Product Approval Specification

MODEL NO.: LW700AT6005

Customer : _____

Approved by : _____

Note :

紀錄	工作	審核	角色	投票
2009-02-23	Approval by Dept. Mgr.(Section Manager)	朱砥瑩	Section Manager (PM)	Accept
2009-02-23	Approval by Dept. Mgr.(PM)	楊水利	Department Manager (PM)	Accept

CONTENTS

RECORD OF REVISIONS

Revision	Date	Page	Description
00	2008/04/28	all	Brief Spec New Creation
01	2008/05/18	13	OUTLINE DRAWING
02	2009/02/23	5	Modify 6.1 AC Electrical CHARATERISTICS
		7	Modify 7. OPTICAL CHARATERISTIC

1. SUMMARY

This technical specification applies to 7“ TFT-LCD panel with a 60-pin TTL interface. This panel supports 800*R.G.B x 480 WVGA mode and can display 262,144 colors.

2. FEATURES

- WVGA(800x480 pixels) resolution.
- 3.3 V TTL interface

3. 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		(TBD)	g
View Angle direction		6 o’clock	
Temperature Range	Operation	-20~70	℃
	Storage	-30~80	℃

4. 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	-

Note 1: DCLK, DE, R0~ R5, G0~ G5, B0~ B5.

5. ELECTRICAL CHARACTERISTICS

5.1 Recommended Operation condition(GND=0V，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
Digital Input Voltage	High Level	V_{IH}	0.7Vcc	-	Vcc	V	Note 1
	Low Level	V_{IL}	0	-	0.3Vcc	V	Note 1

Note 1: DCLK, DE, R0~ R5, G0~ G5, B0~ B5.

5.2 TFT-LCD current comsumption

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
LCD power current	Icc	--	150	200	mA	black pattern

