InnoLux
群創光電

Doc. Number:

■ Tentative Specification

□ Preliminary Specification

□ Approval Specification

MODEL NO.: DD090IA
SUFFIX: 05A

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

REVISION HISTORY

Version	Date	Page	Description
0.0	2020/02/04	All	Product Specification first issue
0.1	2020/6/22	3 10	3.1 Pin Assignment 6.5 Data Input Timing
0.2	2020/8/3	1 2 20-21	1.2　TFT LCD Module General Specifications 2. Module construction 11. Package Drawing

Contents

PRODUCT SPECIFICATION

1. General Specifications

1.1 Overview

DD090IA-05A is a normally black IPS TFT Liquid Crystal Display module. This panel has a 9inches diagonally measured active display area with 1280RGB x 720 resolution. This product is composed of a TFT LCD panel, Polarizer, IC, FPCA, backlight, cover glass and ASF. The following describes the features of this product.

1.2 TFT LCD Module General Specifications

No.	Item	Specification	Remark
1	LCD size	9.0 inch (Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1280 x 3(RGB) x 720	
4	Display mode	Normally Black, Transmissive, AAS	
5	Dot pitch	0.0518(W) x 0.1554(H) mm	
6	Active area	198.912(W) x 111.888(H) mm	
7	Module size	225(W) x 145(H) x6.25(D) mm (Total Thickness) 210.5 (W) x 127(H) mm (BLU)	Note 1
8	Surface treatment	HCLR	
9	Color arrangement	RGB-stripe	
10	Interface	1-port LVDS (DE mode only)	
11	Backlight power consumption	(9.51)W	Note 2
12	Panel power consumption	(0.7)W	
13	Weight	Max. 275g	

Note 1: Refer to Mechanical Drawing.
Note 2: Base on I_L = 120 mA

1.3 Touch General Specifications

Key Parameters	Description	Unit
Touch Technology	Capacitive Multi-Touch	
Numbers of Channels	960 [X=40, Y=24]	Ch
Touch IC	NVT51900	-
Touch Method	Finger / Glove	-
Numbers of Touch	5	point
Accuracy of Finger(non-border)	±1.0	mm
Accuracy of Finger (border)	±2.0	mm
Linearity of Finger (non-border)	±1.5	mm
Linearity of Finger (border)	±2.5	mm
Finger Separation (Horizontal/Vertical)	<14	mm
Reporting rate	<15	ms
Response time	≦30	ms
Stylus diameter	8	mm
Glove (12mm acrylic)	2	mm

<Note> 1.Border is defined as the distance 5mm to the edge of AA
2. Materials used in gloves are silk, cotton and leather

2. Module construction

BALLOON Note :
1.RANGE OF BALLOON : 1~27
2.CRITICAL/SIGNIFICANT DIMENSION : 1,4~6,9~10,15,18~19,25~26

NOTEs :
1. NOT MARKED TOLERANCE IS ±0.5mm
2. "( )" MARK IS REFERENCE DIMENSION
3. CONNECTOR TYPE : MAIN FPCA : IRISO 12003S-40 PINS CONNECTOR
                    LIGHT BAR : IRISO 12001S-12 PINS CONNECTOR

INTERFACE BETWEEN CUSTOMER REAR COVER AND LCM

(7.25)(CG EXPOSING AREA)   MODULE BACK SIDE   (7.25)(CG EXPOSING AREA)
MAIN FPCA COMPONENT AREA   BOTTOM VIEW

(6.45)(CG EXPOSING AREA)   MODULE BACK SIDE   (11.5)(CG EXPOSING AREA)
MAIN FPCA COMPONENT AREA   RIGHT VIEW

NOTE :
1. CG EXPOSING AREA MUST BE INDEED LAMINATED BY DSA.
2. MODULE BACK SIDE MUST BE INDEED SUPPORTED BY SPONGE OR DSA. AND THE AIR GAP BETWEEN SPONGE AND MODULE SHOULD BE ZERO.
3. NEED KEEP CLEARANCE AREA FOR FPCA COMPONENT.

3. Input / output pinning and connector description

3.1 Input Connector

Recommended connector type : IRISO IMSA-12003S-40Y901 (40 pins).

Pin No.	Symbol	I/O	Function	Remark
1	GND	Power	Ground	
2	AVEE	Power	Analog negative voltage	
3	NC	dummy	Keep floating	
4	AVDD	Power	Analog positive voltage	
5	GND	Power	Ground	
6	UD	Input	Vertical shift direction selection	
7	RL	Input	Horizontal shift direction selection	
8	MUTEB	Input	MUTE mode control	
9	IND_OUT	Output	Error signal	
10	SDI	Input	SPI data in	
11	SCL	Input	SPI clock	
12	SDO	Output	SPI data out	
13	CSB	Input	SPI chip select	
14	STBYB	Input	Standby mode setting pin	
15	RESET	Input	Global reset pin	
16	GND	Power	Ground	
17	LVD3P	Input	LVDS data3(+)	
18	LVD3N	Input	LVDS data3(-)	
19	GND	Power	Ground	
20	LVCLKP	Input	LVDS clock(+)	
21	LVCLKN	Input	LVDS clock(-)	
22	GND	Power	Ground	
23	LVD2P	Input	LVDS data2(+)	
24	LVD2N	Input	LVDS data2(-)	
25	GND	Power	Ground	
26	LVD1P	Input	LVDS data1(+)	
27	LVD1N	Input	LVDS data1(-)	
28	GND	Power	Ground	
29	LVD0P	Input	LVDS data0(+)	
30	LVD0N	Input	LVDS data0(-)	
31	GND	Power	Ground	
32	INVFB	Input	Normal or Period Frame Inversion selection	
33	TCH_SCL	Input	Touch I2C clock	
34	TCH_SDA	In/Out	Touch I2C data	
35	TCH_ATTN	Output	Touch attention output	
36	GND	Power	Ground	
37	NC	dummy	Keep floating	
38	NC	dummy	Keep floating	
39	VDDI	Power	+3.3V power	
40	GND	Power	Ground	

3.2 Backlight

Recommended connector type : IRISO IMSA-12001S-12Y900 (12 pins).
Thermistor used: MURATA NCU15XH103F6SRC

