CHIMEI INNOLUX DISPLAY CORPORATION

LCD MODULE

SPECIFICATION

Customer:

Model Name: **EB070NA-09A**

Date: **2012/02/28**

Version: **01**

☐ **Preliminary Specification**
■ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by
Charlie Chou	**Wenyi Wang**	**David Lee**
2012/02/30	2012/02/29	2012/02/28

1

CHIMEI INNOLUX

CONTENTS

CHIMEI INNOLUX

RECORD OF REVISIONS

Revision	Date	Page	Description
Pre-spec.01	2011/08/31	all	Brief Spec New Creation
Final-spec.01	2012/02/28	8	The response time Tf max. is modified to 22ms
		4/14	Update weight

3

CHIMEI INNOLUX

1. GENERAL SPECIFICATIONS

| Parameter		Specifications	Unit
Screen size		7"(Diagonal)	inch
Display Format		800 RGB x 480	Dot
Active area		152.4x91.44	mm
Pixel size		190.5 x 190.5	um
Surface treatment		Anti-glare	
Pixel Configuration		RGB Vertical Stripe	
Outline dimension(cell)		160(W) x 102.34(H) x 1.43 (D)	mm
Weight		48	g
View Angle direction		6 o'clock	
Temperature Range	Operation	-20~70	℃
	Storage	-30~80	℃

2. Pin Assignment

2.1 TFT LCD Panel Driving Section

Pin No.	Symbol	Pin No.	Symbol
1	DUMMY	61	D03
2	VSS	62	D02
3	VSS	63	GND
4	VEE	64	D01
5	VEE	65	D00
6	/XAO	66	RESETB
7	VDD(G)	67	SDI
8	VDD(G)	68	SDO
9	DUMMY	69	VSET
10	VGH	70	LR
11	VGH	71	PWMA
12	DUMMY	72	PWMB
13	VEE	73	GNDP
14	VCOM	74	GND
15	COM(CST)	75	GND
16	VCOM	76	VCCP
17	UD	77	VCC
18	HS	78	VCC
19	VS	79	VDDA
20	DE	80	VDDA
21	EDGSL	81	VSSA
22	FRC	82	VSSA
23	DRV2	83	VCOM
24	VFB2	84	V10
25	DRV1	85	V9
26	VFB1	86	V8

4

27	D27	87	V7
28	D26	88	V6
29	GND	89	V5
30	D25	90	V4
31	D24	91	V3
32	GND	92	V2
33	D23	93	V1
34	D22	94	V1
35	GND	95	V2
36	D21	96	V3
37	D20	97	V4
38	GND	98	V5
39	SPEN	99	V6
40	SPCK	100	V7
41	CLK	101	V8
42	GND	102	V9
43	D17	103	V10
44	D16	104	VSSA
45	GND	105	VSSA
46	D15	106	VDDA
47	D14	107	VDDA
48	GND	108	VCC
49	D13	109	VCC
50	D12	110	VCCP
51	GND	111	GND
52	D11	112	GND
53	D10	113	GNDP
54	GND	114	EDGSL
55	D07	115	VSET
56	D06	116	VCOM
57	GND	117	VCOM(CST)
58	D05	118	VCOM
59	D04	119	VCOM
60	GND	120	DUMMY

