Document Title	M080AWP9 R0 Product Specification			Page No.	1/28
Document No.		Issue date	2017/08/25	Revision	01

Product Specification

To:

Product Name: M080AWP9 R0

Document Issue Date: 2017/08/25

Customer	InfoVision Optoelectronics
SIGNATURE _____ _____ _____ Please return 1 copy for your confirmation with your signature and comments.	**SIGNATURE** **REVIEWED BY CQM** _____ **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	2017/05/25		--	First issue.	
01	2017/08/25			Final	

CONTENTS

1.0 General Descriptions

1.1 Introduction

The M080AWP9 R0 is a color active matrix liquid crystal display with a back light system .The matrix uses a-Si Thin Film Transistor as a switching device. This TFT LCD has a 8-inch diagonally measured active display area with WVGA resolution (800 horizontal by 480 vertical pixels array).

1.2 Features

- ■ Supported WVGA Resolution
- ■ TTL Interface
- ■ Compatible with RoHS Standard

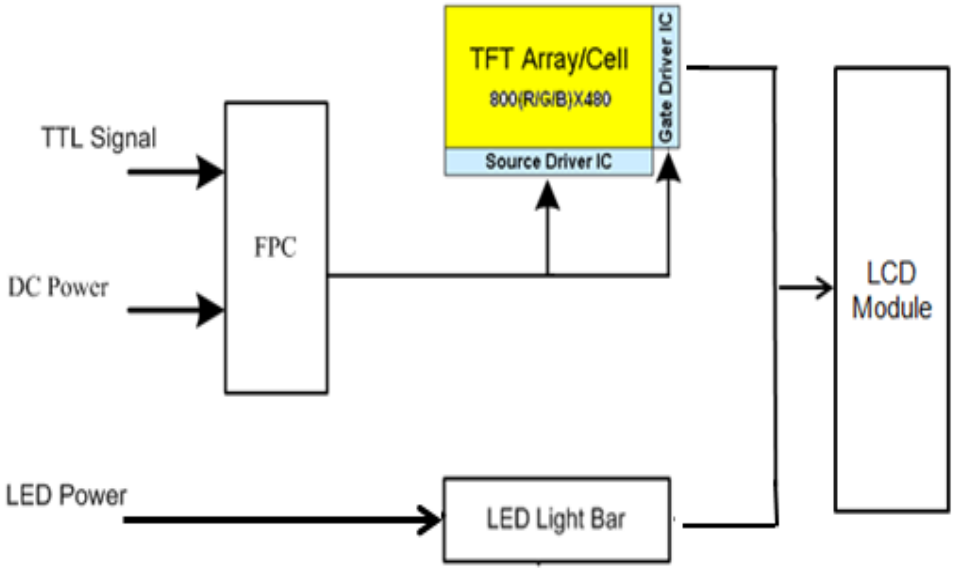
1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	8	inch
Active Area (H x V)	175.20*105.12	mm
Number of Pixels (H x V)	800 x 480	-
Pixel Pitch (H x V)	0.219*0.219	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally White	-
White Luminance ☆	750(Typ.)	cd /m^2
Contrast Ratio ☆	700(Typ.)	-
Response Time	13(Typ.) 25℃ 148(Typ.) -20℃ 323(Typ.) -30℃	ms
Input Voltage	3.3(Typ.)	V
Power Consumption	4.1(Max.)	W
Weight	215 (Max.)	g
Outline Dimension (H x V x D)	186.5(Typ.)x117.22(Typ.)x6.65(Max.)	mm
Electrical Interface (Logic)	TTL	-
Support Color	262K	-
NTSC	70(Typ.)	%
Viewing Direction	6 o'clock	-
Surface Treatment	AG	-

1.4 Functional Block Diagram

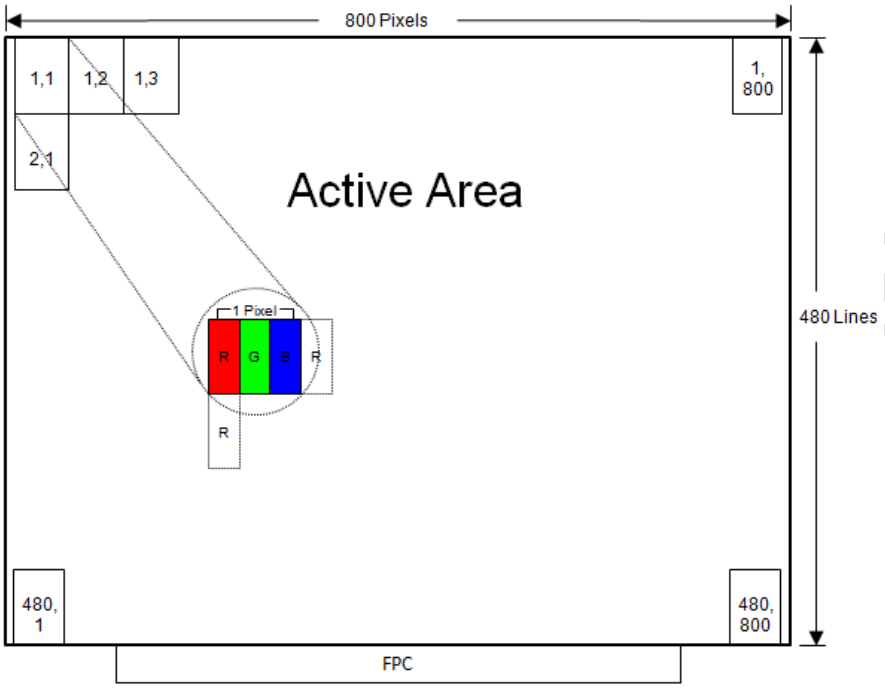
Figure 1 shows the functional block diagram of the LCD module.

