



**SPECIFICATION
FOR
LCD Module
PV07076T0230A**

MODULE:	PV07076T0230A
CUSTOMER:	

KT	INITIAL	DATE
PREPARED BY		20200908
CHECKED BY		20200908
APPROVED BY		20200908

CUSTOMER	INITIAL	DATE
APPROVED BY		



REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2020.9.8	-	First Issued.	Yang
V1.1	2020.10.15	5/7	Update Mechanical Specification 改下 增亮片 增加亮度	YANG



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1. General Description

* DESCRIPTION

PV07076T0230A a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit , back-light unit..The resolution of a 7.0" TFT-LCD contains 1024*600 pixels, and can display up to 16.7M colors.

* Features

- Low Input Voltage: VDD: 1.8V
- Display Colors of TFT LCD: 16.7M colors
- CPU Interface: MIPI-4LINE

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	154.21(H) *85.92(V) (7.0 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1024(RGB) *600	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	50.2(H) *143.2(V)	um	-
Viewing angle	ALL	o'clock	-
Drive IC	EK79007,EK73217B	-	-
Display mode	Normally Black	-	-
Operating temperature	-20~+50	°C	-
Storage temperature	-20~+70	°C	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	163.80	-	mm	±0.3
	Vertical(V)	-	97.00	-	mm	±0.2
	Depth(D)	-	2.6	-	mm	±0.3
Weight		-	TBD	-	g	-



3. PIN DESCRIPTION

Pin NO.	Symbol	Function
1	LED+	Backlight Anode
2	LED+	Backlight Anode
3	VGH	Power supply
4	VGL	Power supply
5	UPDN	Gate up or down scan control. UPDN = "L", STV2 output vertical start pulse and UD pin output logical "L" to Gate driver. (default) UPDN = "H", STV1 output vertical start pulse and UD pin output logical "H" to Gate driver SHLR = "H", shift right: first data = S1→S2→S3.....→S1536 = last data.(default)
6	SHLR	Source right or left sequence control. SHLR = "L", shift left: last data = S1←S2←S3.....←S1536 = first data. SHLR = "H", shift right: first data = S1→S2→S3.....→S1536 = last data.(default)
7	LED-	Backlight Cathode
8	LED-	Backlight Cathode
9	AVDD	Power supply
10	GND	Ground
11	MIPI_TDP3	MIPI data Input
12	MIPI_TDN3	MIPI data Input
13	GND	Ground
14	MIPI_TDP2	MIPI data Input
15	MIPI_TDN2	MIPI data Input
16	GND	Ground
17	MIPI_TCP	MIPI clock Input
18	MIPI_TCN	MIPI clock Input
19	GND	Ground
20	MIPI_TDP1	MIPI data Input
21	MIPI_TDN1	MIPI data Input
22	GND	Ground
23	MIPI_TDPO	MIPI data Input
24	MIPI_TDNO	MIPI data Input
25	GND	Ground
26	STBYB	Standby mode control
27	LRSTB	LRSTB
28	VDD	Power supply
29	VDD	Power supply
30	VCOM	Power supply



4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	VDD	1.71	1.89	V	

4.2 DC ELECTRICAL CHARACTERISTICS

Typical Operating Conditions (Ta=25°C)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Digital Supply Voltage	VDD	-	1.8	-	V	
Analog Supply Voltage	AVDD	-	-	-	V	
Common Voltage	VCOM	-	5.35		V	
TFT Gate ON Voltage	VGH	-	17	-	V	
TFT Gate OFF Voltage	VGL	-	-7	-	V	