CHIMEI INNOLUX

2.2 Schematic Panel Layout
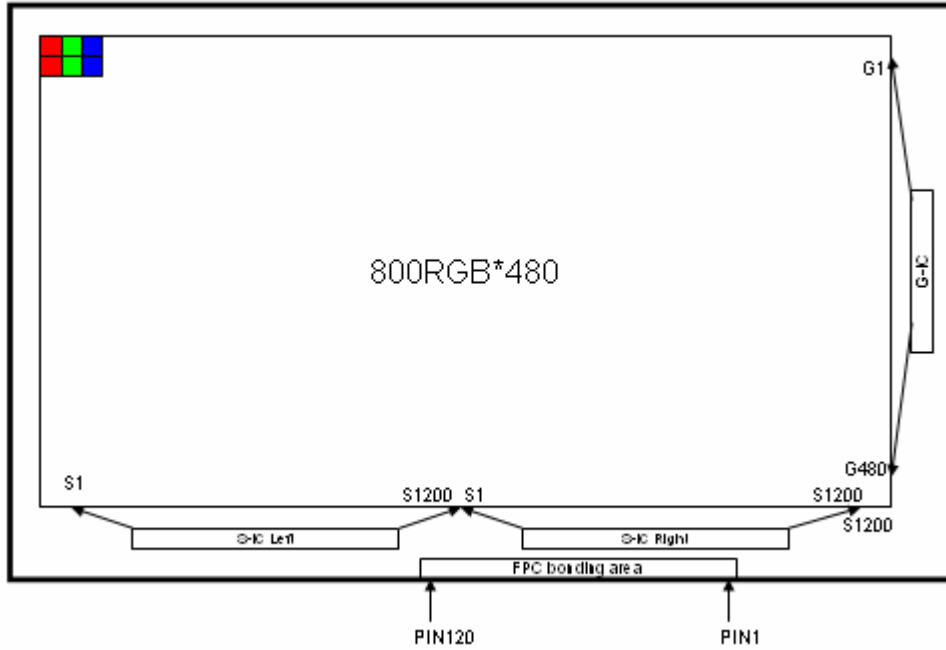
3. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Voltage	Vcc	GND=0	-0.3	6	V	-
	AVDD,	GND=0	6.5	13.5	V	-
	V_{GH}	GND=0	7	V_{GL} +40	V	-
	V_{GL}	GND=0	-20	-5	V	-
	$V_{GH} - V_{GL}$	GND=0	12	40	V	-
Input Signal Voltage	Vi	GND=0	-0.3	Vcc+0.3	V	Note 1
	$V_1 - V_5$	GND=0	0.4AVDD	AVDD-0.1	V	-
	$V_6 - V_{10}$	GND=0	0.1	0.6AVDD	V	-
	V_{COM}	GND=0	-	-	V	-

4. ELECTRICAL CHARACTERISTICS

4.1 Recommended Operation condition(GND=0∨，Ta=25℃)

| Parameter		Symbol	Rating			Unit	Condition
			Min.	Typ.	Max.		
Power Supply Voltage		Vcc	3.0	3.3	3.6	V	
		AVDD	11.5	12	12.5	V	
		V_{GH}	17	18	19	V	
		V_{GL}	-8	-7	-6	V	
Input Signal Voltage		V1~V5	0.4AVDD	-	AVDD-0.1	V	
		V6~V10	0.1	-	0.6AVDD	V	
		V_{COM}	-	4.3	-	V	Black pattern
LCD power current		Icc	--	150	200	mA	black pattern
Digital Input Voltage	High Level	V_{IH}	0.8Vcc	-	Vcc	V	Note 1
	Low Level	V_{IL}	0	-	0.2Vcc	V	Note 1

CHIMEI INNOLUX

5. AC CHARATERISTICS

5.1 AC Electrical CHARATERICS

| Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max.	
Data setup time	Tdsu	6	-	-	ns
Data hold time	Tdhd	6	-	-	ns
DE setup time	Tesu	6	-	-	ns
CLK frequency	F_{CPH}		33.26		MHz
CLK period	T_{CPH}		30.06		ns
CLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}	-	800	-	T_{CPH}
DE frame blanking	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
DE frame width	T_{DE}	-	480	-	$T_{DEH}+T_{DEL}$