Figure 1 Block Diagram



1.5 Pixel Mapping

Figure 2 Pixel Mapping



2.0 Absolute Maximum Ratings

Table 1 Electrical & Environment Absolute RatingItem	Symbol	Min.	Max.	Unit	Note
Power supply voltage	VCC	-0.5	5	V	GND=0
	VDDA	-0.5	15	V	AVSS=0
	VGH	-0.3	42	V	
	VGL	-20	0.3	V	
	Supply range Vgh-Vgl	-0.3	40	V	
	V1~V14	-0.5	15	V	
Logic Signal Input Voltage	VI	-0.5	VCC	V	TTL
Operating Temperature	T_{gs}	-30	85	℃	(1),(2), (3),(4)
Storage Temperature	T_a	-40	90	℃	

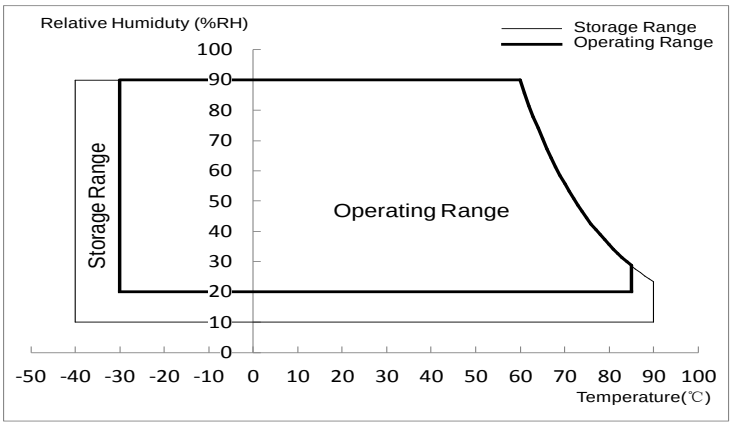
Note (1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded. It is recommended to follow the typical value.

Note (2) All the contents of electro-optical specifications and display fineness are guaranteed under Normal Conditions. All the display fineness should be inspected under normal conditions. Normal conditions are defined as follow: Temperature: 25℃, Humidity: 55± 10%RH.

Note (3) Unpredictable results may occur when it was used in extreme conditions. T_a= Ambient Temperature, T_{gs}= Glass Surface Temperature. All the display fineness should be inspected under normal conditions.

Note (4) Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be lower than 57.8℃, and no condensation of water. Besides, protect the module from static electricity.

Figure 3 Temperature& Humidity Range



3.0 Optical Characteristics

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

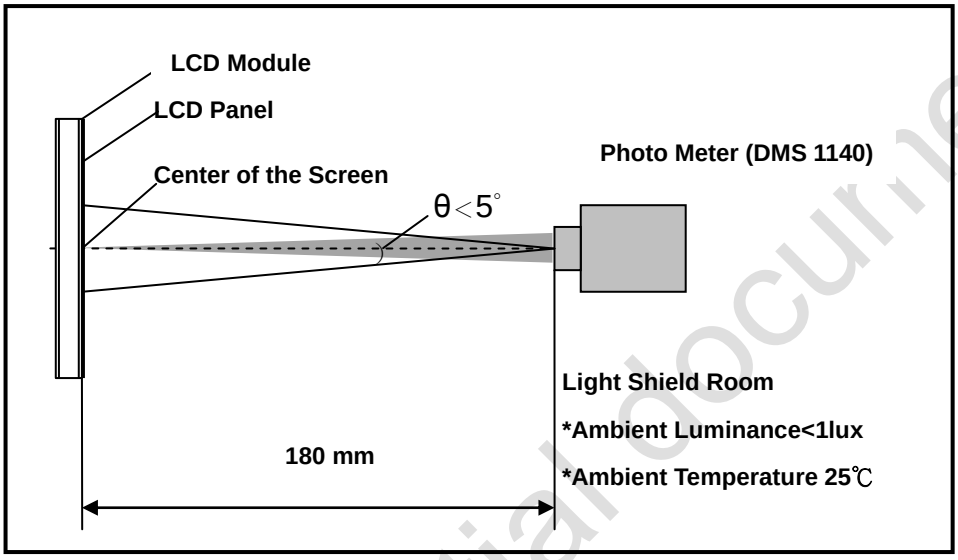
Table 2 Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle （CR>10）☆	Horizontal	θ_{x+}	60	70	-	degree	(1),(2),(3),(4),(7)
		θ_{x-}	60	70	-		
	Vertical	θ_{y+}	40	50	-		
		θ_{y-}	60	70	-		
Contrast Ratio☆	Center Point		500	700	-	-	(1),(2),(4),(7) θx=θy=0°
Response Time	Rising + Falling	25ºC	-	13	20	ms	(1),(2),(5),(7) θx=θy=0°
		-20ºC	-	148	250		
		-30ºC	-	323	550		
Color Chromaticity (CIE1931) ☆	White x		Typ. -0.04	0.313	Typ. +0.04	-	(1),(2),(3),(7) θx=θy=0°
	White y			0.329		-	
	Red x			0.643		-	
	Red y			0.340		-	
	Green x			0.294		-	
	Green y			0.635		-	
	Blue x			0.151		-	
	Blue y			0.065		-	
White Luminance ☆	Center Point		650	750	-	cd/m^2	(1),(2),(7) θx=θy=0°
NTSC			65	70	-	%	(1),(2),(3),(7) θx=θy=0°
Luminance Uniformity	9Points		70	80	-	%	(1),(2),(6),(7) θx=θy=0°

Note (1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature (25℃) for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in a windless room.

