PRODUCT SPECIFICATION

Doc. Number:

■ Tentative Specification

□ Preliminary Specification

□ Approval Specification

MODEL NO.: YH103IA-10B

SUFFIX: CL01

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
		MW Chen

DOCUMENT REVISION HISTORY

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
V1	2021.5.18	First Release	ZJP	XJB
V2	2021.11.05	(Forcelead Gate IC：ST5086 Source IC：FL5894)		

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	10.25 inch (Diagonal)	-
2	Driver element	a-Si TFT active matrix	-
3	Resolution	1920 × 3(RGB) × 720	-
4	Display mode	Normally Black, Transmissive	-
5	Dot pitch	0.1269(W) × 0.1269 (H) mm	-
6	Active area	243.65 (W) × 91.37 (H) mm	-
7	Module size	259.8 (H) x 112.0 (V) x 8.5 (D) (Typ)	Note 1
8	Surface treatment	Anti-Glare	-
9	Color arrangement	RGB-stripe	-
10	Interface	3-port LVDS (DE mode)	-
11	Backlight power consumption	(10.044)W (Typ)	-
12	Panel power consumption	TBD	-
13	Weight	380g (MAX)	-

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

The Connector recommended model is 20647-050E-01 manufactured by I-PEX.

Connector type：I-PEX 20647-050E-01			
Pin	Input signal name	I/O pin (I:input, O:output, P:power)	Description
1	GND	P	Ground
2	VDD	P	External main and I/O power supply ; Power3.3V
3	VDD	P	External main and I/O power supply : Power3.3V
4	VDD_OTP	P	LCD Maker use, please keep connecting 3.3 V
5	RESET	I	Global reset pin (Default high), active low.
6	STBYB	I	Standby mode setting pin (Default high), active low.
7	GND	P	Ground
8	OLV0N	I	LVDS odd data 0-
9	OLV0P	I	LVDS odd data 0+
10	GND	P	Ground
11	OLV1N	I	LVDS odd data 1-
12	OLV1P	I	LVDS odd data 1+
13	GND	P	Ground
14	OLV2N	I	LVDS odd data 2-

15	OLV2P	I	LVDS odd data 2+
16	GND	P	Ground
17	OLVCLKN	I	LVDS odd clk -
18	OLVCLKP	I	LVDS odd clk +
19	GND	P	Ground
20	OLV3N	I	LVDS odd data 3-
21	OLV3P	I	LVDS odd data 3+
22	GND	P	Ground
23	ELV0N	I	LVDS even data 0-
24	ELV0P	I	LVDS even data 0+
25	GND	P	Ground
26	ELV1N	I	LVDS even data 1-
27	ELV1P	I	LVDS even data 1+
28	GND	P	Ground
29	ELV2N	I	LVDS even data 2-
30	ELV2P	I	LVDS even data 2+
31	GND	P	Ground
32	ELVCLKN	I	LVDS even clk -
33	ELVCLKP	I	LVDS even clk +
34	GND	P	Ground
35	ELV3N	I	LVDS even data 3-
36	ELV3P	I	LVDS even data 3+
37	GND	P	Ground
38	GND	P	LCD Maker use, please keep connect Ground.
39	RL	I	Horizontal shift direction (source output) selection. Please reference note (1) table.
40	TB	I	Vertical shift direction (gate output) selection. Please reference note (1) table.
41	I^2C_SDA	I/O	Serial interface address and data input/output for I^2C interface. IF not used, please keep connect Ground.
42	I^2C_SCL	I	Serial interface clock input for I^2C interface. IF not used, please keep connect Ground.
43	VDD	P	LCD Maker use, please keep connecting 3.3 V
44	VDD	P	LCD Maker use, please keep connecting 3.3 V
45	NC		Please keep connect Ground.
46	NC		Please keep connect Ground.
47	NC		Please keep connect Ground.
48	NC		Please keep connect Ground.
49	NC		Please keep connect Ground.
50	NC		Please keep connect Ground.

2.1 LED Board Pin Assignment:

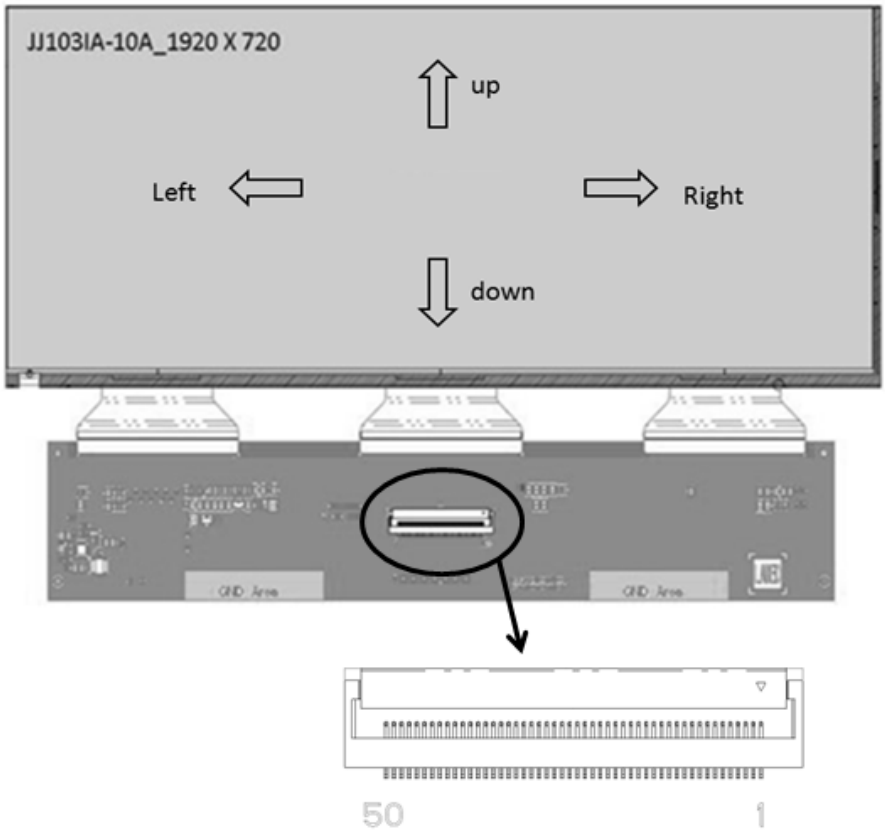
CN2: IRISO 12001S-10Y901

Pin NO.	Symbol	Description
1	PLED	Power LED anode power supply
2	PLED	Power LED anode power supply
3	PLED	Power LED anode power supply
4	NC	
5	NTC1	heat sensor
6	NTC2(GND)	heat sensor
7	NLED	Power LED cathode power supply
8	NLED	Power LED cathode power supply
9	NLED	Power LED cathode power supply
10	NLED	Power LED cathode power supply

