Product Information

To:

Product Name: P270MWN1 **R0**

Document Issue Date: 2012/10/16

Customer	InfoVision Optoelectronics
SIGNATURE _____ _____ _____ – Please return 1 copy for your confirmation with your signature and comments.	**SIGNATURE** **REVIEWED BY** **QA** _____ **PREPARED BY** **FAE** _____

Note: 1. Please contact InfoVision Company. before designing your product based on this product.
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by IVO for any intellectual property claims or other problems that may result from application based on the module described herein.

FQ-7-30-0-009-03D

Revision	Date	Page	Old Description	New Description	Remark
00	2012/10/16	-	-	First issued.	-

CONTENTS

1.0 General Descriptions

1.1 Introduction

The P270MWN1 R0 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) panel, which uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, a timing controller, voltage reference, common voltage, column driver, and row driver circuit. This TFT LCD has a 27 inch (diagonally measured) active display area with FHD resolution (1,920 horizontal by 1,080 vertical pixel array).

1.2 Features

- 27” TFT-LCD Panel
- LED Backlight System
- Supported Full HD Resolution
- Compatible with RoHS Standard
- Compatible with TCO 5.0 Standard

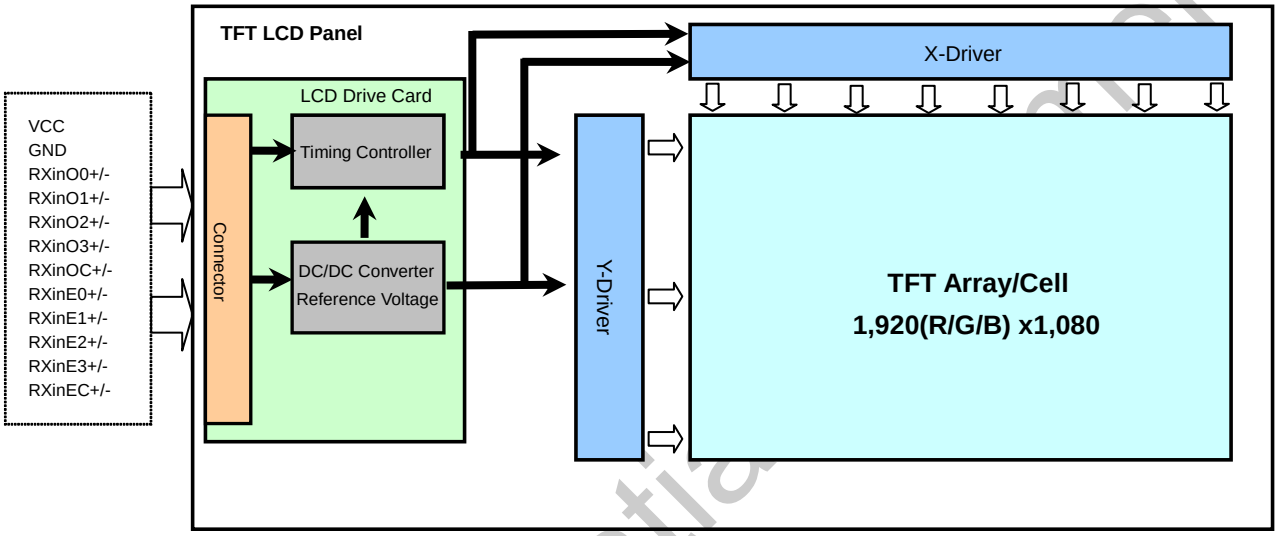
1.3 Product Summary

Items	Specifications	Unit	Remark
Screen Diagonal	27	Inch	-
Active Area	597.888(H)x336.312(V)	mm	-
Pixels(H x V)	1,920 x 1,080	-	-
Pixel Pitch	0.3114x0.3114	mm	-
Pixel Arrangement	R.G.B. Vertical Stripe	-	-
Display Mode	TN Mode, Normally White	-	-
White Luminance	300	cd/ m^2	-
Contrast Ratio	1,000:1	-	-
Response Time	5	ms	-
View Angle(H/V)	170/160	degree	-
Input Voltage	+5.0	V	-
Power Consumption	6.10	Watt	Black Pattern
Weight (Max.)	920	g	-
Outline Dimension(H x V x D)	619.47(H)x408.33(V)x3.27(D)	mm	-
Electrical Interface (Logic)	2ch LVDS	-	-
Support Color	16.7M	-	-
NTSC	72 %	%	-
Optimum Viewing Direction	6 o’clock	-	-
Surface Treatment	Haze 25%, Hard Coating(3H)	-	-

1.4 Functional Block Diagram

Figure 1 shows the functional block diagram of the LCD panel.

Figure 1 Block Diagram



2.0 Absolute Maximum Ratings

Table 1 Electrical Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Logic Supply Voltage	V_{DD}	-0.3	6.0	V	(1),(2)
Logic Input Signal Voltage	-	-0.3	2.7	V	

Note (1) Permanent damage may occur to the LCD panel if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

Note (2) Operating temperature 25℃, humidity 55%.

Table 2 Absolute Ratings of Environment

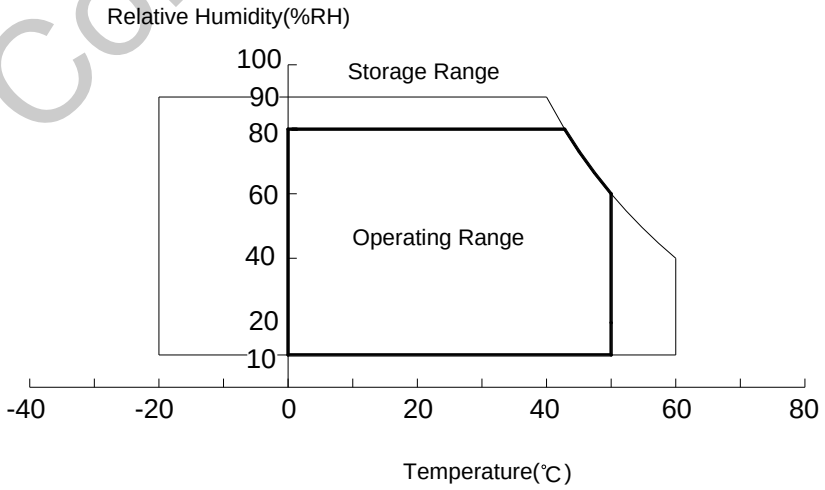
Item	Symbol	Min.	Max.	Unit	Conditions
Operating Temperature	TOP	0	50	℃	(1),(2),(3)
Operating Humidity	HOP	10	80	%RH	
Storage Temperature	TST	-20	60	℃	
Storage Humidity	HST	10	90	%RH	

Note (1) Maximum wet-bulb temperature should be 39 degree C and no condensation of water.