Pin No.	I/O	Function	Remark
1	Power	LED Anode 1	
2	Power	LED Anode 2	
3	Power	LED Anode 3	
4	Power	LED Anode 4	
5	dummy	Floating	
6	Power	LED cathode 1	
7	Power	LED cathode 2	
8	Power	LED cathode 3	
9	Power	LED cathode 4	
10	dummy	Floating	
11	Output	NTC1	
12	Output	NTC2	
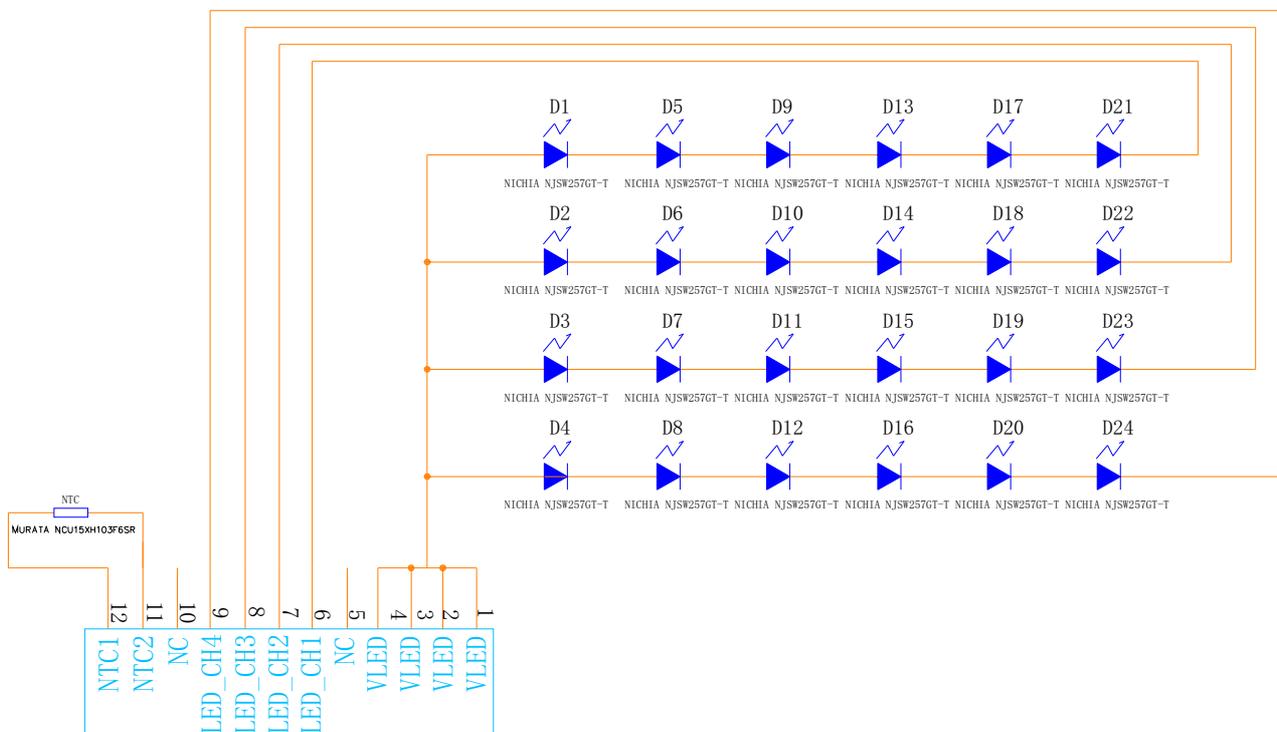
3.3 Backlight NTC Registor

To limit the heat dissipation under high ambient temperature (Ta). The LED string has a NTC (Negative Temperature Coefficient) to detect the ambient temperature of LED string. This NTC was located in the middle of FPC mounted with LED that acts as an indicator to show if the module is operated under safe operation region without overheating and damage. The detail application for this NTC, please refer to data sheet of Murata P/N : NCU15XH103F6SRC. About Murata NCU15XH103F6SRC application. Please follow component data sheet.

4. Absolute Ratings of Environment

There is a difference between the maximum value of a parameter's specification and its absolute maximum value. The maximum value indicates that the performance will be reduced when you go beyond this value, but this is reversible. Where the absolute maximum value as indicated in this section is a value beyond which permanent damage to the product or its function may be expected.
Function operation should be restricted to the conditions described under Normal Operating Conditions

Item	Symbol	Min.	Max.	Unit	Remark
Operating Temperature	OTR	-30	+85	℃	Note 1,2
Storage Temperature	STR	-40	+90	℃	Note 1

Note 1:   Panel surface temperature, no condensation allowed under any condition.
Note 2:   Operating from -40/-30'C possible, readable to some extent, cosmetic defects can happen.
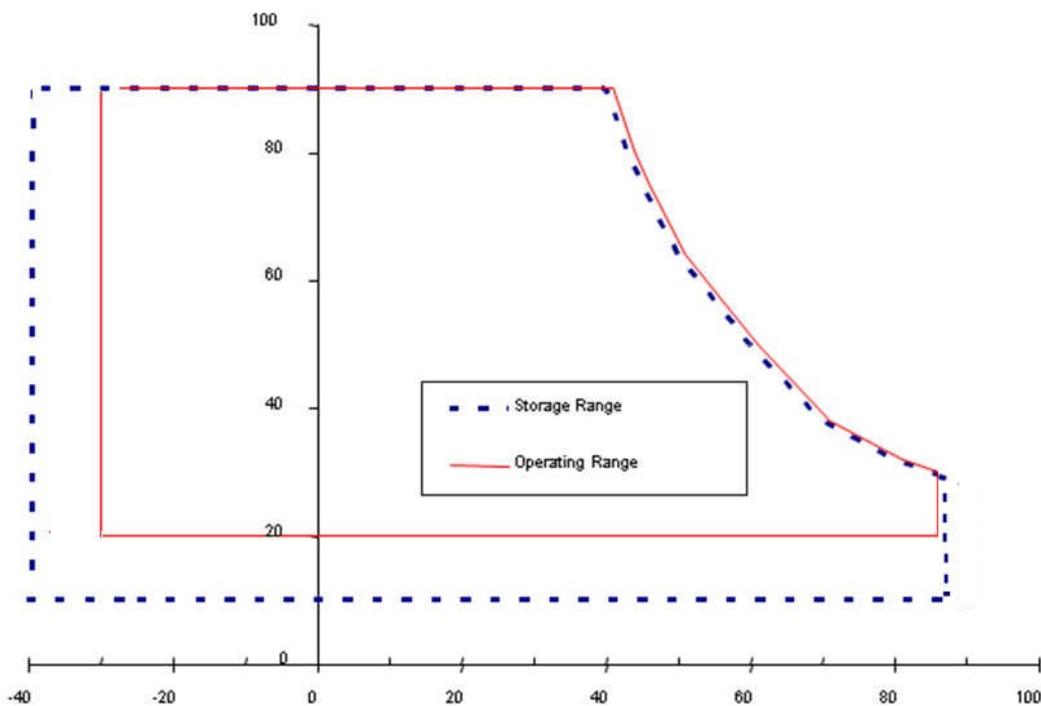
4.1   Absolute Ratings of TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Remark
Power Supply(+3.3V)	VDDI	-0.5	3.6	V	
Analog positive voltage	AVDD	-0.5	7.7	V	
Analog negative voltage	AVEE	-7.7	0.5	V	