Figure 4 Measurement Setup

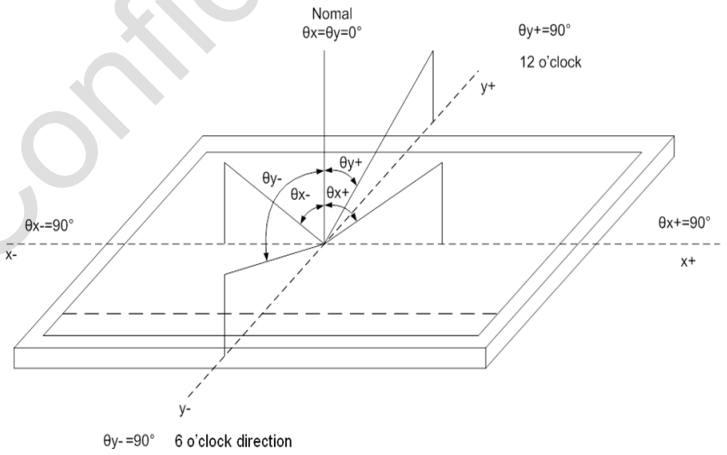


Note (2) The Backlight input parameter setting as:

I_LED: 165mA

Note (3) Definition of Viewing Angle

Figure 5 Definition of Viewing Angle



Note (4) Definition of Contrast Ratio (CR)

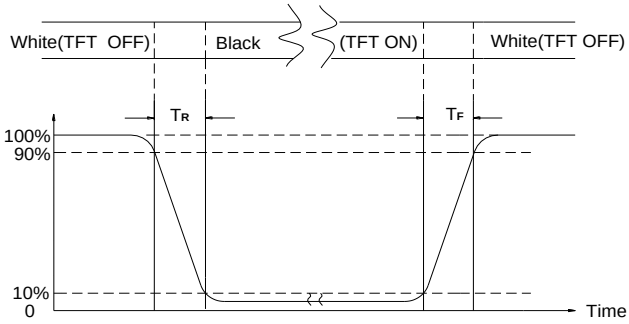
The contrast ratio can be calculated by the following expression:

Contrast Ratio (CR) = L63/ L0

L63: Luminance of gray level 63, L0: Luminance of gray level 0

Note (5) Definition of Response Time (T_R, T_F)

Figure 6 Definition of Response Time



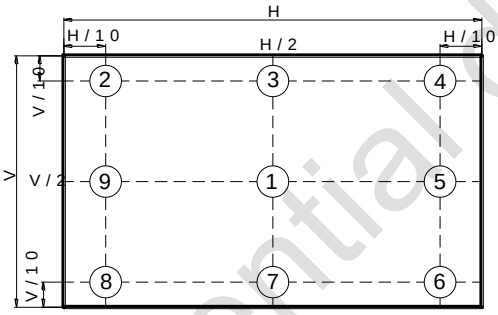
Note (6) Definition of Luminance Uniformity (Ref.: Active Area)

Measure the luminance of gray level 63 at 9 points.

Luminance Uniformity= Min.(L1, L2, ... L9) / Max.(L1, L2, ... L9)

H—Active Area Width, V—Active Area Height, L—Luminance

Figure 7 Measurement Locations Of 9 Points



Note (7) All optical data are based on IVO given system & nominal parameter & testing machine in this document.

4.0 Electrical Characteristics

4.1 Interface Connector

Table 3 Signal Connector Type

Item	Description
Mating Receptacle / Type (Reference)	FH52-60S-0.5SH (HIROSE or equivalent), 60pin, pitch = 0.5mm

Table 4 Signal Connector Pin Assignment

Pin	Signal Name	Description
1	VCOM	Common Voltage
2	VCOM	Common Voltage
3	GND	Digital ground
4	VGH	Gate on Voltage (22V+/-1V)
5	NC	Not connect
6	VGL	Gate OFF Voltage (-7V+/-1V)
7	GND	Digital ground
8	LR	Select Left/Right Shift
9	CLKPOL	Input clock edge selection. Normally pull low CLKPOL="1". Latch data at DCLK rising edge. CLKPOL="0", Latch data at DCLK falling edge(Default)
10	GND	Digital ground
11	GND	Digital ground
12	UD	Up/Down control Pin
13	VCC	Digital power
14	VCC	Digital power
15	BIST	For IVO Test Only When BIST="H" Panel into BIST Model（DCLK input is not needed）When BIST="L" Normal Operations（Default）Suggest Connecting to GND if not used
16	DE	Data Input Enable
17	GND	Digital ground
18	DCLK	Clock for input data, Data latched at rising/falling edge of this signal. Default falling edge.
19	GND	Digital ground
20	VDDA	Analog power

21	VDDA	Analog power
22	GND	Digital ground
23	B5	Blue data input(MSB)
24	B4	Blue data input
25	B3	Blue data input
26	B2	Blue data input
27	B1	Blue data input
28	B0	Blue data input(LSB)
29	GND	Digital ground
30	G5	Green data input(MSB)
31	G4	Green data input
32	G3	Green data input
33	G2	Green data input
34	G1	Green data input
35	G0	Green data input(LSB)
36	GND	Digital ground
37	R5	Red data input(MSB)
38	R4	Red data input
39	R3	Red data input
40	R2	Red data input
41	R1	Red data input
42	R0	Red data input(LSB)
43	GND	Digital ground
44	V14	Gamma correction voltage reference
45	V13	Gamma correction voltage reference
46	V12	Gamma correction voltage reference
47	V11	Gamma correction voltage reference
48	V10	Gamma correction voltage reference
49	V9	Gamma correction voltage reference
50	V8	Gamma correction voltage reference
51	V7	Gamma correction voltage reference
52	V6	Gamma correction voltage reference
53	V5	Gamma correction voltage reference
54	V4	Gamma correction voltage reference

55	V3	Gamma correction voltage reference
56	V2	Gamma correction voltage reference
57	V1	Gamma correction voltage reference
58	AVSS	Analog ground
59	RSTB	Global Reset pin. Active low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.
60	GND	Digital ground