Note (2) When you apply the LCD panel for OA system, please make sure to keep the temperature of LCD panel is less than 60℃.

Note (3) Storage /Operating temperature:

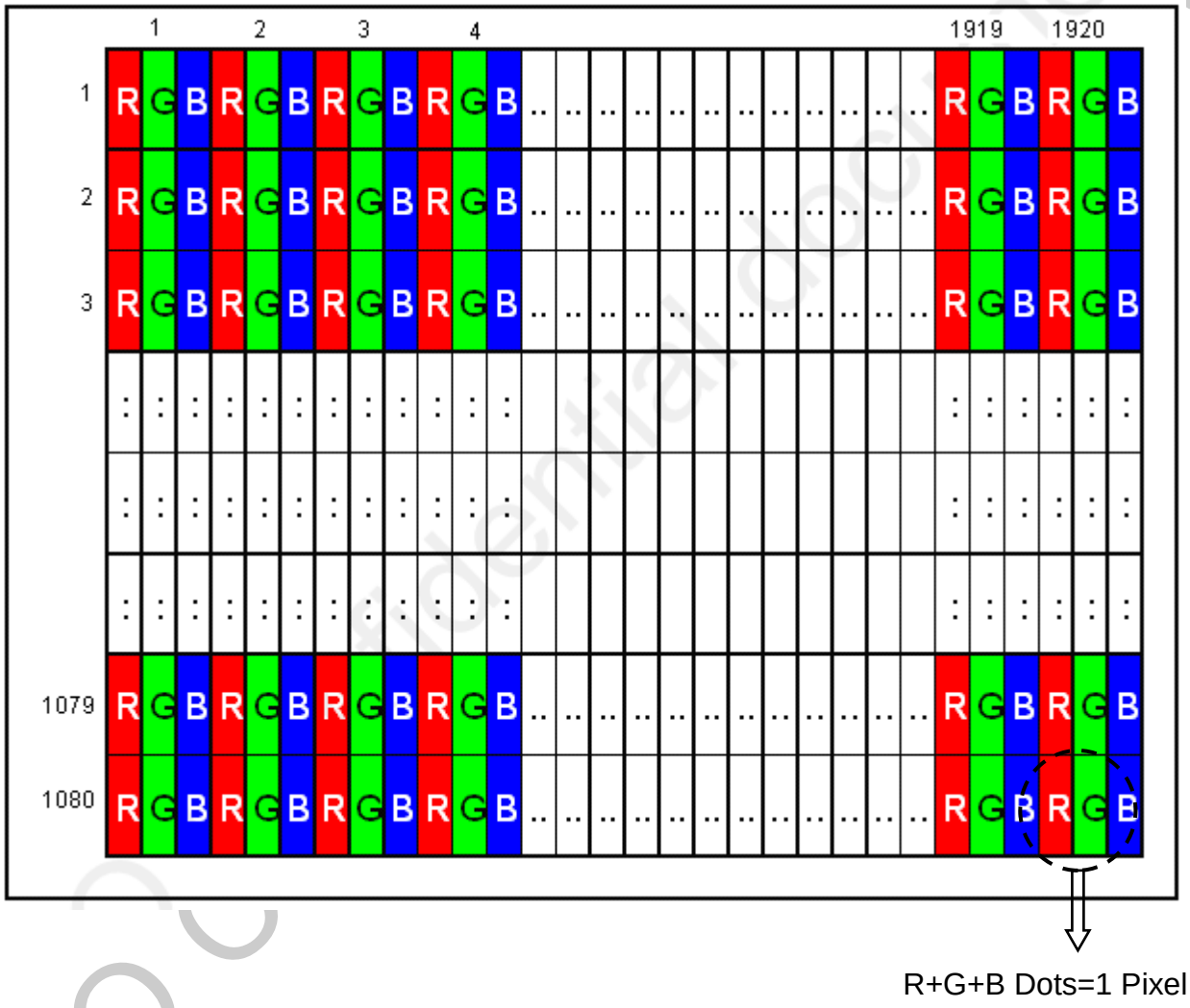
Figure 2 Absolute Ratings of Environment of the LCD Panel



3.0 Pixel Format Image

Figure 3 shows the relationship of the input signals and LCD pixel format image.

Figure 3 Pixel Format



4.0 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes.

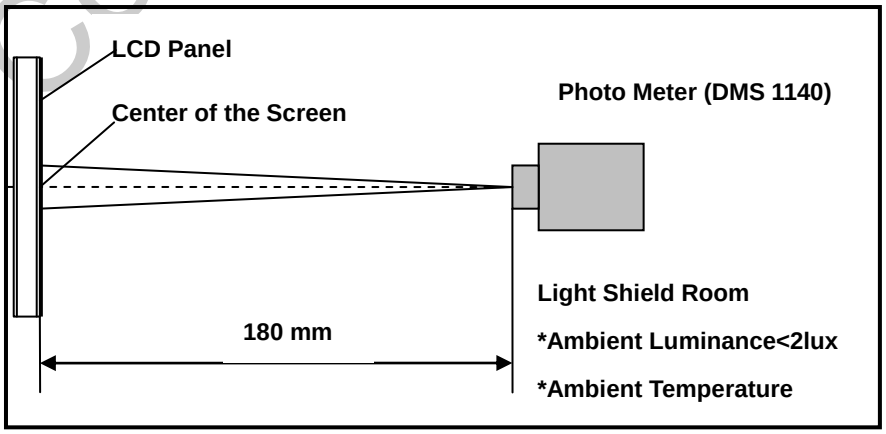
Table 3 Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle （CR>10）	Horizontal	θ_{x-}	75	85	-	degree	(1),(2),(3)
		θ_{x+}	75	85	-		
	Vertical	θ_{y-}	70	80	-		
		θ_{y+}	70	80	-		
Contrast Ratio	Center		700	1000	-	-	(1),(2),(4)
Response Time	Rising + Falling		-	5.0	8.0	ms	(1),(2),(5)
Color Chromaticity (CIE1931)	Red x		Typ. -0.03	(0.637)	Typ. +0.03	-	(1),(2)
	Red y			(0.342)		-	
	Green x			(0.313)		-	
	Green y			(0.622)		-	
	Blue x			(0.152)		-	
	Blue y			(0.047)		-	
	White x		0.283	0.313	0.343	-	
	White y		0.299	0.329	0.359	-	
Transmittance	-		5.79	6.23	-	%	(1),(2),(7)

Note (1) Measurement Setup:

The LCD panel should be stabilized at given temperature (25℃) for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.

