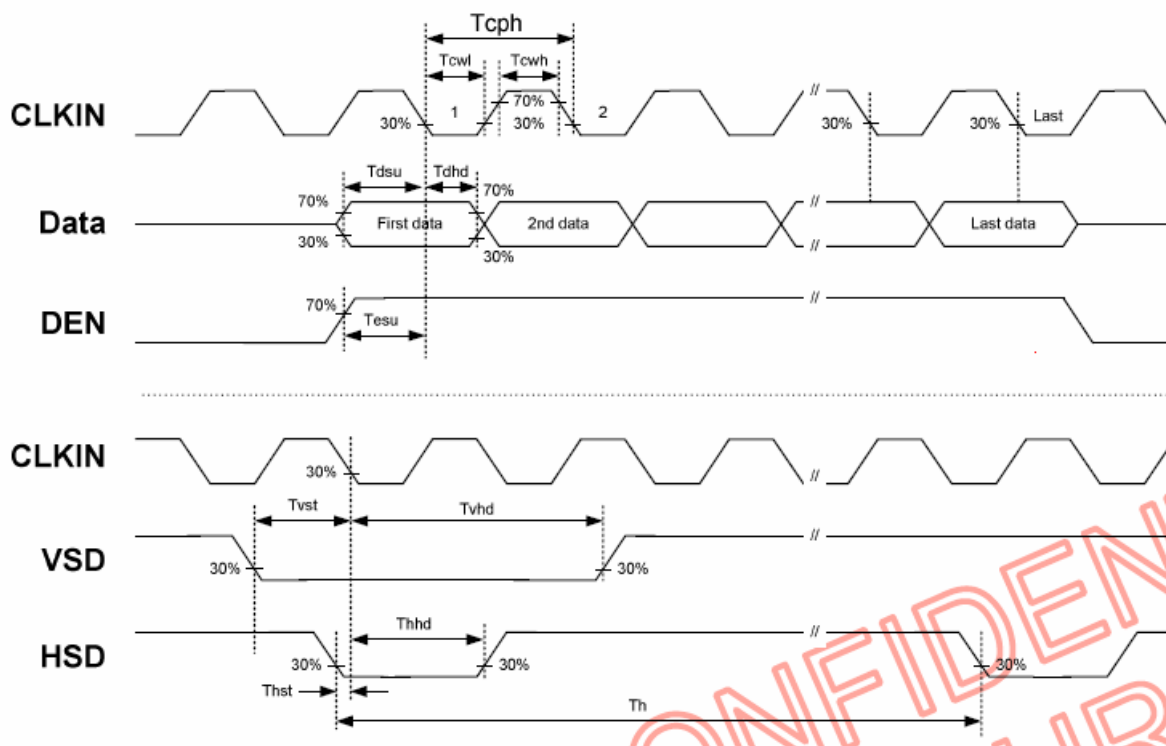
Note: Data include R0~R7, B0~B7, GO~G7, U/D, L/R, DCLK, HS,VS,DE.

3.3. Timing Characteristics

3.3.1. 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	
DV _{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90% DV _{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

3.3.2. Input Clock and Data Timing Diagram



3.3.3. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS 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	-	480	-	TH	
VS period time	tv	510	525	650	TH	

