INNOLUX 群創光電

PRODUCT SPECIFICATION

Doc. Number:

□ Tentative Specification

□ Preliminary Specification

■ Approval Specification

MODEL NO.: DJ080IA
SUFFIX: 10A

Customer:

APPROVED BY **SIGNATURE**

Name / Title

Note :

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By
Henry.Chien	Annie.Lu	Hanwei.Lin

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REVISION HISTORY

Version	Date	Page	Description
0.0	Mar., 31, 2015	All	Spec Ver.0.0 was first issued.
0.1	Apr., 17, 2015	5, 8, 9, 20	Page 5 connector type; page 8 Absolute Maximum Ratings; page 9 Typical Operation Conditions; page 20 Reliability Test Items
1.0	Jun.., 08, 2015	8, 10, 16	Page 8 LED current, page 10 B/L current, page 16 B/L current
1.1	Jun., 15, 2015	22	Page 22 Mechanical Drawing update
1.2	Jun., 18, 2015	22	Page 22 Mechanical Drawing update : define pin 1
1.3	Aug., 25, 2015	4, 9, 10, 14	Page 4, page 14 add DE mode only Page 9, page 10 modify AVDD 12.8V
1.4	Oct., 21, 2015	9, 16, 19, 22, 23, 24, 25	Page 4 General Specifications; Page 9 modify Vgl; Page16 modify Optical Specifications; Page 10 modify Current Consumption; Page 19 add note 8; Page 22 update Mechanical Drawing; Page 23 Packaging Material Table; Page 24-25 modify Package Drawing
1.5	Apr., 15, 2016	8, 10, 11, 16, 23, 24	Page 8 Typical Operation Conditions; Page 10 Backlight Driving Conditions; Page 11 modify power sequence ; Page 16 modify response time; Page23 update Mechanical Drawing; Page 24 Packaging Material Table: total weight
1.6	May, 27, 2016	10, 16	Page 10: Backlight Driving Conditions Page 16: add CR min. Value 700
1.7	Jul., 12, 2016	9, 22	Page 9: Typical Operation Conditions Page 22: Reliability Test Items
1.8	Jul., 21, 2016	9, 11	Page 9: Typical Operation Conditions Page11: Power sequence
1.9	Aug.,22,2016	11	Page11: Power sequence
2.0	Sep., 1, 2016	11,12	Page11,12: Power sequence
2.1	Sep.,7,2016	11	Page11: Power sequence

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PRODUCT SPECIFICATION

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	8.0 inch (Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1024 × 3(RGB) × 600	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.1725(W) × 0.1656(H) mm	
6	Active area	176.64(W) × 99.36(H) mm	
7	Module size	192.8W) ×116.9(H) ×6.4(D) mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	LVDS (DE mode only)	
11	Backlight power consumption	5W (Typ.)	
12	Panel power consumption	550mW (Typ.)	Note2
13	Weight	225g (Max.)	

Note 1: Refer to Mechanical Drawing.
Note 2: Test at white pattern.

2. Pin Assignment

FPC Connector is used for the module electronics interface. The recommended model is 20647-040E-01 manufactured by I-PEX.

Pin No.	Symbol	I/O	Function	Remark
1	NC	---	LCD Maker Internal Use	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	LCD Maker Internal Use	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	I	+ LVDS differential data input	
22	GND	P	Ground	
23	NC	---	LCD Maker Internal Use	
24	NC	---	LCD Maker Internal Use	

25	GND	P	Ground	
26	NC	---	LCD Maker Internal Use	
27	DIMO	O	Backlight CABC controller signal output	
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note3
34	U/D	I	Vertical inversion	Note3
35	VGL	P	Gate OFF Voltage	
36	CABCEN1	I	CABC H/W enable	Note2
37	CABCEN0	I	CABC H/W enable	Note2
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

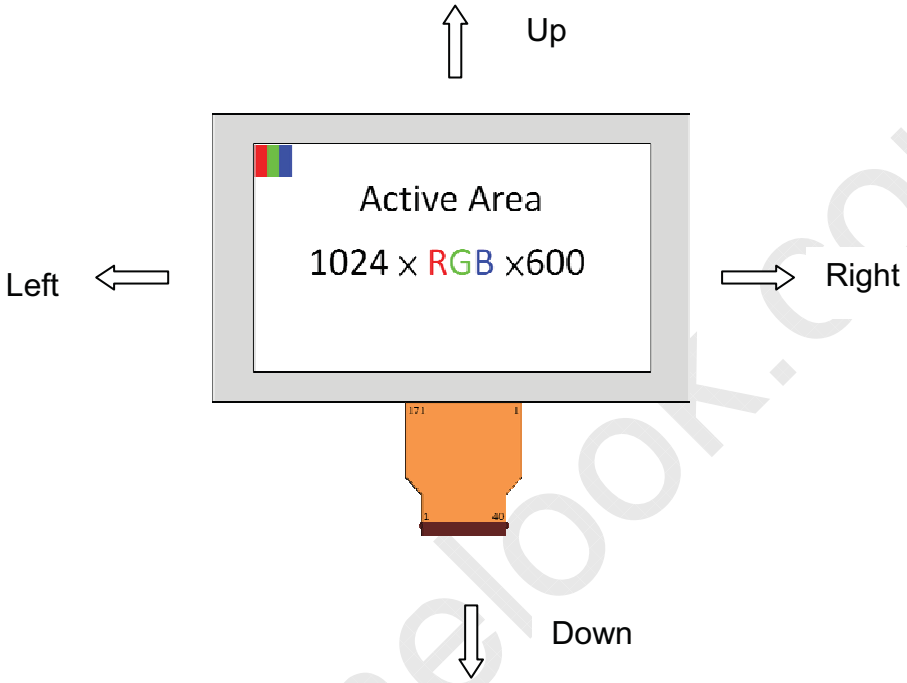
I: input, O: output, P: Power

Note 1: If LVDS input data is 6 bits ,SELB must be set to High;
If LVDS input data is 8 bits ,SELB must be set to Low.

Note 2: When CABC_EN=”00”, CABC OFF.
When CABC_EN=”01”, user interface image.
When CABC_EN=”10”, still picture.
When CABC_EN=”11”, moving image.
When CABC off, don’t connect DIMO, else connect it to backlight.

Note 3: When L/R=”0”, set right to left scan direction.
When L/R=”1”, set left to right scan direction.
When U/D=”0”, set top to bottom scan direction.
When U/D=”1”, set bottom to top scan direction.