Table5 Backlight Connector Type

Item	Description
Mating Receptacle / Type (Reference)	IMSA-9637S-10Y800

Table 6 Backlight Connector Pin Assignment

Pin No.	Symbol	Description
1	LED-Pin1	Anode
2	LED-Pin2	Anode
3	LED-Pin3	Anode
4	Dummy	Dummy
5	Dummy	Dummy
6	LED-pin4	Cathode
7	LED-pin5	Cathode
8	LED-pin6	Cathode
9	Dummy	Dummy
10	Dummy	Dummy

Table7 External Gamma Reference Voltage

Gamma Voltage	Unit(V)
V1	10.302±0.1
V2	10.200±0.1
V3	8.406±0.1
V4	7.917±0.1
V5	7.457±0.1
V6	6.808±0.1
V7	5.602±0.05
V8	5.212±0.05
V9	3.905±0.05
V10	3.256±0.05
V11	2.896±0.05
V12	2.307±0.03
V13	0.513±0.03
V14	0.311±0.01

Note: Vcom must be adjusted to optimize display quality: Crosstalk, Contrast Ratio etc.

4.2 Power Voltage Specification

Table 8 Power Voltage

Item	Symbol	Min.	Typ.	Max.	Units	Note
Input High Level	VIH	VCCX0.7	-	VCC	V	(1)(2)
Input signal voltage	VIL	0	-	VCCX0.3	V	

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

Note (2) DCLK, DE, Digital Data, BIST, RSTB, LR, UD, CLKPOL

4.3 Interface Timings

4.3.1 Timing Characteristics

Synchronization method should be DE mode.

Table 9 Interface Timings

Parameter	Symbol	Unit	Min.	Typ.	Max.
DCLK	FCLK	MHz	29	33.3	40
H Total Time	Th	clocks	908	928	1170
H Active Time	HA	clocks		800	
H Blanking Time	HB	clocks	108	128	370
V Total Time	Tv	lines	517	598	712
V Active Time	VA	lines		480	
V Blanking Time	VB	lines	37	118	232
V Frequency	Fv	Hz	55	60	65

Note: H total*V total*Frame Frequency≤Max FCLK

Figure 8 Timing Characteristics

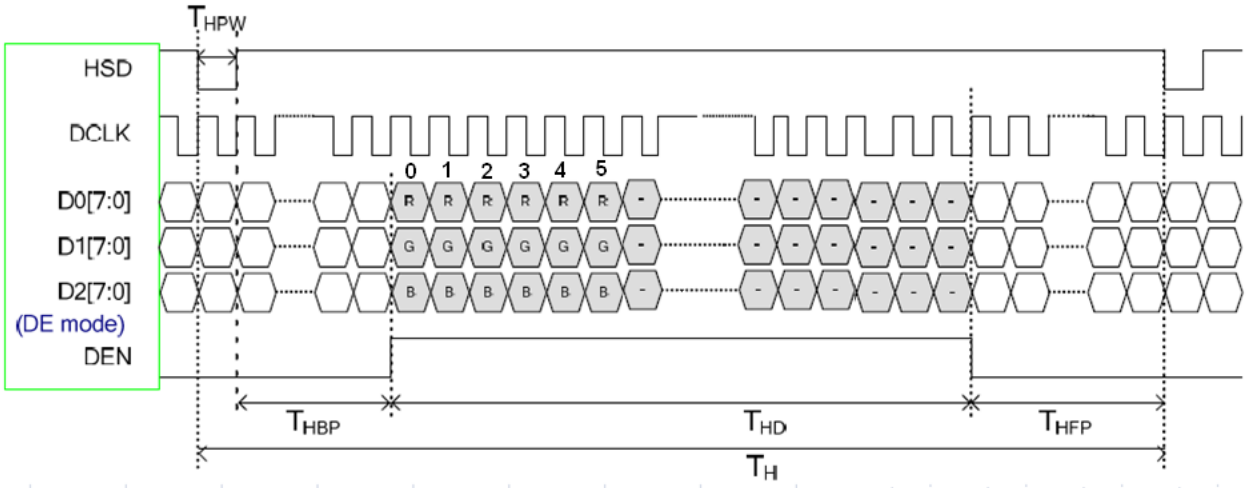
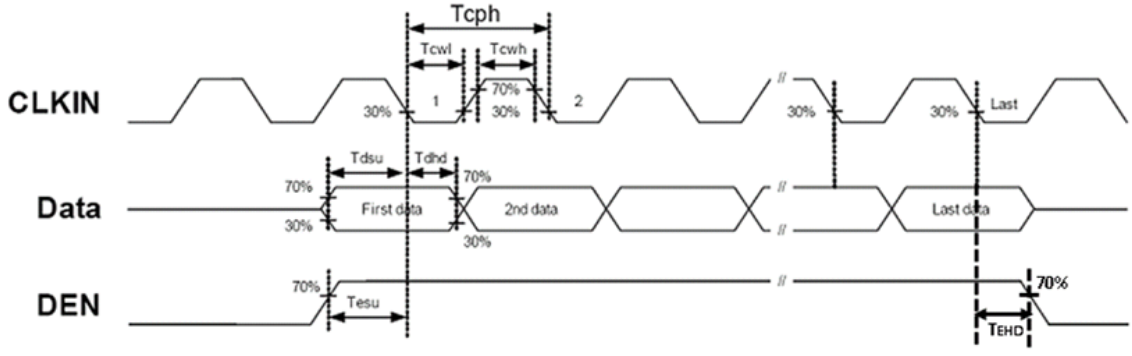


Table 10 Input setup timing requirement

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Clock frequency	FCLK	29	33.3	40	MHz	
Clock cycle time	TCPH	25	30	34.5	ns	
Clock pulse duty	TCWH	40%	50%	60%	TCPH	
Data setup time	TDSU	8	-	-	ns	
Data hold time	TDHD	8	-	-	ns	
DEN setup time	TESU	8	-	-	ns	
DEN hold time	TEHD	8	-	-	ns	

Figure 9 Input setup timing requirement



4.4 Input Power Specifications

Input power specifications are as follows.