4.2   Absolute Ratings of Backlight

Item	Symbol	Min.	Max.	Unit	Remark
LED Light Bar Power Supply Current	LED	10	150	mA	Per chain

Note: LED characteristics (for micro module only)

5. Electrical characteristics

5.1 Recommended operation conditions (based on GND=0V; Ta 25'C±2'C)

Item	Symbol	Min.	Typ	Max.	Unit	Remark
Power Supply Input Voltage	VDDI	3.0	3.3	3.6	V	
Analog supply voltage	AVDD	6.5	-	7.0	V	
Analog supply voltage	AVEE	-7.0	-	-6.5	V	
Power Supply Input Current	IVDDI	-	70	-	mA	
Analog supply Current	IAVDD	-	40	-	mA	
Analog supply Current	IAVEE	-	40	-	mA	
Power GND	GND	-0.2	0	0.3	V	
High Level Intput Voltage	VIH	VDD -0.4	-	-	V	
Low Level Intput Voltage	VIL	GND	-	GND+0.4	V	

Note : VDDI=3.3V, fv 60Hz, fCLK=66MHz , 25°C, Test Pattern : White Pattern

5.2 Backlight Unit (based on GND=0V; Ta 25'C±2'C)

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Power Supply Voltage		16.8	18.6	19.8	V	Per chain
LED Power Supply Voltage		2.8	3.1	3.3	V	Per LED *
LED Power Supply current		-	120		mA	Per chain, Control by fixed current mode
Power Consumption	P	8.07	8.93	9.51	W	Total backlight
LED Life Time	Lbl	10000			hours	
Number of Chains		-	4	-		
LEDs per Chain		-	6	-		

Note: The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ±2 'C and IL = typ setting (Per EA) until the brightness becomes 70% of its original value.

De-rating diagram (Recommended)
TBD

5.3 Self-Protection Function

| Item	Failure mode detection	Condition of IND_OUT=H	IC detection OK	IC detection NG
Power	Low voltage detection	AVDD error VDD error	IND_out: Low level	IND_out: High level
Interface	Clock	Clock signal error	IND_out: Low level	IND_out: High level
	H_sync	H_sync error	IND_out: Low level	IND_out: High level
	V_sync	V_sync error	IND_out: Low level	IND_out: High level
	DE	DE error	IND_out: Low level	IND_out: High level
Gate driver	STV_R	STV_R error	IND_out: Low level	IND_out: High level

6. LCM Interface Timing

6.1 LVDS Interface DC characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	RxVTH	+100	-	-	mV	RxVCM =1.2V
Differential input low threshold voltage	RxVTL	-	-	-100	mV	RxVCM =1.2V
Differential input common mode voltage	RxVCM	1.0	1.2	1.7-|VID|/2	V	
Differential input voltage	|VID|	0.4	-	0.6	V	
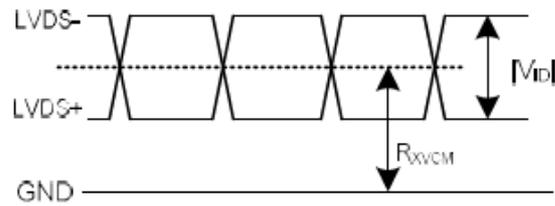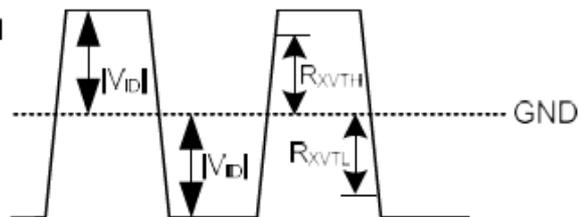
6.2   LVDS Interface AC characteristics