Note: Definition of scanning direction.
Refer to the figure as below:



3. Operation Specifications

3.1. Absolute Maximum Ratings

(GND=AVSS=0V, Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{DD}	-0.3	5.0	V	
	AV_{DD}	6.5	13.5	V	
	V_{GH}	-0.3	42.0	V	
	V_{GL}	-20.0	0.3	V	
	V_{GH}-V_{GL}	-	40.0	V	
Operation Temperature	T_{OP}	-30	85	℃	
Storage Temperature	T_{ST}	-40	90	℃	

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.1.1. Typical Operation Conditions

(GND=AV_{SS}=0V, Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V_{DD}	3.0	3.3	3.6	V	Note 2
	AV_{DD}	12.6	12.8	13.0	V	
	V_{GH}	23.5	24.0	24.6	V	
	V_{GL}	-6.1	-5.6	-5.1	V	
Input logic high voltage	V_{IH}	0.7 V_{DD}	-	V_{DD}	V	Note 3
Input logic low voltage	V_{IL}	0	-	0.3 V_{DD}	V	

Note 1: Be sure to apply V_{DD} and VGL to the LCD first, and then apply VGH.
Note 2: V_{DD} setting should match the signals output voltage of customer's system board .
Note 3: RESET,STBYB,SELB,L/R,U/D,CABCEN0,CABCEN1.

3.1.2. Current Consumption

(GND=AV_{SS}=0V)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	-	0.3	1.0	mA	V_{GH} =24.0V
	I_{GL}	-	0.3	1.0	mA	V_{GL} = -5.6V
	I_{DD}	-	40	60	mA	DV_{DD} =3.3V
	IAV_{DD}	-	30	35	mA	AV_{DD} =12.8V

3.1.3. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V_L	16.8	18.6	20.4	V	Note 1
		18.24	20.76	23.76	V	Note 2
Current for LED backlight	I_L	-	268	-	mA	
LED life time	-	20,000	-	-	Hr	Note 3

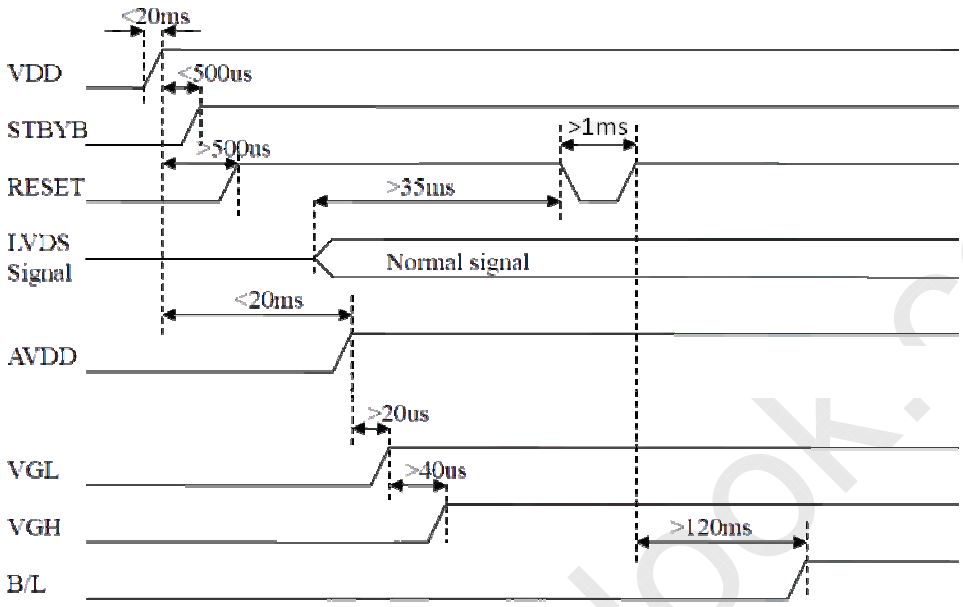
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L =320mA

Note 2: The LED Supply Voltage is defined by the number of LED at Ta= －30℃ and I_L =320mA

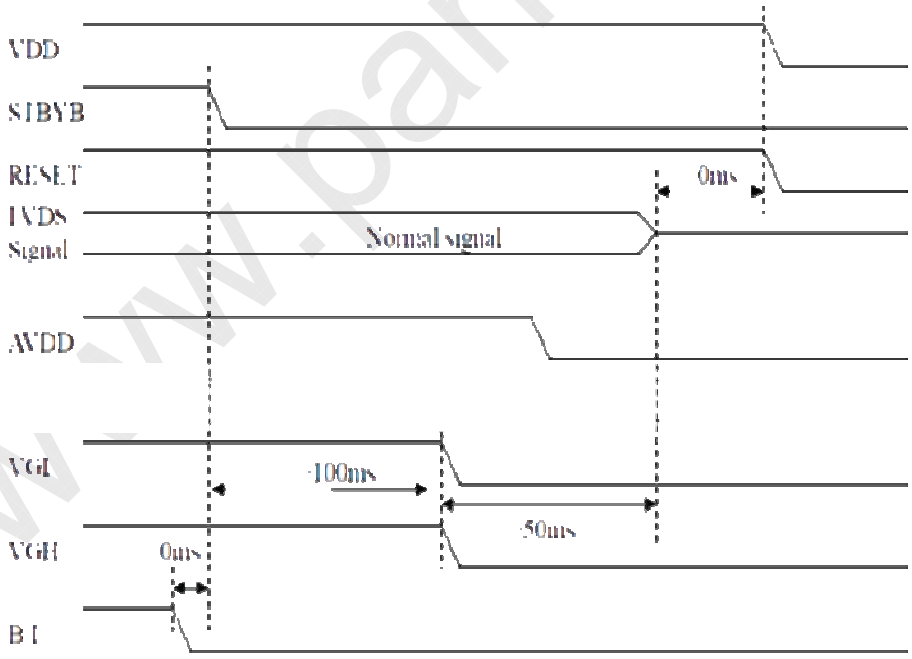
Note 3: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L = 320mA. The LED lifetime could be decreased if operating I_L is larger than 320mA.