Table 11 Input Power Specifications

Item		Symbol	Min.	Typ.	Max.	Units	Note
LCD Drive Voltage (Logic)		VCC	3.0	3.3	3.6	V	(1), (2)
Power Supply		VDDA	10.45	10.60	10.75	V	(1), (2)
Power Supply		VGH	21	22	23	V	(1), (2)
Power Supply		VGL	-8	-7	-6	V	(1), (2)
Power Supply		Vcom	3.15	4.15	5.15	V	(1), (2)
VCC Current	Black Pattern	I_{VCC}	-	10.55	-	mA	(1),(3)
VDDA Current		I_{VDDA}	-	12.65	-	mA	
VGH Current		I_{VGH}	-	0.34	-	mA	
VGL Curretn		I_{VGL}	-	0.34	-	mA	
Power Logic Consumption (VCC)		P_{VCC}	-	-	34.81	mW	
Power Analog Consumption (VDDA)		P_{VDDA}	-	-	134.1	mW	
Power Consumption (VGH)		P_{VGH}	-	-	7.48	mW	
Power Consumption (VGL)		P_{VGL}	-	-	2.38	mW	
Allowable Logic/LCD Drive Ripple Voltage		VCCrp	-	-	200	mV	(1)
LED Forward Voltage		V_F	2.7	-	3.4	V	(1),(2),(5)
LED Forward Current		I_F	-	55	-	mA	
LED Power Consumption		P_{LED}	-	-	3.927	W	
LED Life Time		LT	30000	-	-	Hrs	(1),(4)

Note (1) All of the specifications are guaranteed under normal conditions. Normal conditions are

defined as follow: Temperature: 25℃, Humidity: 55± 10%RH.

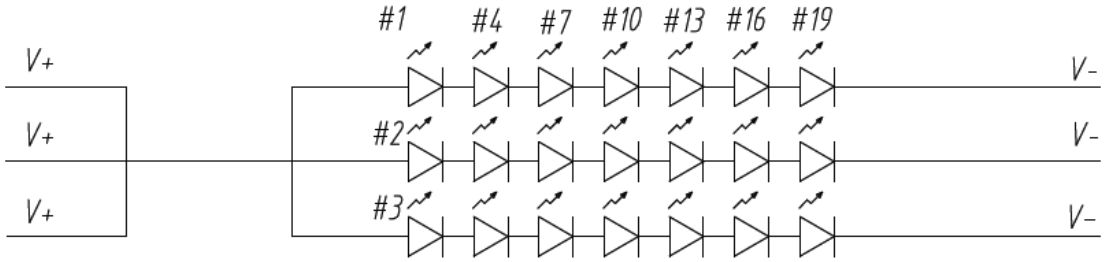
Note (2) All of the absolute maximum ratings specified in the table, if exceeded, may cause faulty operation or unrecoverable damage. It is recommended to follow the typical value.

Note (3) The specified VCC,VDDA,VGH,VGL current and power consumption are measured under the typical voltage, Fv= 60Hz condition and black pattern.

Note (4) The life time is determined as the sum of the lighting time till the luminance of LCD at the typical LED current reducing to 50% of the minimum value under normal operating condition.

Note (5) Definition of V_{LED} and P_{LED}

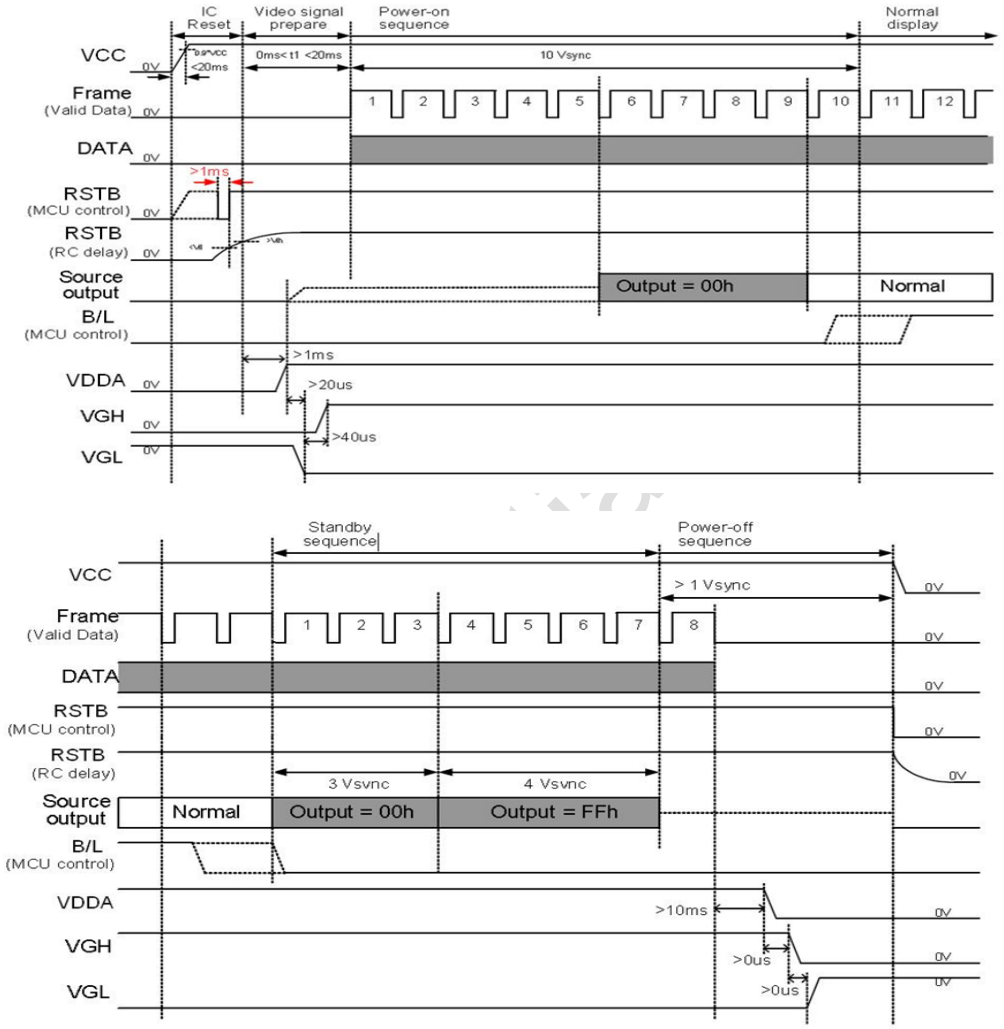
$V_{LED} = V_F \times 7$, $P_{LED} = V_{LED} \times I_F \times 3$