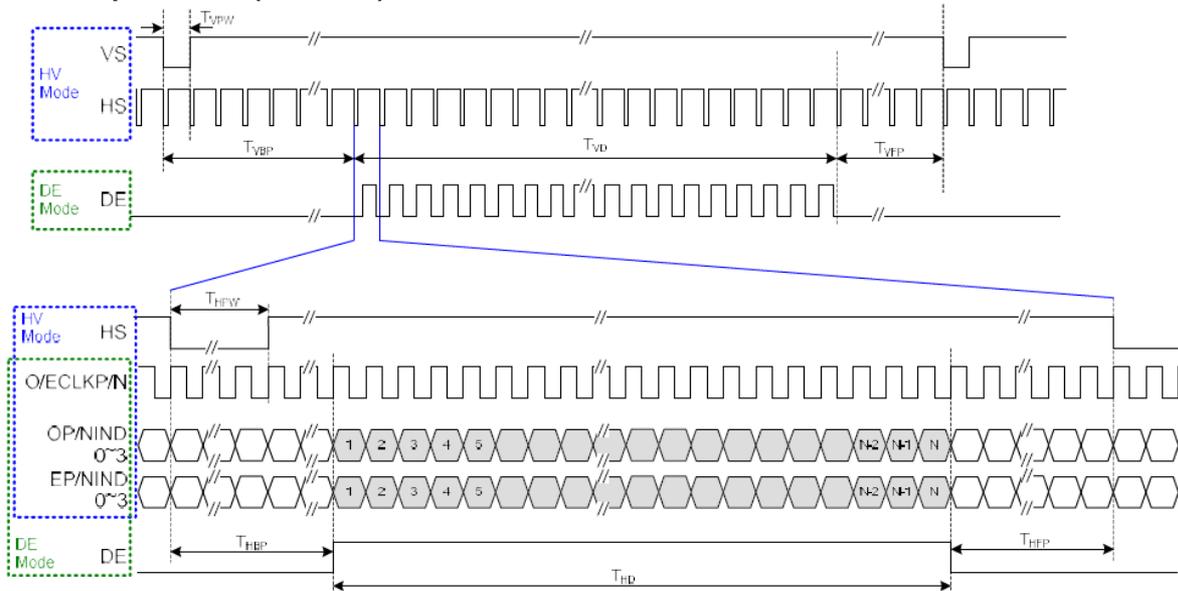| Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	RXFCLK	25	-	110	MHz	Refer to input timing table for each display resolution
Input data skew margin	TRSKM	-	-	0.25	UI	
Clock high time	TLVCH	-	4/(7*RXFCLK)	-	ns	
Clock low time	TLVCL	-	3/(7*RXFCLK)	-	ns	
PLL wake-up time	TenPLL	-	-	500	us	
SSC Modulation Frequency	SSCMF	30	-	93	KHz	LVDS clock = 85MHz ∣ SSCMR ∣ ≦ 3%
SSC Modulation Rate	SSCMR	-3	-	3	%	LVDS clock = 85MHz center spread SSCMF = 30~93KHz
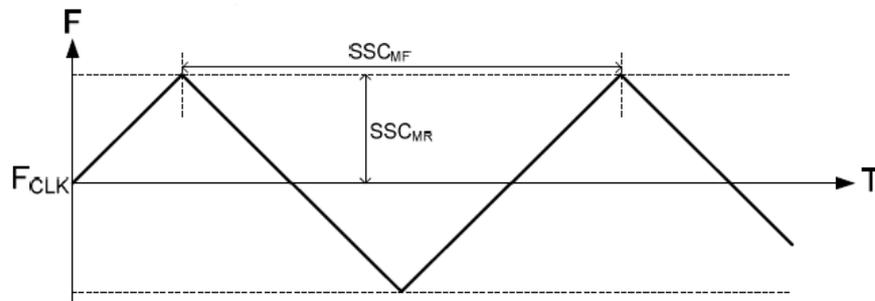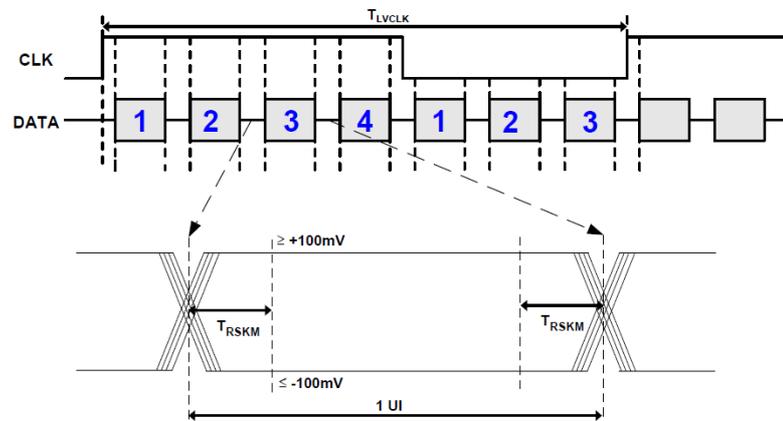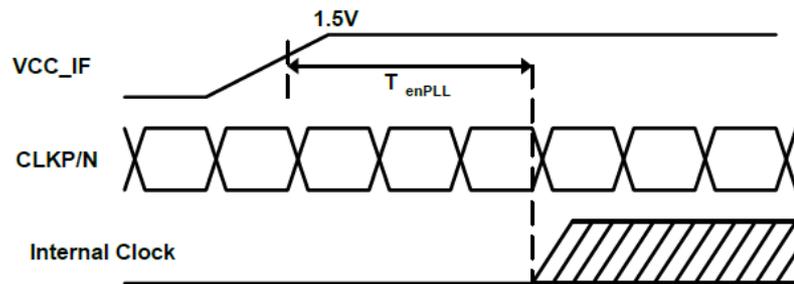
6.3 LVDS input format
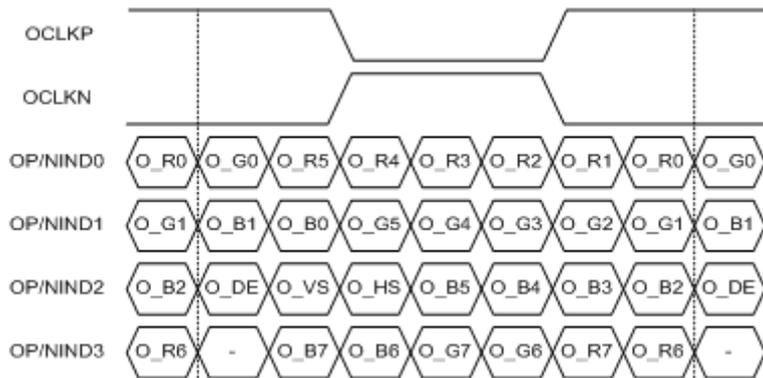
VESA format (8bit)
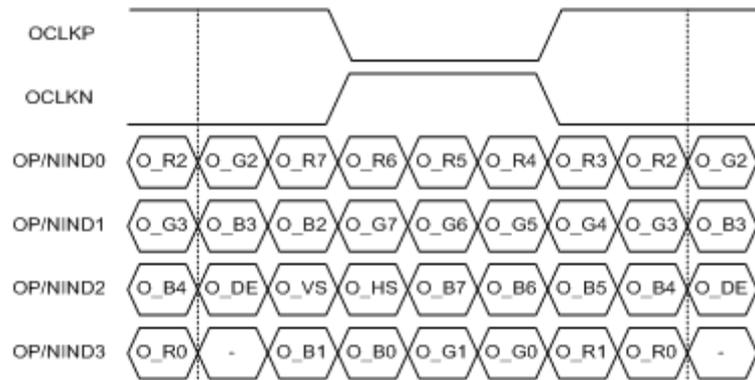
JEIDA format (8bit)

6.4 Data Input format (DE mode)

6.5   Data Input Timing

Table 1. HV mode for 1280RGBx720

Parameter	Symbol	Min.	Typ.	Max.	Unit
DCLK frequency	FDCLK	68.7	71	94.5	MHz
Horizontal display area	THD		1280		DCLK
HS period time	TH	1340	1360	1538	DCLK
HS pulse width	THPW	25	--	40	DCLK
HS back porch	THBP	48	64	72	DCLK
HS front porch	THFP	12	16	186	DCLK
Vertical display area	TVD		720		H
VS period time	TV	854	870	1024	H
VS pulse width	TVPW	1	--	20	H
VS back porch	TVBP	4	6	152	H
VS front porch	TVFP	130	144	152	H

Table 2. DE mode for 1280RGBx720

Parameter	Symbol	Min.	Typ.	Max.	Unit
DCLK frequency	FDCLK	68.7	71	94.5	MHz
Horizontal display area	THD		1280		DCLK
HS period time	TH	1340	1360	1538	DCLK
HS blanking	THFP +THBP	60	80	258	DCLK
Vertical display area	TVD		720		H
VS period time	TV	854	870	1024	H
VS blanking	TVBP +TVFP	134 Note	150 Note	304 Note	H

Note: VS blanking - VBP register setting $\geq$ 3.