VS pulse width	tpw	1	-	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

3.3.4. Data Input Format

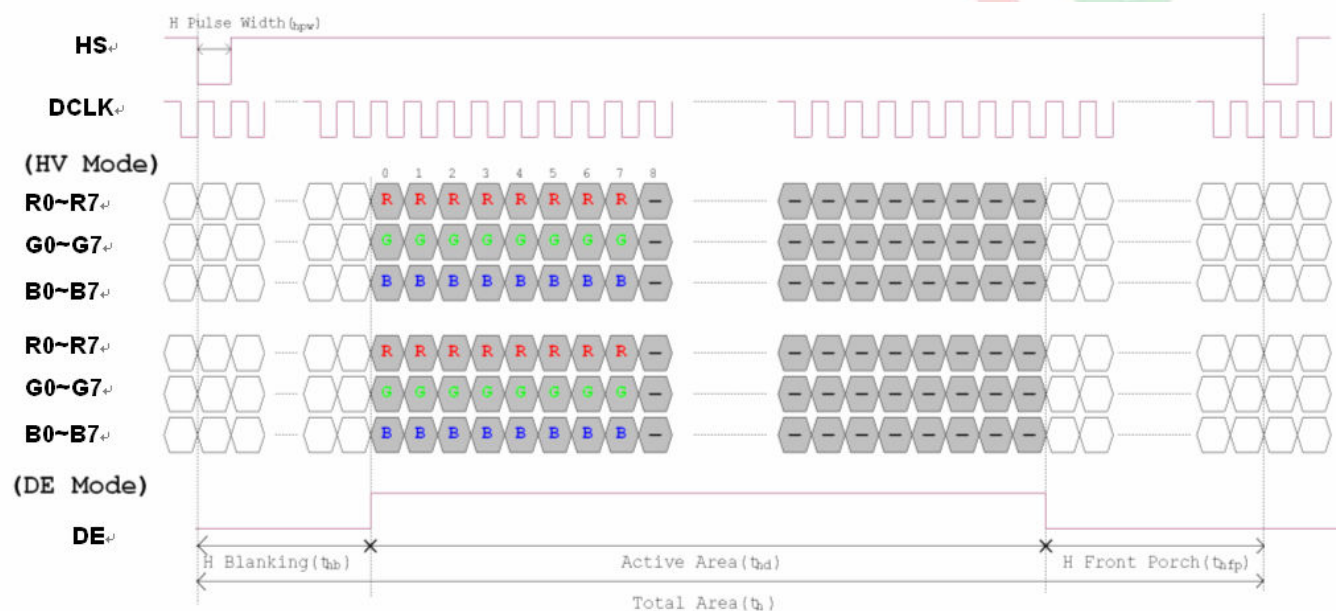


Figure 3. 1 Horizontal input timing diagram.

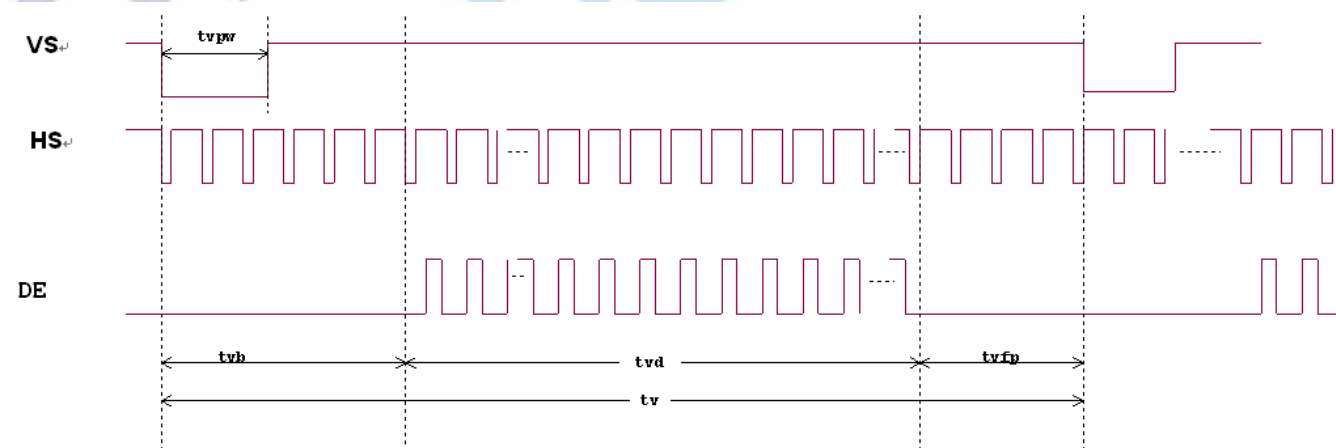


Figure 3. 2 Vertical input timing diagram.