Note (1)

SHLR	UPDN	Data shifting
VDD	VDD	Left→Right，UP→Down(default)
VDD	GND	Left→Right，Down→UP
GND	VDD	Right→Left，UP→Down
GND	GND	Right→Left，Down→UP

Refer to the figure as below:



3. Operation Specifications

3.1. Absolute Maximum Ratings

(GND=0V)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V_{DD}	-0.3	4	V	Note 1
Operation Temperature	T_{OP}	-30	85	℃	Note2, 3
Storage Temperature	T_{ST}	-40	90	℃	Note2, 3
LED Forward Current	I_F	-	120	mA	Each LED

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.

Note 2 : This rating applies to all parts of the module and should not be exceeded.

Note 3 : The operating temperature only guarantees operation of the LCM and doesn't guarantee all the contents of Electro-optical specification.

3.1.1. Typical Operation Conditions

Ta=25℃

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	V_{DD}	3.1	3.3	3.6	V	Note 1,2
Power Supply Input Current	I_{DD}	145	165	185	mA	Note 3
Input logic high voltage	V_{IH}	0.7 V_{DD}	-	V_{DD}	V	Note 4
Input logic low voltage	V_{IL}	GND	-	0.3 V_{DD}	V	

Note 1: VDD setting should match the signals output voltage of customer's system board.

Note 2: The ripple voltage should be controlled under 5% of VDD

Note 3: Full white pattern.

Note 4: RESET, STBYB , RL, TB

3.1.2. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	**V_L**	**27**	**27.9**	**28.8**	**V**	**Note 1**
LED power supply current		**-**	**240**	**-**	**mA**	**Per chain**
LED life time	**-**	**10000**	**-**	**-**	**Hr**	**Note 2**
Number of chains			**4**			
LED per chains			**9**			

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_F =220 mA

Note 2: 1. 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 80% of its original value.

3.1.3 PWM.

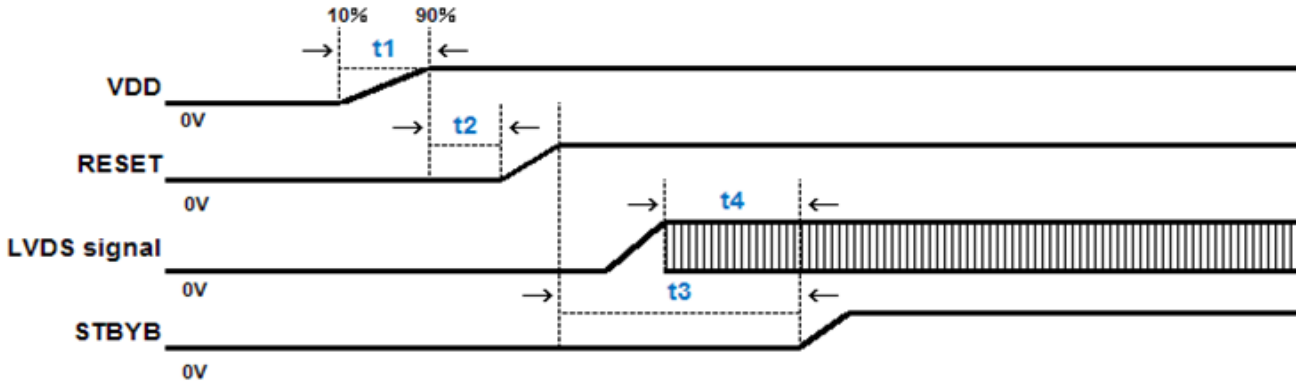
The LED string has a NTC(Negative Temperature Coefficient) to detect the ambient temperature of LED string.
LED power de-rating has to start at TBD°C linear down to PWM TBD at 85°C before switching off, see graph as below

3.2 Power Sequence

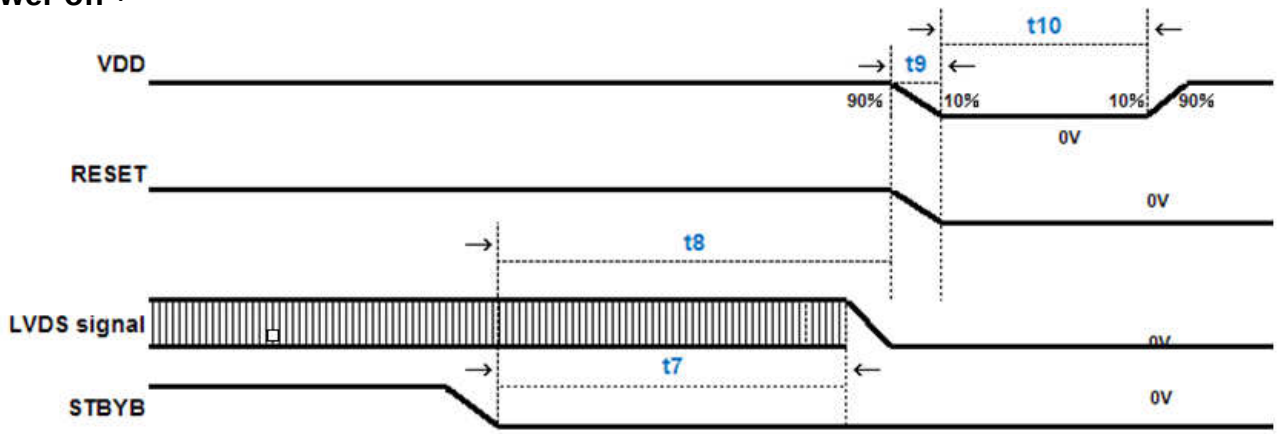
The recommended power on sequence should be: VDD → RESET → STBYB. To power off, reverse this sequence, or turn off all signals and power simultaneously.