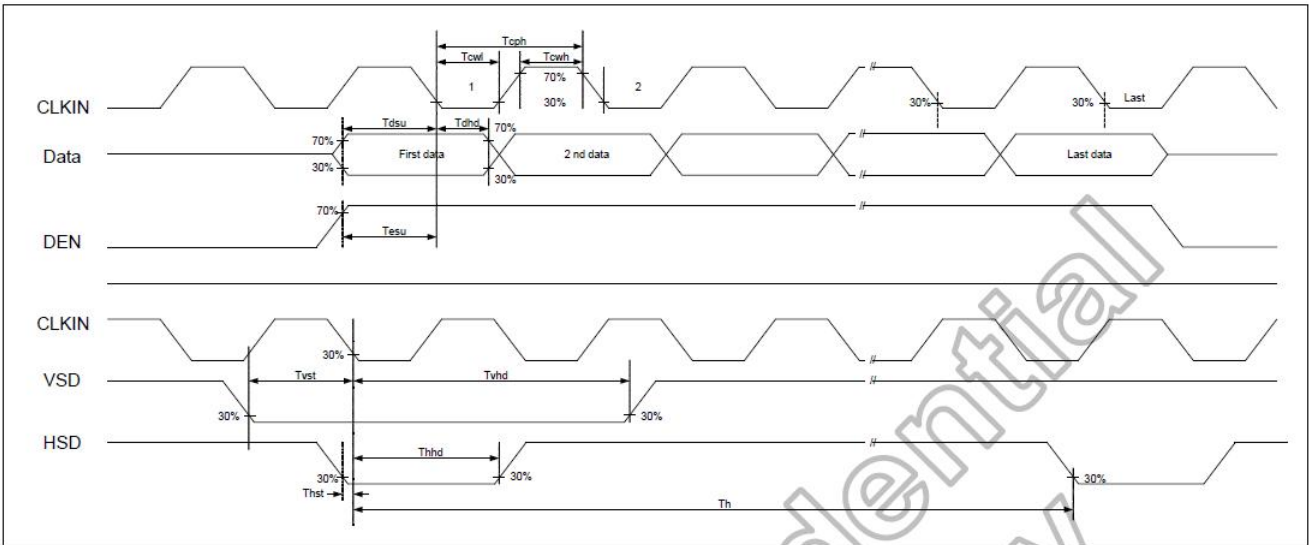
4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V _f	-	9.6	-	V	
Forward supply Current	I _f	-	160	-	mA	
LCM Luminance	L _v	330	380	-	cd/m ²	I _B =160mA
Uniformity	/	75			%	-

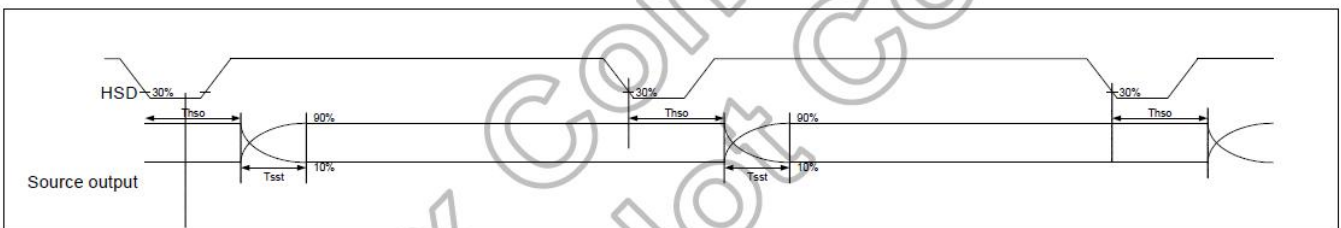


4.3 TIMING CHARACTERISTICS

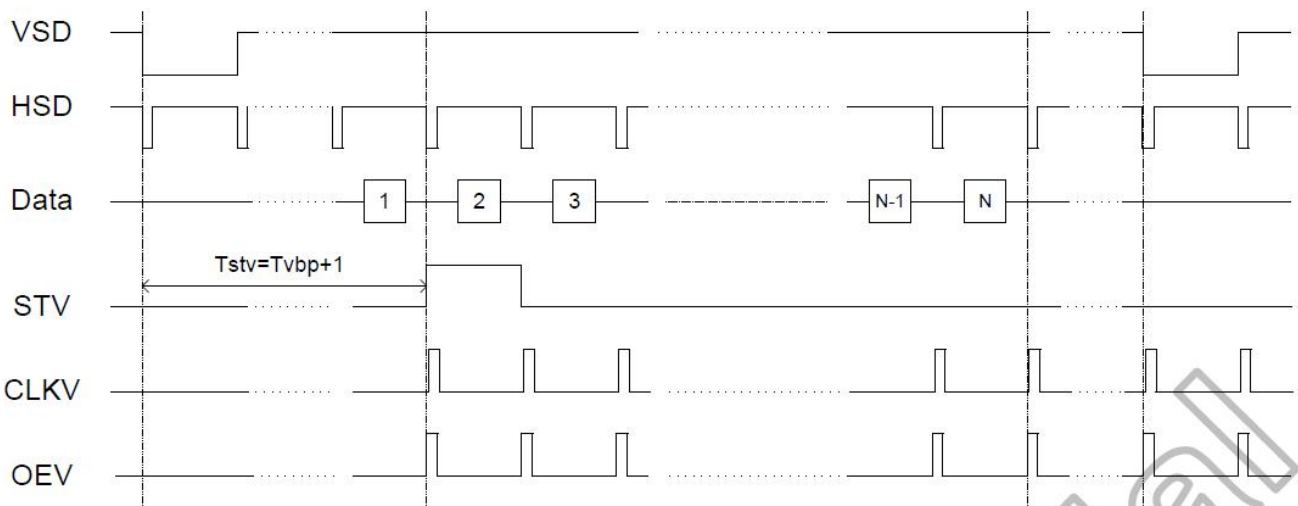
4.3.1 INPUT CLOCK AND DATA TIMING DIAGRAM