4. 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}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2
	W_Y		0.28	0.33	0.38	-	Note 5 Note 6
Transmittance	Tr	-	-	5.11	-	%	

Test Conditions:

1. $DV_{DD}=3.3V$, the ambient temperature is $25^\circ C$.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

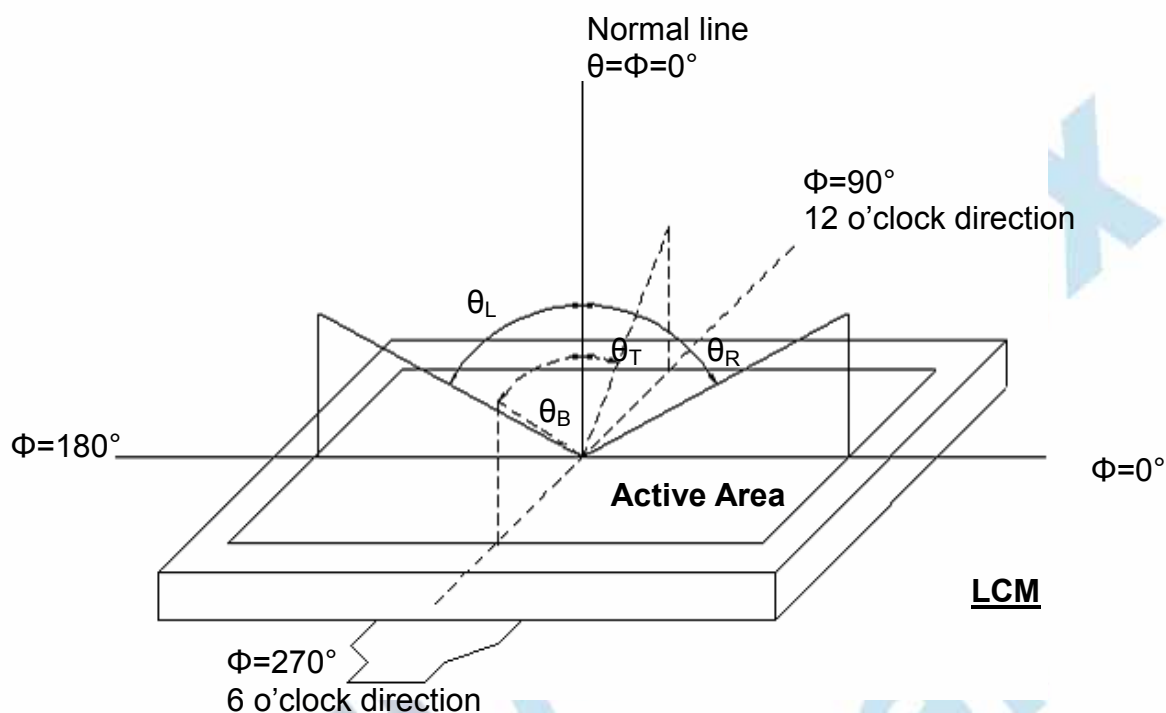


Fig. 4-1 Definition of viewing angle

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.)