5.2 Timing Controller Timing Chart

Clock and Data input waveforms
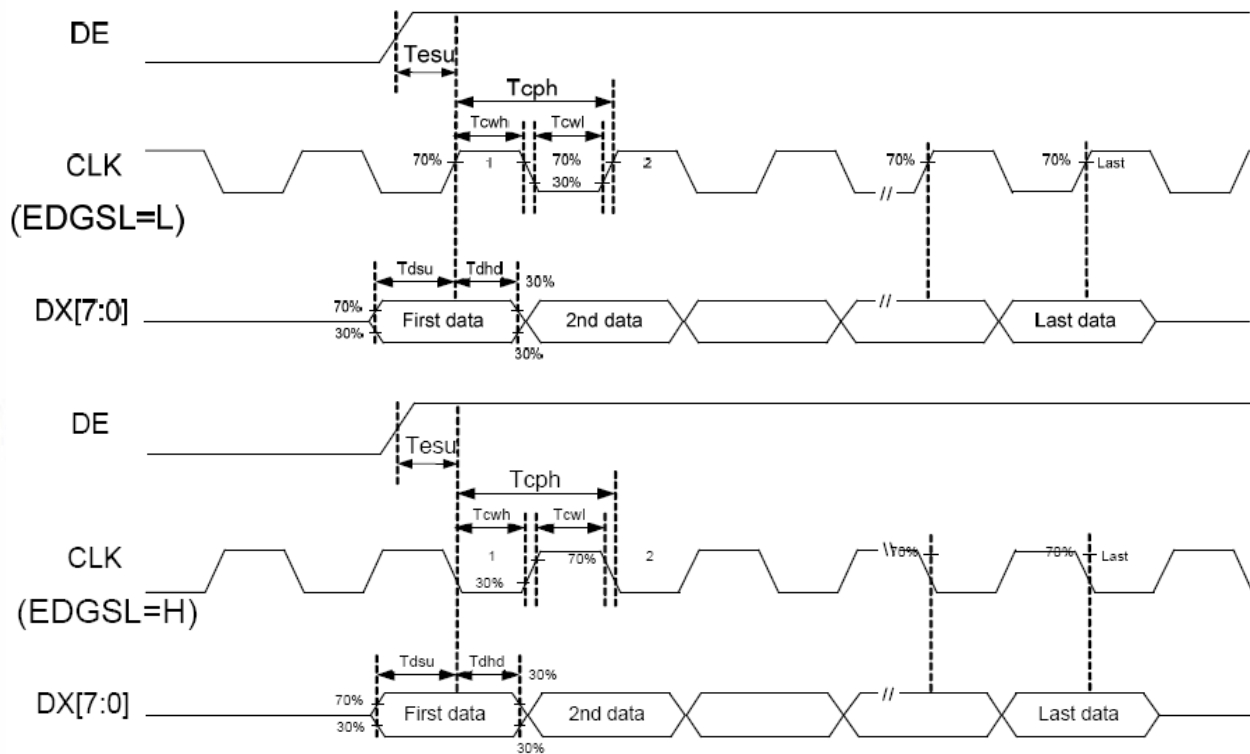
5.3 Data input format