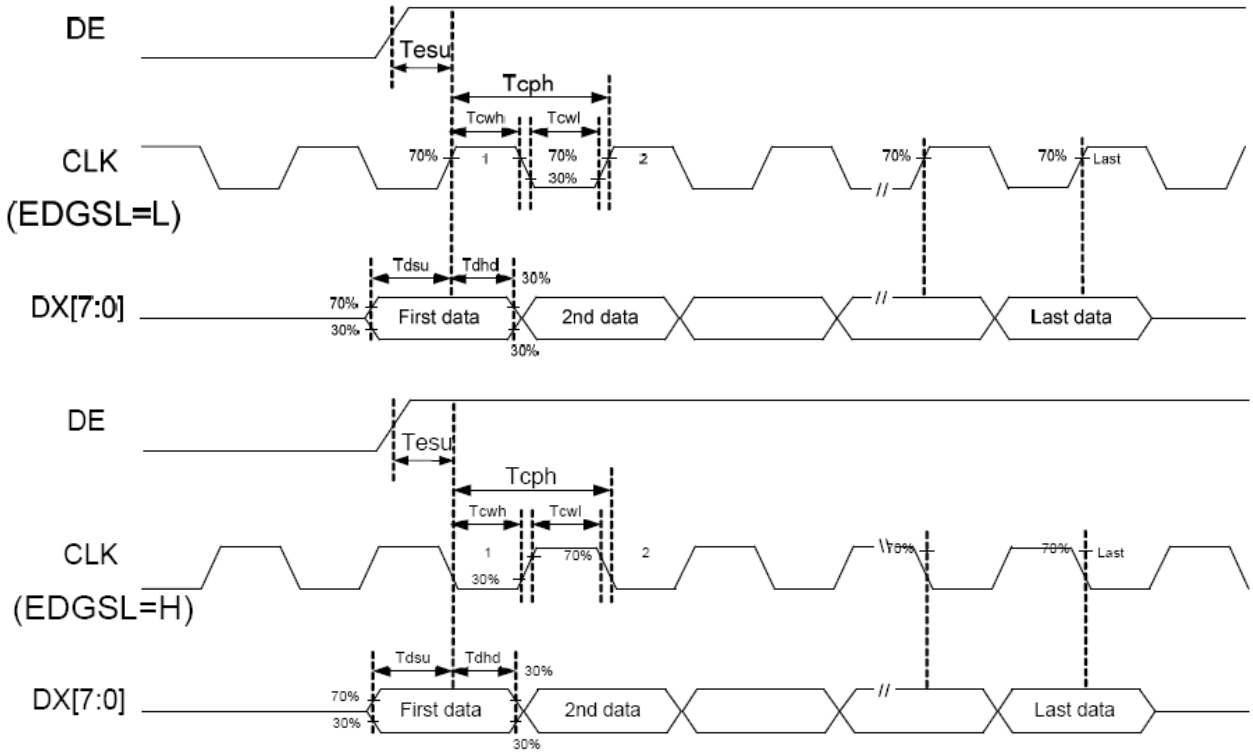
6. AC CHARATERISTICS

6.1 AC Electrical CHARATERISTICS

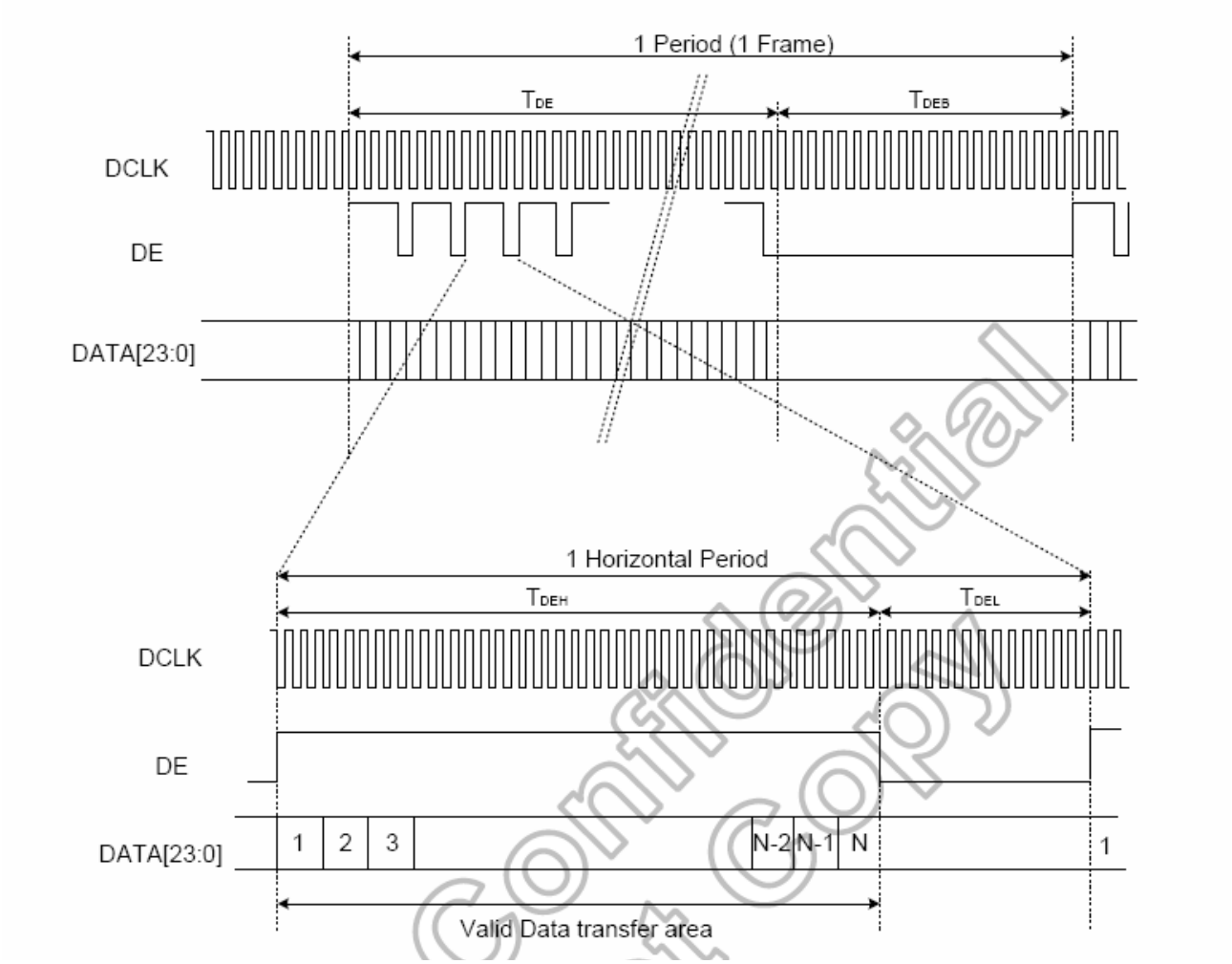
Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max.	
Data setup time	Tdsu	6	-	-	ns
Data hold time	Tdhd	6	-	-	ns
DE setup time	Tesu	6	-	-	ns
CLK frequency	F_{CPH}		33.26		MHz
CLK period	T_{CPH}		30.06		ns
CLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}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