3.2. Power Sequence

a. Power on:



b. Power off:

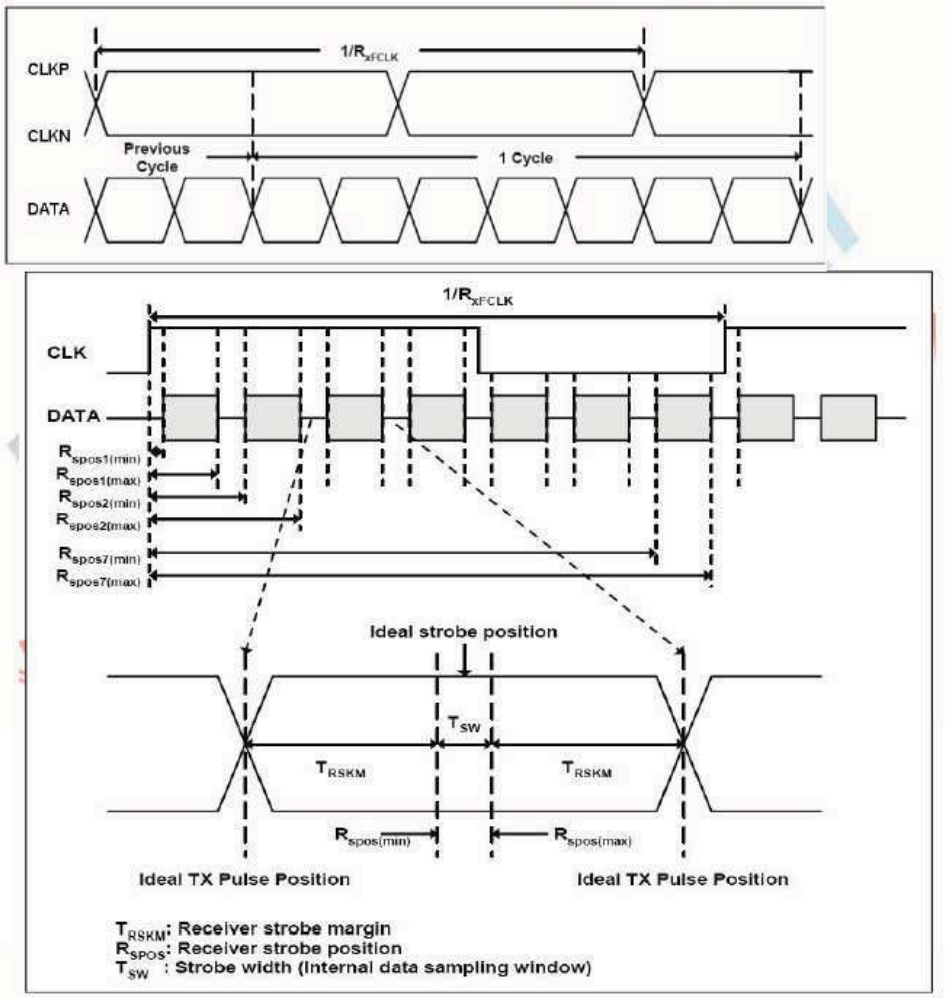


3.3. Timing Characteristics

3.3.1. AC Electrical Characteristics

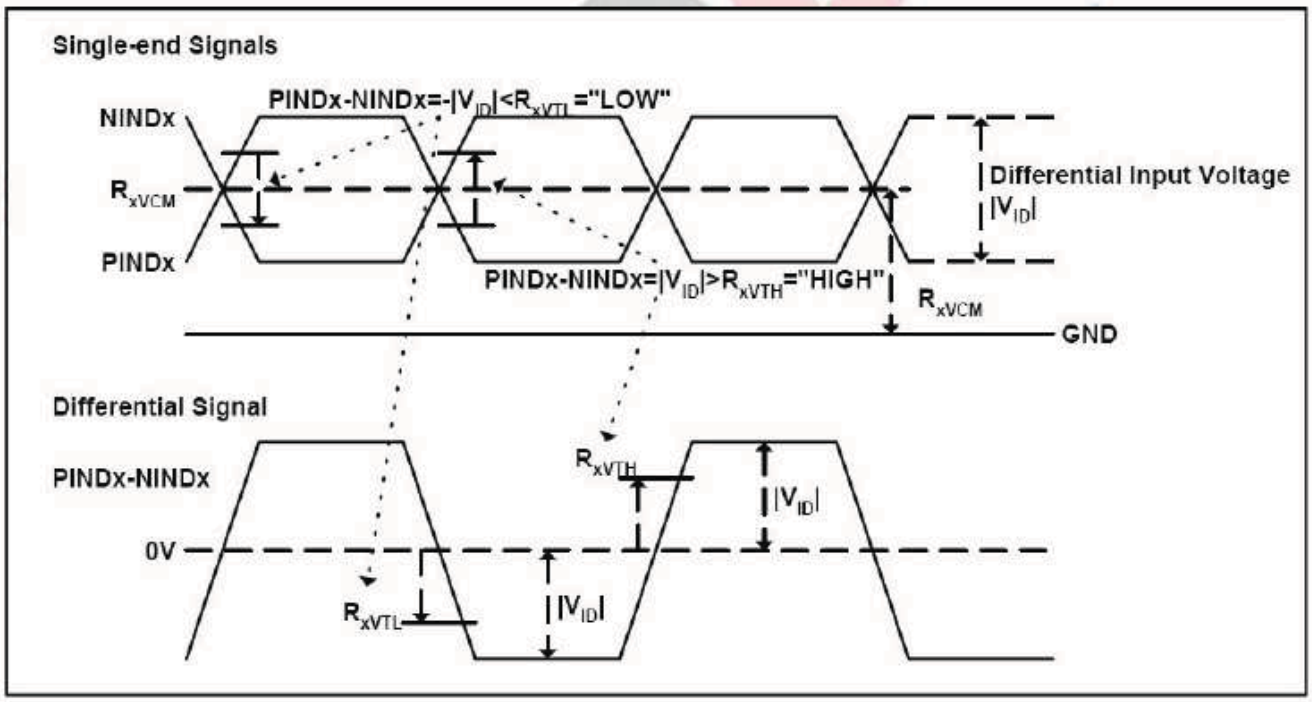
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	20	-	71	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	$4/(7* R_{xFCLK})$	-	ns	
Clock low time	T_{LVCL}	-	$3/(7* R_{xFCLK})$	-	ns	

3.3.2. Input Clock and Data Timing Diagram



3.3.3. DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low Threshold voltage	R_{xVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	RxVIN	0	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$\|V_{ID}\|/2$	-	$2.4-\|V_{ID}\|/2$	V	
Differential voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	RV_{xliz}	-10	-	+10	uA	