VDD=3.0~3.6V

Power on：



Power off：



Symbol	SPEC.			Unit
	Min.	Typ.	Max.	
t1	1.5	2	3	ms
t2	1	5	10	ms
t3	0	30	50	ms
t4	0	5	10	ms
t7	7(117)	9(150.3)	10(167)	frame(ms)
t8	8(133.6)	10(167)	11(183.7)	frame(ms)
t9	0	1	3	ms
t10	1000	2000	3000	ms

3.3Timing Characteristics

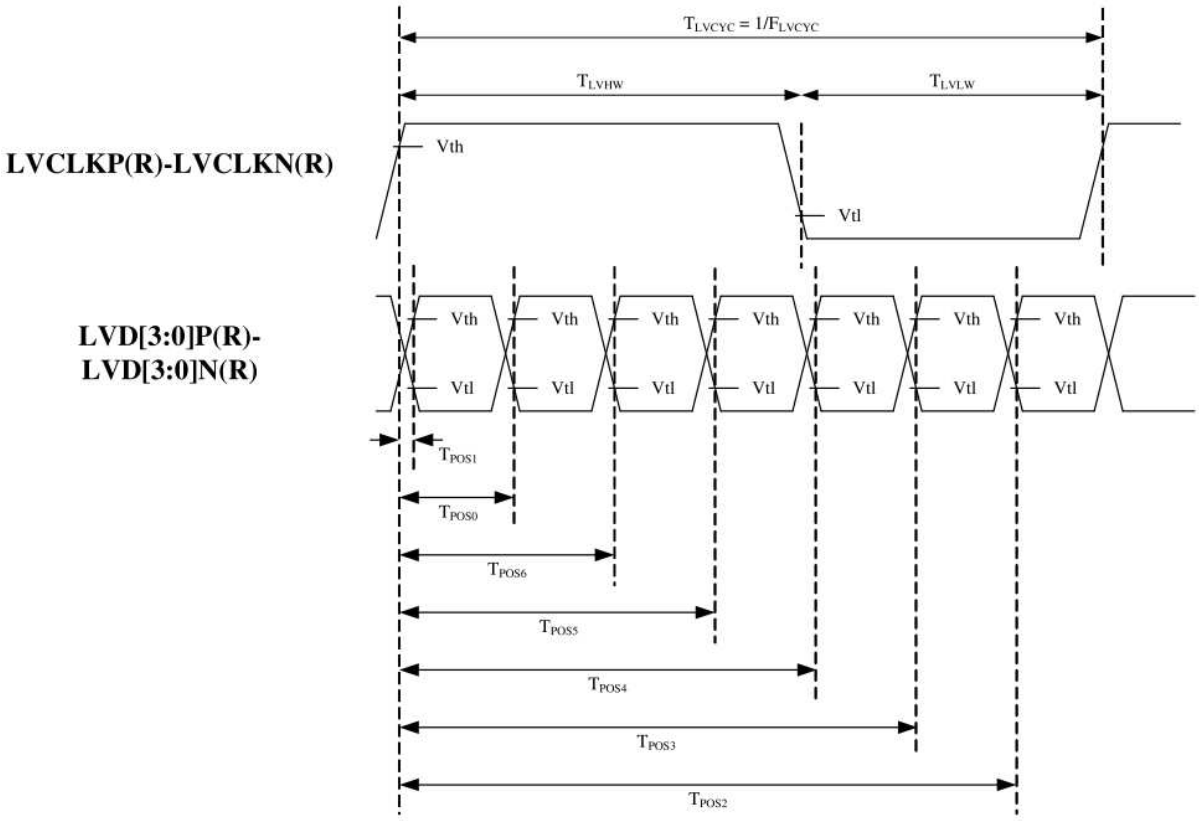
3.3.1. AC Electrical Characteristics

Parameter	Symbol	Spec.			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	FLVCYC	20	-	85	MHz	Frame rate=60Hz
Clock Period	TLVCYC	11.76	-	50	Nsec	Frame rate=60Hz
1 data bit time	UI	-	1/7	-	TLVCYC	
Position 1	TPOS1	-0.2	0	0.2	UI	Note 1
Position 0	TPOS0	0.8	1	1.2	UI	
Position 6	TPOS6	1.8	2	2.2	UI	
Position 5	TPOS5	2.8	3	3.2	UI	
Position 4	TPOS4	3.8	4	4.2	UI	
Position 3	TPOS3	4.8	5	5.2	UI	
Position 2	TPOS2	5.8	6	6.2	UI	
Input eye width	TEYEW	0.6	-	-	UI	
Input eye border	TEX	-	-	0.2	UI	
LVDS wake up time	TENLVDS	-	-	150	ns	

Note1 : Please refer to “4.6.2 LVDS input timing Diagram”

