Chunghwa Picture Tubes, Ltd.
Product Specification

To ：聯濤
Date : 2016/07/25

TFT LCD
CLAA080NA12 CW

ACCEPTED BY : (V1.2)

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REVISION STATUS

Revision Notice	Description	Page	Rev. Date
Ver. 0.0	First revision (Tentative)	-	2013.07.17
Ver. 0.1	Add 5.2.4 Color Data Reference	P13	2013.07.23
Ver. 0.2	Modify the specification of power consumption	P.4	2013.10.07
Ver. 0.2	Modify the specification of Module Weight	P.4	2013.10.14
Ver. 0.2	Modify the value of Common power supply voltage	P.6	2013.10.14
Ver. 0.2	Modify the value of TFT-LCD Current Consumption	P.7	2013.10.14
Ver. 0.2	Modify the rear side	P.15	2013.10.14
Ver. 0.2	Modify the value of Color Coordinate	P.16	2013.10.14
Ver. 0.3	Modify the value of Common power supply voltage	P.6	2013.11.05
Ver. 0.3	Modify the rear side	P.15	2013.11.05
Ver. 0.4	Add Packing	P.20	2013.12.09
Ver. 0.5	Modify the LVDS input data mapping	P.13	2014.03.20
Ver. 0.6	Modify the descriiption of Note 2 and fix the votlage value of AVDD	P.6	2014.04.10
Ver. 0.6	Modify the power sequence	P.7	2014.04.10
Ver. 0.6	Modify upper and down view angle of vertical and	P.16	2014.04.10
Ver. 0.6	Fix the value of RGB's Color Coordinate	P.16	2014.04.10
Ver. 0.6	Modify the description of Note 1	P.16	2014.04.10
Ver. 0.6	Modify the condition of thermal shock	P.18	2014.04.10
Ver. 0.6	Modify the PASS description of Judgment	P.19	2014.04.10
Ver. 1.0	Modify the condition of thermal shock	P.18	2014.06.20
Ver. 1.0	Modify the PASS description of Judgment	P.19	2014.06.20
Ver. 1.1	Added the suggest connector of CN1	P.9	2014.11.13
Ver. 1.1	Added the suggest connector of CN2	P.10	2014.11.13
Ver. 1.2	Modify the value of Common Power Supply Voltage	P.6	2015.01.13

CONTENTS

1. OVERVIEW

CLAA080NA12 CW is 8” color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs ,control circuit and LED backlight. By applying 1024×600 images are displayed on the 8” diagonal screen. Display 16.7M colors by R.G.B signal input.

General specification are summarized in the following table:

ITEM	SPECIFICATION			
Display Area (mm)	176.64(W) x 99.36(H)			
Number of Pixels	1024(H) × 3 (RGB) × 600(V)			
Pixel Pitch (mm)	0.1725(W) x 0.1656(H)			
Color Pixel Arrangement	RGB vertical stripe			
Display Mode	Normally white			
Number of Colors	16.7M			
Brightness (cd/m^2)	600nit(Typ)			
Response Time (ms)	25ms(Typ.)			
Optimum Viewing Direction	6 O'clock(Max contrast ratio,Gray level inversion)			
Contrast Ratio	800:1(Typ.)/ 600:1(min)			
Viewing Angle (CR≧10)	150degree (Horizontal.)			
	130degree (Vertical)			
Power Consumption (W)	2.87W(Typ)			
Interface connection	LVDS			
Module Size (mm)		Min.	Typ.	Max.
	Horizontal(H)	192.5	192.8	193.1
	Vertical(V)	116.6	116.9	117.2
	Depth(D)	6.1	6.4	6.7
Module Weight (g)	220(Typ)			
Backlight Unit	LED			
Surface Treatment	Anti-Glare			

2. ABSOLUTE MAXIMUM RATINGS

The following are maximun values which, if exceeded, may cause faulty operation or damage to the unit.

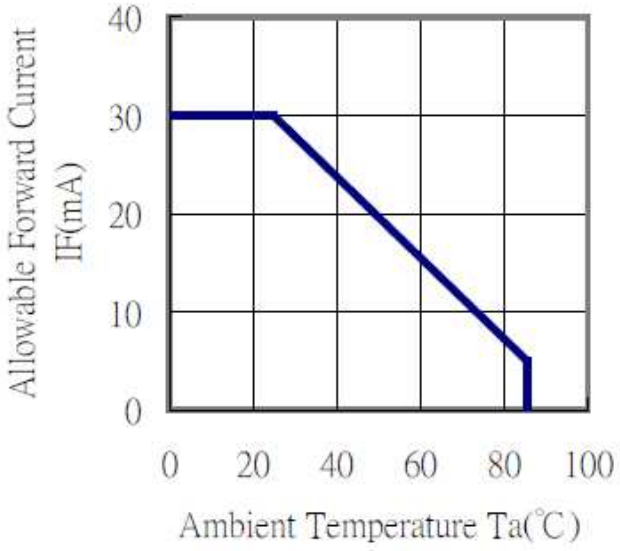
Item	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	DVDD DVDD_LVDS	-0.3	3.96	V	
Analog Supply Voltage	AVDD	-0.5	14.85	V	
Gate On Voltage	VGH	-0.3	40	V	
Gate Off Voltage	VGL	-20	0.3	V	
Gate On-Gate Off Voltage	VGH-VGL	12	40	V	
Signal Input Voltage	NIND0 ~ NIND3 PIND0 ~ PIND3 NINC,PINC	-0.5	5	V	
Forward Current （per LED）	If	-	30	mA	
Reverse Voltage（per LED）	VR	-	5	V	
Pulse forward current（per LED）	Ifp	-	100	mA	1、2、3
Operating temperature	Topa	-20	70	℃	4
Storage temperature	Tstg	-30	80	℃	4

Note：

*1) If the product were used out of the operation and storage range, it will have quality issue.

*2) Ifp Conditions ： Pulse Width≦10msec，Duty≦1/10.

*3) Each one of LED operation must be follow diagram of Ambient Temperature and Allowable Forward Current.



*4)If users use the product out off the environmemtal operation range（temperature and humidity）, it will have visual quality concerns.