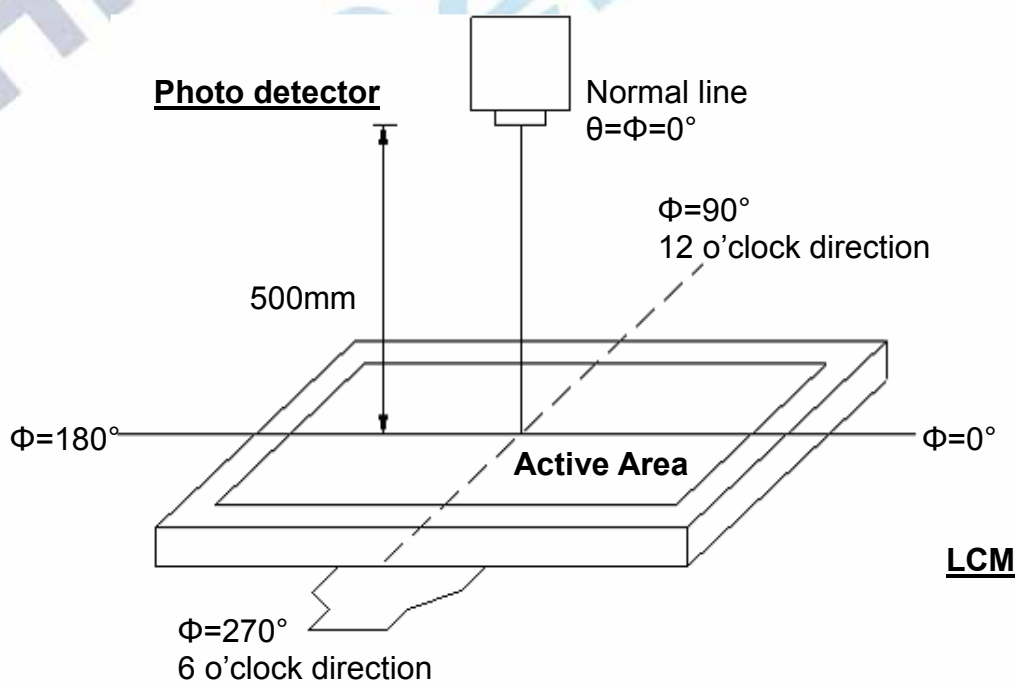


Fig. 4-2 Optical measurement system setup

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%.

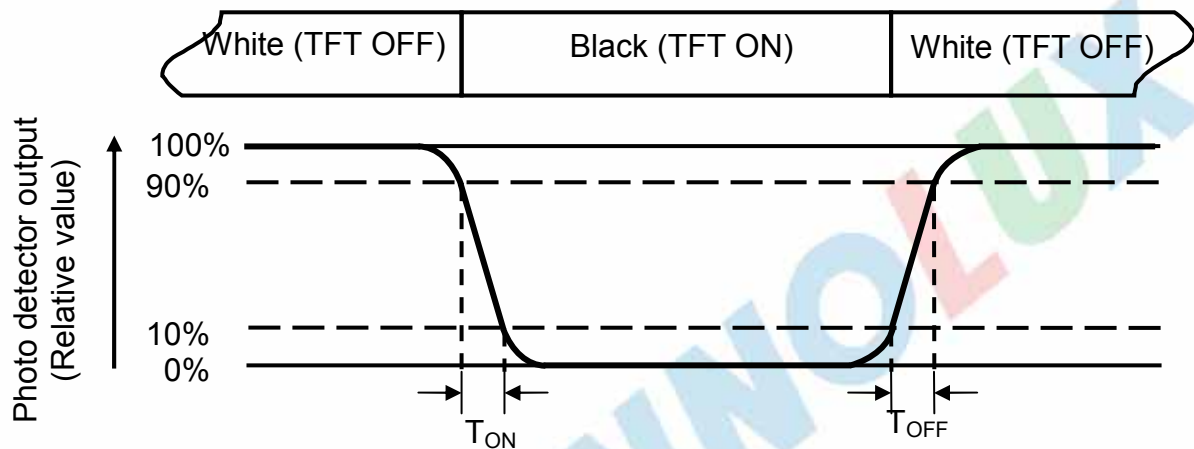


Fig. 4-3 Definition of response time

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.

5. Reliability Test Items

(Note3)

Item	Test Conditions		Remark
High Temperature Storage	Ta = 80℃	240hrs	Note 1, Note 4
Low Temperature Storage	Ta = -30℃	240hrs	Note 1, Note 4
High Temperature Operation	Ts = 70℃	240hrs	Note 2, Note 4
Low Temperature Operation	Ta = -20℃	240hrs	Note 1, Note 4
Operate at High Temperature and Humidity	+60℃, 90%RH	240hrs	Note 4
Thermal Shock	-30℃/30 min ~ +80℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.		Note 4