Figure 4 Measurement Setup

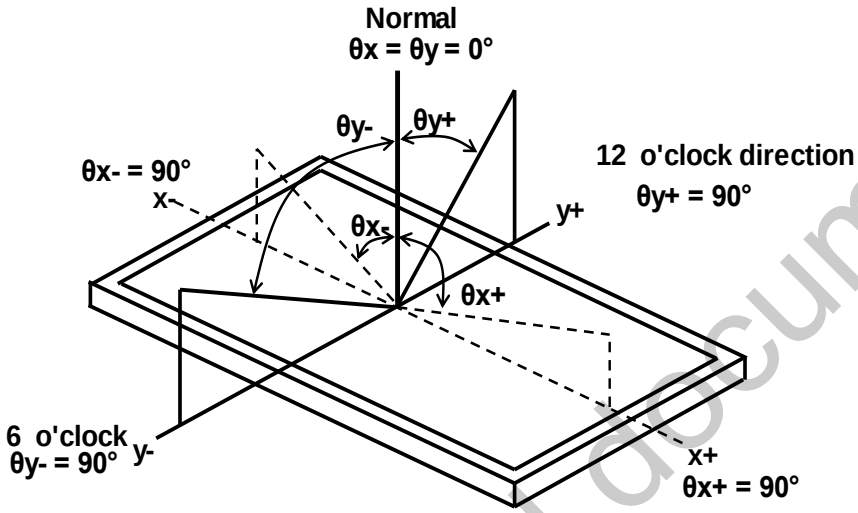


Note (2) The LED input parameter setting as:

PWM_LED: Duty 100 %

Note (3) Definition of Viewing Angle

Figure 5 Definition of Viewing Angle



Note (4) Definition of Contrast Ratio (CR)

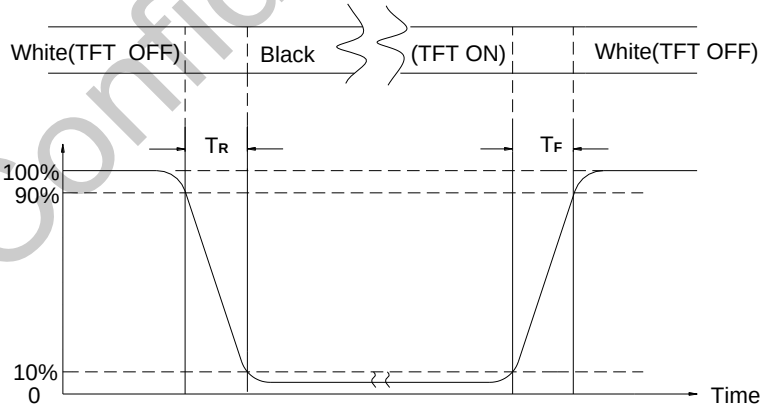
The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L255 / L0

L255: Luminance of gray level 255, L0: Luminance of gray level 0

Note (5) Definition Of Response Time (TR, TF)

Figure 6 Definition of Response Time



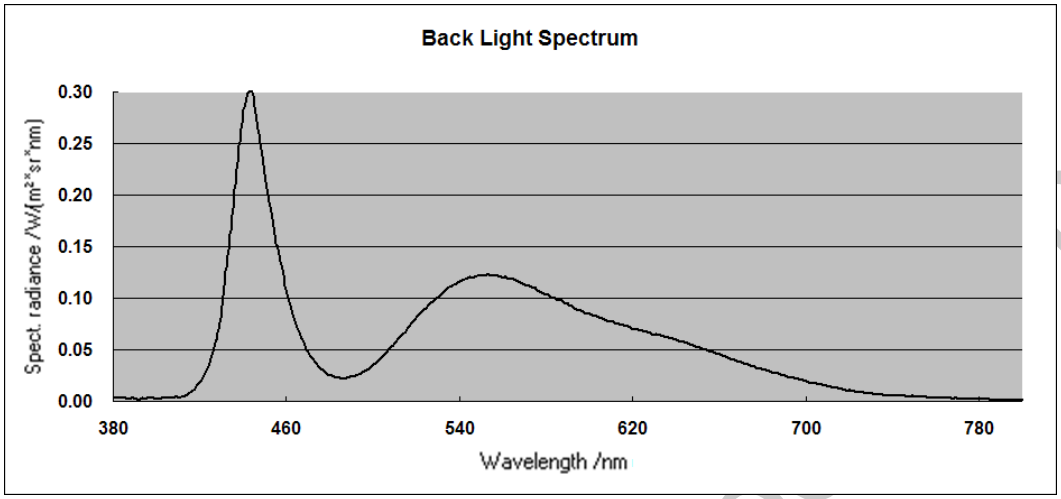
Note (6) Definition Of Luminance White

Measure the luminance of gray level 255 at center point (Ref: Active Area)

Note (7) Light source is the BLU which is supplied by IVO.

Figure 7 Back Light Spectrum

1.



5.0 Backlight Characteristics(Reference)

5.1 Parameter Guideline Of LED Backlight

Table 4 Parameter Guideline for LED Backlight

Item	Symbol	Min.	Typ.	Max.	Units	Note
LED Input Voltage	V_{LED}	-	(41.6)	44.2	V	(1)
LED Forward Voltage	V_F	2.9	(3.2)	3.4	V	
LED Forward Current	I_F	-	120	-	mA	
LED Light Bar Pin Current	I_{PIN}	-	120	-	mA	

Note (1) Operating temperature 25℃, humidity 55%.