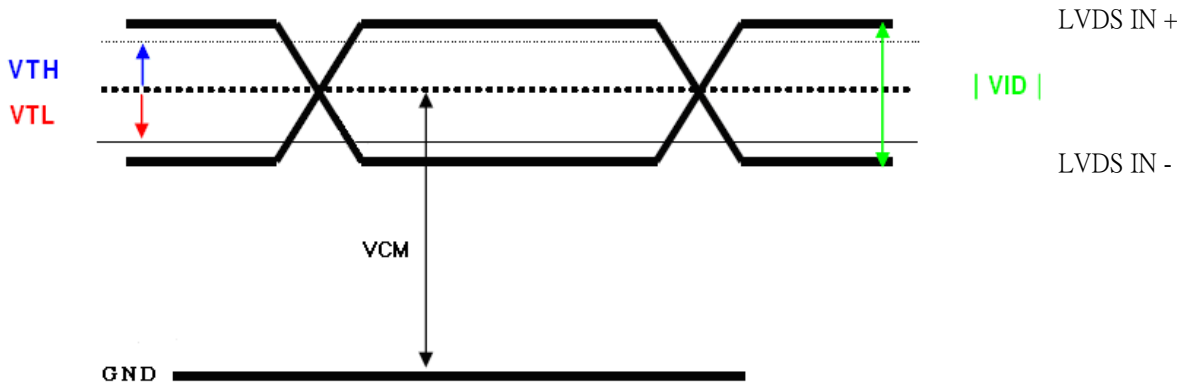
3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD

Ta=25℃

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	DVDD	3	3.3	3.6	V	
Logic Input Voltage (LVDS:IN+,IN-)	VCM	$\frac{\lvert VID \rvert}{2}$	-	$2.4-\frac{\lvert VID \rvert}{2}$	V	Note1
	$\lvert VID \rvert$	200	-	600	mV	Note1
	VTH	-	-	100	mV	VCM=1.2V Note1
	VTL	-100	-	-	mV	
Analog Power Supply Voltage	AVDD	9.4	9.6	9.8	V	
Gate On Power Supply Voltage	VGH	20	21	22	V	
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	
Common Power Supply Voltage	VCOM	3.73	3.93	4.13	V	Note2
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	
	VIL	GND	-	0.3*DVDD	V	

【Note1】LVDS signal



【Note2】Vcom is the reference voltage for customer, it should be adjust VCOM to make the flicker level be minimum.

3.2 TFT-LCD Current Consumption

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note.
Gate on Current	IVGH	VGH =21V	-	0.5	1	mA	【Note1】
Gate off Current	IVGL	VGL= -6V	-	0.5	1	mA	【Note1】
Digital Current	IDVDD	DVDD = 3.3V	-	25	35	mA	【Note1】
Analog Current	IAVDD	AVDD = 9.6V	-	25	35	mA	【Note1】
Total Power Consumption	PC		-	336	478.5	mW	【Note1】

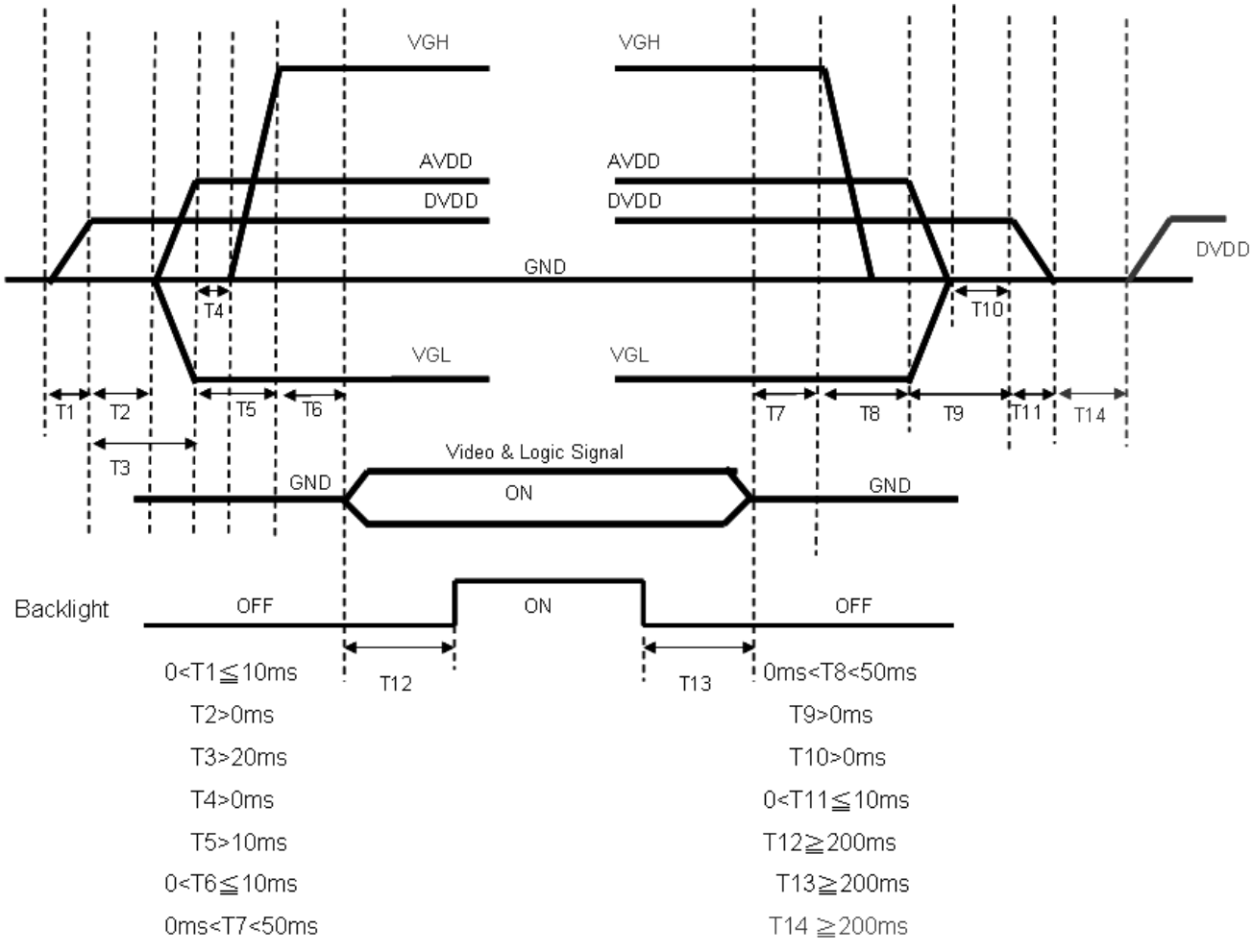
【Note1】 Typical: Under 256 gray pattern
Maximum: Under Black pattern