6.2 Timing Controller Timing Chart

Clock and Data input waveforms



6.3 Data input format



7. OPTICAL CHARATERISTIC

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr	θ =0°、Φ=0°	-	5	10	.ms	Note 3,5
		Tf		-	11	16	.ms	
Contrast ratio		CR	At optimized viewing angle	250	400	-	-	Note 4,5
Color Chromaticity	White	Wx	θ =0°、Φ=0	Typ-0.05	0.31	Typ+0.05	-	Note 2,6,7
		Wy			0.33			
Color Saturation (NTSC)		-	-	-	45%	-	-	-
Viewing angle		θ L	CR≧10	65	70	-	Deg.	Note 1
		θ R		65	70	-		
		ϕ T		55	60	-		
		ϕ B		55	60	-		
Brightness		-			-	cd/m^2	Center of display	

Note 1: Definition of viewing angle range

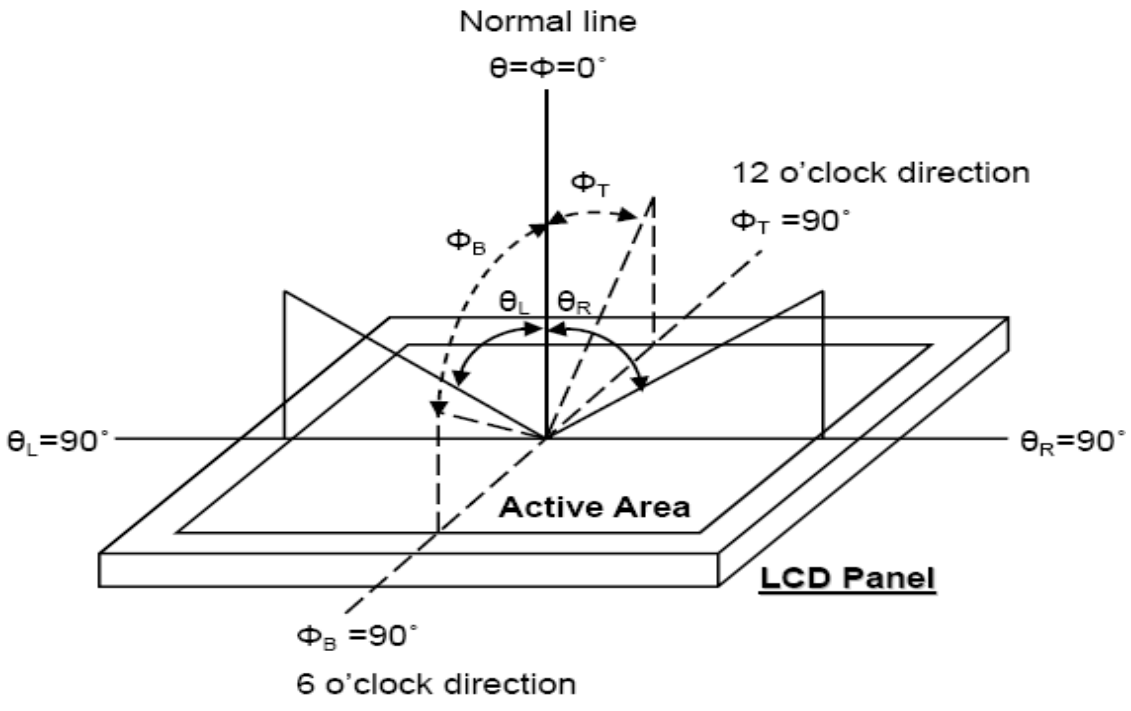


Fig. 7-1 Definition of viewing angle

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.