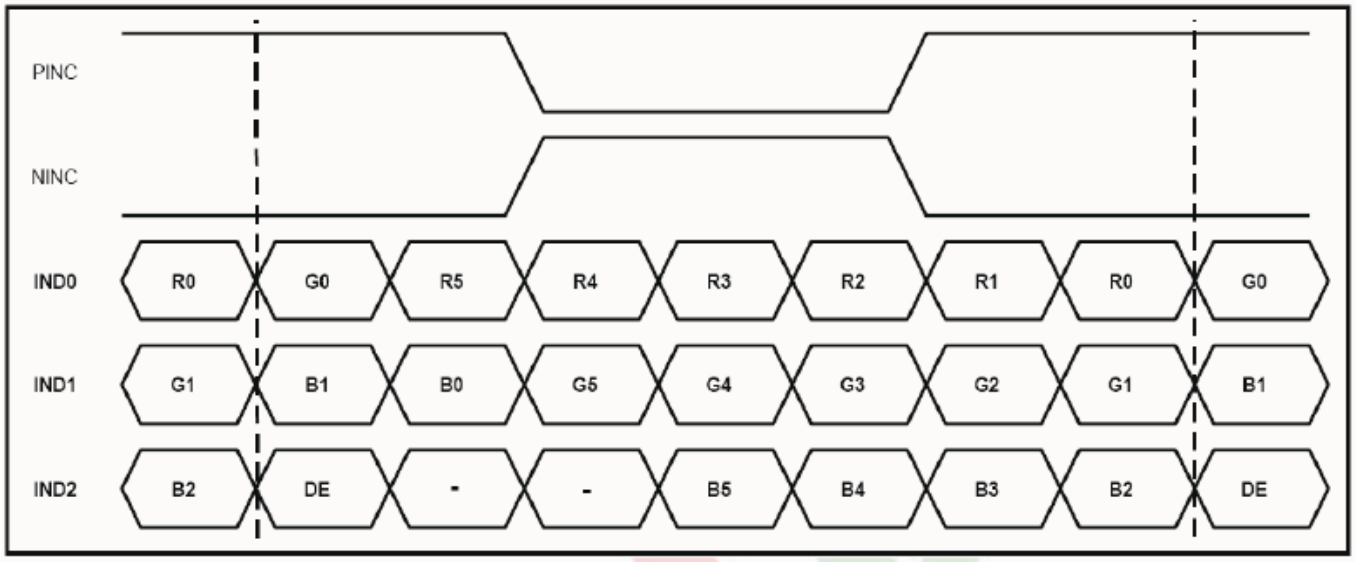
3.3.4. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd		1024		DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	Thb+thfp		600		H	
VS period time	tv	610	635	800	H	
VS Blanking	Tvb+tvfp	10	35	200	H	

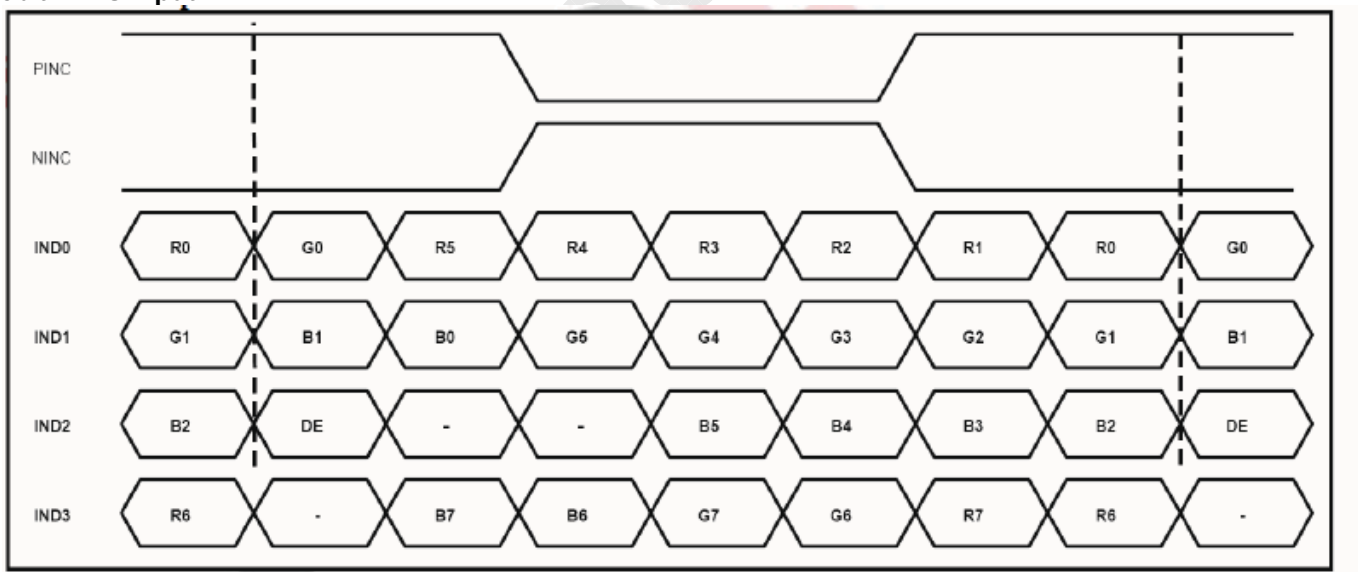
Note: DE mode only.

3.3.5. Data Input Format

6bit LVDS input



8bit LVDS input



Note: Support DE timing mode only, SYNC mode not supported.

4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180℃(9 o'clock)		85	-	degree	Note 1
	θ_R	Φ=0℃(3 o'clock)		85	-		
	θ_T	Φ=90℃(12 o'clock)		85	-		
	θ_B	Φ=270℃(6 o'clock)		85	-		
Response time	T_{ON}	Normal θ=Φ=0°	-	15	20	msec	Note 4
	T_{OFF}		-	10	15	msec	Note 4
Contrast ratio	CR		700	1000	-	-	Note 2 Note 5
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 6 Note 7
	W_Y		0.28	0.33	0.38	-	
NTSC			65	70		%	
Gamma			1.9	2.2	2.5		Note 3
Luminance	L		600	750	-	cd/m²	Note 7
Luminance uniformity	Y_U		75	80	-	%	Note 8

Test Conditions:

1. DV_{DD}=3.3V, I_L=268mA (Backlight current), the ambient temperature is 25℃.

2. The test systems refer to Note 2. and Note3.

Note 1: Definition of viewing angle range.
The view angel for Θ=85° is measured by BM-5A.