256 gray pattern

Black Pattern

3.3 Power and Signal sequence

Power On：DVDD→AVDD/VGL →VGH →Video &Logic Signal→Backlight
Power Off：Backlight→Video &Logic Signal→ VGH→AVDD/VGL→DVDD



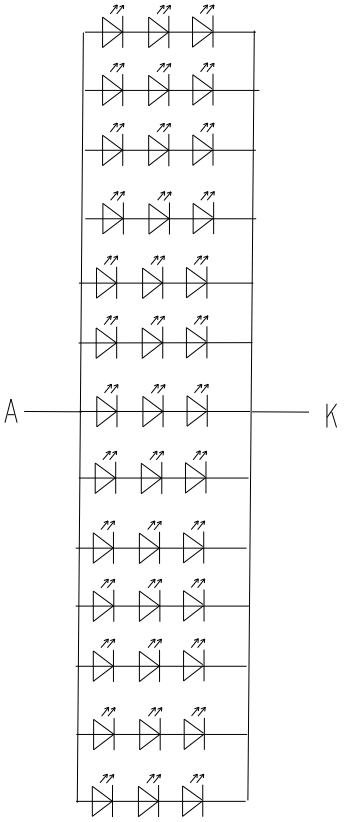
3.4 Backlight

Ta=25℃

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
LED current	IL	Ta=25℃ (20mA/serise)	--	260	--	mA	
LED voltage	VL	Ta=25℃ (20mA/serise)	8.55	9.75	10.65	V	
Power consumption	WL	Ta=25℃ (20mA/serise)	--	2.496	--	W	
LED Lifetime	-	Ta=25℃ IF=20mA	30000			Hr	

Remarks：

*1)LED Circuit Diagram



*2) A：Anode(＋)，K：Cathode(－)

*3) Suggestion: Using the constant current control to avoid the leakage light and brightness quality issue.

*4) Definition of Led lifetime：Luminance < Initial luminance 50%.

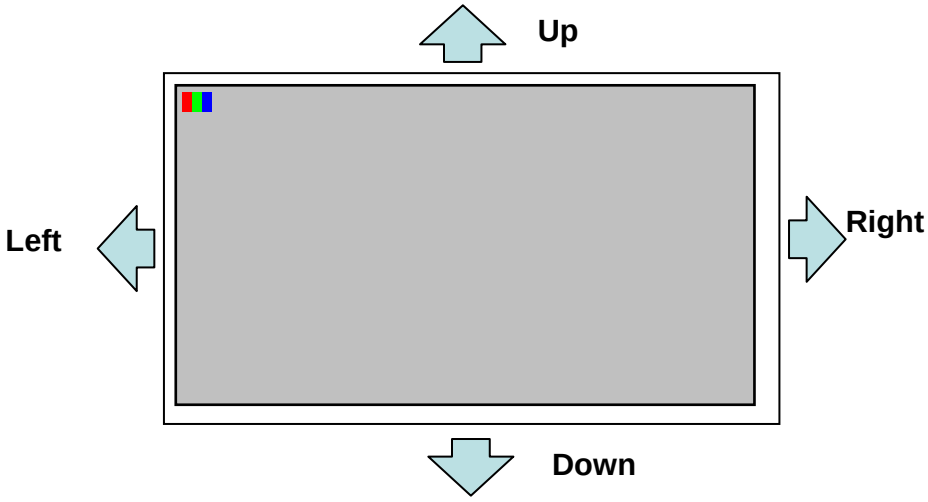
4. INTERFACE CONNECTION

4.1 CN1 (Input Signal) FH12A-40S-0.5SH(Hirose)

Pin No.	SYMBOL	FUNCTION	Note
1	VCOM	Common voltage	
2	DVDD	Digital power	
3	DVDD	Digital power	
4	NC	Not connect	
5	RESET	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ，C=1μF)	
6	UPDN	Vertical inversion	Note 1
7	SHLR	Horizontal inversion	Note 1
8	STBYB	Standby mode, normally pull high STBYB=”1”, normal operation STBYB=”0”,timing control, source driver will turn off, all output are high-Z	
9	GND	Ground	
10	NINC	Negative LVDS differential clock input	
11	PINC	Positive LVDS differential clock input	
12	GND	Ground	
13	NIND0	Negative LVDS differential data input	
14	PIND0	Positive LVDS differential data input	
15	GND	Ground	
16	NIND1	Negative LVDS differential data input	
17	PIND1	Positive LVDS differential data input	
18	GND	Ground	
19	NIND2	Negative LVDS differential data input	
20	PIND2	Positive LVDS differential data input	
21	GND	Ground	
22	NIND3	Negative LVDS differential data input	
23	PIND3	Positive LVDS differential data input	
24	GND	Ground	
25	SELB	6bit/8bit mode select if LVDS input data is 6bits,SELB set to High if LVDS input data is 8bits,SELB set to Low	
26	GND	Ground	
27	AVDD	Power for Analog Circuit	
28	GND	Ground	
29	VGH	Positive power for TFT	
30	NC	Not connect	
31	NC	Not connect	
32	VGL	Negative power for TFT	
33	GND	Ground	
34	NC	Not connect	
35	NC	Not connect	
36	NC	Not connect	
37	NC	Not connect	
38	NC	Not connect	
39	NC	Not connect	
40	NC	Not connect	

【Note1】UPDN and SHLR control function

SHLR	UPDN	Data shifting
DVDD	GND	Left→Right，Up→Down(default)
GND	GND	Right→Left，Up→Down
DVDD	DVDD	Left→Right，Down→Up
GND	DVDD	Right→Left，Down→Up



4.2 CN2 (LED backlight)

PIN NO	SYMBOL	FUNCTION
1	A	Anode
2	K	Cathode

Note：
Input connector: BHSR-02VS-1(JST)
Outlet connector: SM02B-BHSS-1(JST)