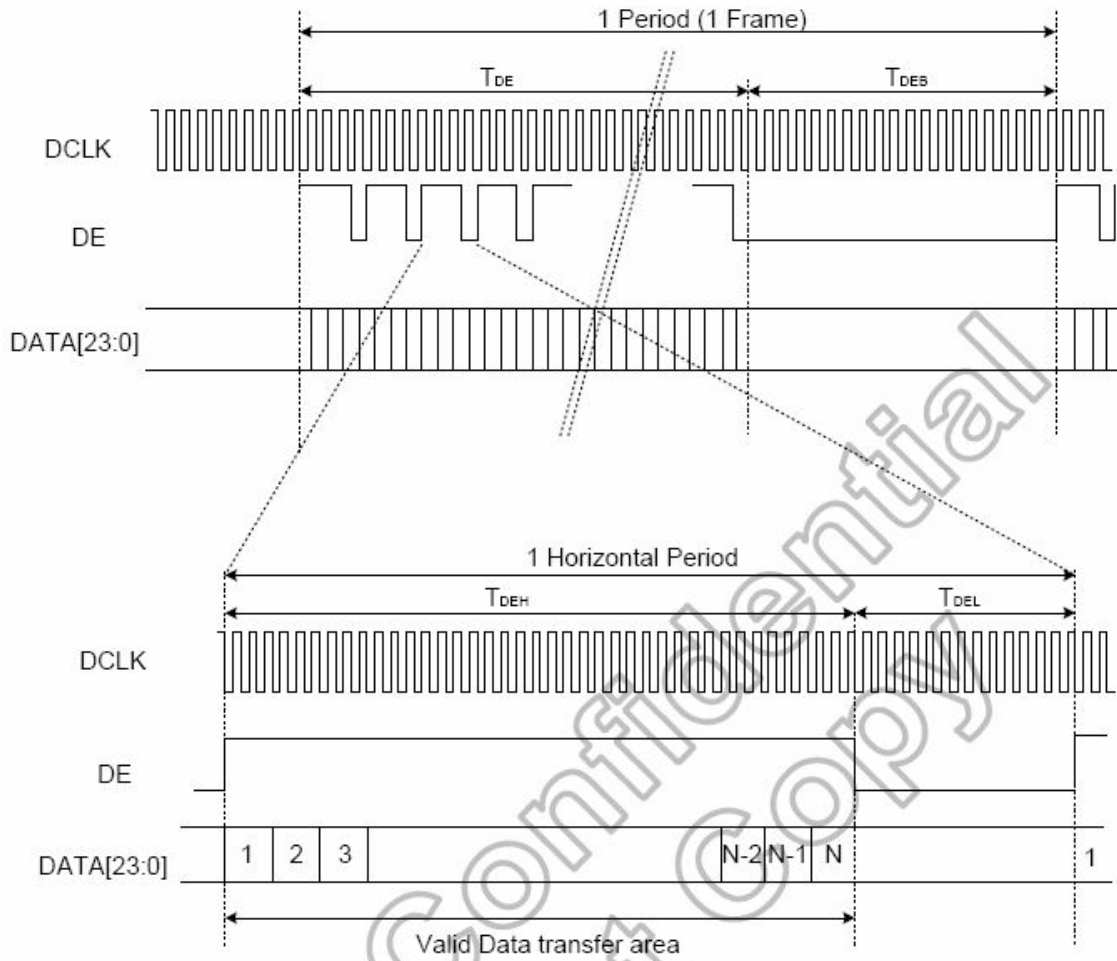
5.4 Recommend circuit
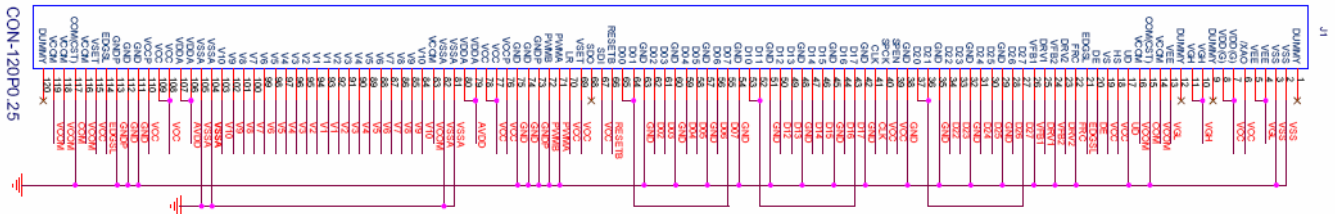
6. OPTICAL CHARATERISTIC