4.3.2 SOURCE OUTPUT TIMING DIAGRAM(CASCADE)

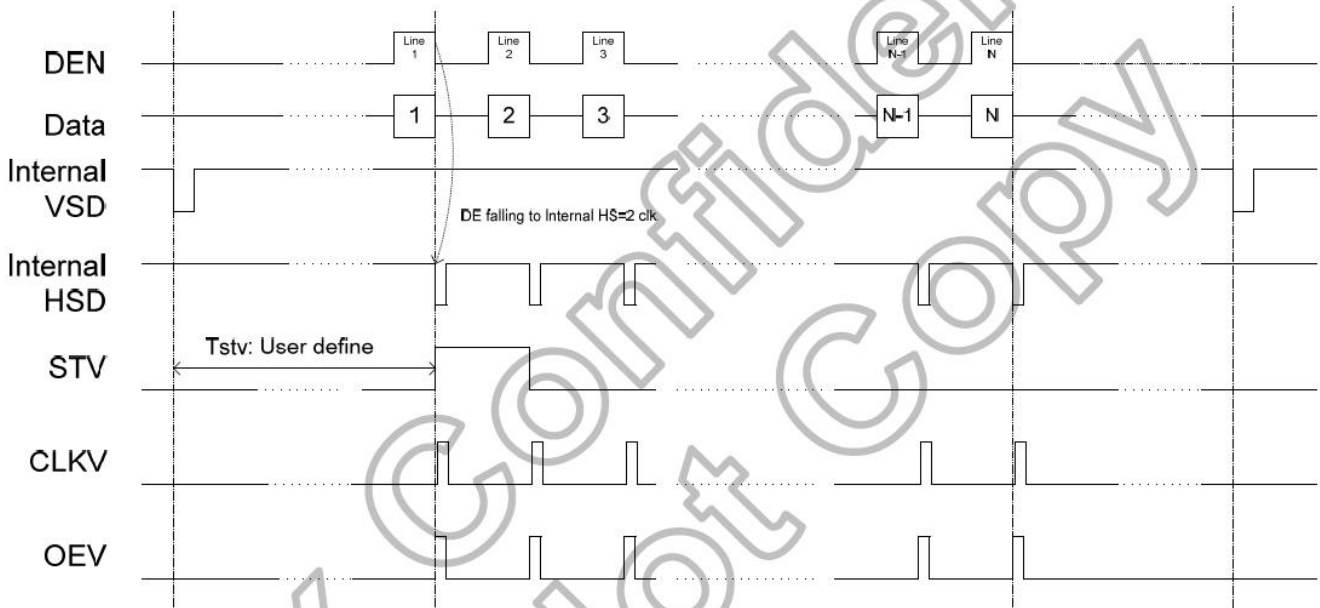


4.3.3 Vertical timing diagram HV(Cascade)