6.0 Electrical Characteristics

6.1 Interface Connector

Table 5 Connector Name / Designation

Manufacturer	STARCONN or UJU
Type / Part Number	093G30-B0001A-M4 or IS100-L30B-C23
Corresponding Connectors (Ref.)	107J30-100000-00 or HS100-L30N-N23

Table 6 Signal Pin Assignment

Pin #	Signal Name	Description	Remarks
1	RXinO0-	Negative LVDS differential data input(0)	-
2	RXinO0+	Positive LVDS differential data input(0)	-
3	RXinO1-	Negative LVDS differential data input(1)	-
4	RXinO1+	Positive LVDS differential data input(1)	-
5	RXinO2-	Negative LVDS differential data input(2)	-
6	RXinO2+	Positive LVDS differential data input(2)	2. -
7	GND	Power Ground	3. -
8	RXOC-	Negative LVDS differential data input(clock)	4. -
9	RXOC+	Positive LVDS differential data input(clock)	5. -
10	RXinO3-	Negative LVDS differential data input(3)	6. -
11	RXinO3+	Positive LVDS differential data input(3)	7. -
12	RXinE0-	Negative LVDS differential data input(0)	8. -
13	RXinE0+	Positive LVDS differential data input(0)	9. -
14	GND	Power Ground	10. -
15	RXinE1-	Negative LVDS differential data input(1)	11. -
16	RXinE1+	Positive LVDS differential data input(1)	12. -
17	GND	Power Ground	13. -
18	RXinE2-	Negative LVDS differential data input(2)	14. -
19	RXinE2+	Positive LVDS differential data input(2)	-
20	RXEC-	Negative LVDS differential data input(clock)	15. -
21	RXEC+	Positive LVDS differential data input(clock)	16. -
22	RXinE3-	Negative LVDS differential data input(3)	17. -
23	RXinE3+	Positive LVDS differential data input(3)	18. -
24	GND	Power Ground	19. -
25	NC	No Contact	20. -

26	BIST	When BIST = HIGH and no any LVDS input signals, the internal pattern generator actives. Keep low for normal operation.	21. -
27	NC	No Contact	22. -
28	VDD	Power Supply	5V(Typ.)
29	VDD	Power Supply	5V(Typ.)
30	VDD	Power Supply	5V(Typ.)

Note: All input signals shall be low or Hi - Z state when VDD is off.

6.2 LVDS Receiver

6.2.1 Signal Electrical Characteristics For LVDS Receiver

The built-in LVDS receiver is compatible with (ANSI/TIA/TIA-644) standard.

Table 7 LVDS Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	-	-	+100	mV	V_{CM}=+1.2V
Differential Input Low Threshold	Vtl	-100	-	-	mV	V_{CM}=+1.2V
Magnitude Differential Input Voltage	$\|V_{ID}\|$	100	-	600	mV	-
Common Mode Voltage	V_{CM}	1.0	1.2	1.4	V	Vth-Vtl =200mV

Note (1) Input signals shall be low or Hi - Z state when VDD is off.

Note (2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

Note (3) All values are measured at condition of V_{DD} =5V and Ta=25℃.