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

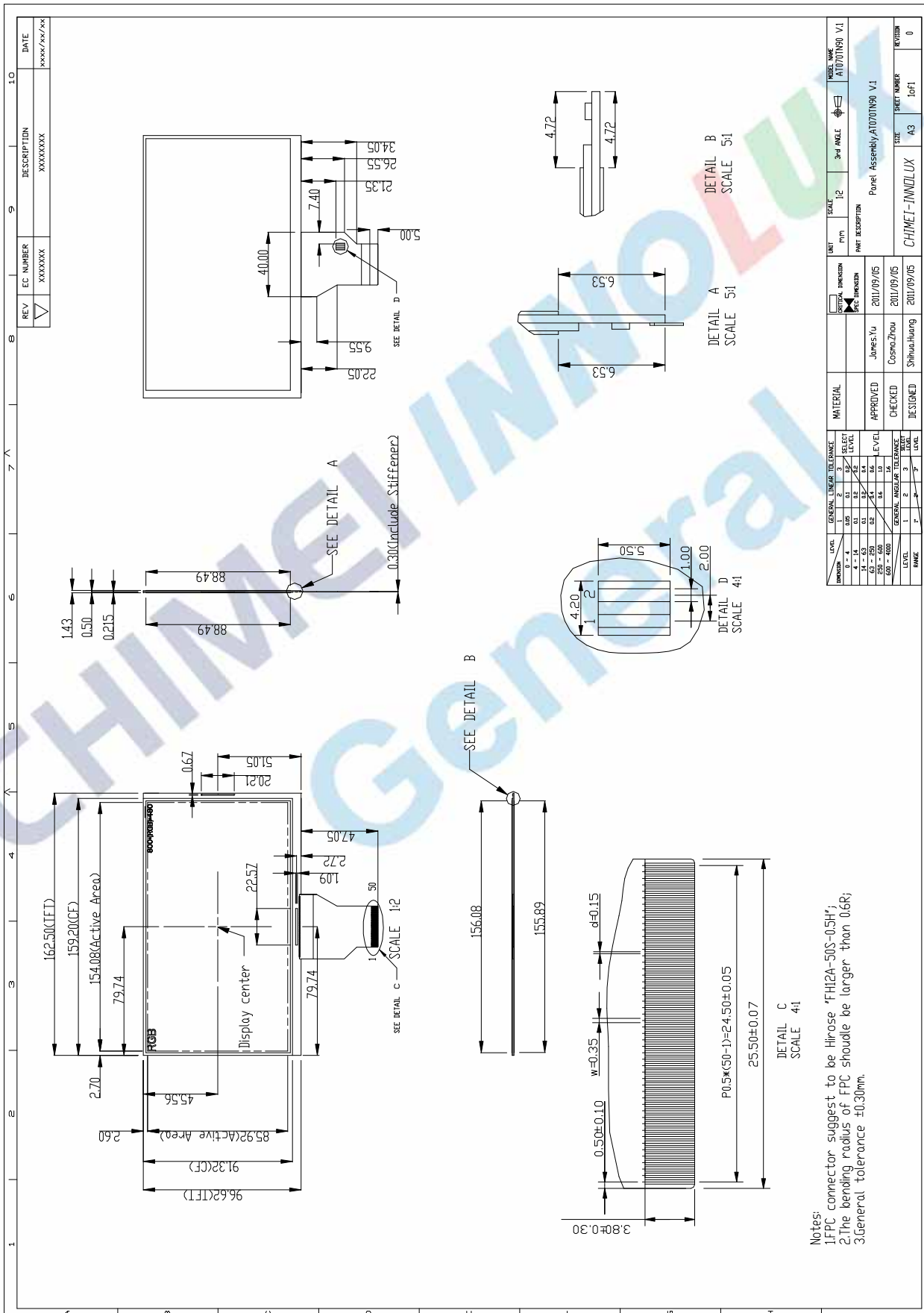
1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

6.4. Storage

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

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.