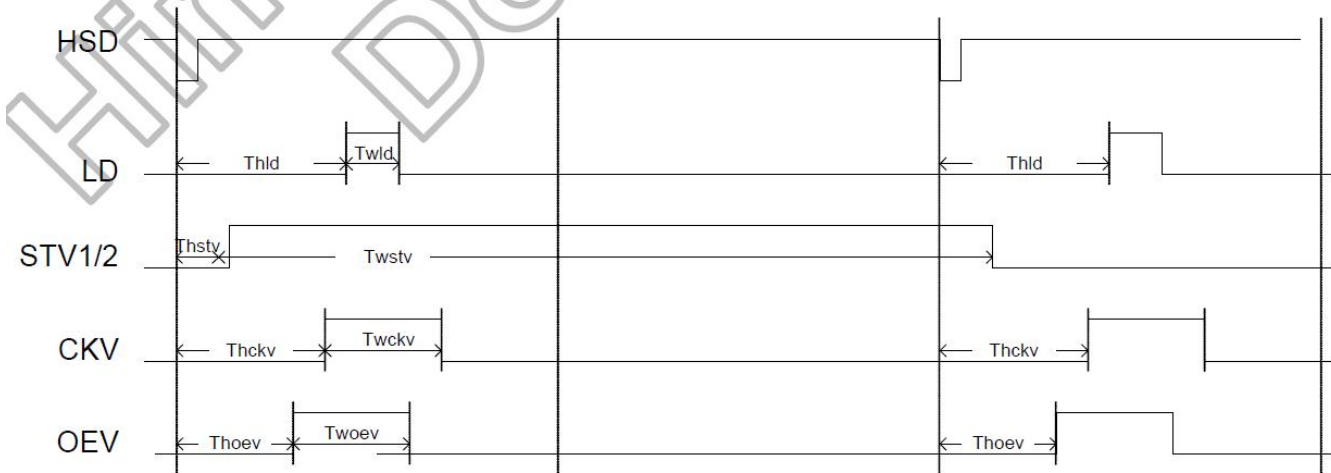




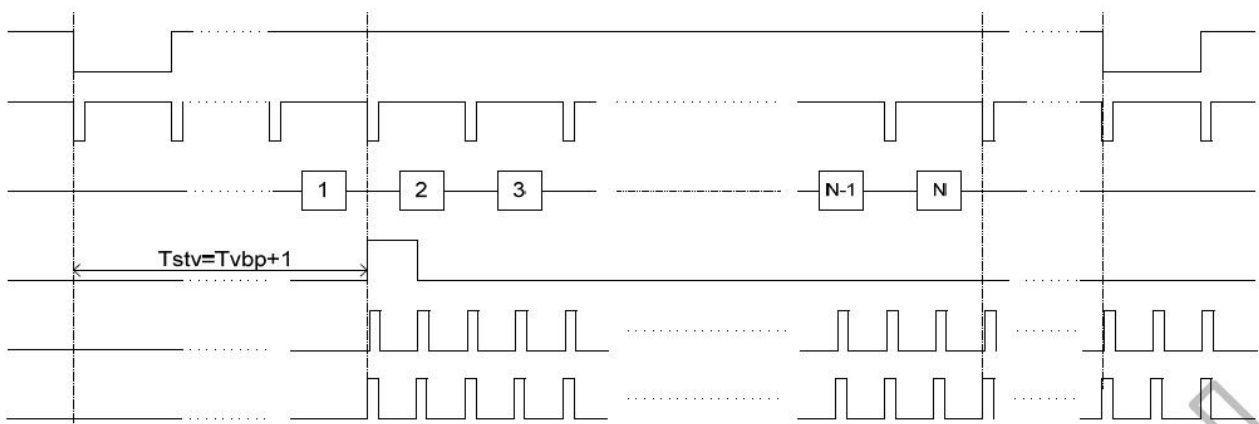
4.3.4 Vertical timing diagram DE(Cascade)