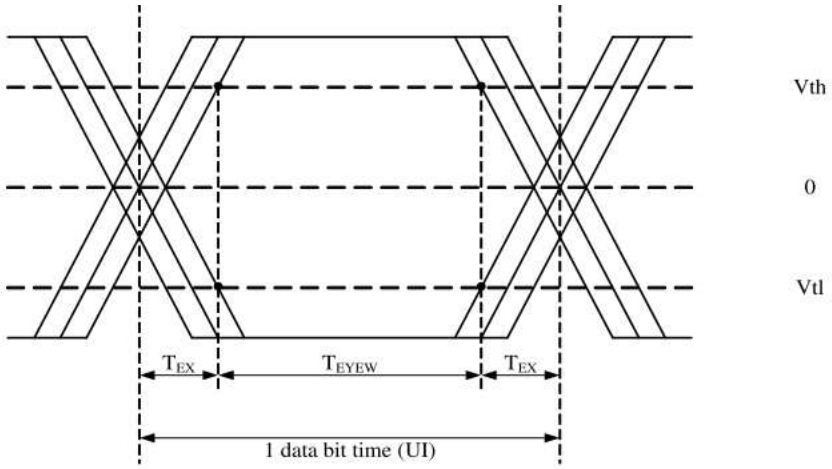
3.3.2. AC Electrical Characteristics

LVDS input timing:

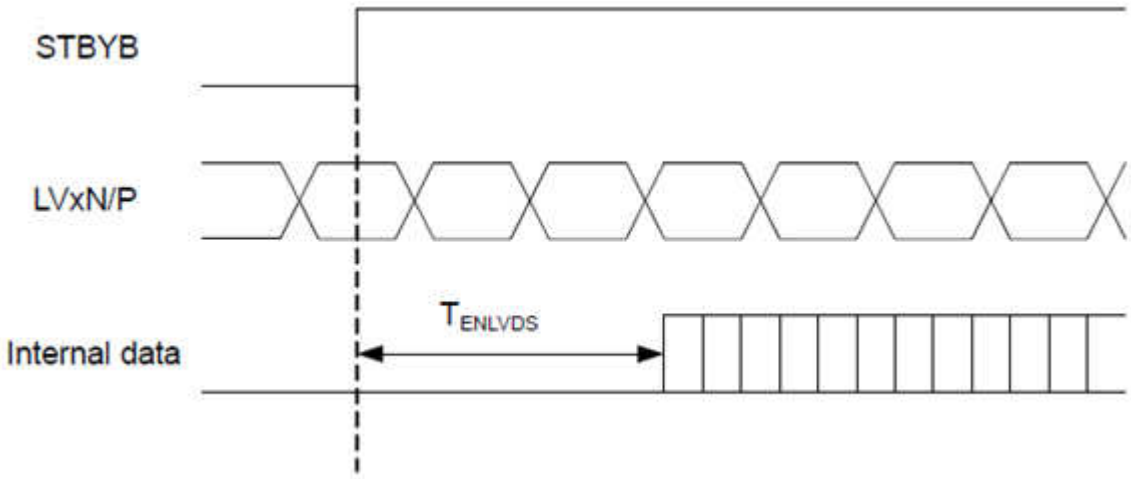


Differential:

LVD[3:0]P-LVD[3:0]N



LVDS input eye diagram

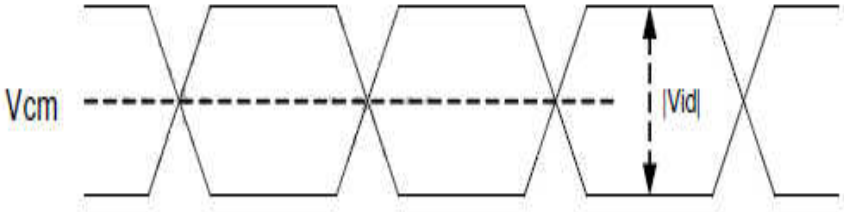


LVDS wake up time

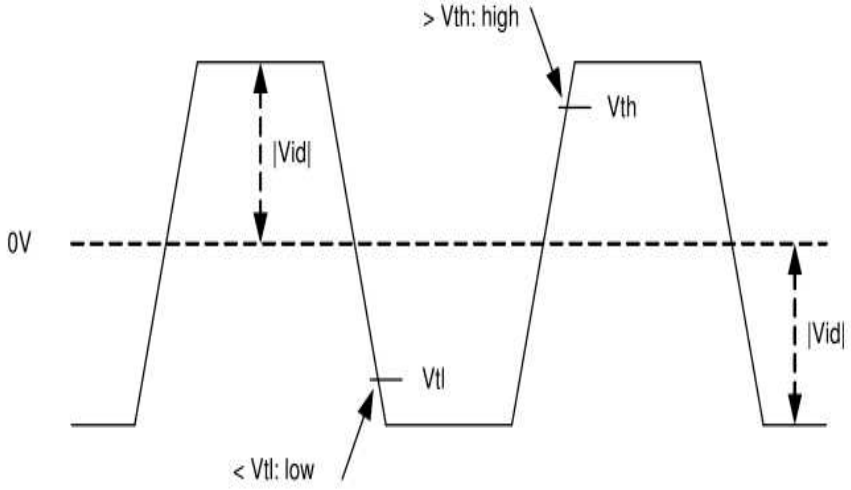
3.3.3. LVDS DC Electrical Characteristics

Parameter	Symbol	Spec.			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	Vth	-	-	+0.1	V	Vcm=1.2V
Differential input low Threshold voltage	Vtl	-0.1	-	-	V	
Differential input common Mode voltage	Vcm	1	1.2	1.7-$\|V_{id}\|/2$	V	-
Differential input voltage	|Vid|	0.2	-	0.6	V	-
Differential input leakage Current	Vleak	-10	-	+10	μA	-

Single-ended:
LVCLKP(R),
LVCLKN(R),
LVD[3:0]P(R),
LVD[3:0]N(R)



Differential:
LVCLKP(R)-LVCLKN(R),
LVD[3:0]P(R)-
LVD[3:0]N(R)