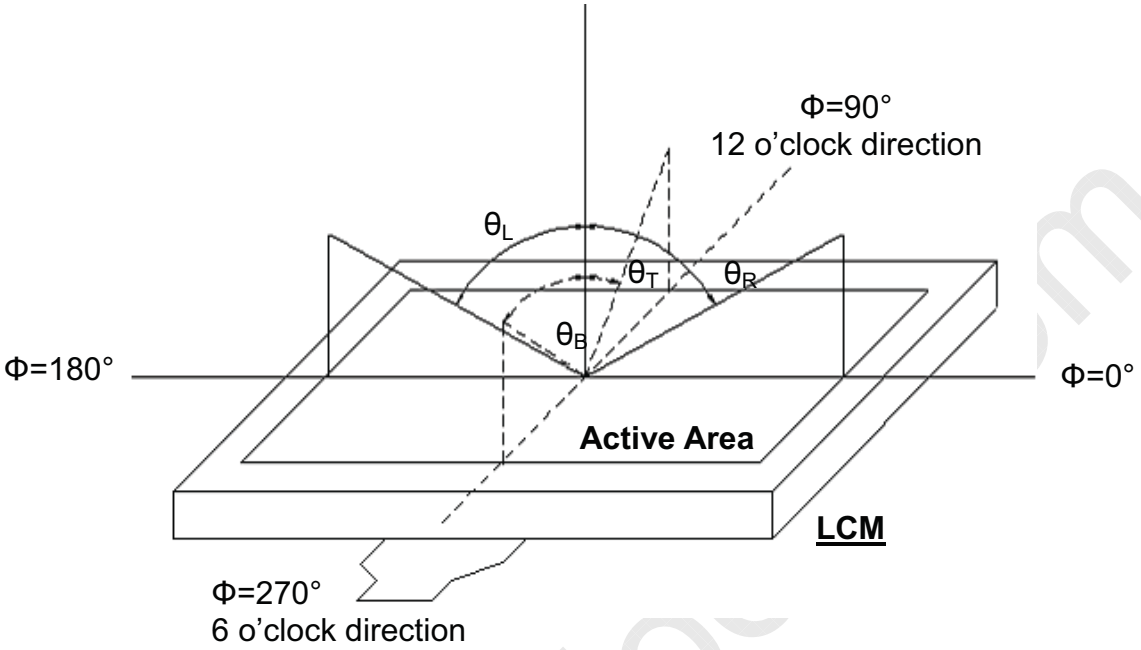


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.
The backlight has been light on for 30 minutes then measured the optical properties at the center point of the LCD screen in dark room. The color chromaticity、contrast ratio are measured by DMS 803.

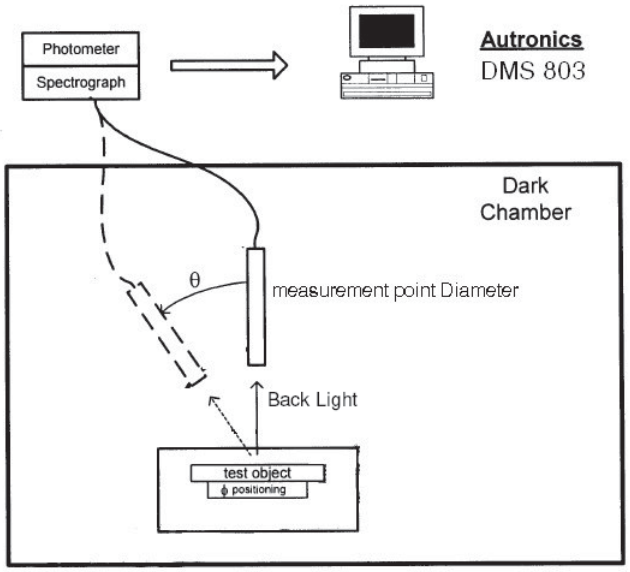


Fig. 4-2 Optical measurement system setup

Note 3: Definition of gamma curve measurement system.
The backlight has been light on for 30 minutes then measured the optical properties at the center point of the LCD screen in dark room. The gamma is measured by SR3.

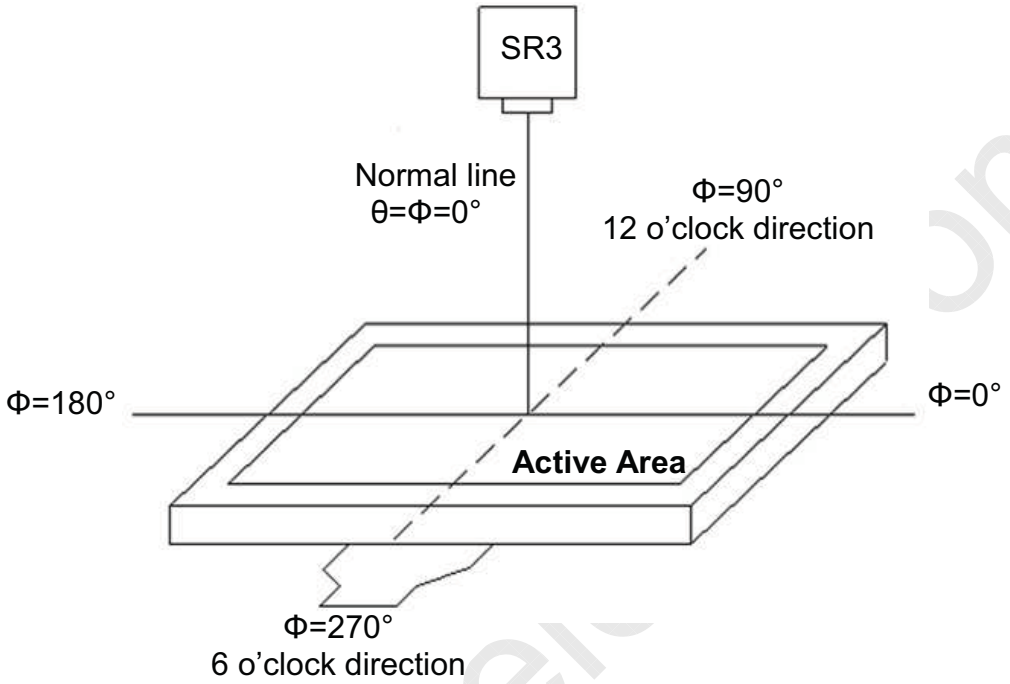


Fig. 4-3 Gamma curve measurement system setup

Note 4: Definition of response time
The response time is measured by photo detector of oscilloscope.