4.3.5 Gate output timing diagram(Cascade)

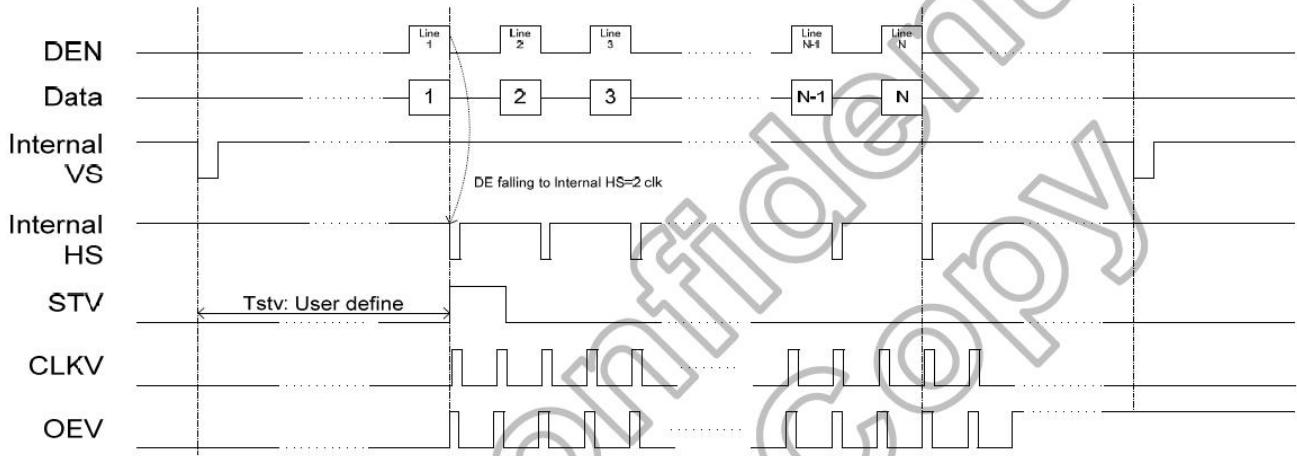


4.3.6 Vertical timing diagram HV(Dual date)

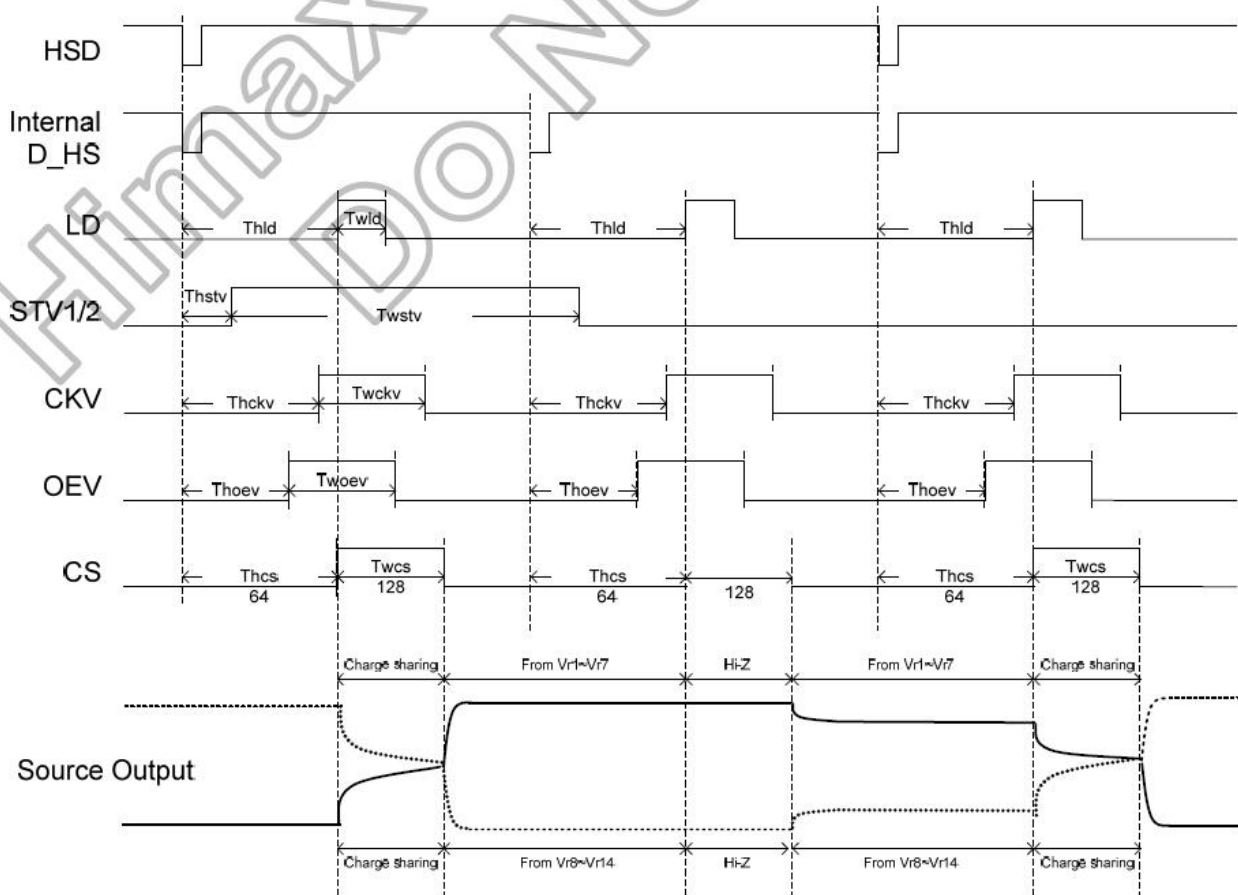




4.3.7 Vertical timing diagram DE(Dual date)



4.3.8 Gate output timing diagram (Dual date)





5. OPTICAL CHARACTERISTICS

(LCM MONOMER PARAMETERS)