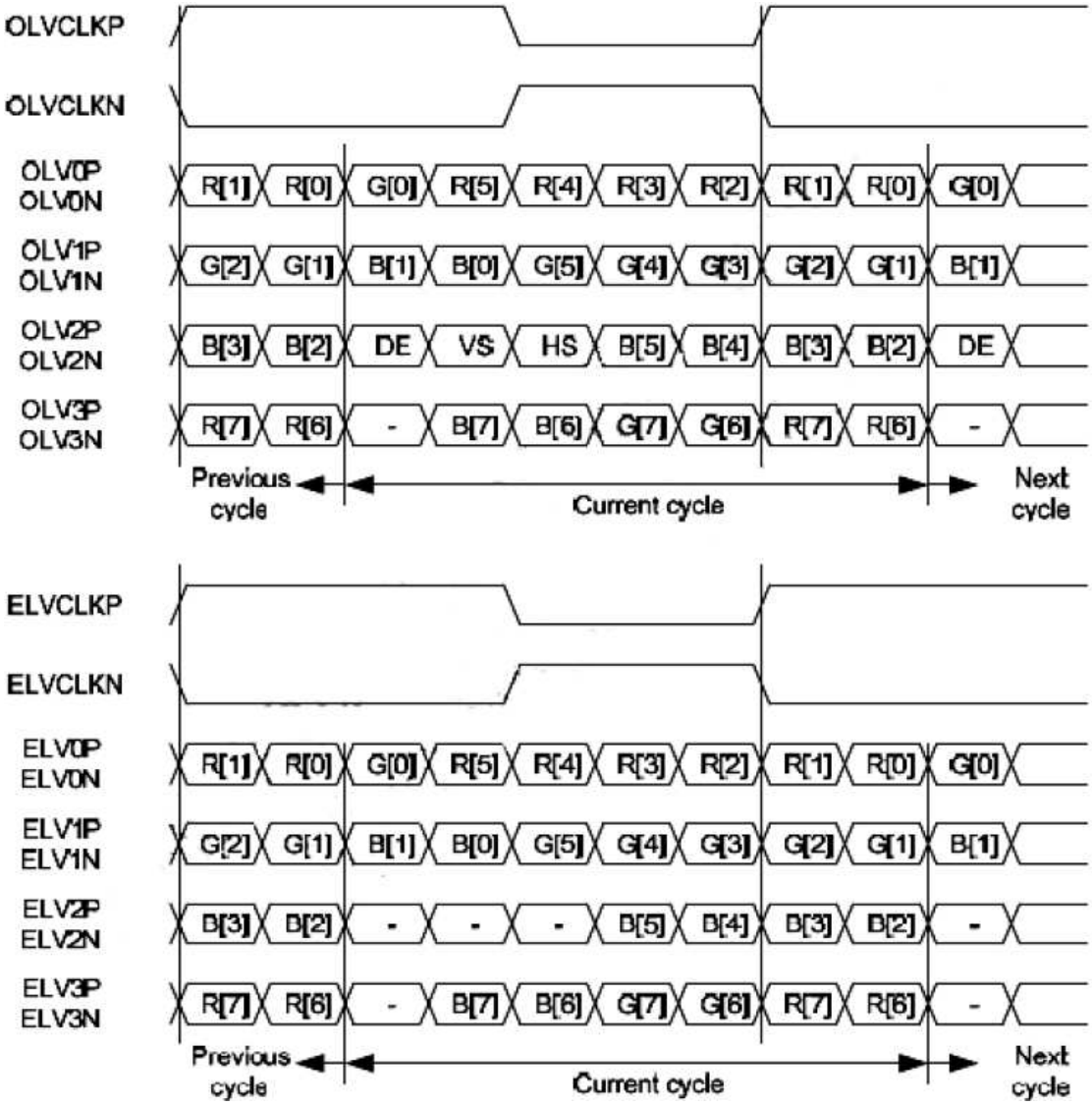
3.3.4. Timing

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
CLK Frequency	F_{CLK}	-	44.1	-	MHz	
Horizontal valid data	t_{hd}		960		DCLK	
1 Horizontal Line	th	989	1002	1248	DCLK	
Vertical valid data	t_{vd}		720		H	
1 Vertical field	tv	727	733	936	H	
Frame rate	FR	-	60	-	Hz	

Note: DE mode only.

3.3.5. Data Input Format

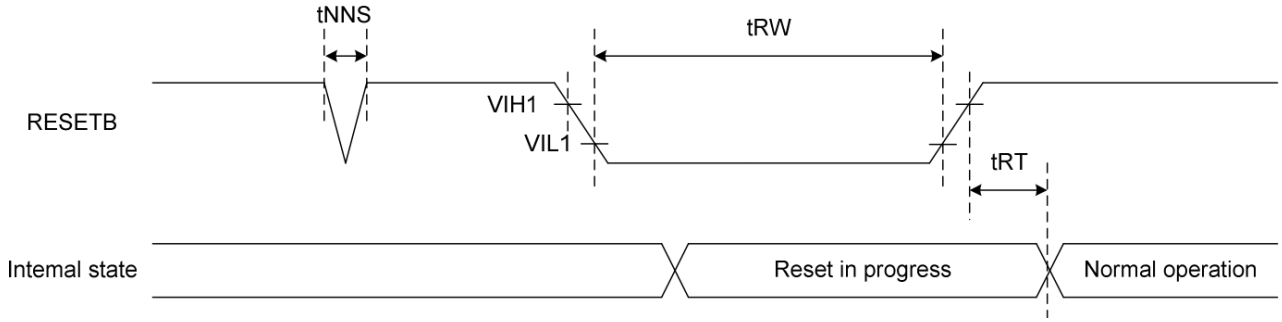
Panel LVDS format follow standard LVDS format:



VESA format (8bit)

Notice: Panel LVDS interface Spec, Odd = 1st Pixel, Even = 2nd Pixel

Resting timing



Signal	Parameter	Symbol	Spec.			Unit	Remark
			Min.	Typ.	Max.		
RESET	Reset pulse width	tRW	10	-	-	μs	-
	Reset complete time	tRT	-	-	5	μs	-
	Negative spike noise width	tNNS	-	-	100	ns	-