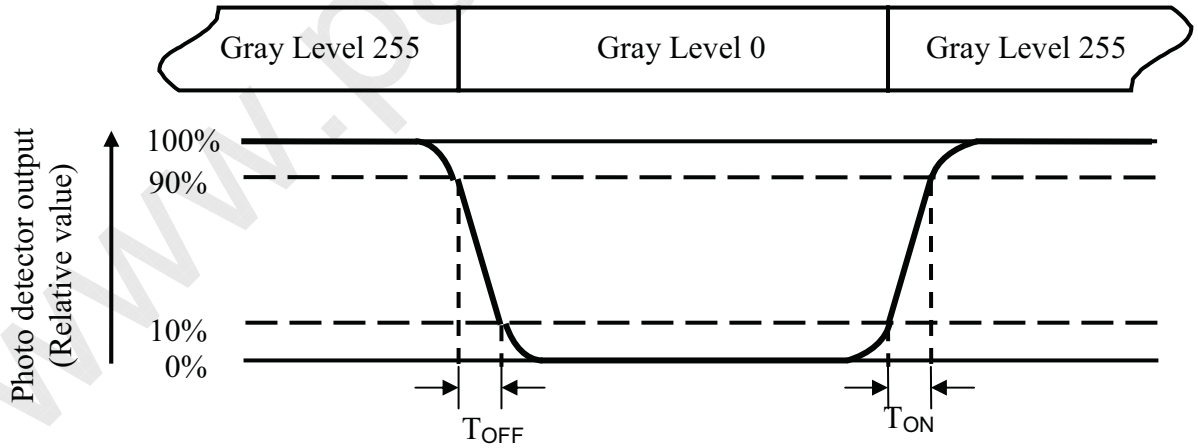


Fig. 4-4 Definition of response time

Note 5: Definition of contrast ratio

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

Note 6: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 7: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=(268mA).

Note 8: Definition of luminance uniformity
Active area is divided into 9 measuring areas (Refer to Fig. 4-4).

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L----- Active area length W----- Active area width

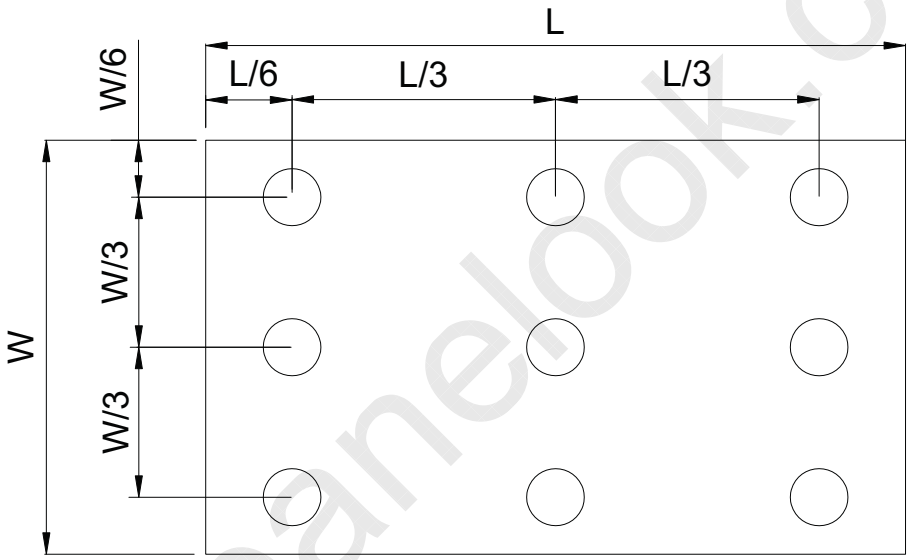


Fig. 4-5 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.
B_{min} : The measured minimum luminance of all measurement position.

Note 9: Definition of flicker
The flicker is measured by CA210. The luminance signal is processed by the FFT analyzer (Fast Fourier Transform Analyzer), and is displayed in a form of energy distribution of frequency components (Fig. 4-6).

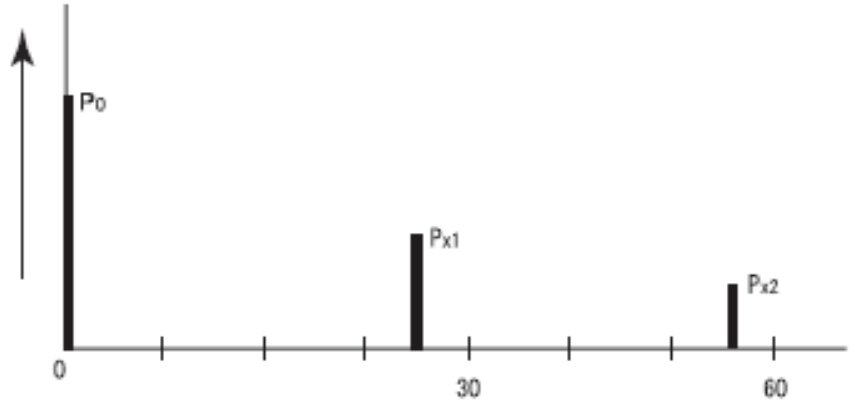


Fig. 4-6 Energy distribution of frequency components by FFT

As shown in Fig. 4-6, when two or more frequency components (P_0, P_{x1}, P_{x2}) exist, the maximum value among all the frequency components (P_{x1}, P_{x2} in the case of Fig. 4-6) except for P_0, that is the component of frequency 0, will be set as P_x.

$$\text{Flicker amount} = 10 \times \log (P_x/P_0) \text{ [dB]}$$

5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage Test	90ºC, 500 hours	(1) (2) (4)
Low Temperature Storage Test	-40ºC, 500 hours	
High Temperature Operation Test	85ºC, 500 hours	
Low Temperature Operation Test	-30ºC, 500 hours	
High Temperature & High Humidity Operation Test	60ºC, RH 90%, 500 hours	
Thermal Shock	(-30℃ 30min)→(85℃ 30min)]/cycle，(Ramp rate≧20℃/min) , 100cycles	
ESD Test (Operation)	Condition 1：C = 150pF, R = 330Ω Contact Discharge, ± 8KV Condition 2：C = 150pF, R = 330Ω, Air Discharge, ± 15KV	(5)
Mechanical Shock	100G, 6ms, half sine wave, 3 times for each direction of ±X, ±Y, ±Z	(1)(3)
Mechanical Vibration	Frequency: 10 ~55~10Hz;Sweep Mode: Log Sweep Sweep time: 1Oct/min; Acceleration: 1.5G;Test time:2 hr for each direction of X, Y, Z.	(1)(3)
Packaging Vibration Test	1.47Grms X, Y, Z three axes (30min /axis) [Spectrum：5Hz(0.015G2/Hz)，100Hz(0.015G2/Hz)，200Hz(0.0037G2/Hz)]	
Packaging Drop Test	1corner, 3edges, 6faces (1 time/direction) <follow ISTA(1A) Height> 0kg≦W<10kg：76cm, 10kg≦W<19kg：61cm, 19kg≦W <28kg：46cm, 28kg≦W<45kg：31cm, 45kg≦W≦68kg：20cm	

Note (1) criteria : Normal display image with no obvious non-uniformity and no line defect.