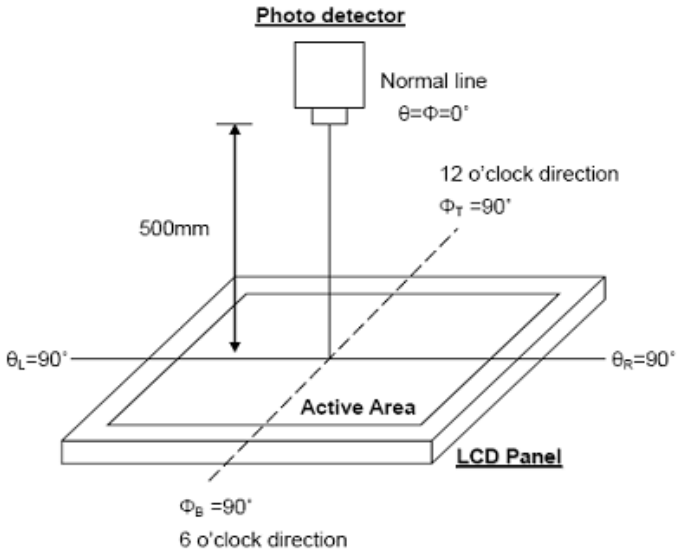


Fig. 7-2 Optical measurement system setup

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% .

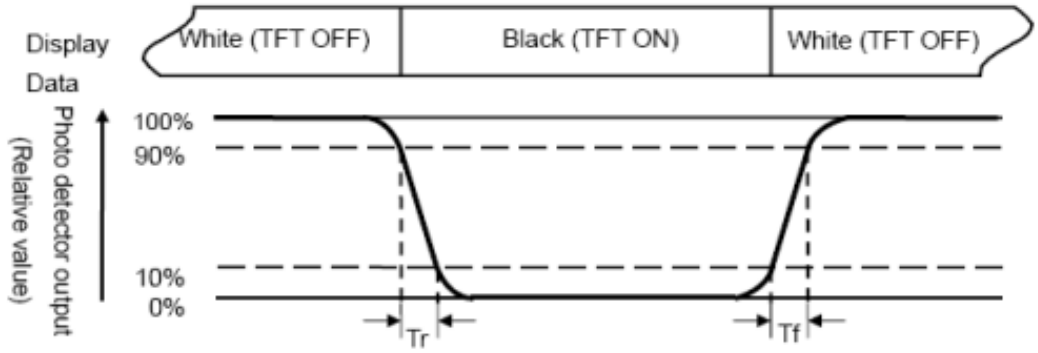


Fig. 3-3 Definition of response time

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} ± 1.5V
Black Vi = V_{i50} ± 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)