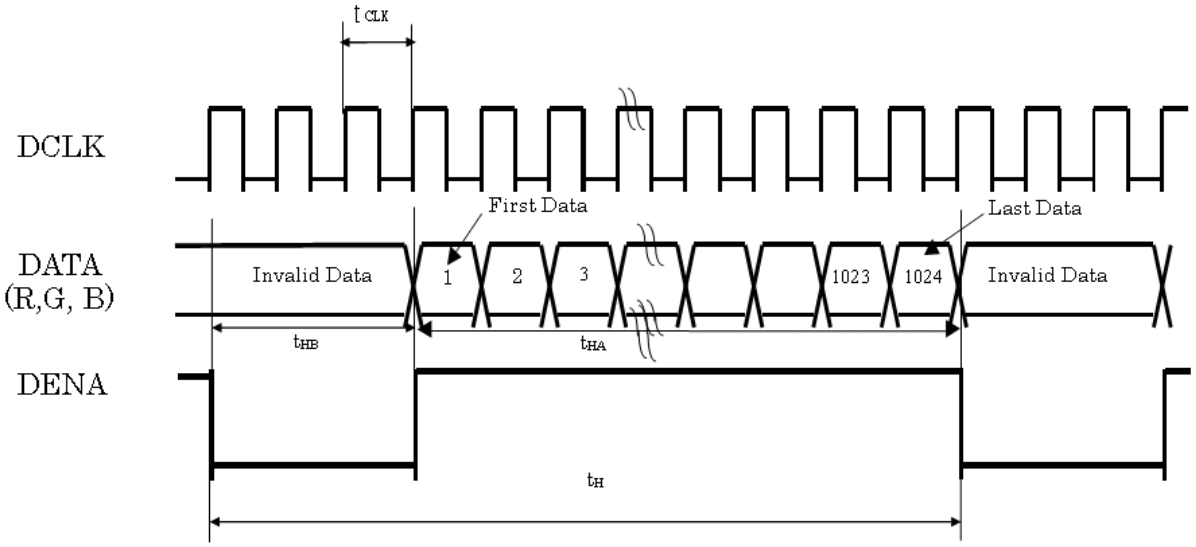
5. INPUT SIGNAL(DE ONLY MODE)

5.1 Timing Specification

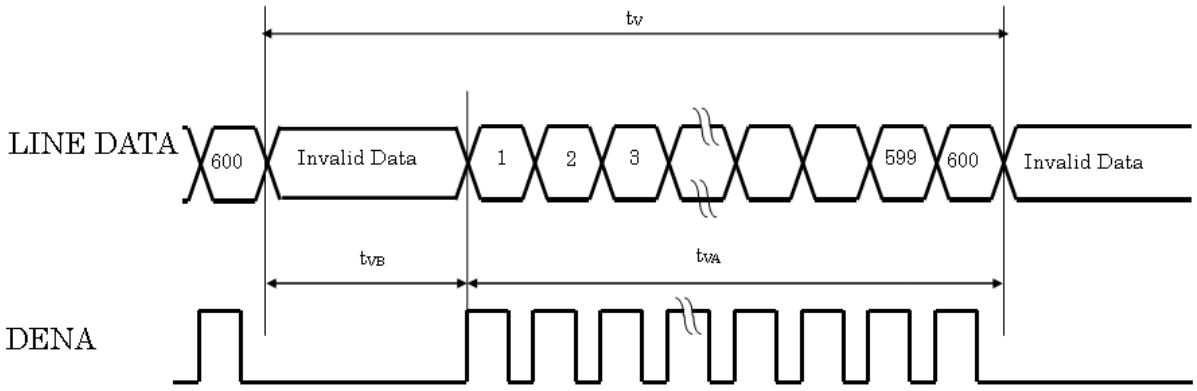
Item				Symbol	Min.	Typ.	Max.	Unit
LVDS input signal sequence	CLK Frequency			tclk	45	51.2	57	MHz
LCD input signal sequence （Input LVDS Transmitter）	DENA	Horizontal	Horizontal total Time	t_H	1324	1344	1364	tCLK
			Horizontal effective Time	t_{HA}	1024			tCLK
			Horizontal Blank Time	t_{HB}	300	320	340	tCLK
		Vertical	Vertical total Time	t_V	625	635	645	t_H
			Vertical effective Time	t_{VA}	600			t_H
			Vertical Blank Time	t_{VB}	25	35	45	t_H