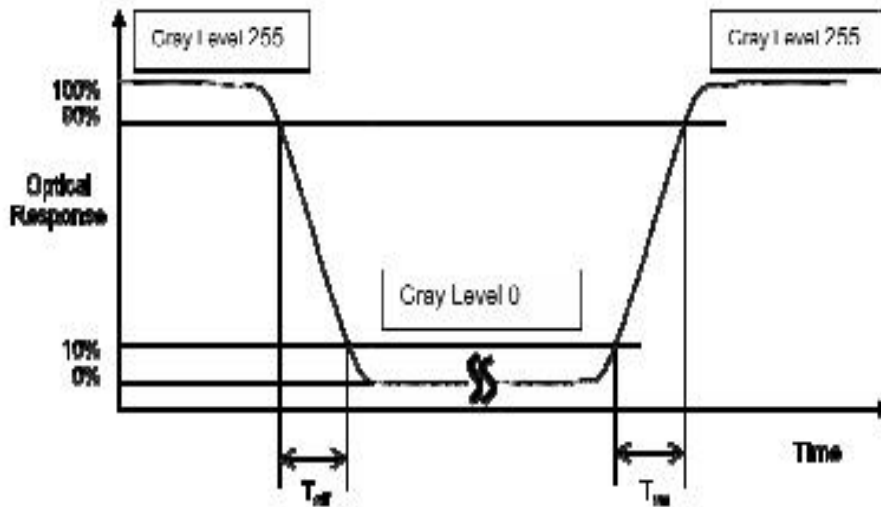
The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note.1.

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle	Horizontal	Θ_R	$CR \geq 10$	80	-	-	degree	Note.2
		Θ_L		80	-	-		
	Vertical	Φ_H		80	-	-		
		Φ_L		80	-	-		
Response Time(T_r+T_f)			$\Theta=0$	-	25	-	ms	Note.3
Brightness			Center	330	380		cd/m ²	
Contrast Ratio		CR	At optimized viewing angle	800	1000	-	-	Note.4
Color Gamut(NTSC)		S		-	50	-	%	
Color Chromaticity	White	X_w	Viewing normal angle $\Phi, \Theta=0$	-0.03	0.28	+0.03	-	Note.5
		Y_w		-0.03	0.30	+0.03		
	Red	X_R		-0.03	0.58	+0.03		
		Y_R		-0.03	0.35	+0.03		
	Green	X_G		-0.03	0.31	+0.03		
		Y_G		-0.03	0.55	+0.03		
	Blue	X_B		-0.03	0.14	+0.03		
		Y_B		-0.03	0.08	+0.03		

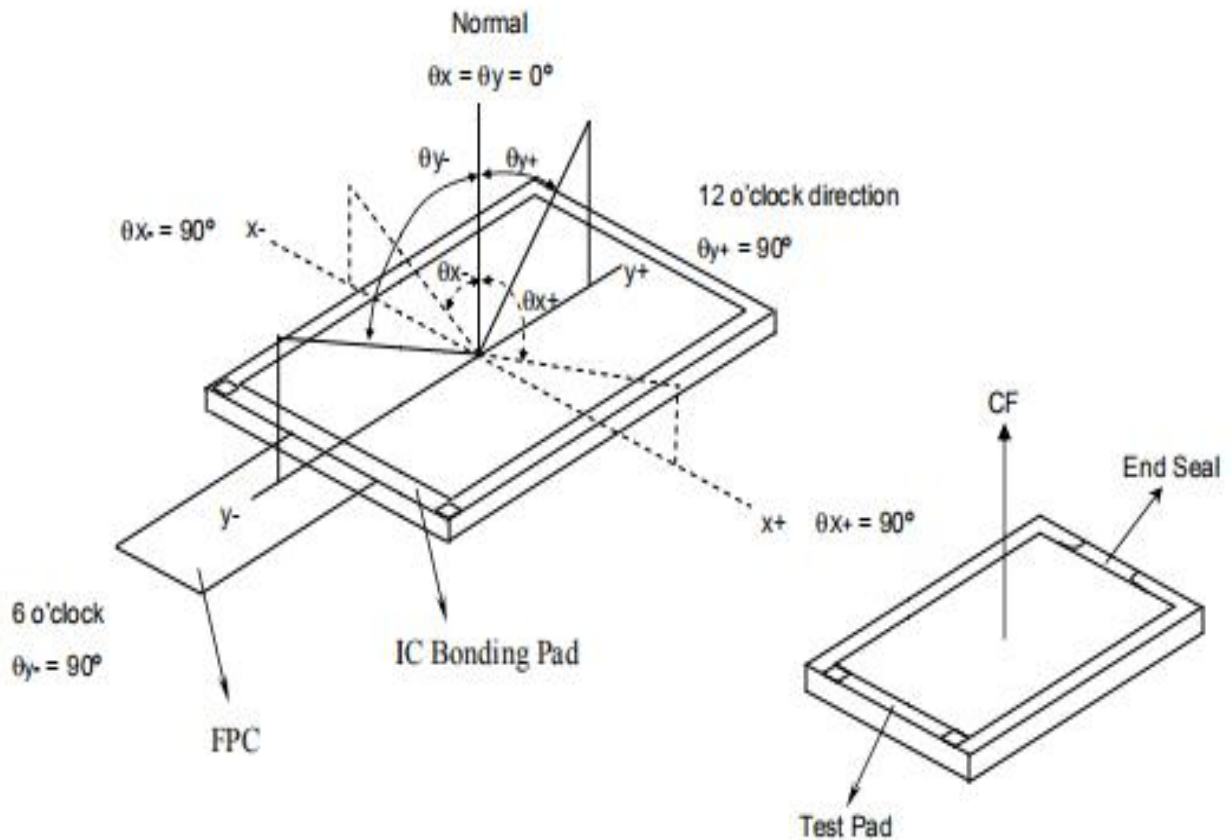
Note.1: After stabilizing and leaving the panel alone at a given temperature for 30 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7(fast) with a viewing angle of 1° at a distance of 50cm and normal direction.