8. Package Drawing

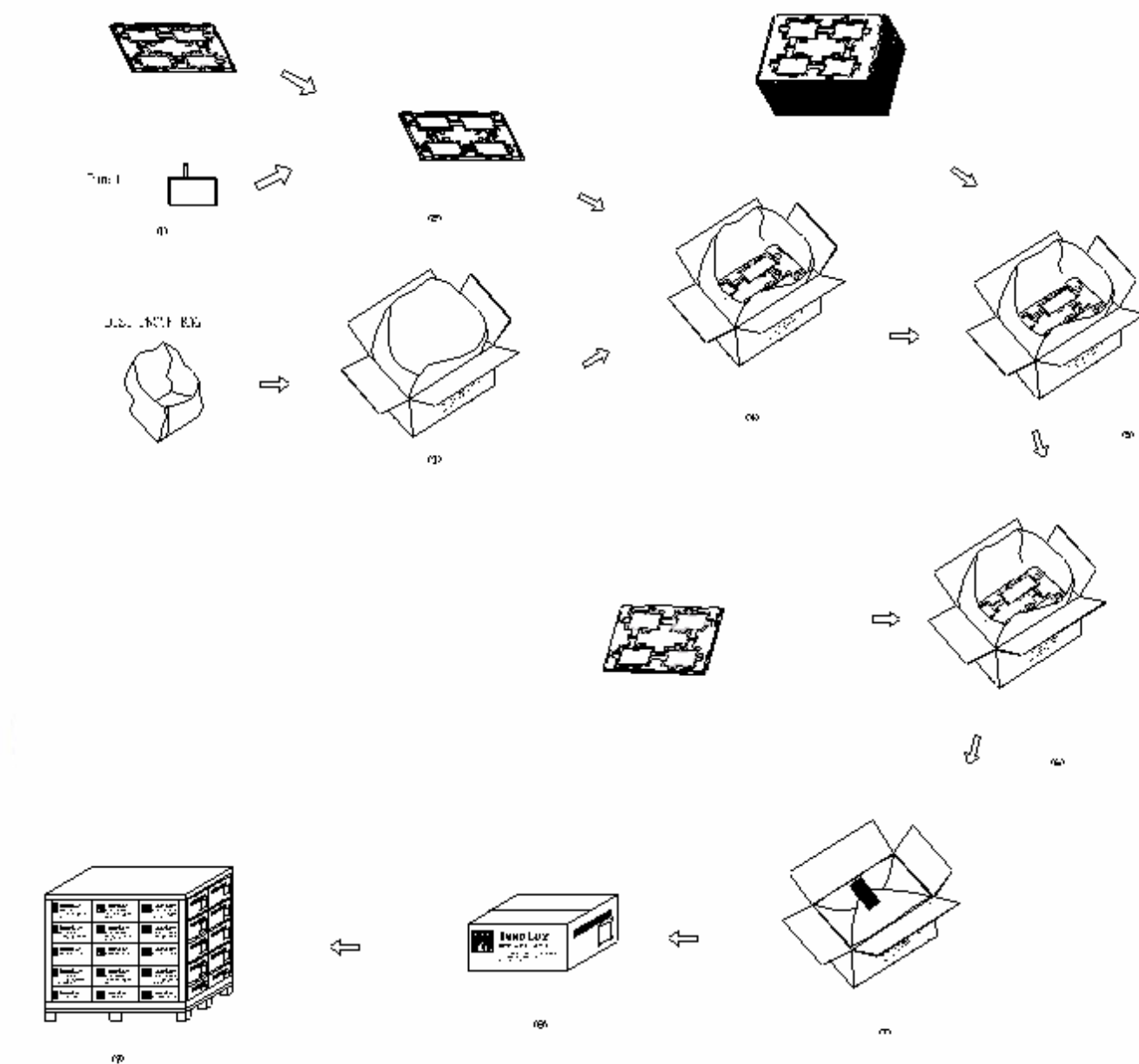
8.1. Packaging Material Table

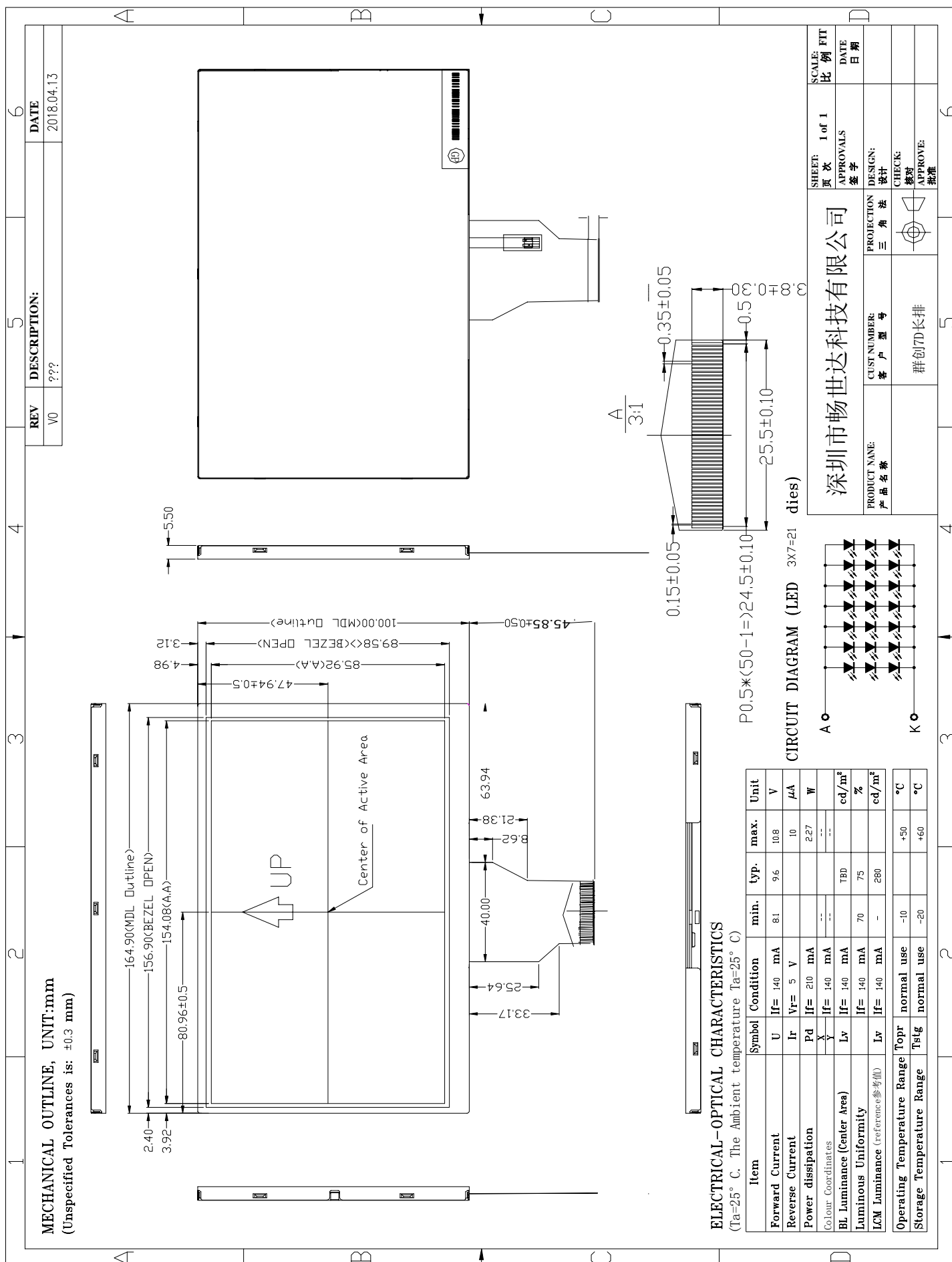
No.	Item	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity (pcs)	Remark
1	Panel Assembly	AT070TN90 V.1	162.5 × 96.3 × 1.43	0.0445	80	
2	Dust- Proof Bag	PE	700 x 530	0.050	1	
3	Tray	PET	505 x 338 x 16.5	0.200	21	Anti-static
4	Partition	Corrugated Paper	512 x 350 x 225	0.290	1	
6	Carton	Corrugated Paper	530 x 355 x 255	0.810	1	
7	Total weight	8.91± 5%Kg				

8.2. Packaging Quantity

(1) LCM quantity per tray :	2 row x 2column = 4 pcs
(2) Total LCM quantity of per Carton:	4 pcs/ tray x 21 tray / Box = 80 pcs

8.3. Packaging Drawing





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4. 1 测定条件

在无特别指定条件下，产品于温度 $25\pm2^{\circ}\text{C}$ ，湿度 $60\pm 10\%$ 环境条件进行测试。

5. 品质要求

5. 1 光学特性

项目	符号	条件	规 格			单位	备注
			Min	Typ	Max		
均匀度	ΔI	面内九点	70	75	—	%	
色度	X	中心点					
	Y	中心点					
模组亮度	I	中心点	—	280	—	cd/m ²	