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr	$\theta=0°$、$\Phi=0°$	-	5	10	.ms	Note 3,5
		Tf		-	11	22	.ms	
Contrast ratio		CR	At optimized viewing angle	250	400	-	-	Note 4,5
Color Chromaticity	White	Wx	$\theta=0°$、$\Phi=0$	Typ-0.05	0.31	Typ+0.05	-	Note 2,6,7
		Wy			0.33			
Color Saturation (NTSC)		-	-	-	45%	-	-	-
Viewing angle		θL	CR$\geqq$10	65	70	-	Deg.	Note 1
		θR		65	70	-		
		ϕT		55	60	-		
		ϕB		55	60	-		

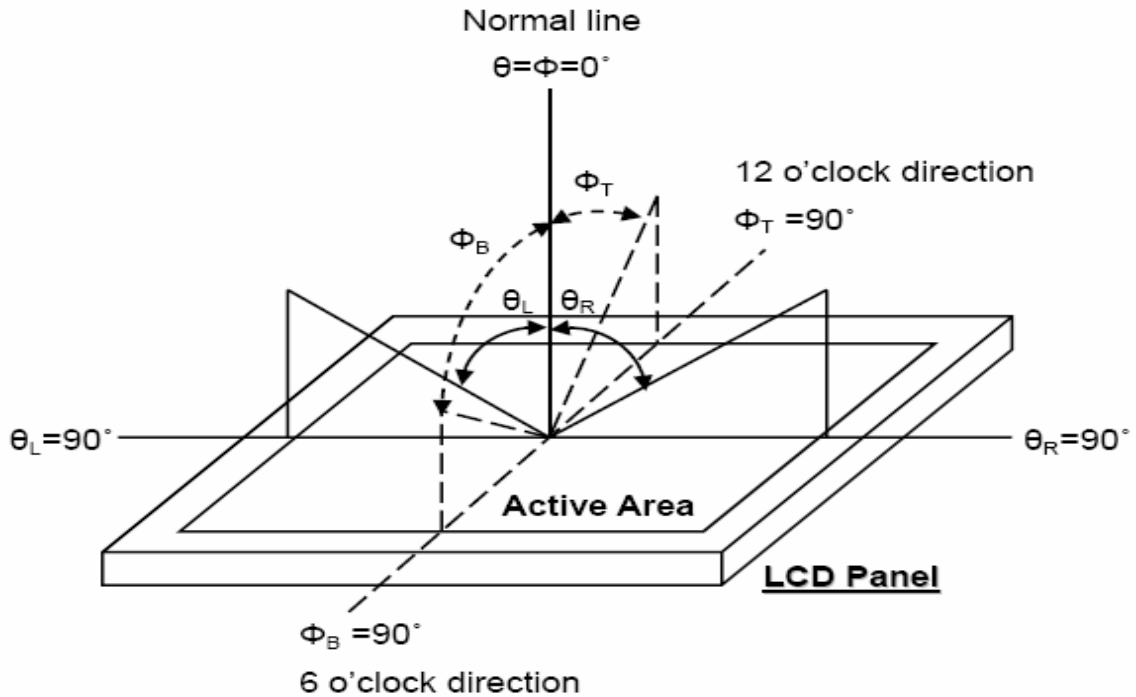Note 1: Definition of viewing angle range