Figure 8 Voltage Definitions

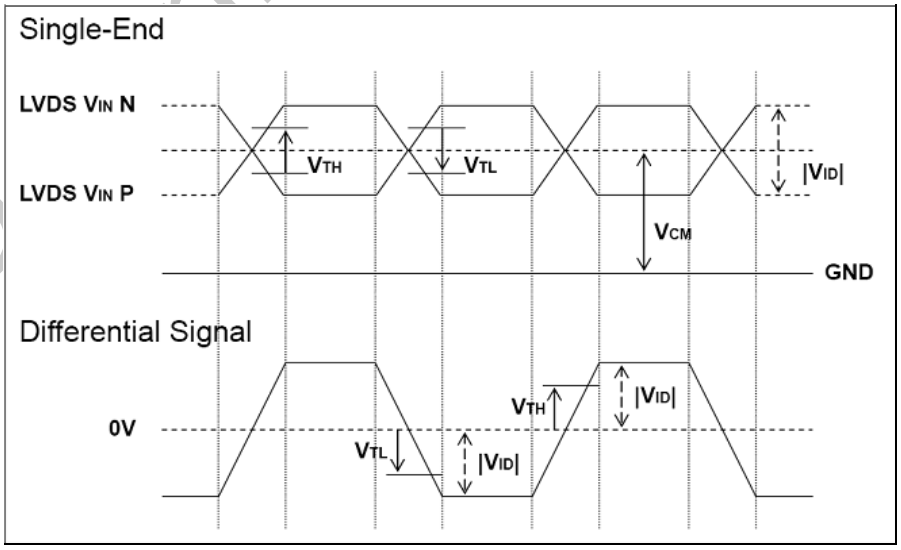


Figure 9 Measurement System

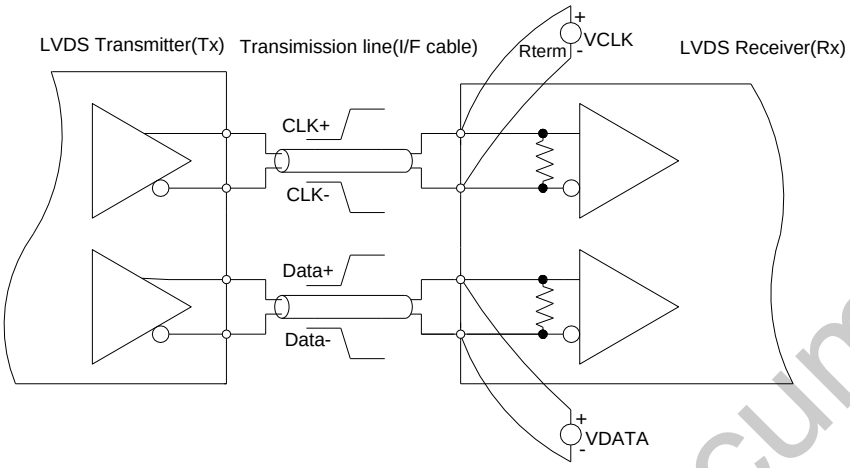
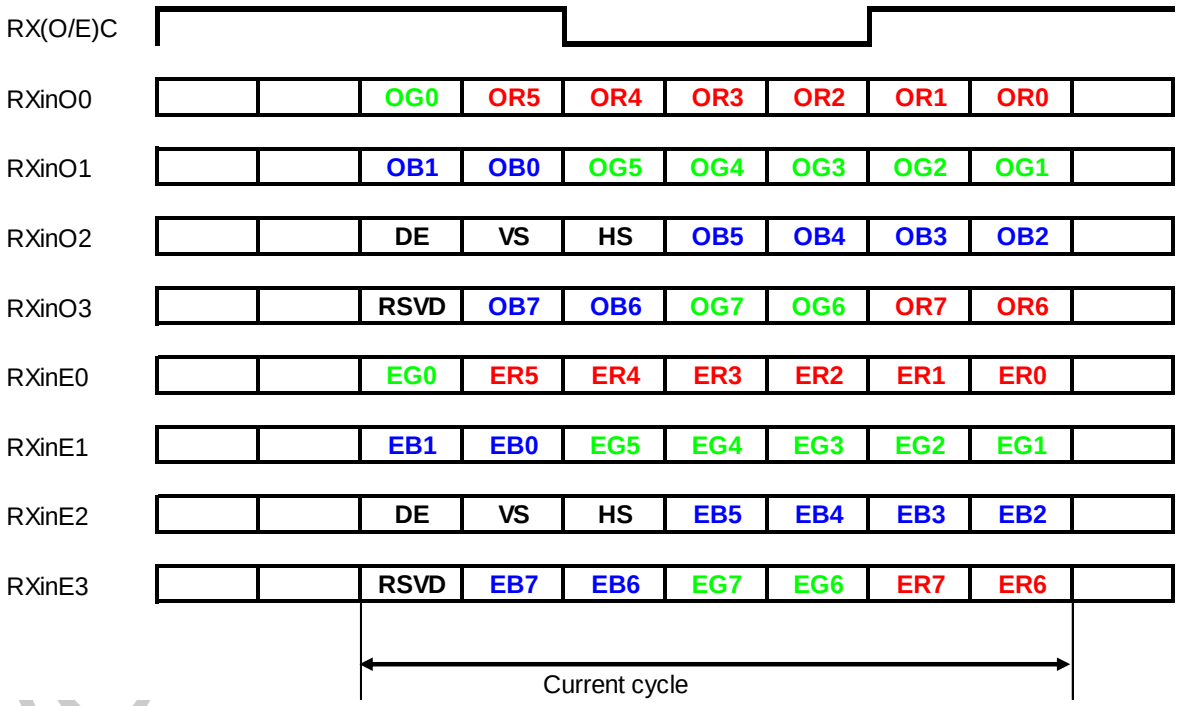


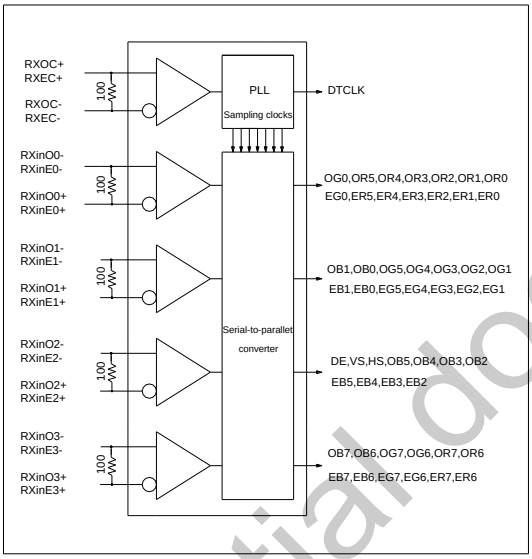
Figure 10 Data Mapping



6.2.2 LVDS Receiver Internal Circuit

Figure 11 LVDS receiver internal circuit shows the internal block diagram of the LVDS receiver. This LCD panel equips termination resistors for LVDS link.