Note (2) Evaluation should be tested after storage at room temperature for more than two hour

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Note (4) A certain level of Mura (non-uniformity) of dark / black image will happen several days after high temperature testing (H.T.T.). There is a slowly part recovery over a long time (several months). Such a long exposure time like in H.T.T. will normally not happen in a real application. Therefore the test H.T.T. was introduced to simulate cycles with normal conditions in-between but with the same total exposure time what show a significant reduced Mura.

The root cause is related to tension generated due to different amount of shrinking in the stack of layers in the polariser sheet. The effect is more significant on larger displays like this size. An investigation into alternative polariser material showed that there is no better alternative currently available.

Note (5) Criteria Class B: Some performance degradation allowed. No data loss. Self - recoverable No hardware failures.

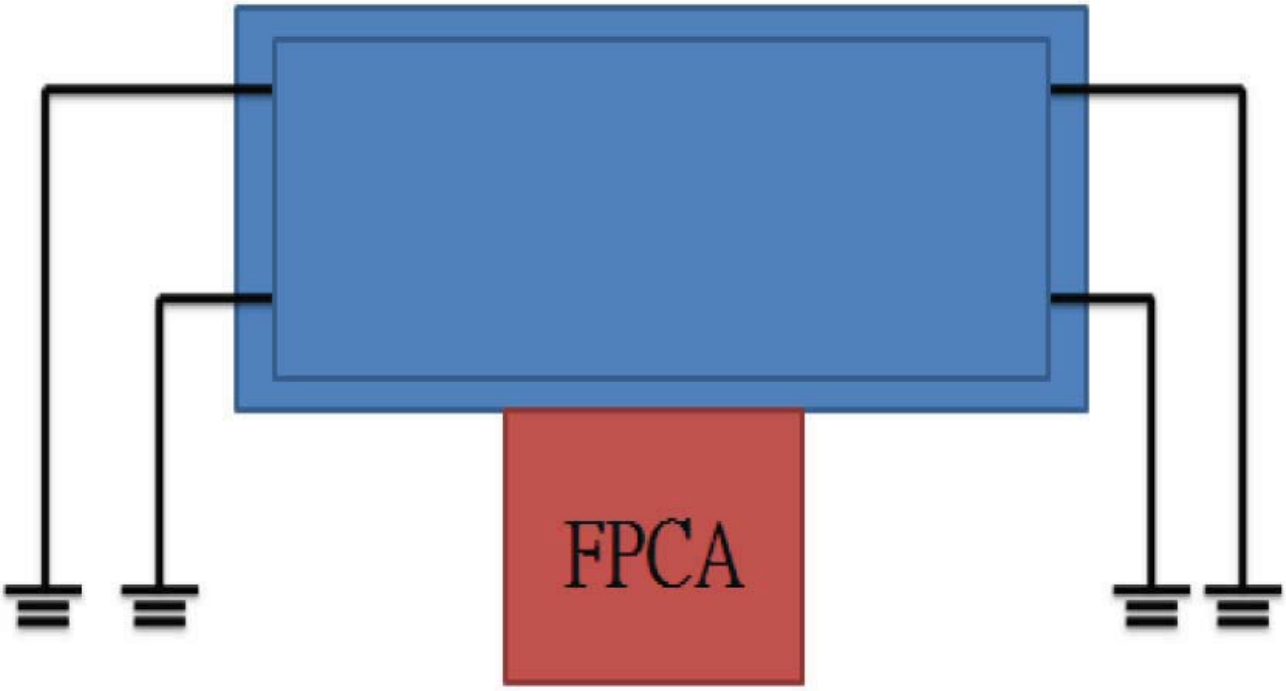


Fig. 5-1 Definition of grounding method

6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.

2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.

3. To avoid contamination on the display surface, do not touch the module surface with bare hands.

4. Keep a space so that the LCD panels do not touch other components.

5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.

6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.

7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.

2. Do not apply voltage which exceeds the absolute maximum rating value.

6.4. Storage

1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.

2. Do not store the module in surroundings containing organic solvent or corrosive gas.

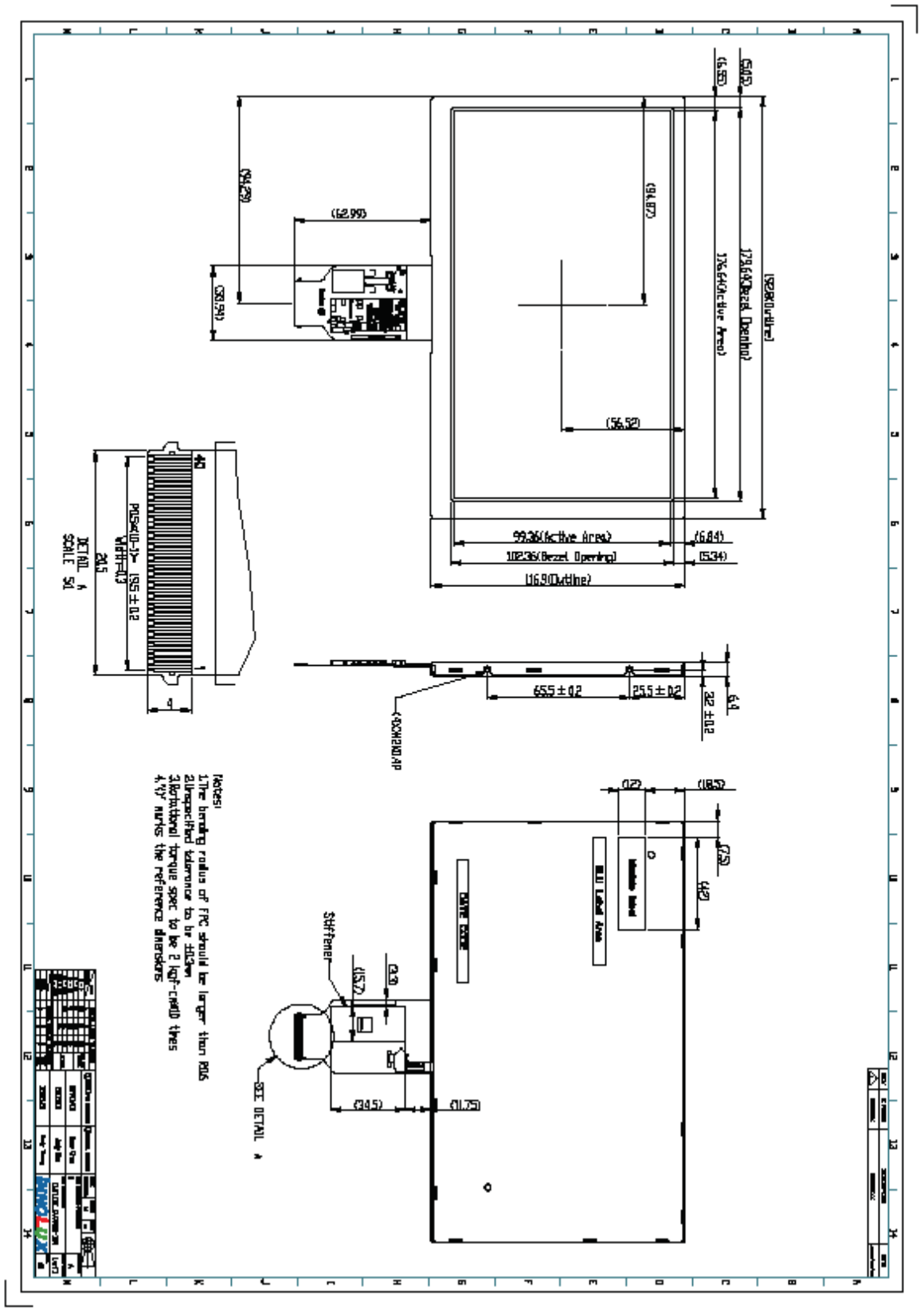
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.