6.6 Power on/off sequence
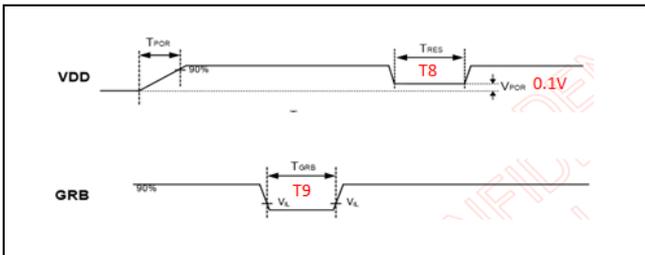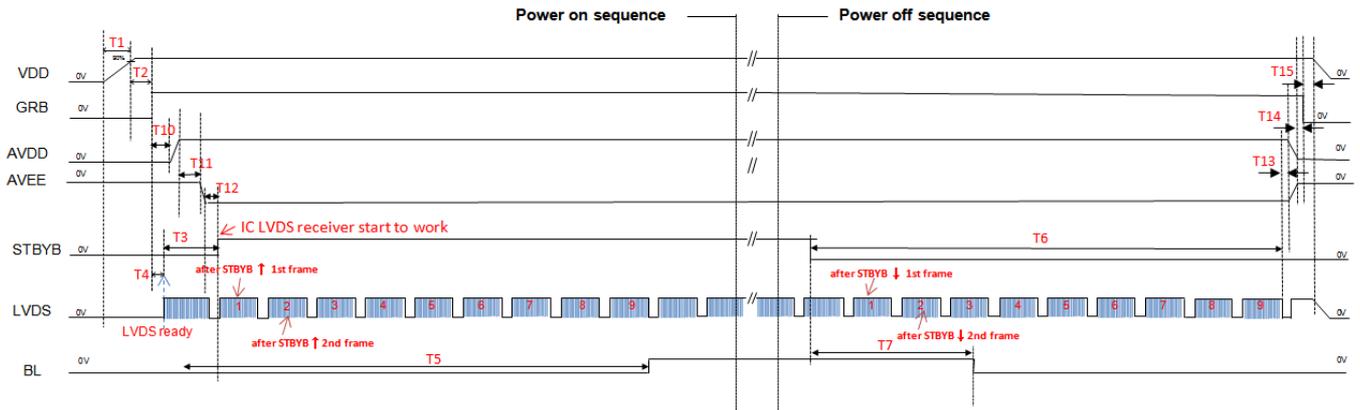
Symbol	Min	Typ.	Max.	Unit
T1	1	--	20	ms
T2	5	--	--	ms
T3	40	--	--	ms
T4	0	--	T3-8	ms
T5	10	--	--	Frame
T6	10	--	--	Frame
T7	1.5	--	--	Frame
T8	1	--	--	s
T9	1	--	--	ms
T10	1	--	--	ms
T11	0	--	--	ms
T12	1	--	--	ms
T13	0	--	--	ms
T14	0	--	--	ms
T15	1	--	--	Frame

7. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Luminance	L		800	1000	-	cd/m²	Note 1
Contrast ratio	CR		1000	1300	-	-	Note 2 Note 3
Viewing angle (CR≥ 10)	θ_L	Φ=180° (9 o'clock)	80	85	-	degree	Note 4
	θ_R	Φ=0° (3 o'clock)	80	85	-		
	θ_T	Φ=90° (12 o'clock)	80	85	-		
	θ_B	Φ=270° (6 o'clock)	80	85	-		
Luminance uniformity	Y_U		75	80	-	%	Note 5 Note 6
Response time (Gray to gray)	25 ℃	Normal θ=Φ=0°	-	(26.6)	-	msec	Note 7
	-20 ℃		-	(227.6)	-		
	-30 ℃		-	(490.4)	-		
Color chromaticity (CIE 1931)	W_X		0.27	0.31	0.35	-	Note 1
	W_Y		0.29	0.33	0.37	-	Note 2
NTSC (CIE 1931)				70	-	%	Note 1 Note 2

Test Conditions:
1. DV_{DD}=3.1V, I_L=120 mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1: Color chromaticity is defined by CIE1931.
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.
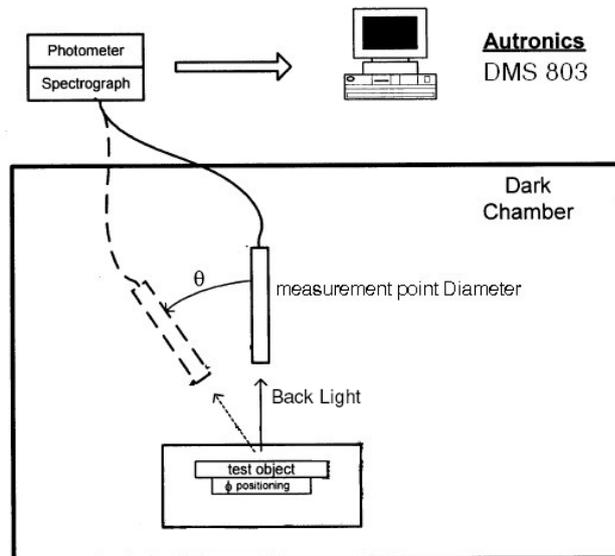