4.5 Power ON/OFF Sequence

1. Interface signals are also shown in the chart. Signals from any system shall be Hi-resistance state or low level when VCC voltage is off.
2. When system first start up, should keep the VCC high time longer than 200ms, otherwise may cause image sticking when VCC drop off.

Figure 11 Power Sequence



Power on Sequence: VCC➔RSTB➔ VDDA ➔ VGL ➔ VGH ➔ Data➔B/L

Power off Sequence: B/L➔ Data ➔ VDDA ➔VGH ➔ VGL ➔RSTB ➔ VCC

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
VCC power source slew time	TPOR	-	-	20	ms	From 0V to 90%VCC
RSTB active pulse width	TRSTB	1	-	-	ms	-

5.0 Mechanical Characteristics

5.1 Outline Drawing

Figure 12 Reference Outline Drawing (Front Side)

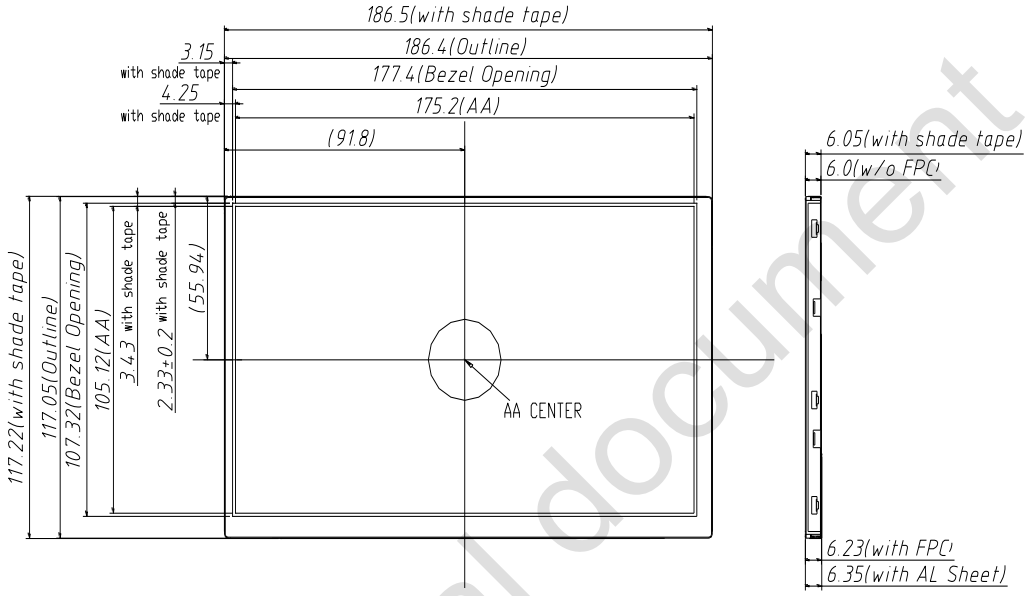
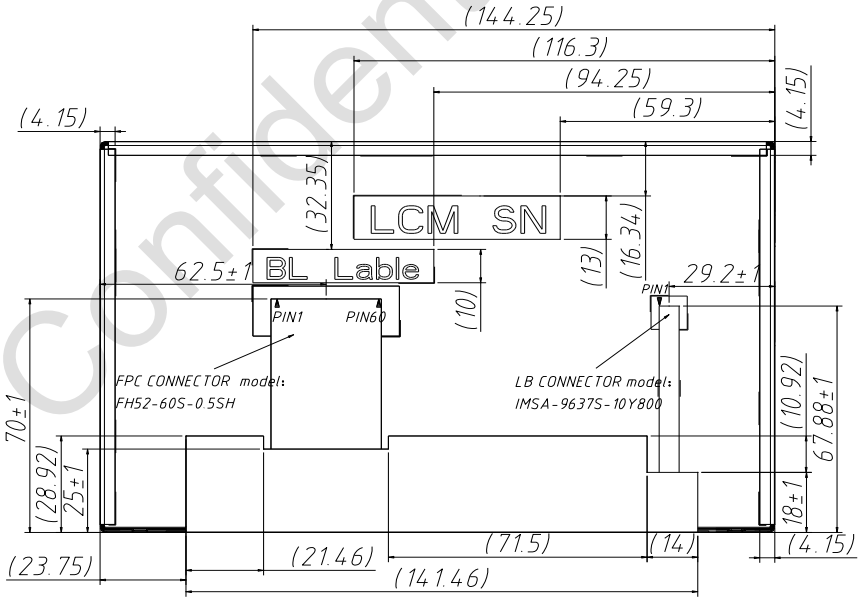


Figure 13 Reference Outline Drawing (Back Side)