Figure 11 LVDS Receiver Internal Circuit



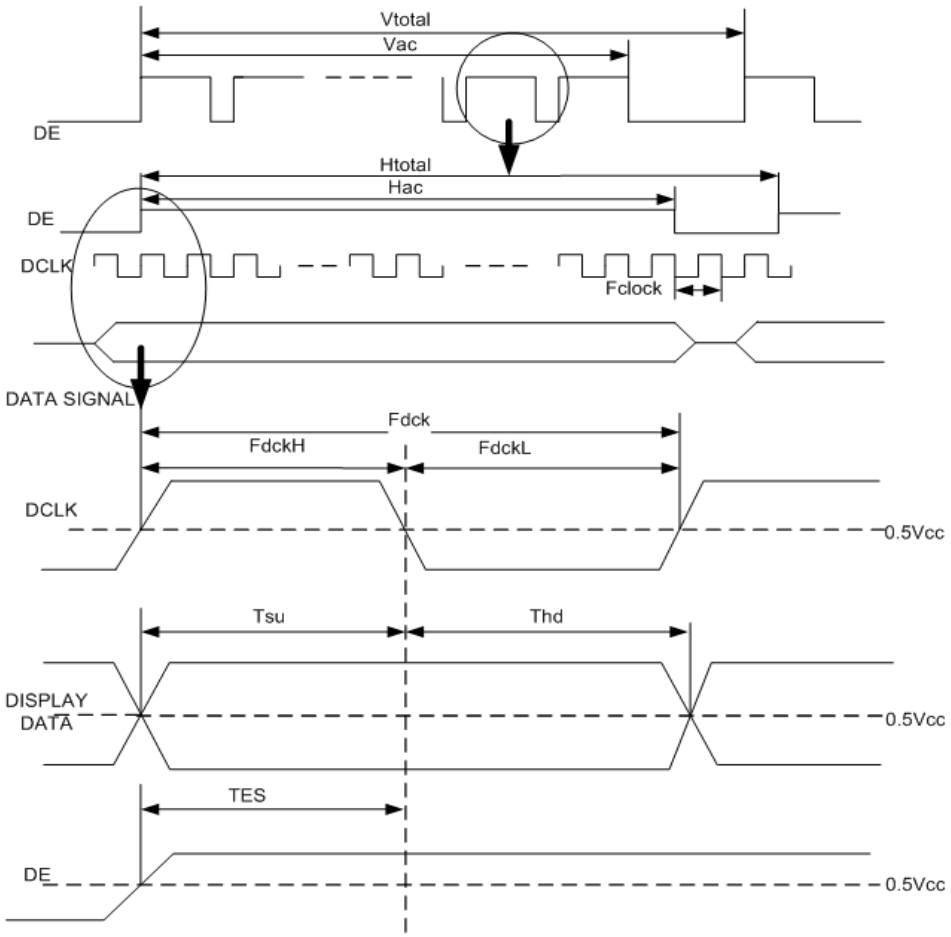
7.0 Interface Timings

7.1 Timing Characteristics

Table 8 Interface Timings

Parameter	Symbol	Unit	Min.	Typ.	Max.
LVDS Clock Frequency(Single)	Fdck	MHz	54.54	74	98
H Total Time	Htotal	Clocks	1,050	1,100	1,150
H Active Time	Hac	Clocks	960	960	960
V Total Time	Vtotal	Lines	1,105	1,125	1,136
V Active Time	Vac	Lines	1,080	1,080	1,080
Frame Rate	Vsync	Hz	47	60	75

Figure 12 Timing Characteristics



Note: TES is data enable signal setup time.

8.0 Power Consumption

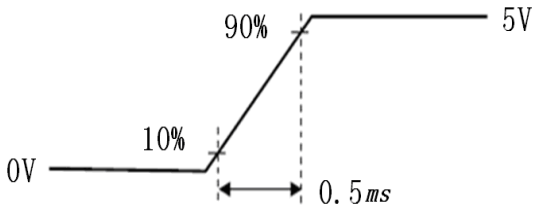
Input power specifications are as follows.

Table 9 Power Consumption

Symbol	Parameter	Min.	Typ.	Max.	Units	Condition
V_{DD}	Logic/LCD Drive Voltage	4.5	5.0	5.5	V	(2), (4)
I_{DD}	V_{DD} Current	-	1.2	1.4	mA	(3),(4)
P_{DD}	V_{DD} Power	-	6.10	7.32	W	
Irush	Rush Current	-	-	3	A	(1),(4)
$I_{Off-Rush}$	AC Off Rush Current	-	-	4	A	(5)
$V_{DD}rp$	Allowable Logic/LCD Drive Ripple Voltage	-	-	300	mVp-p	(4)

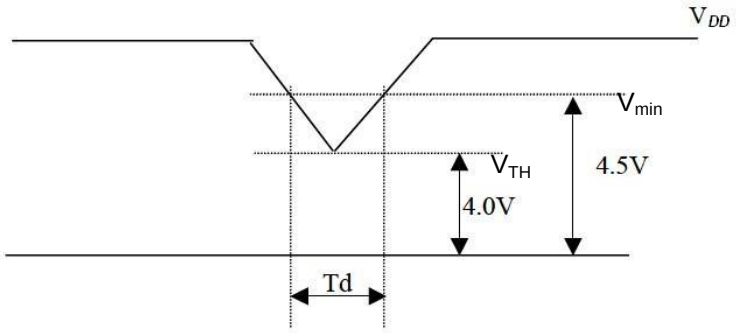
Note (1) Measure Condition

Figure 13 VDD Rising Time



Note (2) VDD Power Dip Condition

Figure 14 VDD Power Dip



If $V_{TH} < V_{DD} \leq V_{min}$ and td≤10ms then when the voltage return to normal our panel must revive automatically.

Note (3) Fv=60Hz, VDD=5.0V, DC Current, Black Pattern.

Note (4) Operating temperature 25℃, humidity 55%.

Note (5) The rush current would be happened when system doesn't follow the power sequence in AC off status.

9.0 Power ON/OFF Sequence

VDD power on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi - Z state or low level when VDD is off.