*Note (2) Definition of Response Time (T_{on} , T_{off}):



*Note(3) Definition of Viewing Angle

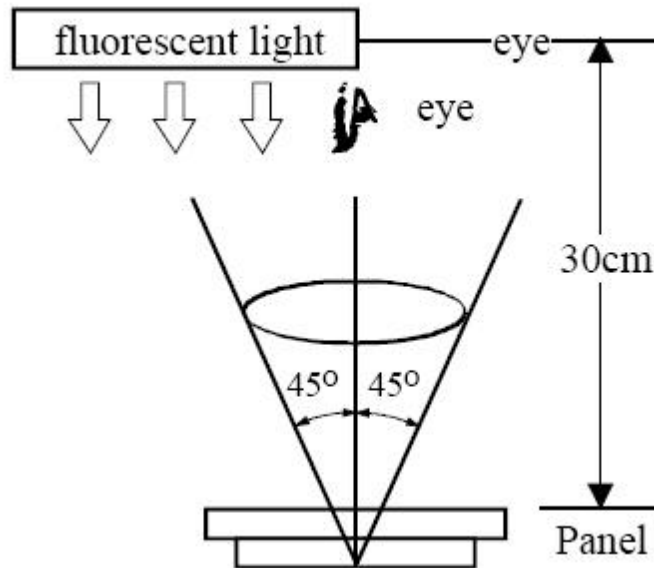




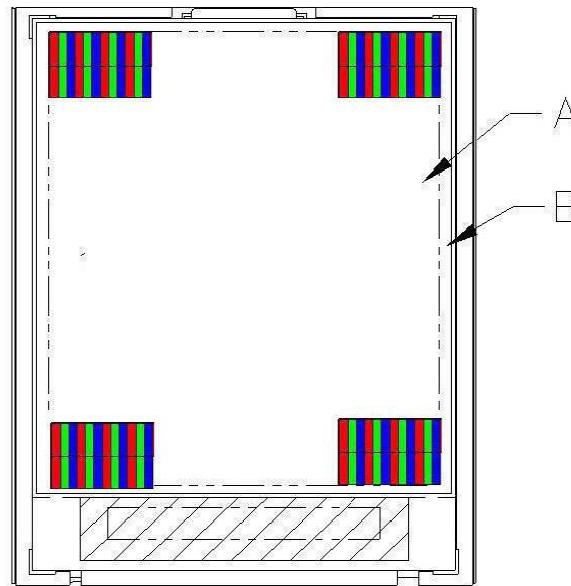
6. QUALITY SPECIFICATIONS

6.1 INSPECTION CONDITION

- (1) Inspect under 300~500Lux fluorescent light, leaving 30~35cm between panels and eyes, and between panels and lights.
- (2) Inspection condition is $23\pm 5^{\circ}\text{C}$, $50\pm 20\%RH$ maximum.



6.2 DEFINITION OF AREA





A Area : Viewing area.


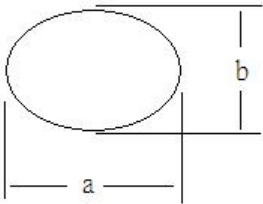
B Area : Out of viewing. (outside viewing area)