注 1：表内测定点规格需在发光条电流(140)mA，周围环境温度 $25\pm2^{\circ}\text{C}$ 测试。

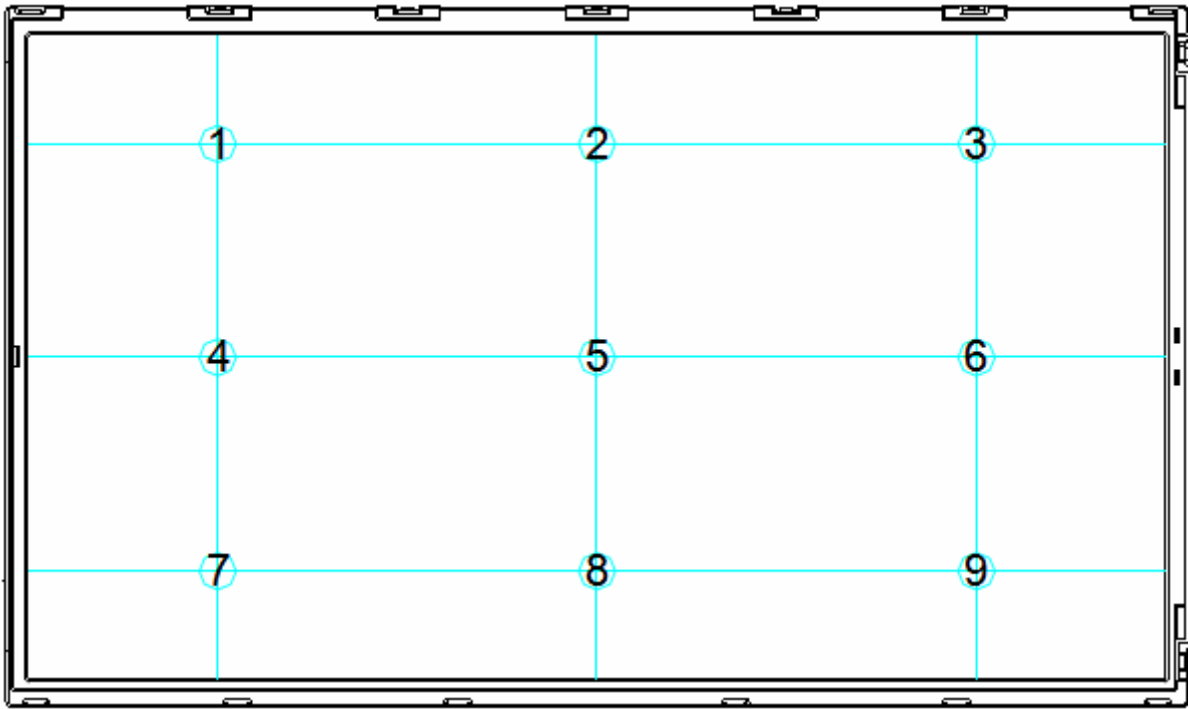
注 2：测试条件：1) 以规定的电流电压正常点亮；

2) 测试环境：暗室（10Lux 以下）

3) 辉度、色坐标测试点：见下图

4) 光学特性测试点图

注 3：均匀性 $\Delta I = (I_{\text{MIN}} \div I_{\text{MAX}}) \times 100\%$



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5. 2 电气特性

5. 2. 1 LED电性规格

项目	符号	条件	规 格			单位	备注
			Min	Typ	Max		
LED电流	IL	常温25℃	—	20	3	mA	
LED电压	VL	常温25℃	2.7	3.2	3.6	V	IL=20mA
点亮延迟到	TD	注2				sec	
注1：LED点亮电流不可超过最大电流限定值，否则LED寿命和亮度将会受到严重影响。							
注2：点亮测试延迟时间：ON 30sec—OFF 30sec							

5. 2. 2 LED灯条适用电性规格

项目	符号	条件	规 格			单位	备注
			Min	Typ	Max		
灯条电压	VL	常温25℃	8.1	9.6	10.8	Vrms	IL=140mA
灯条电流	IL	常温25℃	—	140	210	mArms	
点亮功率	WL	常温25℃			(2.27)	W	IL=210mA
注1：灯条点亮功率需在要求范围以内。							

5. 3 产品寿命

周围温度+25℃±2℃，湿度 60±20%RH，以每灯 20mA 工作电流之推荐使用条件，背光源之寿命为：
辉度减半平均寿命： 30，000 小时以上
辉度减半保证寿命： 20，000 小时以上
注：辉度减半平均寿命指背光源平均辉度衰减到初期平均辉度的 50%所需时间。