4. Optical Specifications

TEST CONDITIONS

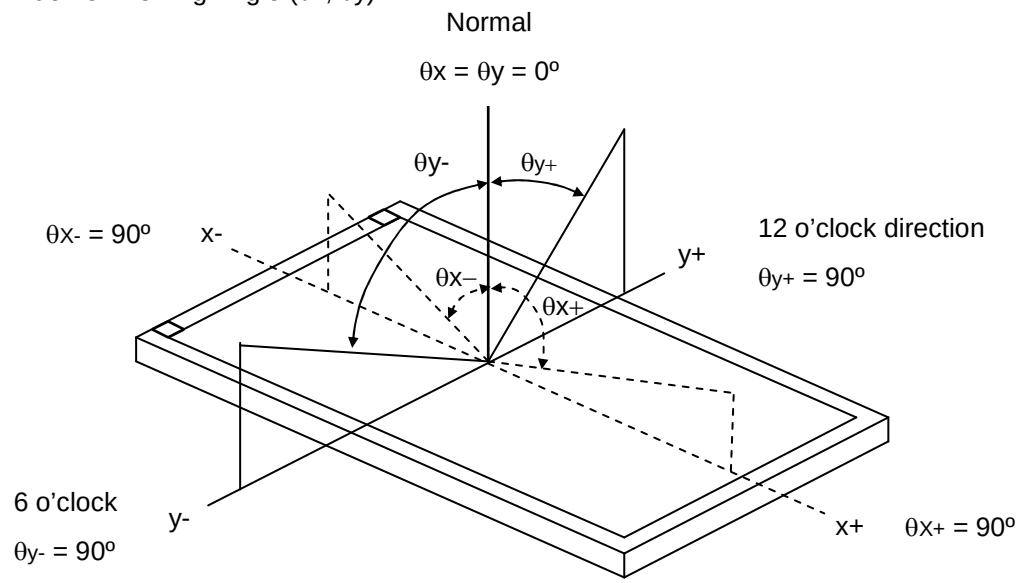
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25	^{o}C
Ambient Humidity	Ha	50	%RH
Supply Voltage	VDD	3.3	V
Input Signal	According to typical value in "4. ELECTRICAL CHARACTERISTICS"		

The measurement methods of optical characteristics are shown in Section 5.2. The following items should be measured under the test conditions described in Section 5.1 and stable environment shown in Note (5).

OPTICAL SPECIFICATIONS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Horizontal	x+	CR > 10	80	-	-	Deg.	(1), (4), (5)
		x-		80	-	-		
	Vertical	y+		80	-	-		
		y-		80	-	-		
Transmittance		T%	θ_x=0°, θ_Y =0°	3.68	4.22	-	%	(4), (5)
Contrast Ratio		CR		800	1000	-	-	(2), (4), (5)
Response Time		$T_{R+}T_F$		-	25	35	ms	(3), (5)
Color Coordinates	White	Wx		0.283	0.313	0.343	-	Panel under C light
		Wy		0.334	0.364	0.394		
	Red	Rx		0.628	0.658	0.688		
		Ry		0.300	0.330	0.360		
	Green	Gx		0.252	0.282	0.312		
		Gy		0.543	0.573	0.603		
	Blue	Bx		0.104	0.134	0.164		
		By		0.074	0.104	0.134		
NTSC				62	67		-	

Note (1) Definition of Viewing Angle (θx, θy):



Note (2) Definition of Contrast Ratio (CR):

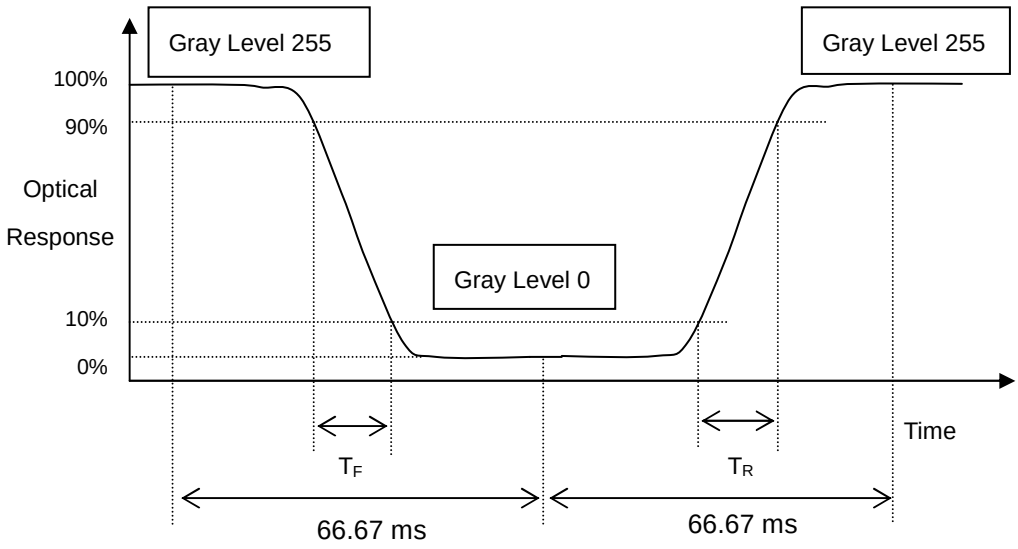
The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