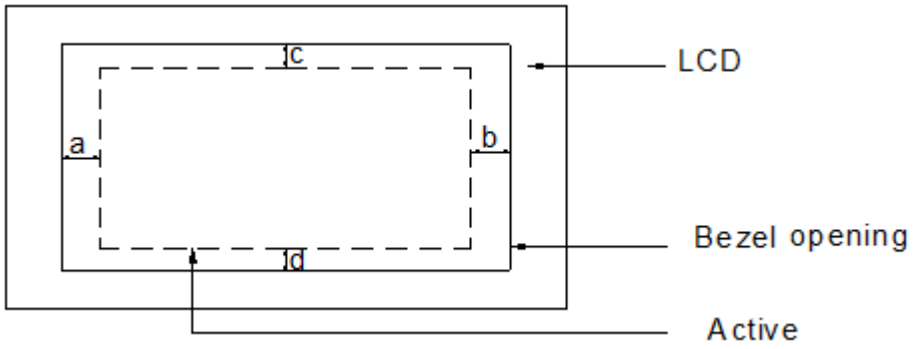
Note: Not marked tolerance is ±0.3mm Unit：mm

5.3 Dimension Specifications

Table 12 Module Dimension Specifications

Item	Min.	Typ.	Max.	Units
Width	186.2	186.5	186.8	mm
Height	116.92	117.22	117.52	mm
Thickness	6.05	6.35	6.65	mm
Weight	-	195	215	g
| a-b | & | c-d |	-	-	0.6	mm

Figure 14 BM Area



6.0 Reliability Conditions

Table 13 Reliability Condition

Item		Package	Test Conditions		Note
High Temp. Operating		Module	Tgs=85℃,500hrs		(1),(2),(3),(4)
High Temp. Storage			Ta=90℃, 500hrs		(1),(3),(4)
Low Temp. Operating			Ta=-30℃, 500hrs		(1),(2),(3),(4)
Low Temp. Storage			Ta=-40℃, 500hrs		(1),(3),(4)
High Temp. High Humidity Operating			Tgs=60℃,90%RH, 500hrs		(1),(2),(3),(4)
High Temp. High Humidity Storage			Ta=60℃,90%RH, 500hrs		(1),(3),(4)
Thermal Shock Non-operating Test			-40℃-85℃, 60min/each cycle,500cyc		(1),(3),(4)
Thermal Cycle			-30~85°C,20%~90%RH, 4cycle,29hrs/cycle (25°C/50%→85°C/20%,1hrs; 85°C/20%,6hrs; 85°C/20%→60°C/90%,1hrs; 60°C/90%,6hrs 60°C/90%→-30°C/0%,2hrs; -30°C/0%,12hrs; -30°C/0%→25°C/50%,1hrs;)		(1),(2),(3),(4)
ESD	Operating		Air	Voltage: ±5KV,±10KV,±15KV (C=150pF,R=150Ω), Class C	(1)(2)(6)

Note (1) A sample can only have one test. Outward appearance, image quality and optical data can only be checked at normal conditions according to the IVO document before reliable test. Only check the function of the module after reliability test.

Note (2) The setting of electrical parameters should follow the typical value before reliability test.

Note (3) During the test, it is unaccepted to have condensate water remains. Besides, protect the module from static electricity.

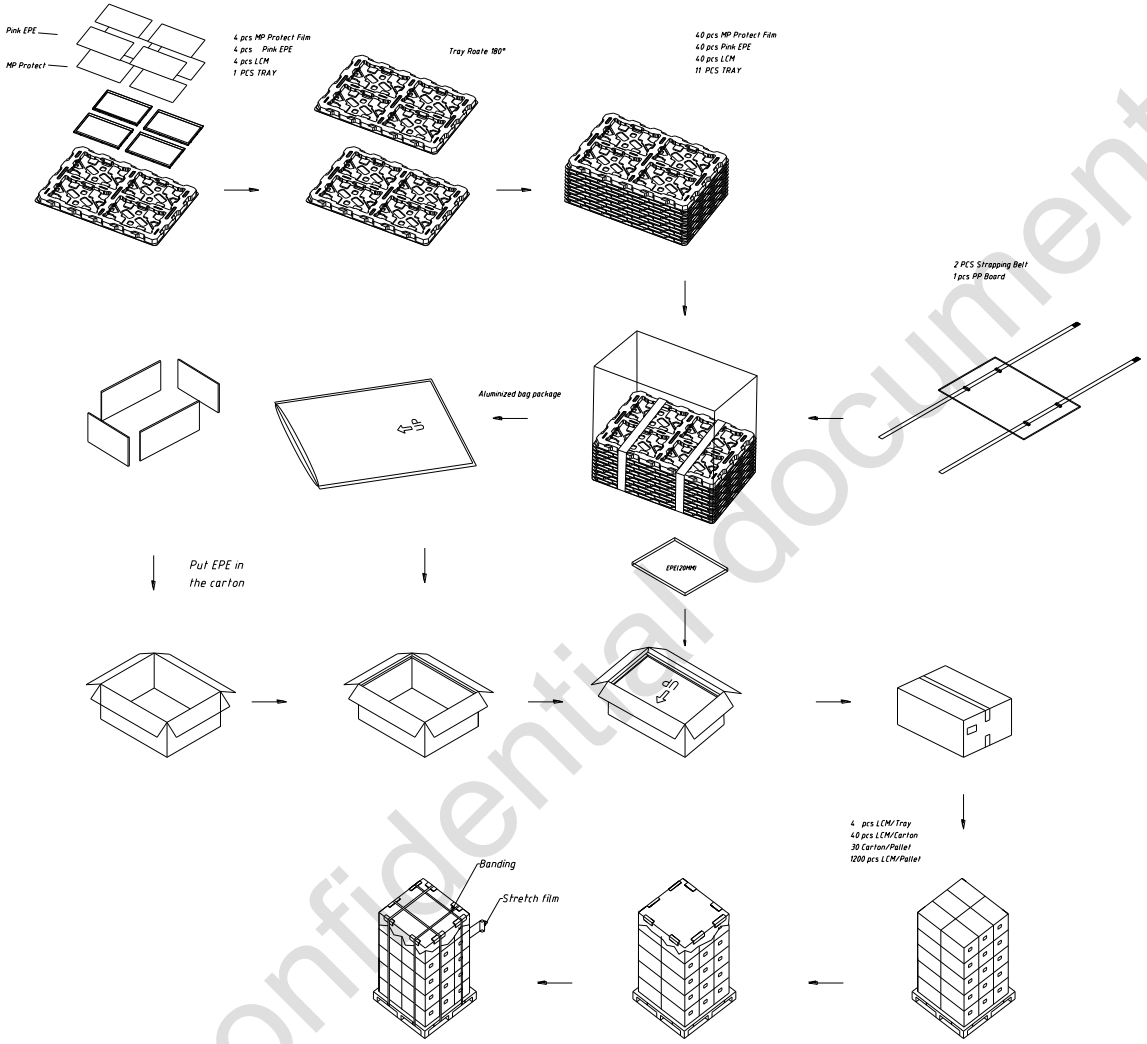
Note (4) The sample must be released for 24 hours under normal conditions before judging. Furthermore, all the judgment must be made under normal conditions. Normal conditions are defined as follow: Temperature: 25℃, Humidity: 55± 10%RH. T_a= Ambient Temperature, T_{gs}= Glass Surface Temperature.