Fig. 7-1 Optical measurement system setup

Note 3: Definition of contrast ratio

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

Note 4: Definition of viewing angle range. The view angel for Θ=85°is measured by BM-5A.
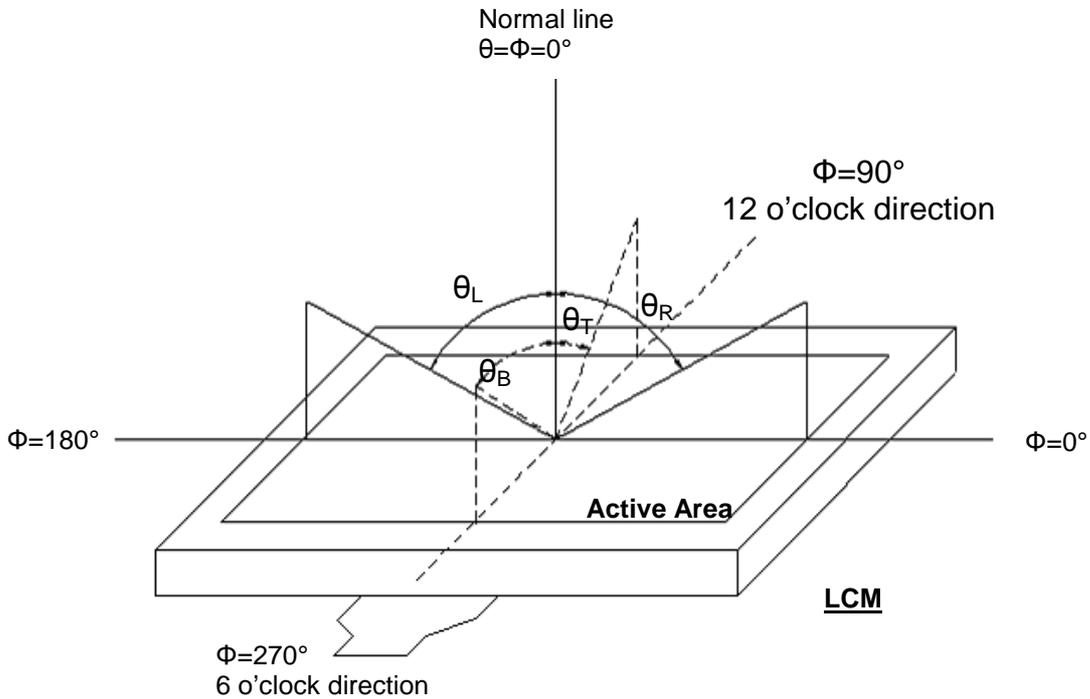

Fig. 7-2 Definition of viewing angle

Note 5: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL= 120 mA.

Note 6: Definition of luminance uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).
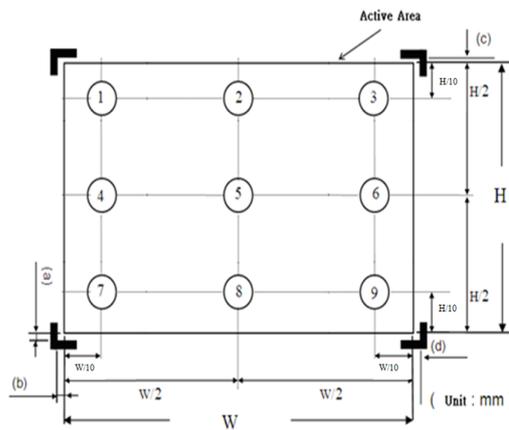
L----- Active area length   W----- Active area width

Fig. 7-3 Definition of measuring points

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

Bmax: The measured maximum luminance of all measurement position.
Bmin : The measured minimum luminance of all measurement position.

Note 7: Definition of response time. The response time is measured by photo detector of oscilloscope.
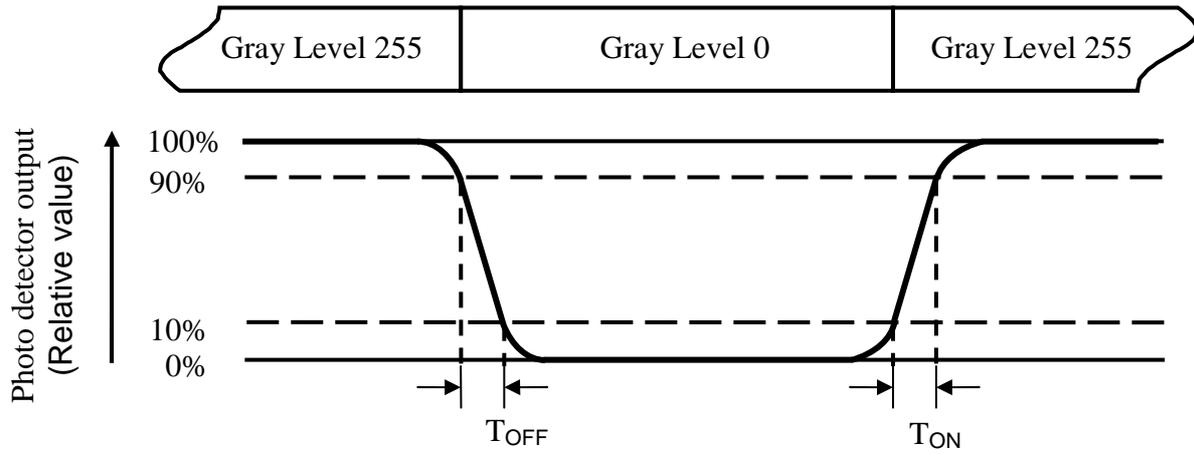

Fig. 4-3 Definition of response time

8. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage Test	Ta=90ºC, 500 hours	Note 1 Note 2 Note 3 Note 5
Low Temperature Storage Test	Ta=-40ºC, 500 hours	
High Temperature Operation Test	Tp=85ºC, 500 hours	
Low Temperature Operation Test	Tp=-30ºC, 500 hours	
High Temperature & High Humidity Operation/ Storage Test	Ta=60ºC, RH 90%, 500 hours	
Thermal Shock	[(Ta=-40℃ 30min)~(Ta=85℃ 30min)]/cycle，(Ramp rate≧16℃/min) , 100cycles	
ESD Test (Operation)	Condition 1 : C = 150pF, R = 330Ω Contact Discharge, ± 8KV Condition 2 : C = 150pF, R = 330Ω, Air Discharge, ± 15KV	Note 6
Mechanical Shock	100G, 6ms, half sine wave, 3 times for each direction of ±X, ±Y, ±Z	Note 2 Note 4
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.	Note 2 Note 4
Packaging Vibration Test	1.14Grms X, Y, Z three axes (30min /axis) [Frequency：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,	

Note 1: Ta = Ambient Temperature, Tp = Panel Surface Temperature.

Note 2: Criteria: Normal display image with no Function NG, or line defects.

Note 3: Evaluation should be tested after storage at room temperature for more than two hour

Note 4: 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 5: 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 polarizer sheet. The effect is more significant on larger displays like this size. An investigation into alternative polarizer material showed that there is no better alternative currently available.

Note 6 : Criteria Class B

9. General Precautions

9.1 Safety

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

9.2 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 avoidscratch 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.

9.3 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.

9.4 Storage

1. Store the module in a dark room where must keep at $25\pm10°C$ 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.

9.5 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.

10. Quality Requirement

The defect categories covered in this specification are comprised of defects in the active area such as dot defects, blemishes and partly completely mal functioning displays as well as visual appearance of the complete product and packaging of the product.