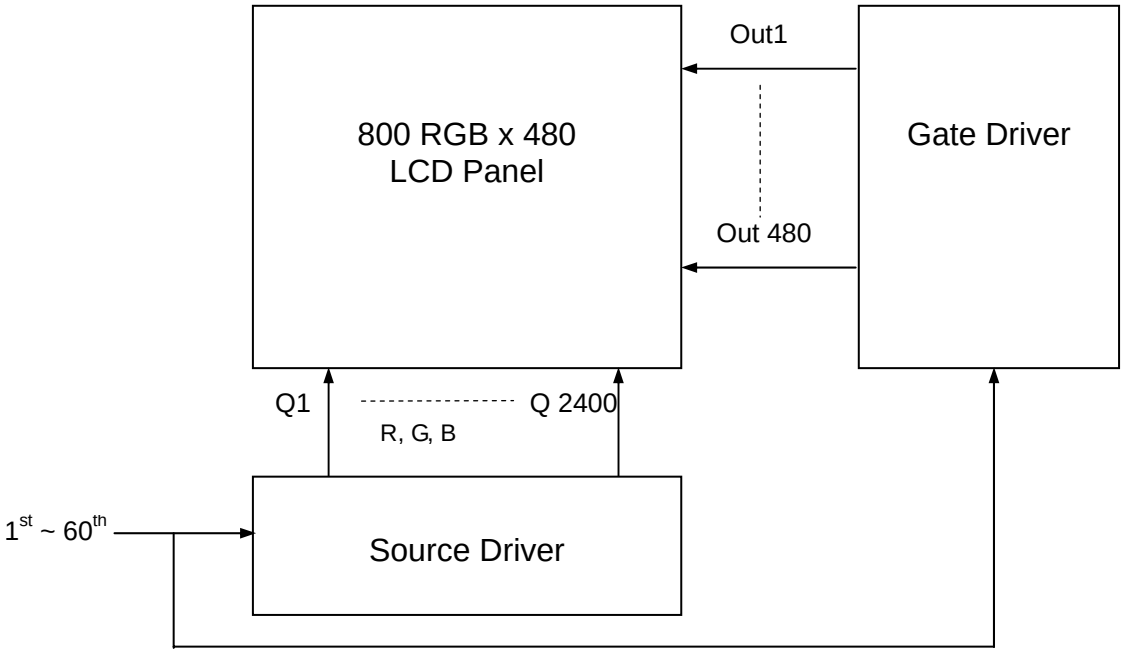
8. INTERFACE

8.1 LCM PIN Definition

Pin No.	Symbol	Description	Remark
1	NC	NC	
2	NC	NC	
3	NC	NC	
4	NC	NC	
5	NC	NC	
6	GND	Power Ground	
7	EDGSL	Define Input Clock Polarity. When EDGSL=L, Latch Data By Rising Edge of CLK. (Default Pull Low) When EDGSL=H, CLK Polarity is Inverted, Latch Data by Falling Edge of CLK.	
8	VCC	Digital Power Supply (+3.3V)	
9	V9	Gamma voltage level 9	
10	VGL	Gate OFF power supply voltage	
11	V2	Gamma voltage level 2	
12	VGH	Gate ON power supply voltage	
13	V6	Gamma voltage level 6	
14	RESETB	Hardware Global Reset. Low Active. (Default Pull high)	
15	VCOM	Common electrode voltage input	
16	GND	Power Ground	
17	AVDD	Analog Power Supply (+12V)	
18	NC	NC	
19	NC	NC	
20	V8	Gamma voltage level 8	
21	V5	Gamma voltage level 5	
22	V3	Gamma voltage level 3	
23	GND	Power ground	
24	R5	Red data (MSB)	
25	R4	Red data	
26	R3	Red data	
27	R2	Red data	
28	R1	Red data	
29	R0	Red data (LSB)	
30	GND	Power ground	
31	GND	Power ground	
32	G5	Green data (MSB)	
33	G4	Green data	
34	G3	Green data	
35	G2	Green data	
36	G1	Green data	
37	G0	Green data (LSB)	
38	DE	Input Data Enable Control. When DE Mode. Active High To Enable Data Input. (Default Pull Low)	
39	NC	NC	
40	GND	Power ground	

Pin No.	Symbol	Description	Remark
41	DCLK	Clock Signal Input. When CLK=H, User Can Input Different Polarity CLK By EDGSL Setting. When CLK=L, User Can Select CLK Rising Or Dual Edge To Latch By EDGSL Setting.	
42	VCC	Digital Power Supply (+3.3V)	
43	NC	NC	
44	NC	NC	
45	B5	Blue data (MSB)	
46	B4	Blue data	
47	B3	Blue data	
48	B2	Blue data	
49	B1	Blue data	
50	B0	Blue data (LSB)	
51	NC	NC	
52	V1	Gamma voltage level 1	
53	V4	Gamma voltage level 4	
54	V7	Gamma voltage level 7	
55	V10	Gamma voltage level 10	
56	NC	NC	
57	NC	NC	
58	AVDD	Analog Power Supply (12V)	
59	GND	Power ground	
60	VCOM	Common electrode voltage input	