5.2 Timing sequence(Timing chart)

5.2.1 Horizontal Timing Sequence

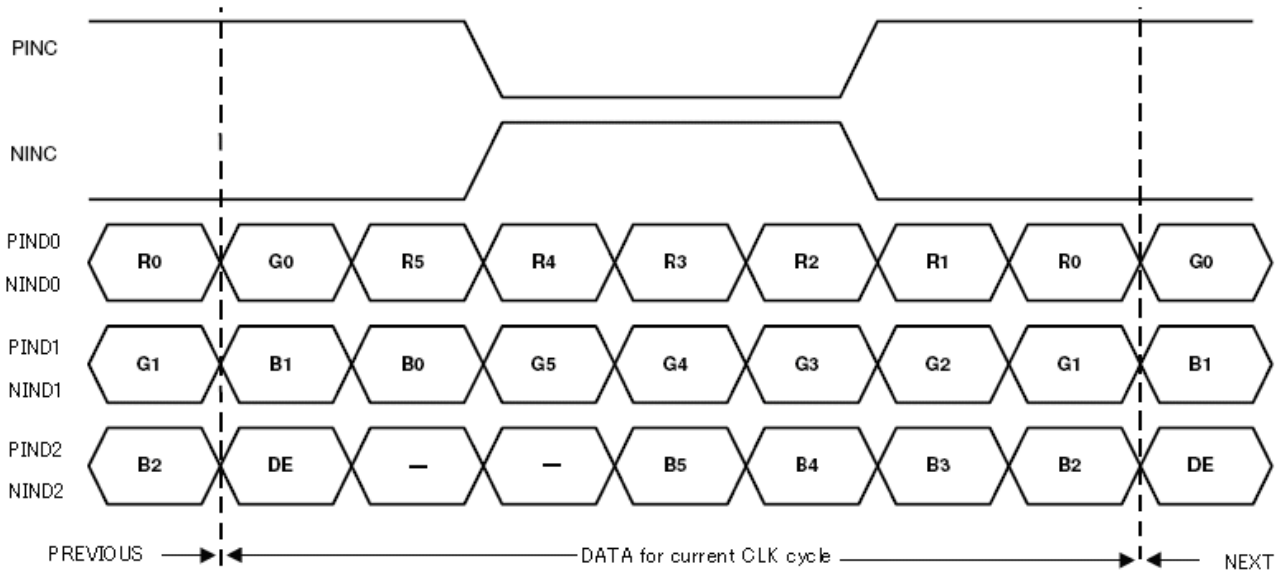


5.2.2 Vertical Timing Sequence

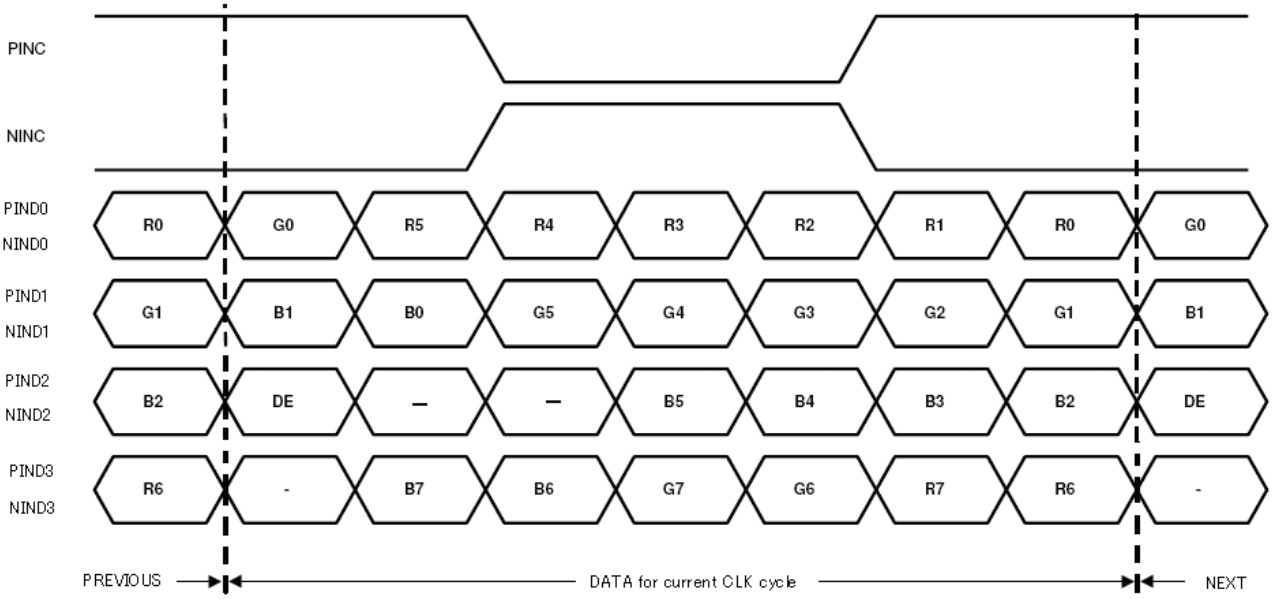


5.2.3 LVDS Input Data mapping

6 Bit LVDS input



8 Bit LVDS input



5.2.4 Color Data Reference

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

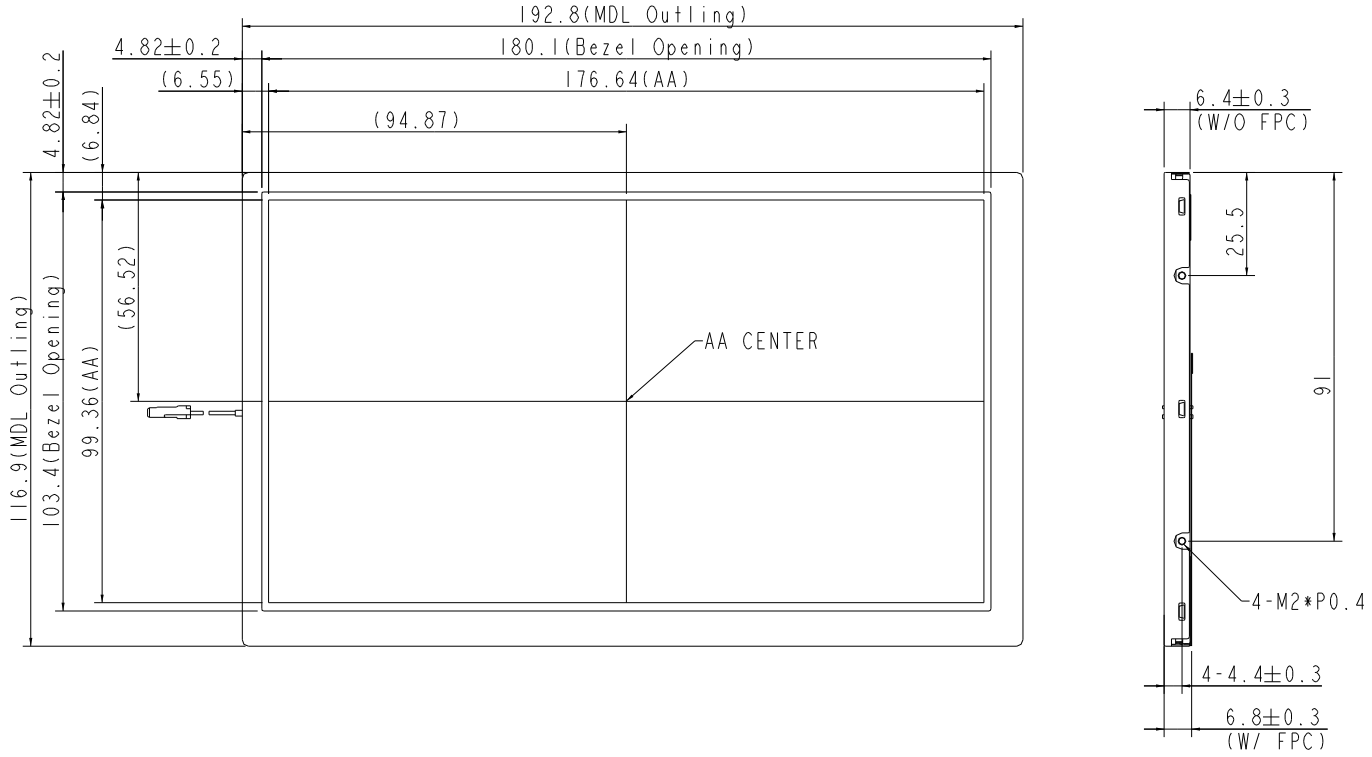
Note :