10.1　　Inspection conditions and test patterns

Item	Condition	
Lighting	Equivalent　Illumination. Ambient Illumination: 800 ~ 1200 Lux for external appearance inspection Ambient Illumination: 300 ~ 500 Lux for light on inspection	
Temperature	20~30℃	
Humidity	25~75 %RH	
Driving condition	Equipment	Product specific test tool
	Test pattern	Black, White, R, G, B
	Supply voltage	Typical voltages as given in the specification
Inspection method	Time	≤ 1 minute
	Distance	Panel visual inspection on the operation condition for cosmetic shall be conducted at the distance 40~50cm or more between the LCD module and eyes of inspector.
	Viewing angle	±15 degree to the front surface of display panel in vertical direction. ±15 degree to the front surface of display panel in horizontal direction.
ND Filter	When using ND Filter for judging Mura, placing ND Filter near Mura defect and get close to the surface of LCD Panel (its distance shall be 1~2cm between the surface of Panel and ND Filter). Don't touch the surface of polarizer to avoid scratching polarizer, and then move to the defect position to judge mura by view angle 0 degree within 3 seconds.	
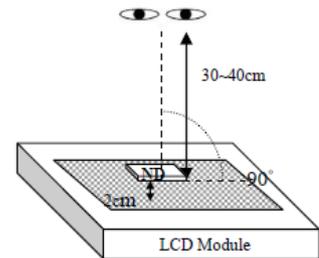
10.2　　Classification of defects

Defects are classified two types, major defect and minor defect according to the defect.　And, the definition of defects is classified as below.

(1) Major defect
   Any defect may result in functional failure, or reduce the usability of product for its purpose. For example, electrical failure, deformation and etc..

(2) Minor defect
   A defect that is not to reduce the usability of product for its intended purpose and un-uniformity, sub-pixel defect and etc..

The criteria on major and/or minor judgment will be according with the classification of defects.

Inspection Item	Criteria and Description	Defect type
Vertical line	Signal input, vertical line off or irregular V-line appears	Major
Horizontal line	Signal input, horizontal line off or irregular H-line appears	Major
Cross line	Pattern signal input, a correct display is not obtained	Major
No display	Signal input, display is dead	Major
Irregular display	Pattern signal input, a correct display is not obtained	Major
Sub-pixel defect	Exceed specified standards	Minor
Scratch and Dent on polarizer	Exceed specified standards	Minor
Foreign material	Exceed specified standards	Minor
Mura	The Mura criteria follows: 10.3 Inspection Criteria (2) Display Inspection items "Mura"	Minor
External Appearance	Deformation, irregular plating, coating missing etc.	Minor

	A appearance defect that do not affect function or performance	
Bezel claw	Bezel claw missing or not bent	Major
Polarizer bubble	Exceed specified standards	Minor

10.3　Inspection Criteria

(1) Definition of dot defect induced from the panel inside

　a) Full bright dot：Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

　b) Full dark dot：Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.
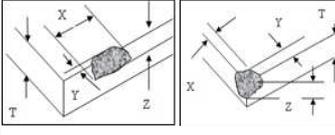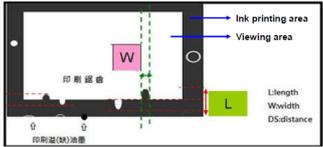
　c) 2 adjacent dots = 1pair = 2 sub-pixel

　　　Picture:

| 2 adjacent dots | 2 adjacent dots | 2 adjacent dots(vertical) | 2 adjacent dots (slant) |
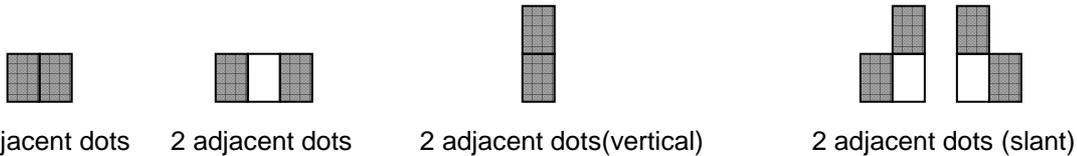
(2) Display Inspection standards when power on

Items		Acceptable count
Full Bright dot	Random	N≦0
	2 adjacent dots	N≦0
	3 adjacent dots or more	N≦0
Full Dark dot	Random	N≦4
	2 adjacent dots	N≦0
	3 adjacent dots or more	N≦0
Total bright and dark dots		N≦4
Distance	Minimum Distance Between Dark dots	≧5mm
Foreign Black/White/Bright Spot	$D=(a+b)/2$	D＜0.15mm, ignore 0.15mm≦D≦0.3mm , N≦4 D＞0.3mm, N=0
Foreign Black/White/Bright Lint	W: width, L：length	W≦0.05mm, ignore 0.05<W≦0.10mm, L≦3.0mm, N≦4 W＞0.10mm, L＞3.0mm, N=0
Display failure (V-line/H-line/Cross line etc.)		Not allowable
Mura/ Waving/ Hot spot	Not visible through 5% ND filter in 50% Gray pattern or judge by limit sample if necessary	

Note：Defect which is on the Black Matrix (outside of Active Area) are not considered as a defect

10.4　External Appearance Inspection Criteria (power off)

Item	Contents
Line Shape in display area (Particle / Scratch / Lint / Bubble)	W≦0.05mm, ignore 0.05<W≦0.10mm, L≦3.0mm, N≦4 W＞0.10mm, L＞3.0mm, N=0
Dot Shape in display area (Particle / Dent / Bubble)	D＜0.15mm, ignore 0.15mm≦D≦0.3mm , N≦4 D＞0.3mm, N=0
Protective Film	Any defects on the protective film are ignored, such as protective film scratches, protective film bubbles and particles on protective film.
FPC	Break-off 、Connector Break-off / Burn-off is not permitted
Metal frame (Bezel)	Assembly NG or Function fail caused by deformation is not permitted

Backlight	Scratch	The scratch which may causes a problem in practical use is not permitted.
	Break-off	Breaking off is not permitted.
	Crack	The crack is not permitted.
Tape/Label		Incorrect position, missed label is not permitted.
Connector		Assembly NG or Function fail caused by deformation is not permitted
Outline size		Spec. out is not permitted.

Touch panel	Broken & chipping
	
		(1)For Edge type:
		    a. Y≦0.15mm，N / X / Distance，Ignore
		    b. X≦0.3mm，0.15<Y≦0.3mm，Z≦1/2 T，N≦6
		(2) For Corner type:
		    X≦0.3mm，0.15<Y≦0.3mm，Z≦1/2 T，N≦3
		    Distance Ignore

	BM Printing Pinhole	D≦0.3mm，Ignore 0.3mm＜D≦0.5mm，N≦4，Distance≧5mm If RoHS-Qualified oil pen can fix it，ignore
	BM Printing sawtooth 	L≦0.1 mm，Ignore 0.1mm＜L≦0.15 mm, W≦1mm，N≦2 Distance＞5mm

Notes: 1. Any defect can be wiped off, ignore.