Figure 15 Power Sequence

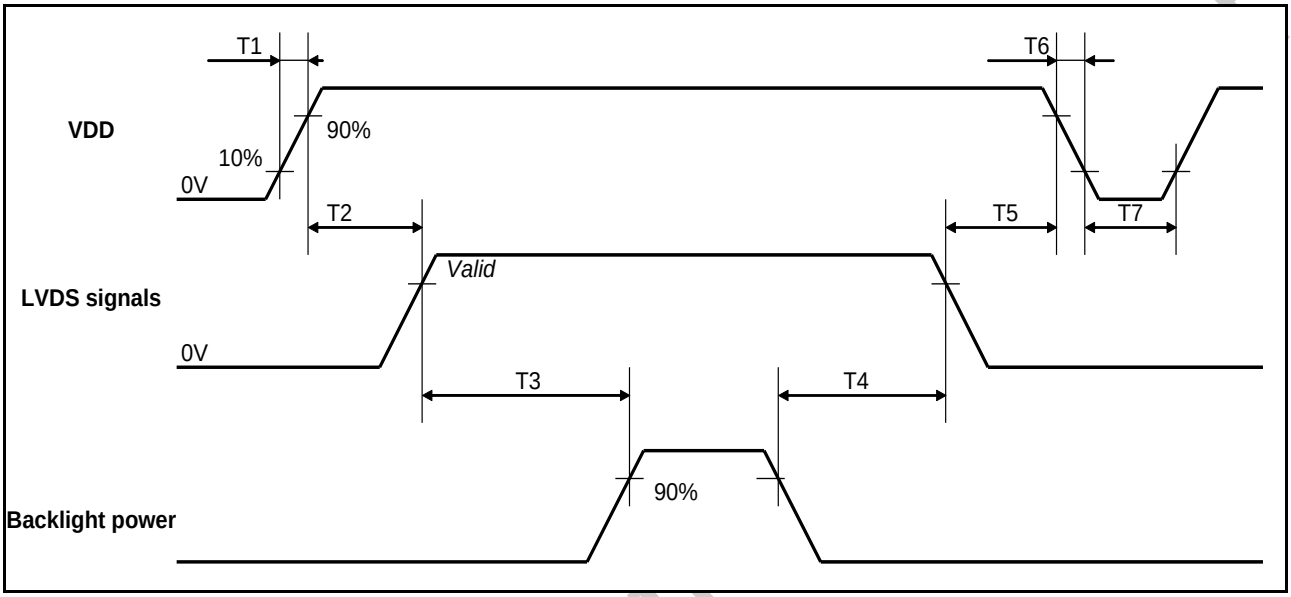


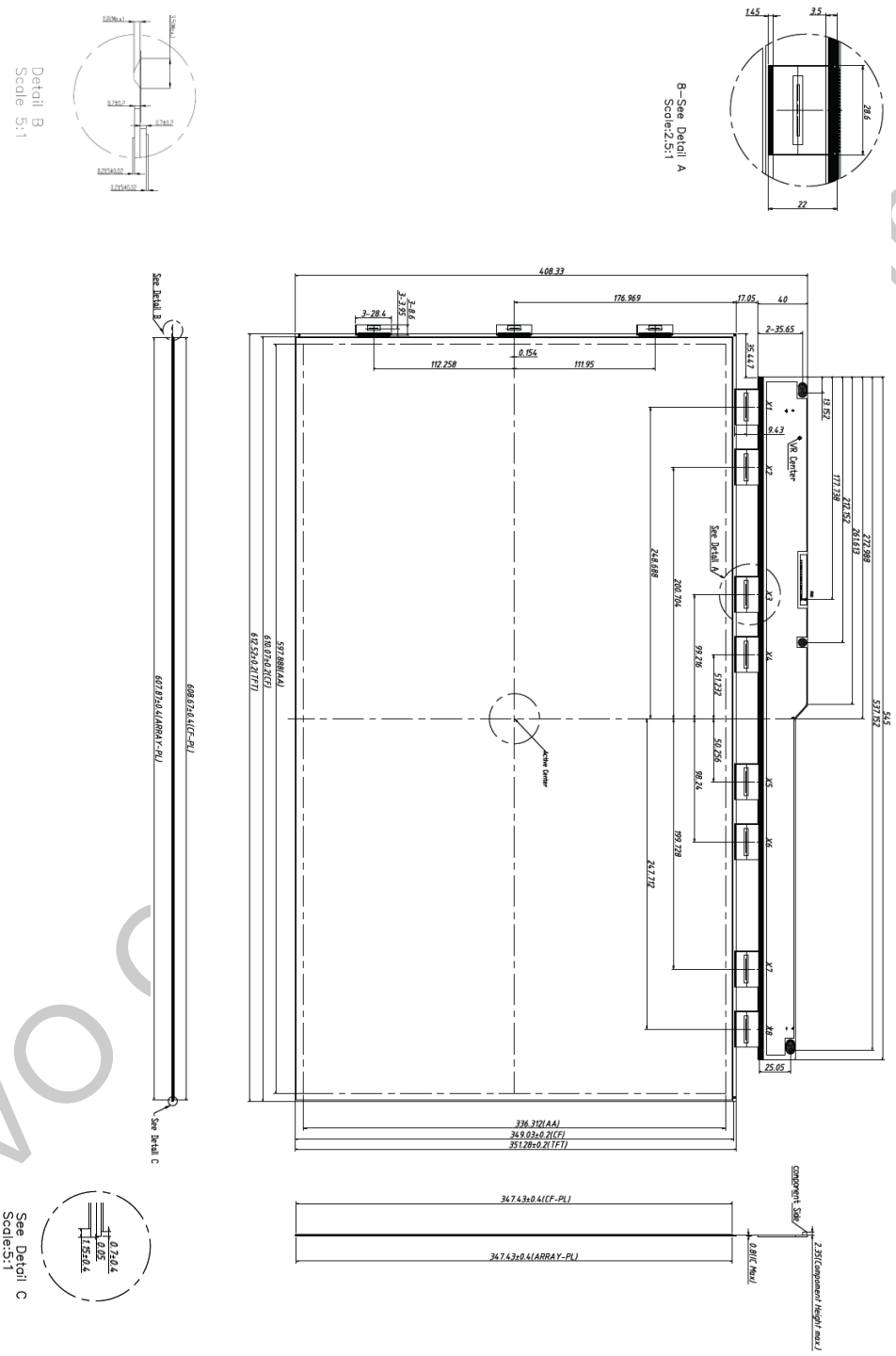
Table 10 Power Sequencing Requirements

Parameter	Symbol	Unit	Min.	Typ.	Max.
VDD Rise Time	T1	ms	0.5	-	10
VDD Good to Signal Valid	T2	ms	0	-	50
Signal Valid to Backlight On	T3	ms	200	-	-
Backlight Off to Signal Disable	T4	ms	90	-	-
Signal Disable to Power Down	T5	ms	0	-	50
VDD Fall Time	T6	ms	0	-	100
Power Off	T7	ms	500	-	-