2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

7. Mechanical Drawing



8. Package Drawing

8.1 Packaging Material Table

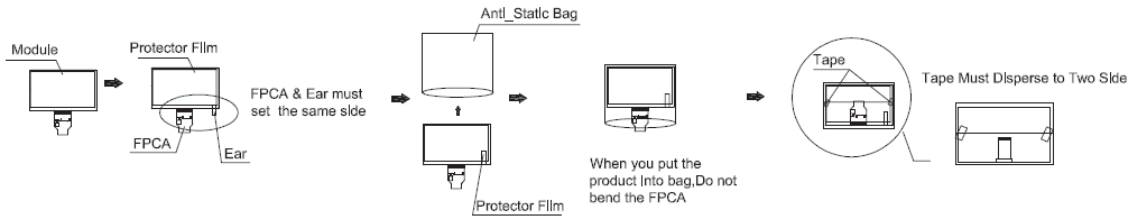
No.	Item	Model (Material)	Dimensions(mm)	Unit Weight (kg)	Quantity	Remark
1	LCM Module	Model name	192.8 × 116.9 × 6.4	0.22	30pcs	
2	EPO Box	EPO	376 x 330 x 241	0.6	1	
3	A/S Bag	PE	205 x 190 x 0.08	0.006	30	
4	Carton	Corrugated paper	398 x 352 x 273	0.9	1	
5	Total weight	8.28 Kg				

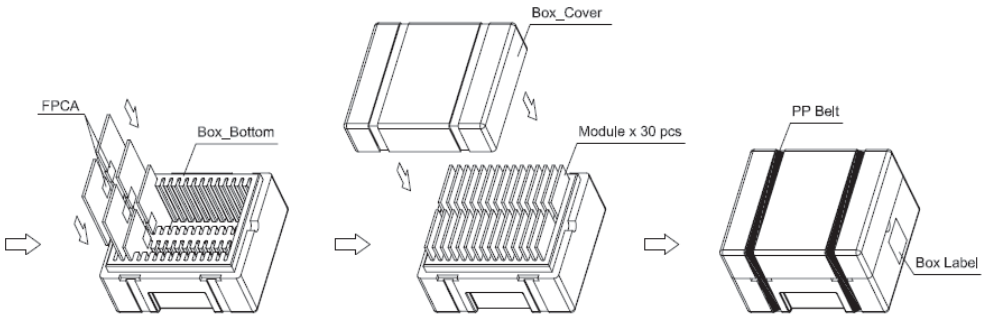
8.2 Packaging Quantity

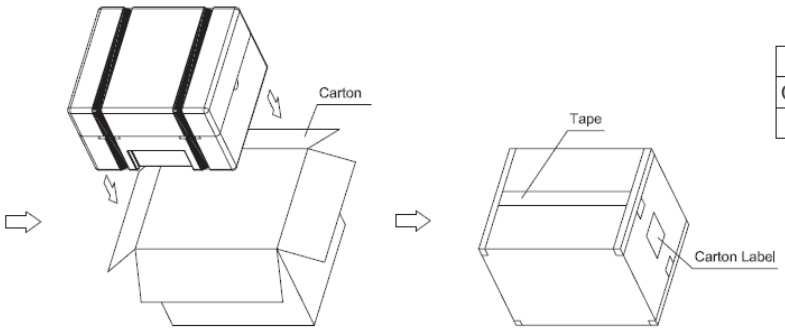
Total LCM quantity in Carton: no. of Partition 1 Rows x quantity per Row 30 = 30

8.3. Packaging Drawing

Package



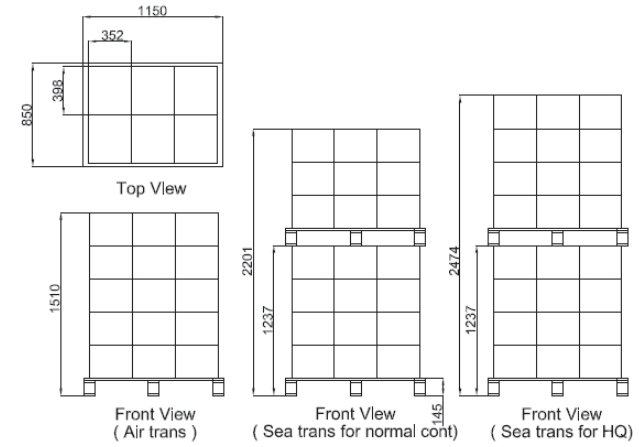




Box dimensions : 376 (L)x330(W)x241(H) (mm)	
Carton Box dimensions : 398 (L)x352(W)x273(H) (mm)	
Module / box (pcs)	30

8.4. Shipping Drawing

Shipping



Pallet Type .

Destlnatlon	Materlal	Pallet slze(mm)
For customer	Wood	L1150xW850xH145
-	-	-

Trans type	Box / Top Pallet	Box / Bottom Pallet
Air	0	30
Sea	18	24
Sea for HQ	24	24

Storage Codition

Destination	Value	Unlt
Temperature	0~35	°C
Humidity	40~80	%RH