1) Gray level:
   Color(n)：n is level order; higher n means brighter level.
2) DATA:
   1: high，0: low

6. MECHANICAL DIMENSION

6.1 Front Side

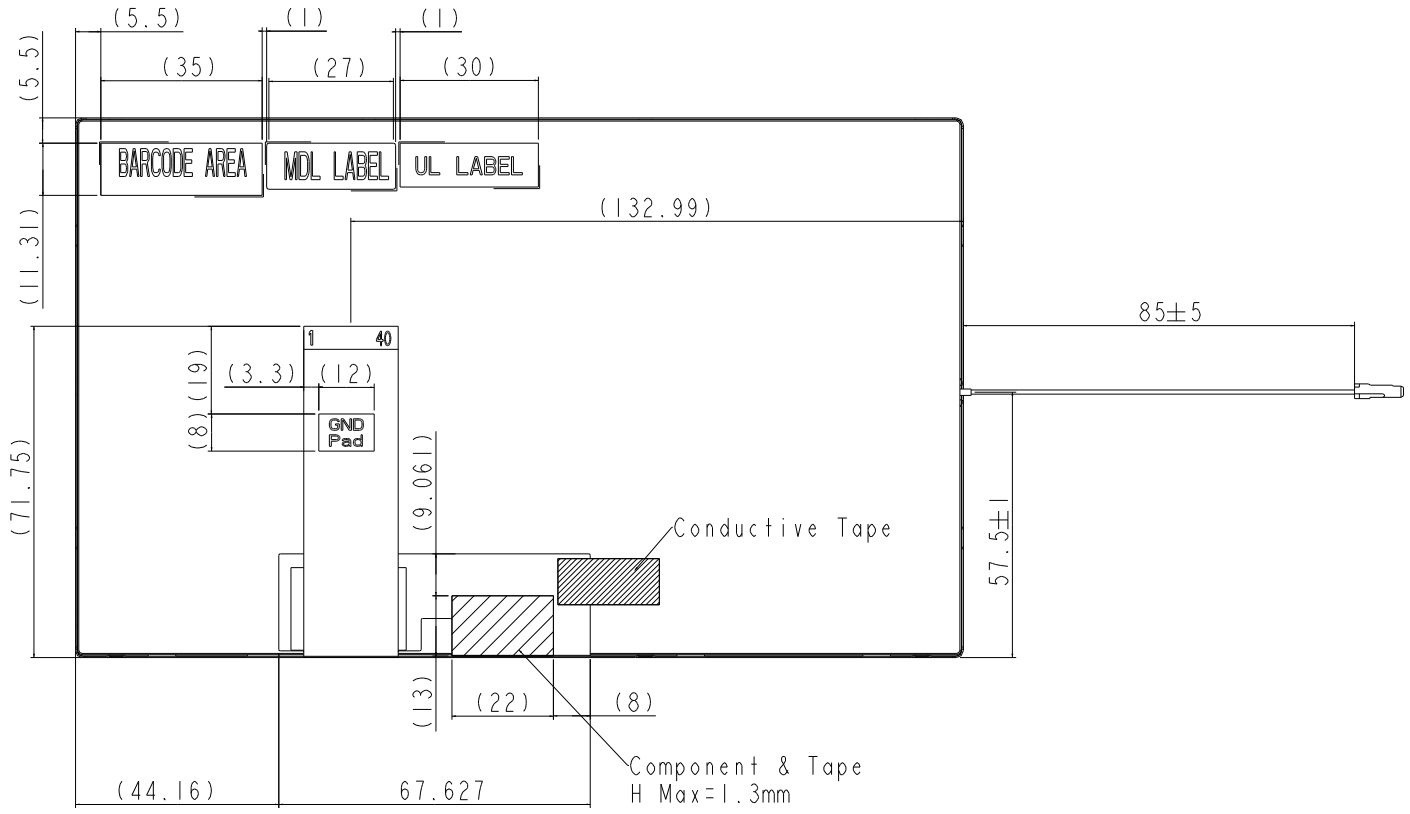
[Unit：mm]

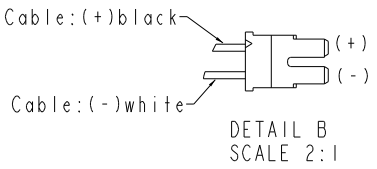


NOTE:
1.GENERAL TOLERANCE=±0.3mm
2.ALLOWED DEPTH OF USERHOLD SCREW INSERT IS 1.0mm MAX
3.USEHOLD SCREW OF TORQUE=1.4kgf/cm MAX

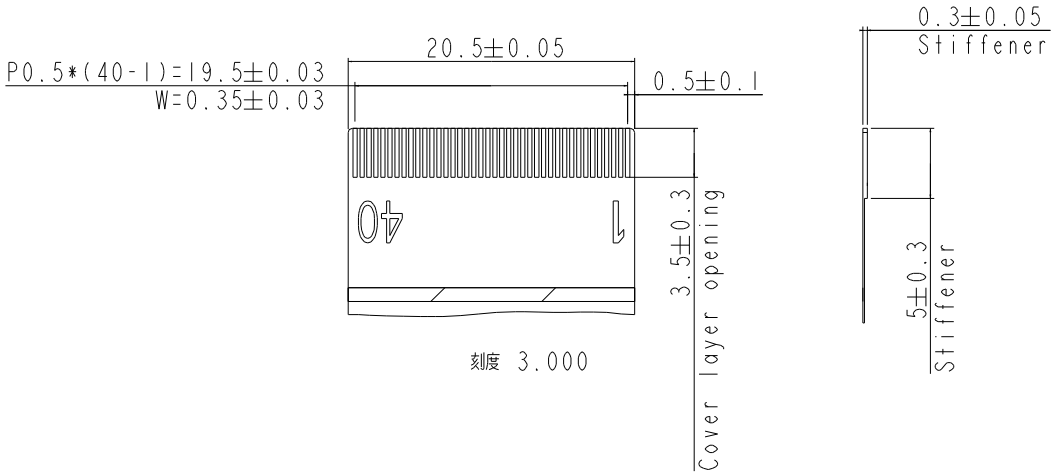
6.2 Rear Side

[Unit：mm]