6.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electrical Testing	<p>1-1 sub pixel classification</p> <ul style="list-style-type: none"> ● Sub Pixel: Number of sub pixel doesn't exceed one dot. <div style="text-align: center;">  <p>Sub Pixel (Dot)</p> </div> <p>a> Dark dot ----one Allowed b> Bright dot ---- one Allowed</p> <ul style="list-style-type: none"> ● Pixel : Three dots link together doesn't exceed ones <div style="text-align: center;">  <p>Pixel</p> </div> <p>1-2 Leakage to light</p> <ul style="list-style-type: none"> ● Leakage to light be not allowed. <p>1-3 Picture to shake</p> <ul style="list-style-type: none"> ● Picture had shake, twinkle and noise etc. instable of defect that be not allowed. <p>1-4 Function</p> <ul style="list-style-type: none"> ● No display or No function. ● Source Line, Gate Line. ● Contrast Ratio ● Current consumption exceeds product specifications. ● Display malfunction. 	<p>$N \leq 3$</p> <p>$N \leq 1$</p> <p>$N=0$</p> <p>$N=0$</p> <p>$N=0$</p>
2	Mechanical Dimension	<p>2-1 Mechanical Dimension exceeds product specifications.</p> <p>2-2 Out of frame and boss of plastic changed shape that be not allowed.</p>	<p>$N=0$</p>



NO	Item	Acceptable specification	Judgment Criterion																																												
3	Cosmetic Inspection	<p>3-1 Blemish: Line shapes of defect</p> <table border="1" data-bbox="363 322 1313 678"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable number</th> <th>Mini. space</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.08$</td> <td>Ignore</td> <td rowspan="3">10MM</td> </tr> <tr> <td>$L \leq 10MM$</td> <td>$0.08 < W \leq 0.10$</td> <td>3</td> </tr> <tr> <td>$L \leq 10MM$</td> <td>$0.10 < W \leq 0.20$</td> <td>1</td> </tr> <tr> <td>--</td> <td>$W > 0.20$</td> <td>Not allowed</td> <td>---</td> </tr> </tbody> </table> <p>L: length(mm) W: width(mm)</p>  <p>3-2 Blemish: dot shapes of defect.</p> <table border="1" data-bbox="434 934 1281 1167"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.20$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.25$</td> <td>4</td> <td rowspan="2">5 m m</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.35$</td> <td>3</td> </tr> <tr> <td>$\Phi > 0.35$</td> <td>0</td> <td>---</td> </tr> </tbody> </table> <p>3-3 Polarizer Bubble</p> <table border="1" data-bbox="434 1240 1281 1406"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.30$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.30 < \Phi \leq 0.40$</td> <td>4</td> <td>15 m m</td> </tr> <tr> <td>$\Phi > 0.40$</td> <td>0</td> <td>---</td> </tr> </tbody> </table> <p>Foreign Substances</p>  <p>$\Phi = (a+b)/2$</p>	Length	Width	Acceptable number	Mini. space	---	$W \leq 0.08$	Ignore	10MM	$L \leq 10MM$	$0.08 < W \leq 0.10$	3	$L \leq 10MM$	$0.10 < W \leq 0.20$	1	--	$W > 0.20$	Not allowed	---	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.20$	Ignore	---	$0.20 < \Phi \leq 0.25$	4	5 m m	$0.25 < \Phi \leq 0.35$	3	$\Phi > 0.35$	0	---	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.30$	Ignore	---	$0.30 < \Phi \leq 0.40$	4	15 m m	$\Phi > 0.40$	0	---	
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NO	Item	Acceptable specification	Judgment Criterion			
3	Cosmetic Inspection	3-4 Scratch ● Sensate scratch not allowed. ● Impassive scratch as below. <div style="text-align: right; color: red;">Unit:mm</div>				
		Length		Width	Acceptable number	Mini. space
		-----		$W \leq 0.08$	Ignore	10 m m
		$L \leq 10$		$0.08 < W \leq 0.10$	5	
		$L \leq 10$		$0.10 < W \leq 0.18$	4	---
		----		$0.18 < W$	Not allowed	
		$L > 3.5$		----	Not allowed	
		4		Package	4-1 Mixed product types 4-2 Shipping q'ty should be the same as "shipping notice form" q'ty. 4-3 Outer box can't broken.	N=0
5	LCD Mura	LCD Mura according to ND 5% keep out to determine, if keep out distance at 30cm be seen by eyes is NG, otherwise will be ok if invisible.				



7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	50°C for 96 hours
Low Temperature Operation	-20°C for 96 hours
High Temperature Storage	70°C for 96 hours
Low Temperature Storage	-30°C for 96 hours
High Temperature Operation Humidity Operation	60°C, 90%RH for 72 hours
Thermal Shock	-10°C (30min) ~+25°C (5min)~ +60°C (30min) for 10 cycles
Static electricity test	Touch 4KV,air touch 8KV



8. HANDLING PRECAUTION

8.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\% \text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.

8.4 WARRANTY

- 1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- 2) According to Kingtech TFT LCD quality standard, Kingtech will rework or exchange for functional defect goods since within one year.