Fig. 7-1 Definition of viewing angle

CHIMEI INNOLUX

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a distance of 50cm and normal direction.
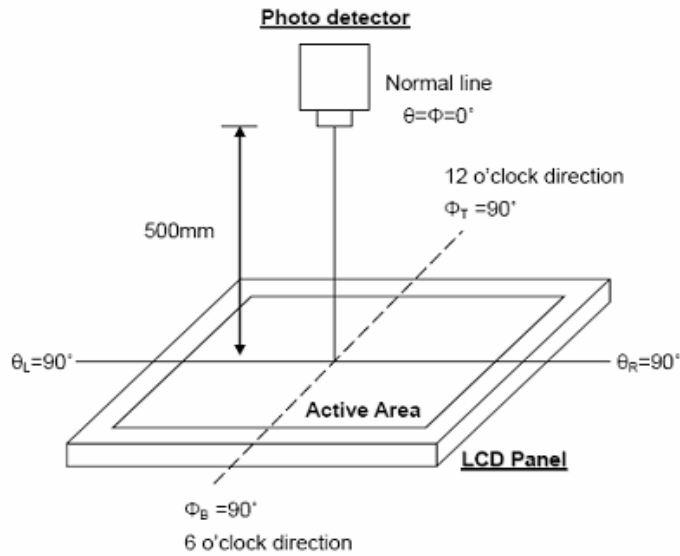
Fig. 7-2 Optical measurement system setup

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, Tr, is the time between photo detector output intensity changed from 90﹪ to 10﹪ . And fall time, Tf, is the time between photo detector output Intensity changed from10﹪ to 90﹪ .
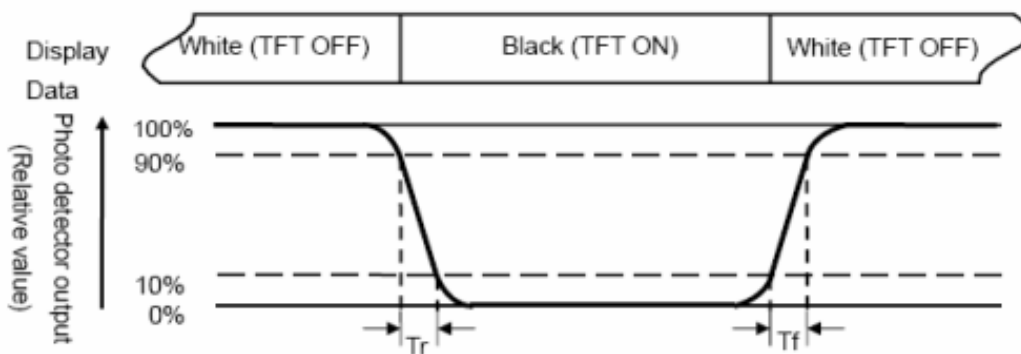
Fig. 3-3 Definition of response time

CHIMEI INNOLUX

Note 4: Definition of contrast ratio:
The contrast ratio is defined as the following expression.