9. BLOCK DIAGRAM

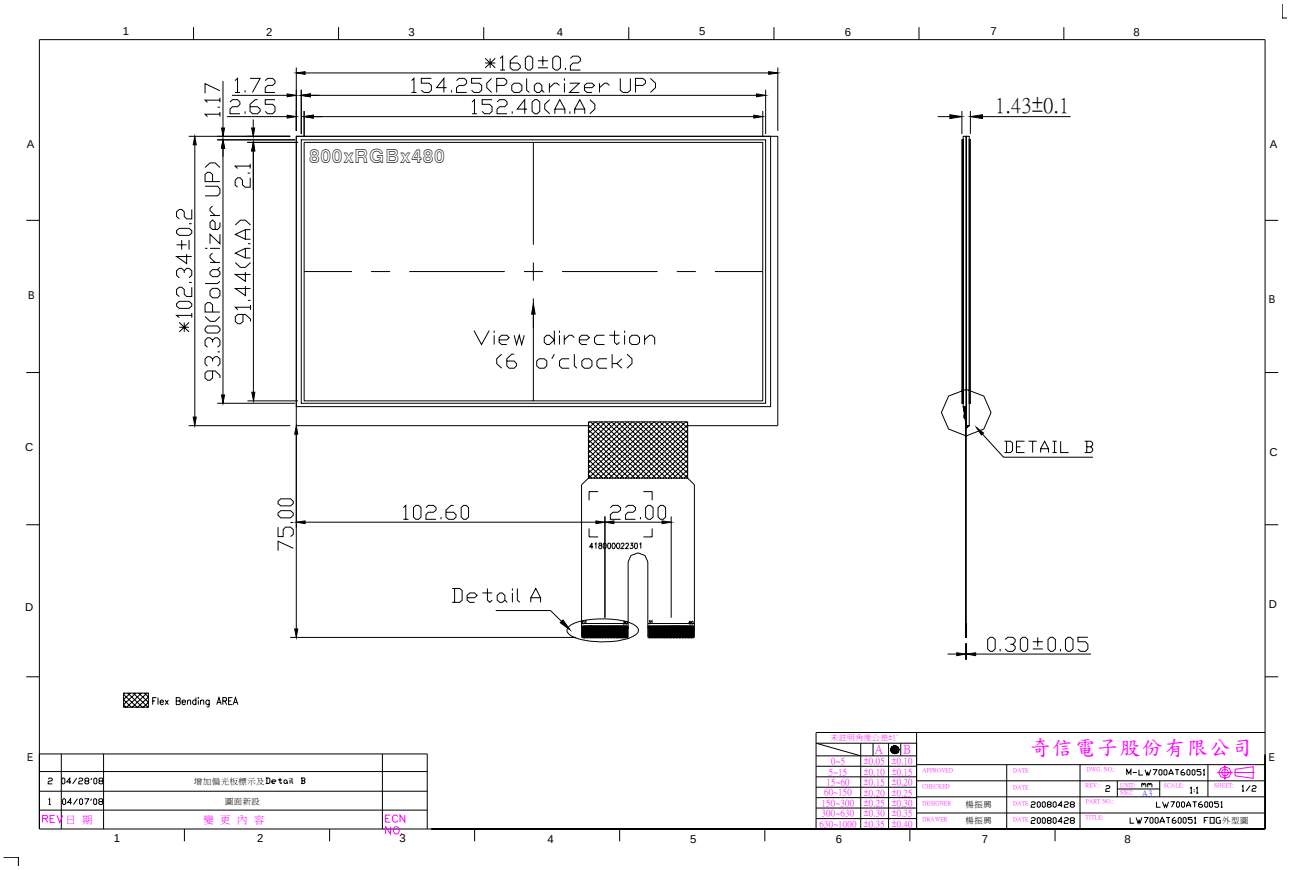


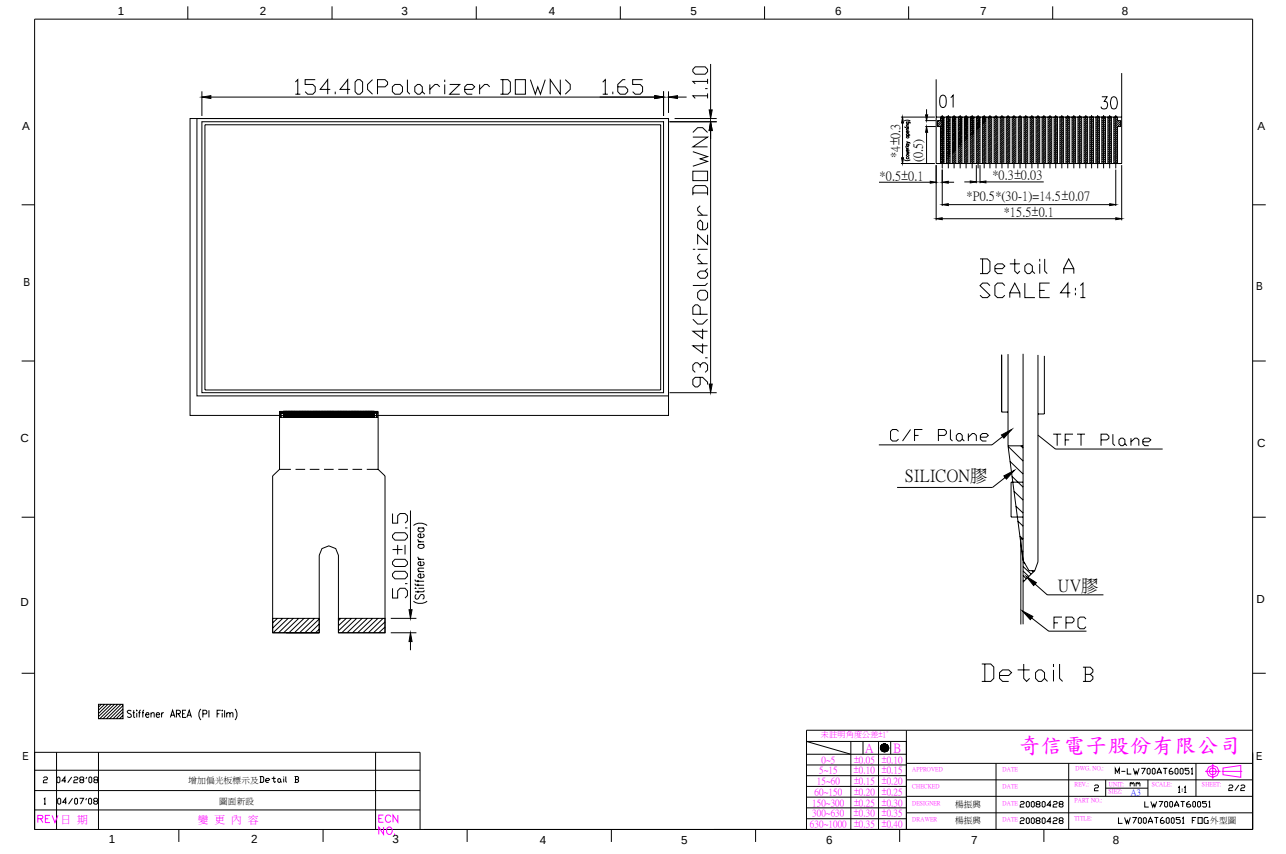
10. QUALITY ASSURANCE

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)	

***** Ta= Ambient Temperature

11. OUTLINE DRAWING





12. PACKAGE INFORMATION

TBD

13. PRECAUTIONS

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

13.1 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.

13.2 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.

13.3 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.

13.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

13.5 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.
(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.

13.6 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.