L255: Luminance of gray level 255

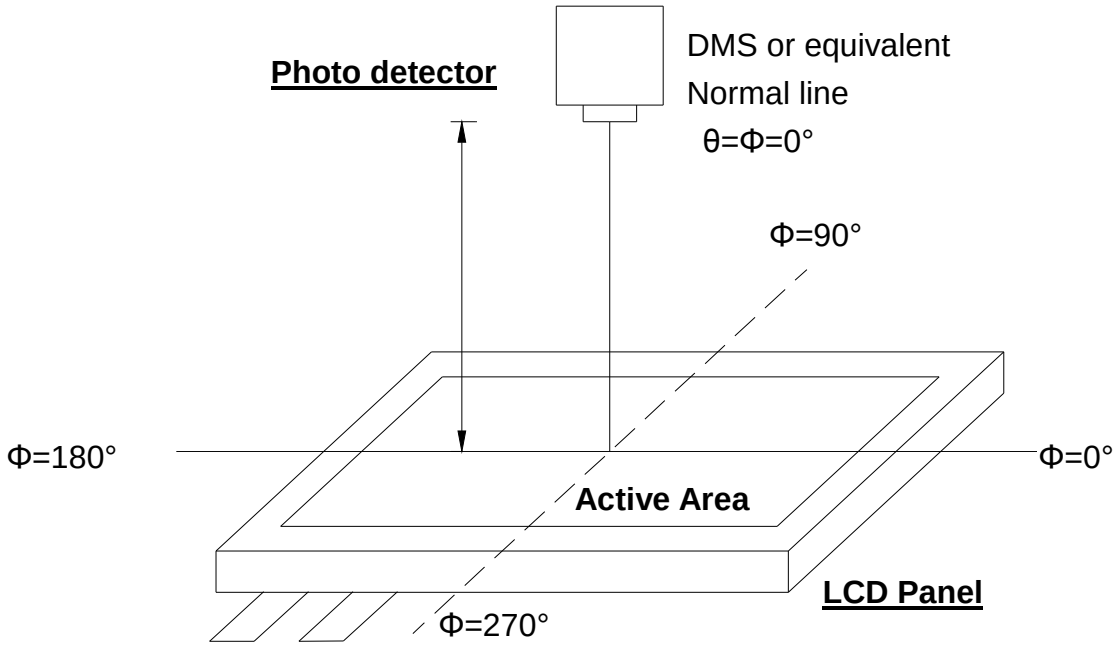
L 0: Luminance of gray level 0

Note (3) Definition of Response Time (T_R, T_F):



Note (4) Measurement Setup:

The LCD module should be stabilized at given temperature(T=+25℃) for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

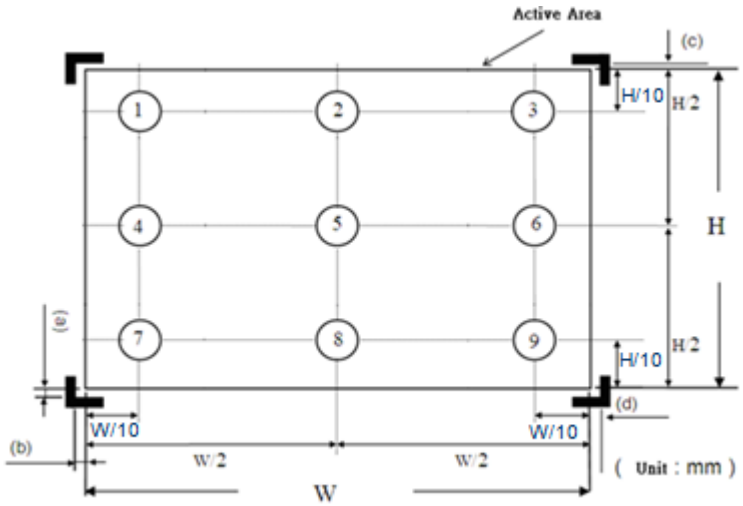


Note (5) : Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD when panel is driven at “White”, “Red”, “Green” and “Blue” state respectively.

Note (6) : Definition of luminance uniformity

Active area is divided into 9 measuring areas

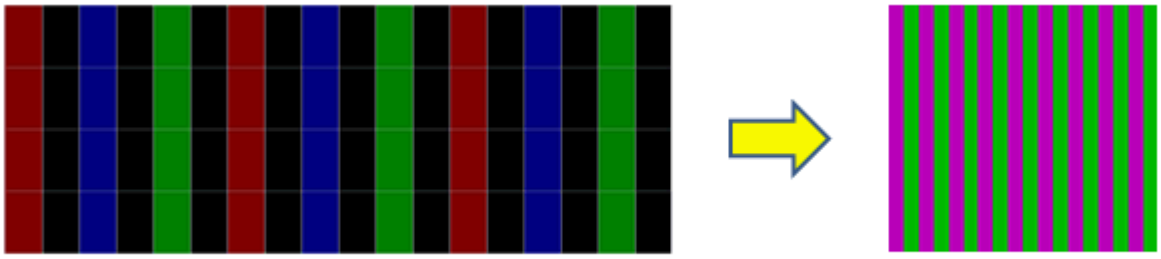


$$\text{LuminanceUniformity(Yu)} = \frac{B_{min}}{B_{max}}$$

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

Note (7) : Definition of flicker

Flicker test pattern is sub-pixel inversion of gray 128 as below



Sub pixel Pixel

Note (8): Gamma

Gamma (γ) are defined by

$$L = aV^{\gamma} + L_b \ldots (1)$$

L, L_b: gray-scale and black luminance; V: gray-signal signal Level

$$\log(1) \rightarrow \quad \log(L - L_b) = \log a + \gamma \log V \ldots (2)$$

Linear Fitting to obtain

$$\gamma = \{\log(L - L_b) - \log a\} / \log V$$

5 Reliability Test Items

Test Item	Test Condition	Note
High Temperature Storage Test	Ta=90℃, 500 hours	Note 1 Note 2 Note 3 Note 4
Low Temperature Storage Test	Ta=-40ºC, 500 hours	
High Temperature Operation Test	Tp=85℃, 500 hours	
Low Temperature Operation Test	Ta=-30ºC, 500 hours	
High Temperature & High Humidity Operation Test	Ta=60ºC, RH 90%, 500hours	
Thermal Shock	[(Ta=-30℃ 30min)→(Ta=85℃ 30min)]/cycle , 100cycles	
ESD Test	[Human Body Model] C=100pF, R=1.5KΩ ; Discharge: ±2KV	Note 2
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, 28kg≦W <45kg：31cm, 45kg≦W ≦68kg：20cm	

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

Note 2: Criteria: Normal display image with no obvious non-uniformity and no line defect.