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

Note 5: White Vi = $V_{i50} \pm 1.5V$
Black Vi = $V_{i50} \pm 2.0V$
"±" means that the analog input signal swings in phase with VCOM signal.
"±" means that the analog input signal swings out of phase with VCOM signal.
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)
Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened. (Reference : Backlight's brightness is 350 nit)

11

CHIMEI INNOLUX

7. BLOCK DIAGRAM
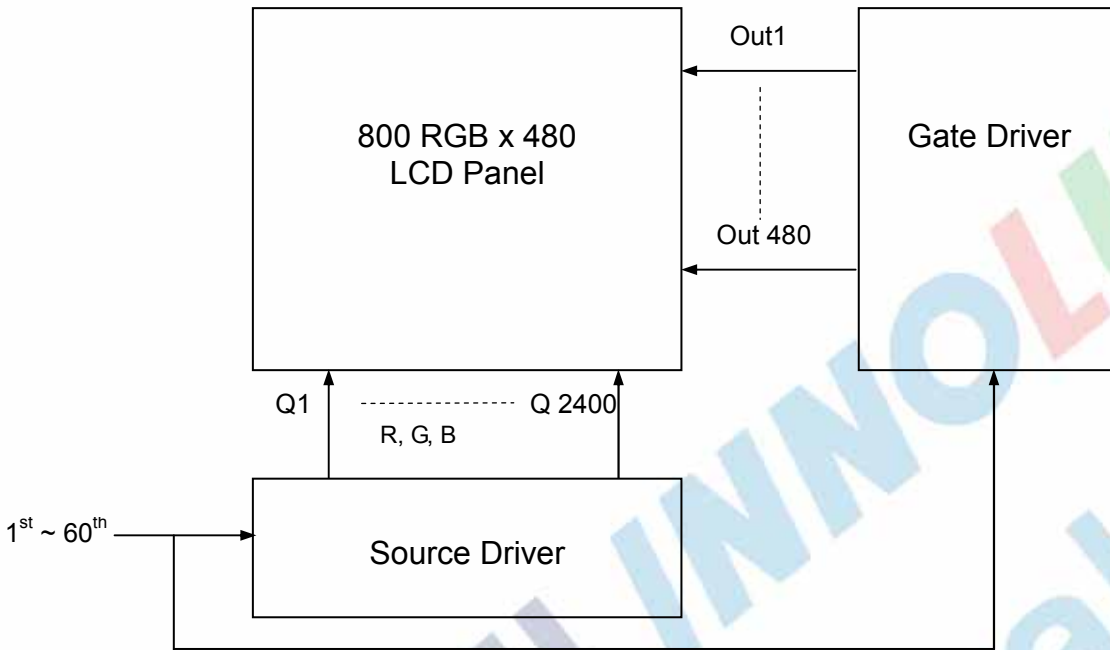
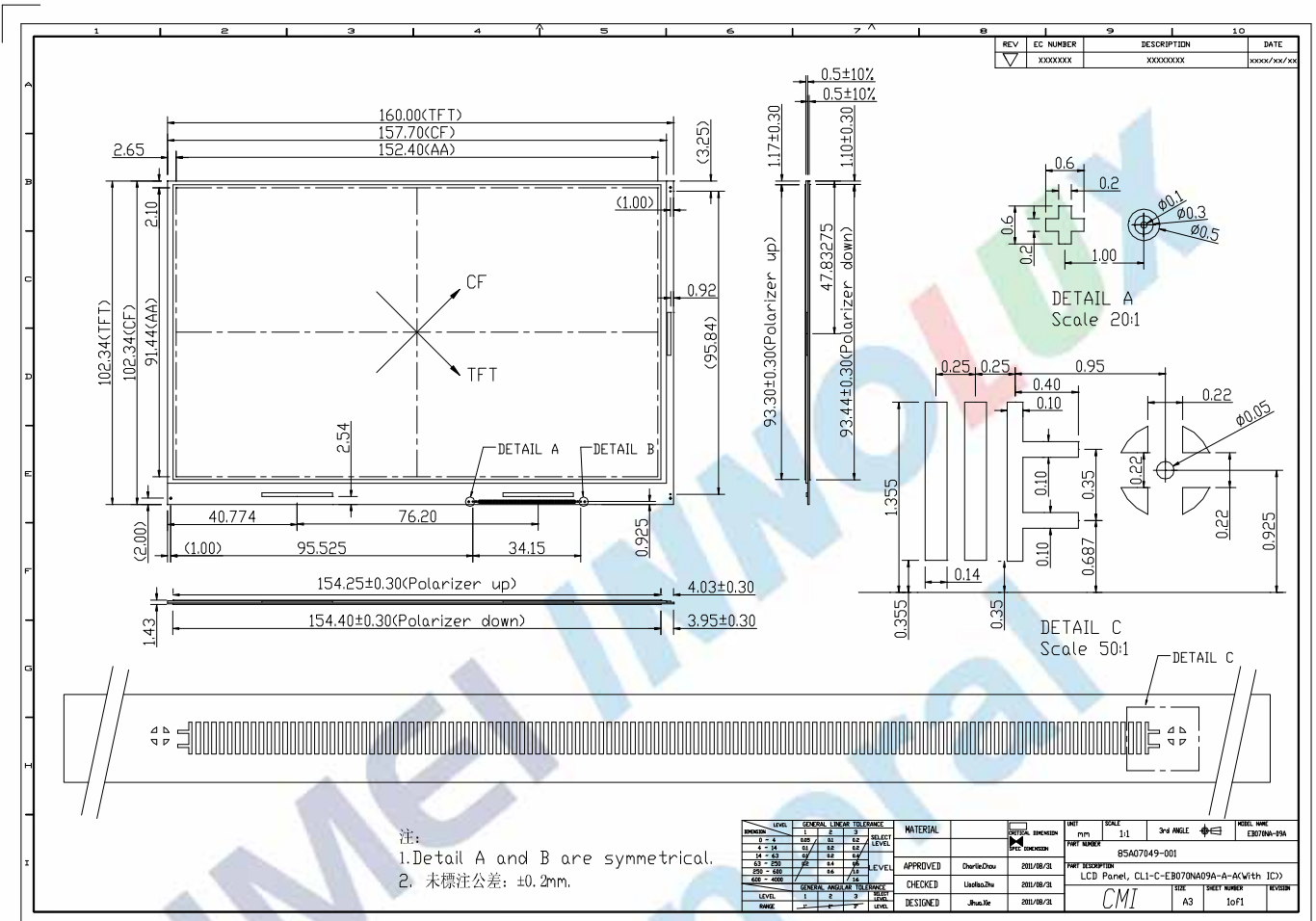## 8. QUALITY ASSURANCE