DETAIL B
SCALE 2:1



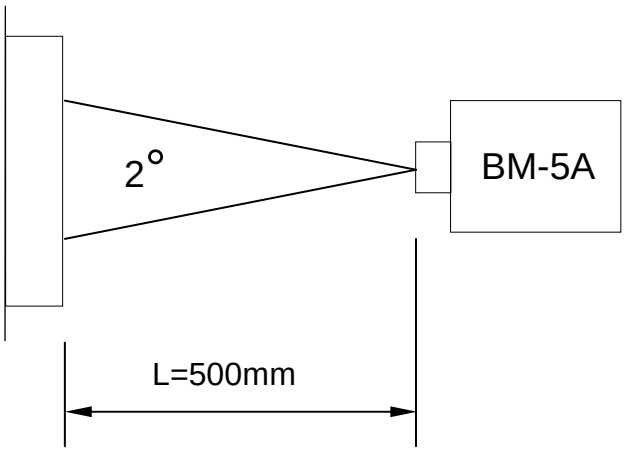
Remark：1.General tolerance ±0.3mm

7. OPTICAL CHARACTERISTICS

Ta = 25℃, Vcc=3.3V

ITEM		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Constrast Ratio		CR	Point-5	600	800		--	1, 2, 3
Luminance(CEN)		Lw	Point-5	500	600		cd/m^2	1, 3
Luminance Uniformity		ΔL		70	80		%	1, 3
Response Time (White - Black)		Tr +Tf	Point-5	-	25	35	ms	1, 3, 5
NTSC		-	Point-5	45	50	-	%	1, 4
Viewing Angle	Vertical	Upper(θ)	CR≧10 Point-5	50	60	--	°	1, 4
		Down(θ)		60	70			1, 4
	Horizontal	Left(ψ)		65	75			1, 4
		Right(ψ)		65	75	--	°	1, 4
Color Coordinate	White	Wx Wy	Point-5	0.273 0.289	0.313 0.329	0.353 0.369	--	1, 3
	Red	Rx Ry		0.522 0.284	0.562 0.324	0.602 0.364		
	Green	Gx Gy		0.291 0.537	0.331 0.577	0.371 0.617		
	Blue	Bx By		0.112 0.061	0.152 0.101	0.192 0.141		

【Note1】Measure condition：25℃±2℃，60±10%RH，under 1 Lux in the dark room.BM-5A (TOPCON)，viewing angle2°，IL=260mA（Backlight current），measurement after lighting on 10 mins.



【Note2】Definition of contrast ratio：

Contrast Ratio (CR)= (White) Luminance of ON ÷ (Black) Luminance of OFF

【Note3】 Definition of luminance：Measure white luminance on the point 5 as figure.7-1
Definition of Luminance Uniformity: Measure white luminance on the point1~9 as figure.7-1
△L = [L(MIN)/L(MAX)]×100

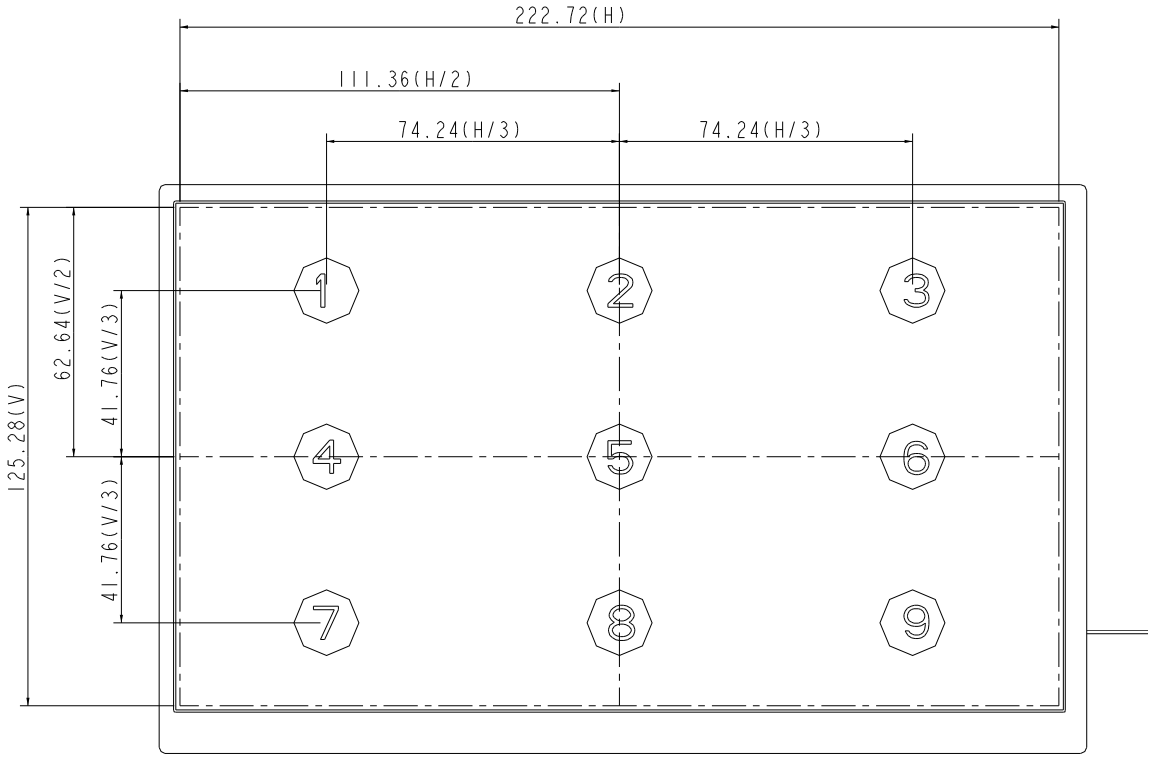


Fig.7-1 Measuring point

【Note4】 Definition of Viewing Angle(θ,ψ),refer to Fig.7-2 as below：

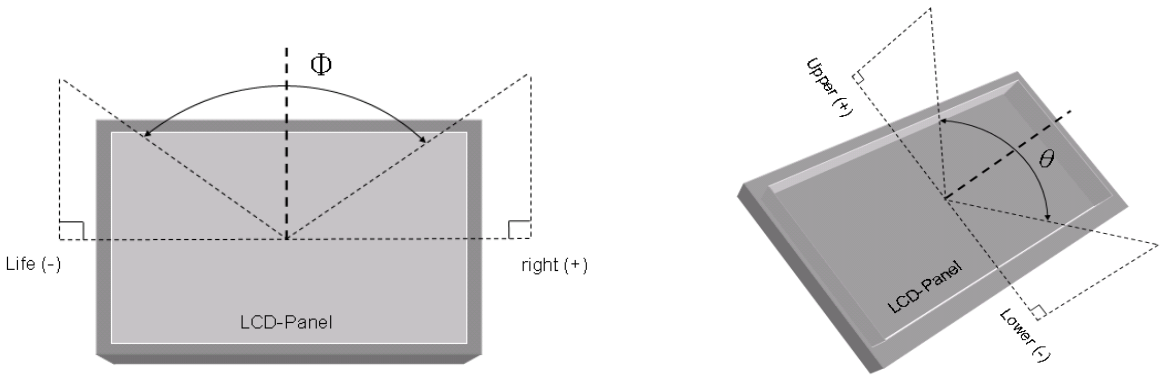


Fig.7-2 Definition of Viewing Angle

【Note5】 Definition of Response Time.(White-Black)