Note (5) The module should be fixed firmly in order to avoid twisting and bending.

Note (6) It could be regarded as pass, when the module recovers from function fault caused by ESD after resetting.

7.0 Package Specification

Figure 16 Packing Method



8.0 Lot Mark

Note: This picture is only an example.

8.1 20 Lot Mark

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

Code 1,2,4,5,6,7,8,9,10,11,16: IVO internal flow control code.
Code 3: Production Location.
Code 12: Production Year.

Year	2006	2007	2008	2009	2010	2011	2012	2013	.....	2035
Mark	6	7	8	9	A	B	C	D	.....	Z

Code 13: 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

Code 14,15: Production Day.
Code 17,18,19,20: Serial Number.

8.2 10 Customer Code

1	2	3	4	5	6	7	8	9	10

Code 1: Production Year.
Code 2~3: Production Month.
Code 4~5: Production Day:
Code 6~10: Serial Number.

9.0 General Precaution

9.1 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 lead to be catastrophic.

9.2 Handling Precaution

(1)The LCD product should be operated under normal conditions.

Normal conditions are defined as below:

Temperature: 25℃

Humidity: 55±10%

Display pattern: continually changing pattern (Not stationary)

(2) Brightness and response time depend on the temperature. (It needs more time to reach normal brightness in low temperature.)

(3) It is necessary for you to pay attention to condensation when the ambient temperature drops suddenly. Condensate water would damage the polarizer and electrical contacted parts of the module. Besides, smear or spot will remain after condensate water evaporating.

(4) If the absolute maximum rating value was exceeded, it may damage the module.

(5) Do not adjust the variable resistor located on the module.

(6) Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding may be important to minimize the interference.

(7) Image sticking may occur when the module displayed the same pattern for long time.

(8) Do not connect or disconnect the module in the “power on” condition. Power supply should always be turned on/off by the “power on/off sequence”

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

9.3 Mounting Precaution

(1) All the operators should be electrically grounded and with Ion-blown equipment turning on when mounting or handling. Dressing finger-stalls out of the gloves is important for keeping the panel clean during the incoming inspection and the process of assembly.

(2) It is unacceptable that the material of cover case contains acetic or chloric. Besides, any other material that could generate corrosive gas or cause circuit break by electro-chemical reaction is not desirable.

(3) The case on which a module is mounted should have sufficient strength so that external force is not transmitted to the module directly.

(4) It is obvious that you should adopt radiation structure to satisfy the temperature specification.

(5) So as to acquire higher luminance, the cable of the power supply should be connected directly with a minimize length.

(6) It should be attached to the system tightly by using all holes for mounting, when the module is assembled. Be careful not to apply uneven force to the module，especially to the PCB on the back.

(7) A transparent protective film needs to be attached to the surface of the module.
(8) Do not press or scratch the polarizer exposed with anything harder than HB pencil lead. In addition, don't touch the pin exposed with bare hands directly.
(9) Clean the polarizer gently with absorbent cotton or soft cloth when it is dirty.
(10) Wipe off saliva or water droplet as soon as possible. Otherwise, it may cause deformation and fading of color.
(11) Desirable cleaners are IPA (Isopropyl Alcohol) or hexane. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
(12) Do not disassemble or modify the module. It may damage sensitive parts in the LCD module, and cause scratches or dust remains. IVO does not warrant the module, if you disassemble or modify the module.

9.4 Handling Precaution

(1) Static electricity will generate between the film and polarizer, when the protection film is peeled off. It should be peeled off slowly and carefully by operators who are electrically grounded and with Ion-blown equipment turning on. Besides, it is recommended to peel off the film from the bonding area.
(2) The protection film is attached to the polarizer with a small amount of glue. When the module with protection film attached is stored for a long time, a little glue may remain after peeling.
(3) If the liquid crystal material leaks from the panel, keep it away from the eyes and mouth. In case of contact with hands, legs or clothes, it must be clean with soap thoroughly.

9.5 Storage Precaution

When storing modules as spares for long time, the following precautions must be executed.
(1) Store them in a dark place. Do not expose 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.
(3) It is recommended to use it in a short-time period, after it's unpacked. Otherwise, we would not guarantee the quality.

9.6 Others

When disposing LCD module, obey the local environmental regulations.