No.	Test Items	Test Condition	REMARK
1	High Temperature Storage Test	Ta=80℃ Dry 240h	
2	Low Temperature Storage Test	Ta=-30℃ Dry 240h	
3	Thermal Shock Test	-20℃(0.5h) ~ 70℃(0.5h) / 100 cycles(Dry)	

***** T$_a$= Ambient Temperature

CHIMEI INNOLUX

9. OUTLINE DRAWING

CHIMEI INNOLUX

10. PACKAGE INFORMATION

10.1 Packaging Material Table

No.	Item	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity (pcs)	Remark
1	Panel Assembly	EB070NA-09A	160 ×102.34 × 1.43	0.048	80	
2	Dust-Proof Bag	PE	700 x 530	0.048	1	
3	Tray	PET	505 x 338 x 16.5	0.233	21	Anti-static
4	Partition	Corrugated Paper	1152 × 512	0.290	1	
5	Carton	Corrugated Paper	530 x 355 x 255	0.810	1	
6	Total weight		9.88± 5%Kg			

10.2 Packaging Quantity

(1) LCM quantity per tray :	2 row x 2column = 4 pcs
(2) Total LCM quantity of per Carton:	4 pcs/ tray x 20 tray / Box = 80 pcs

CHIMEI INNOLUX
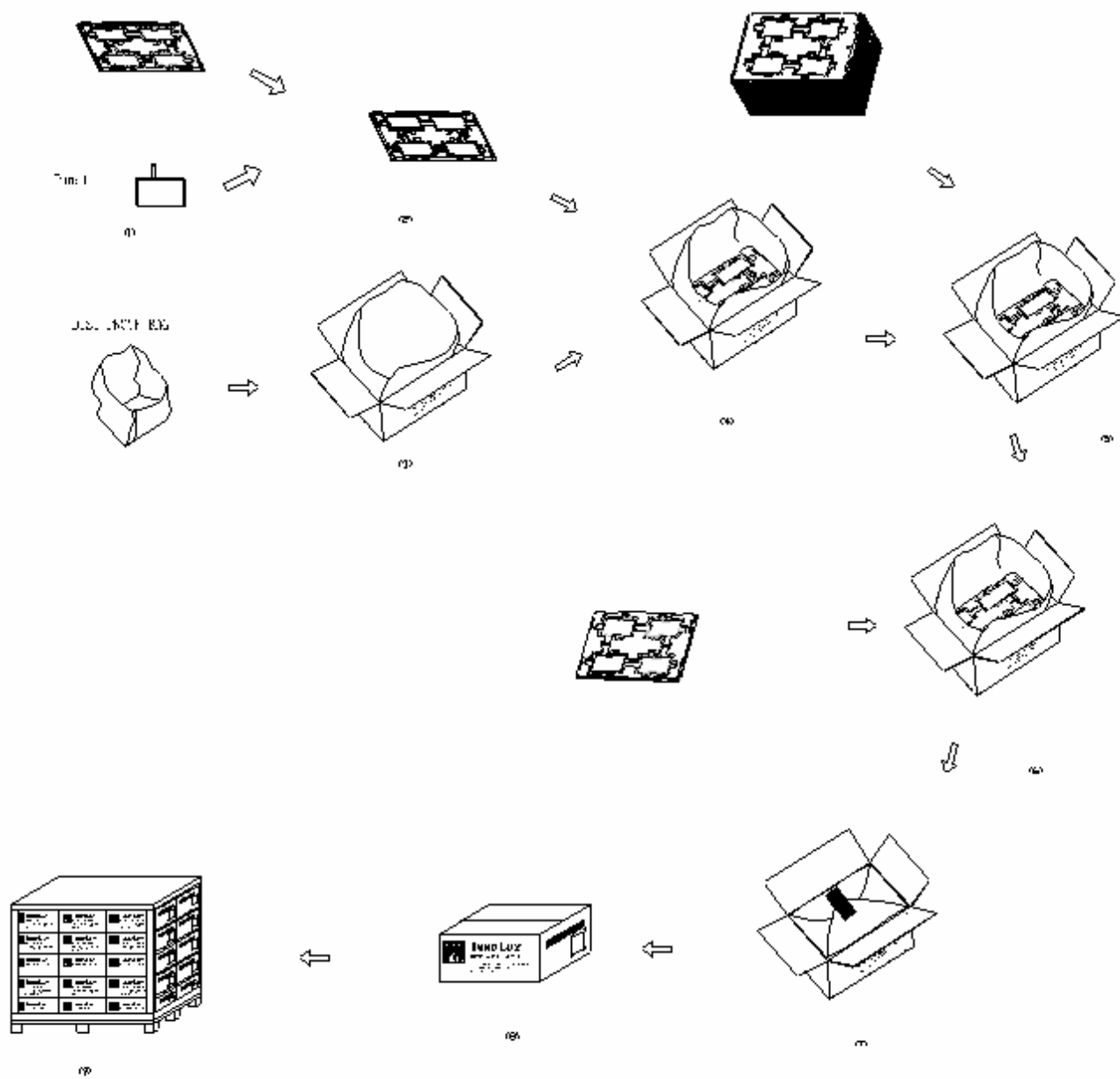
11. PRECAUTIONS

Please pay attention to the following when you use this TFT LCD panel.

11.1 MOUNTING PRECAUTIONS

(1) You must mount a module using arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module.
   And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
(3) Please attach a transparent protective plate to the surface in order to protect the polarizer.
   Transparent protective plate should have sufficient strength in order to the resist external force.
(4) You should adopt radiation structure to satisfy the temperature specification.
(5) Acetic acid type and chlorine type materials for the cover case are not describe because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
   Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are determined to the polarizer)
(7) When the surface becomes dusty, please wipe gently with adsorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(9) Do not open the case because inside circuits do not have sufficient strength.

11.2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage：
   V=±200mV(Over and under shoot voltage)
(2) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(3) Brightness depends on the temperature. (In lower temperature, it becomes lower)
   And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

11.3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

11.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

11.5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.
(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

CHIMEI INNOLUX

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

11.6 HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) The protection film is attached to the polarizer with a small amount of glue. Is apt to remain on the polarizer.Please carefully peel off the protection film without rubbing it against the polarizer.

(3) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.

(4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.