10.0 Mechanical Characteristics

10.1 Outline Drawing

Figure 16 Reference Outline Drawing



10.2 Dimension Specifications

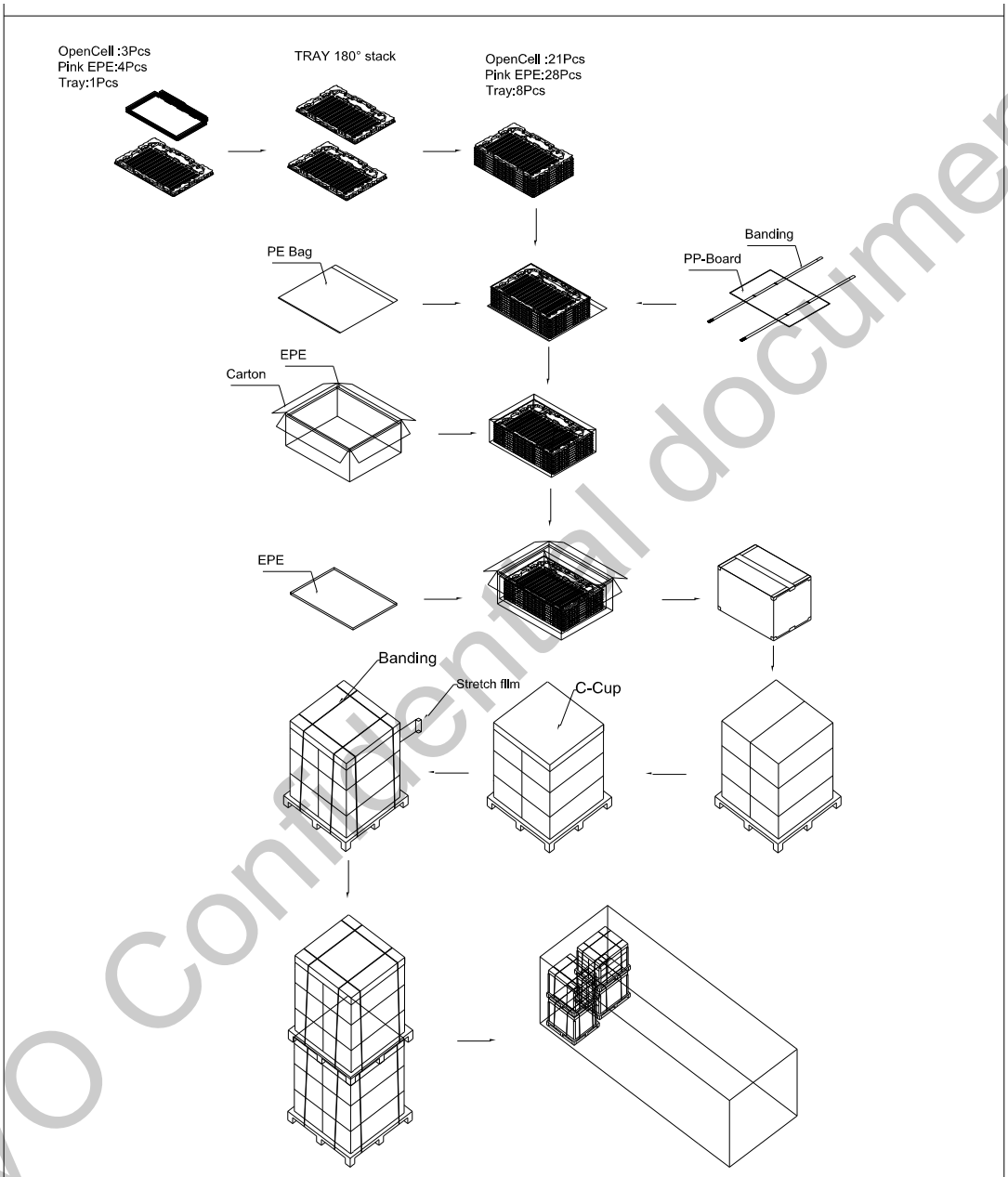
Table 11 Panel Dimension Specifications

Item	Min.	Typ.	Max.	Units
Length	619.27	619.47	619.67	mm
Width	408.13	408.33	408.53	mm
Thickness	3.07	3.27	3.47	mm
Weight	880	900	920	g

Note: Measure instrument Vernier caliper.

11.0 Package Specification

Figure 17 Packing Method



Components Material	Tray	Pink EPE	Top&Bottom EPE	Left&Right EPE	Front&Back EPE	PP-Board	Bandlng	PE Bag	Carton	C-Cup	Weight
Matrnlal Slze(mm)	720*490*33	609*405*1	760*530*20	490*213*20	760*213*20	720*490*5	(1800+100)*25	750*691*0.1	775*545*273l	1130*805*100	27Kg
Amount (Pcs/Carton)	8	28	2	2	2	1	2	1	1	1	21 Pcs Opencell (Include Packing)

12.0 Lot Mark

Note: This picture is only a sample.

12.1 Lot Mark

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Code1,2,4,5,6,7,8,9,10,11,16: IVO internal flow control code.
Code3: Production location.
Code12: Production year.
Code13: Production month.
Code14, 15: Production date.
Code17, 18, 19, 20: Serial number.
Note (1) Production Year

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mark	6	7	8	9	A	B	C	D	E	F

Note (2) Production Month

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

12.2 23 Product Barcode

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

Code1, 2: Manufacture District.
Code3, 4, 5, 6, 7: IVO internal module name.
Code8, 9, 10, 13, 16: IVO internal flow control code.
Code11, 12: Cell location Suzhou defined as “SZ”.
Code14, 15: Module line kunshan defined as” KS”.

Code17, 18, 19: Year, Month, Day Refer to Note (1) and Note (2) of Lot Mark.
Code20~23: Serial Number.

13.0 General Precaution

13.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

13.2 Handling Precaution

(1) Please mount LCD panel by using mounting holes arranged in four corners tightly.
(2) Do not disassemble or modify the panel. It may damage sensitive parts inside LCD panel, and may cause scratches or dust on the display. IVO does not warrant the panel, if customers disassemble or modify the panel.
(3) If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin. If liquid crystal contacts mouth or eyes, rinse out with water immediately. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
(4) Disconnect power supply before handling LCD panel
(5) Refrain from strong mechanical shock and /or any force to the panel.
(6) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature; etc otherwise LCD panel may be damaged. It's recommended employing protection circuit for power supply.
(7) Do not touch, push or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD panel for incoming inspection or assembly.
(8) When the surface is dusty, please wipe gently with absorbent cotton or other soft material. When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene or other adequate solvent.
(9) Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may cause deformation or color fading.
(10) Protection film must remove very slowly from the surface of LCD panel to prevent from electrostatic occurrence.
(11) Because LCD panel uses CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge, please be careful with electrostatic discharge .Persons who handle the panel should be grounded through adequate methods.
(12) Do not adjust the variable resistor located on the panel.

13.3 Storage Precaution

(1) Please do not leave LCD panel in the environment of high humidity and high temperature for a long time.
(2) The panel shall not be exposed under strong light such as direct sunlight. Otherwise display characteristics may be changed.
(3) The panel should be stored in a dark place. It is prohibited to apply sunlight or fluorescent light in storage.

13.4 Operation Precaution

(1) Do not connect or disconnect the panel in the "Power On" condition.
(2) Power supply should always be turned on/off by "Power ON/OFF Sequence".

(3) Panel has high frequency circuits. Sufficient suppression to the electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

(4) After installation of the TFT Panel into an enclosure, do not twist nor bend the TFT panel even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT panel from outside. Otherwise the TFT panel may be damaged.

13.5 Others

(1) Ultra-violet ray filter is necessary for outdoor operation.

(2) Avoid condensation of water which may result in improper operation or disconnection of electrode.

(3) If the panel keeps displaying the same pattern for a long period of time, the image may be "sticked" to the screen.

(4) This panel has its circuitry PCB's on the rear side and should be handled carefully in order not to be stressed.

13.6 Disposal

When disposing LCD panel, obey the local environmental regulations.