2. If any specific defect is not included in the above defect table, this defect should be

judged by INX/ODM/Brand customer discussion.

3.Defect was ignored if invisible at the user side.

11. Package Drawing
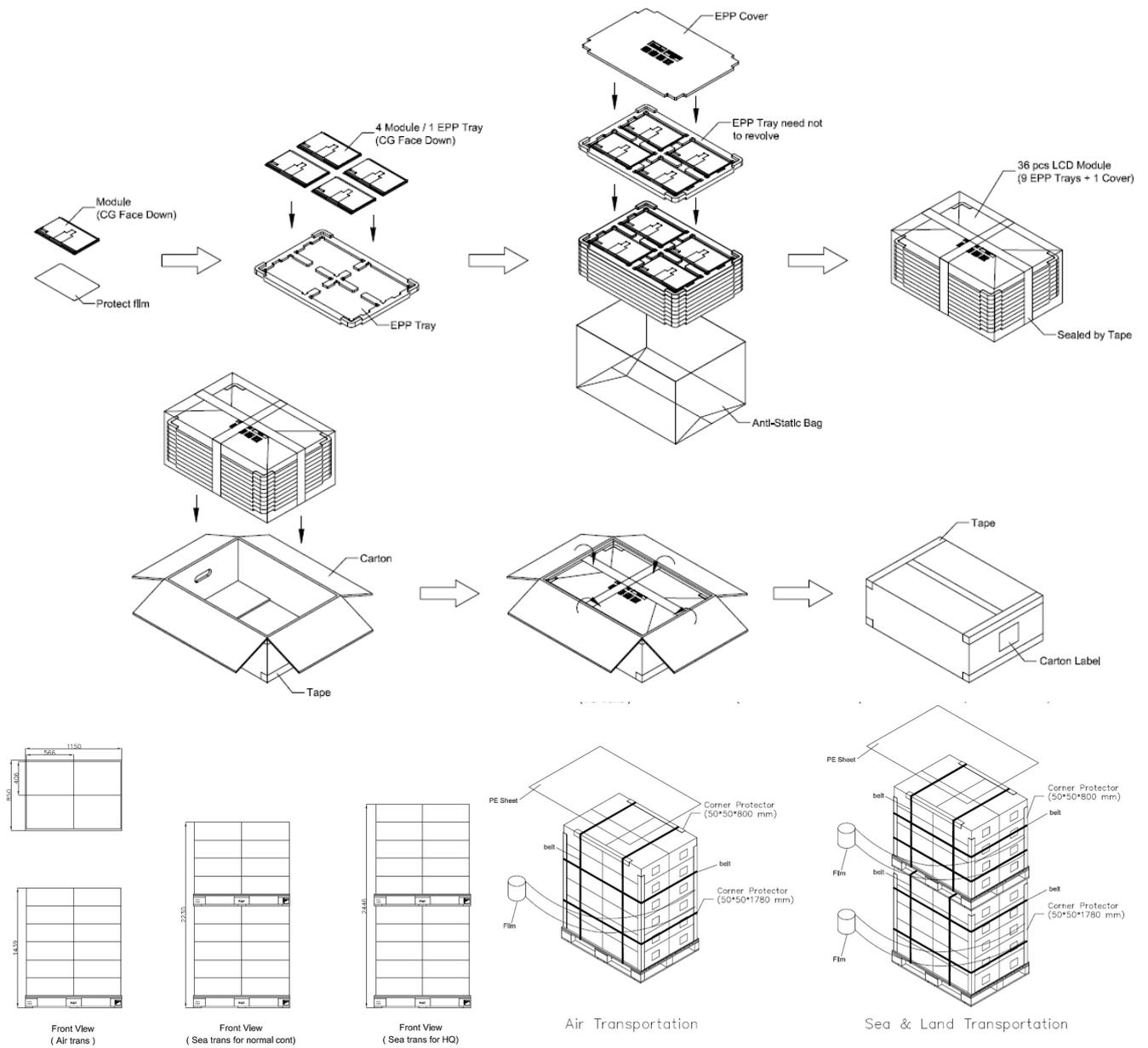
DD090IA-05A Module delivery packing method.

(1) First Level: Inner box level packing method – 9 layer EPP Tray and 1 EPP Cover in box. INX packing method on this level for this product is 566 x 406 x 216mm.

- Put 4 pieces module into one Tray.
- 9 pieces EPP trays contains of 36 pieces modules. The top layer for one EPP Cover. Total EPP Trays are 9 pieces. Size is 542x382x182.8mm.
- Put 9 EPP trays and 1 EPP Cover into an Anti-static Bag, seal the Anti-static Bag with 2 rolls of tape.
- Put 9 EPP trays and 1 EPP Cover into a carton.
- The packing quantity per box is 36 pieces.
- Gross weight per pallet is 11.96 kg

(2) Second Level: Pallet box level. INX packing method on this level for this product is 1150 x 850 x 1439 mm(air transportation) or 1150 x 850 x 2230 mm(Sea and Land transportation) .

- Altogether 24 pieces boxes on one pallet (6 layers and 4 pieces boxes in each layer).
- The full packing quantity per pallet box of air transportation is 24 x 36 = 864 pieces.

- Altogether 20+16 pieces boxes on two pallets (5+4 layers and 4 pieces boxes in each layer).

- The full packing quantity two pallets boxes of sea & land transportation is   36 x 36 = 1296 pieces.

- Altogether 20+20 pieces boxes on two pallets (5+5 layers and 4 pieces boxes in each layer).

- The full packing quantity two pallets boxes of sea & land transportation for HQ container is 40 x 36 = 1440 pieces.

Gross weight per pallet is 303 kg

Module (CG Face Down)

Protect film

4 Module / 1 EPP Tray (CG Face Down)

EPP Tray

EPP Cover

EPP Tray need not to revolve

Anti-Static Bag

36 pcs LCD Module (9 EPP Trays + 1 Cover)

Sealed by Tape

Carton

Tape

Tape

Carton Label

Front View (Air trans)

Front View (Sea trans for normal cont)

Front View (Sea trans for HQ)

Air Transportation

Sea & Land Transportation

PE Sheet

Corner Protector (50*50*800 mm)

Corner Protector (50*50*1780 mm)

belt

Film

belt

21

12. Label

TBD