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

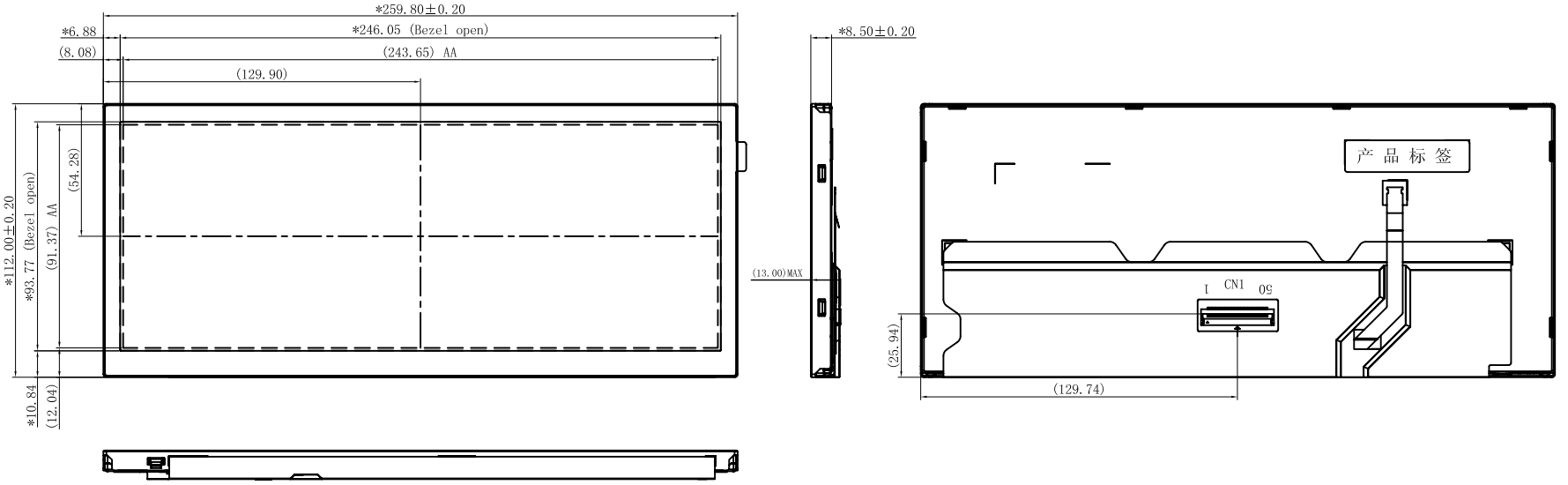
Note 4: A certain level of Mura (non-uniformity) of dark / black image will happen several days after high temperature testing (H.T.T.). There is a slowly part recovery over a long time (several months). Such a long exposure time like in H.T.T. will normally not happen in a real application. Therefore 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 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.

6. Mechanical Drawing

Customer Name: 客户名称:		Customer's Code: 客户料号:	
Approved by: 承认:		Module NO.: 模组料号:	XX103C112-85M709-36C
Approval Date: 承认日期:		Edition: 版本号:	A0

第三视角

模组成品图

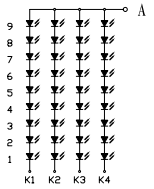


RoHS

Notes:
1. Unit:mm
2. Do not scale drawing
3. All radii without dimension R0.20mm
4. Luminous instensity(9 AVG):
   Module:650cd/㎡(Min),850cd/㎡(Typ)
5. Uniformity:75%(Min)
   VF:27.0V(Min);27.9V(Typ);28.8V(Max);IF:240mA(Fix)
6. The color coordinates:

	MIN	TYP	MAX
x	0.24	——	0.34
y	0.25	——	0.35

7. ⚠ Modification rev.number
8. draft angle 1.0°
9. Genral Tolerance:±0.20mm
10. Mark mold cavity indentification in recess approximately where indicated
11. "*" For important dimension "( )" for reference dimention
12. RoHs must be complied.(Use Lead-free process)



LED 电路图

NO.	TITLE (项目)	QUANTITY (数量)
13	产品标签	1
12	双面胶	2
11	单面胶	4
10	硅胶垫	2
9	上铁框	1
8	HSD玻璃	1
7	增光膜	2
6	扩散膜	1
5	反射膜	1
4	热敏电阻+LED+FPC	1
3	下铁框	1
2	导光板	1
1	胶 框	1

REV (修改)	DATE (日期)	DESCRIPTION (修改内容)	REVISER(修改者)

Design by: (设计)		Check by: (审查)		Number (编号)		Date: (日期)	22.05.31	Page: (页数) 1/1

7. Package

1.1 Packaging Instruction

YCJE103IA-A01 Module delivery packing method.

(1) First Level: Inner carton level packing method – 11 layer Tray in carton. INX packing method on this level for this product is 475 x 377 x 275mm.

- Put 3 pieces module into one Tray.
- Put 1 piece spacer on the full tray.
- 10 pieces trays contains of **30** pieces modules. The top layer for one piece empty tray. Total trays are 11 pieces. Size is 402x304x192mm.
- Put 11 trays into an Anti-static Bag, seal the Anti-static Bag with 2 rolls of tape.
- Put a cushion into a carton.
- Put 11 trays into a carton and put a cushion on the top side.
- The packing quantity per carton is **30** pieces.
- Gross weight per carton is TBD kg

(2) Second Level: Pallet carton level. INX packing method on this level for this product is 1150 x 970 x 970 mm(air transportation) or 1150 x 970 x 1940mm(Sea and Land transportation) **.**

- Altogether 30 pieces carton on one pallet (3 layers and 6 pieces carton in each layer).
- The full packing quantity per pallet carton of air transportation is 18 x 30 = **540** pieces.
- Altogether 18+18 pieces carton on two pallets (3+3 layers and 6 pieces carton in each layer).
- The full packing quantity two pallets carton of sea & land transportation is 36 x 30 = **1080** pieces.
- Altogether 18+18 pieces carton on two pallets (3+3 layers and 6 pieces carton in each layer).
- The full packing quantity two pallets carton of sea & land transportation for HQ container is 36 x 30 = **1080** pieces.
- Gross weight per pallet is TBD kg