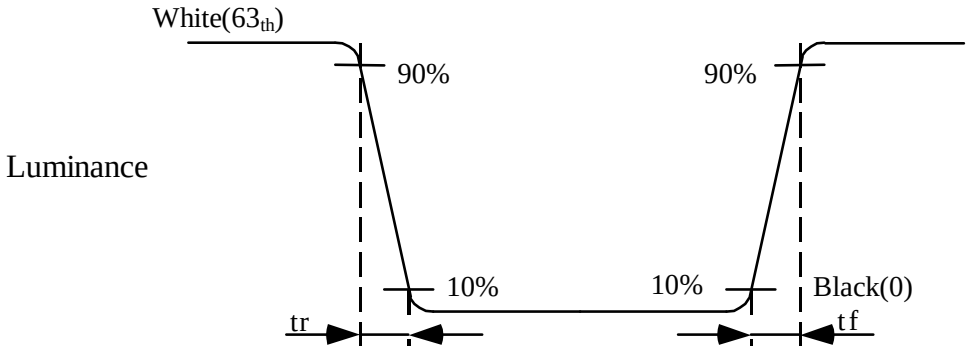


Fig.7-3 Definition of Response Time(White-Black)

8. RELIABILITY TEST

8.1. Temperature and humidity

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	70℃ ;240hrs	
High Temperature Storage	80℃ ; 240hrs	
High Temperature High Humidity Operation	60℃ ; 90%RH ;240hrs	No condensation
Low Temperature Operation	-20℃ ; 240hrs	
Low Temperature Storage	-30℃ ; 240hrs	
Thermal Shock	－20℃(0.5hr) ~ 70℃(0.5hr) ; 100 Cycles	
Image Sticking	25 ℃± 2 ℃ ; 4hrs	Note 1
MTBF	20,000hrs	

【Note1】:

Condition of Image Sticking test：25 ℃± 2 ℃

Operation with test pattern sustained for 4 hrs, then change to gray pattern immediately.

After 5 mins, the mura must be disappeared completely .

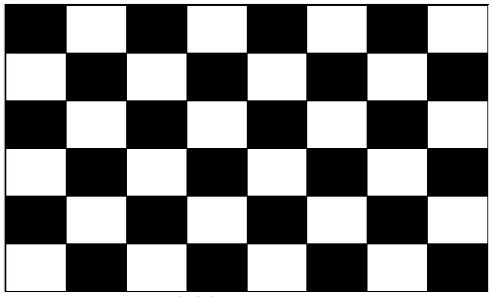


Image Sticking –pattern

Mid-Gray pattern

8.2. Shock and Vibration

TEST ITEMS	CONDITIONS
Shock (Non-operation)	● Shock level: 980m/s2(equal to 100G). ● Waveform: half sinusoidal wave,6ms. ● Number of shocks: ±X,±Y,±Z axes for a total of six shock inputs.
Vibration (Non-operation)	● Frequency range:8~33.3Hz ● Stoke：1.3 mm ● Vibration: sinusoidal wave, perpendicular axis(both x, z axis: 2hrs ,y axis: 4hrs). ● Sweep: 2.9G,33.3 Hz -400 Hz ● Cycle time: 15 min

8.3 Electrostatic Discharge

TEST ITEM	CONDITIONS	Note
ESD	150pF，330Ω，±8kV&±15kV air& contact test	1
	200pF，0Ω，±200V contact test	2

【Note】 Measure

1: LCD glass and metal bezel

2: IF connector pins

8.4. Judgment standard

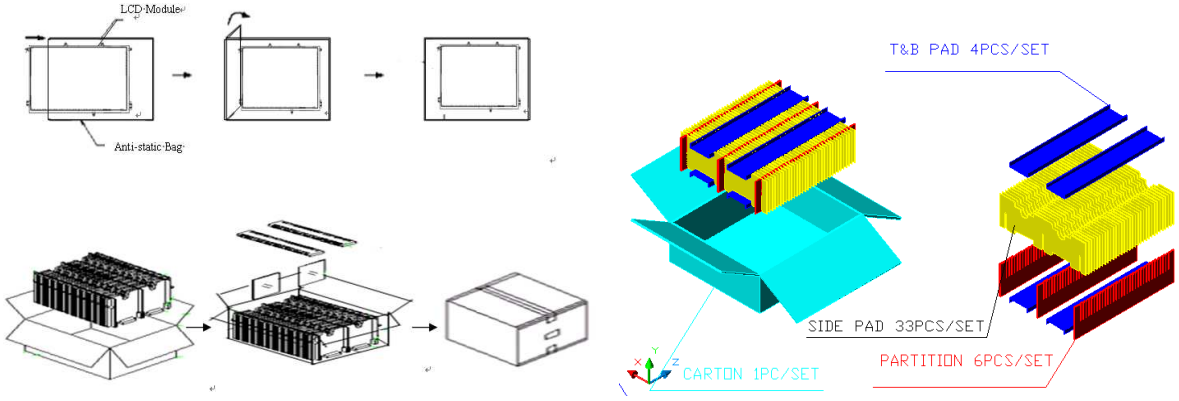
The Judgment of the above test should be made as follow:
Pass: Normal display image no line defect.
Fail: No display image, Function NG, or line defects.

9. PACKING

9.1Packing order

(1)Box Dimension: 565mm(L) X 490mm(W) X 185mm(H)

(2)Package Quantity in one Box : 64pcs



9.2 Pallet Packing

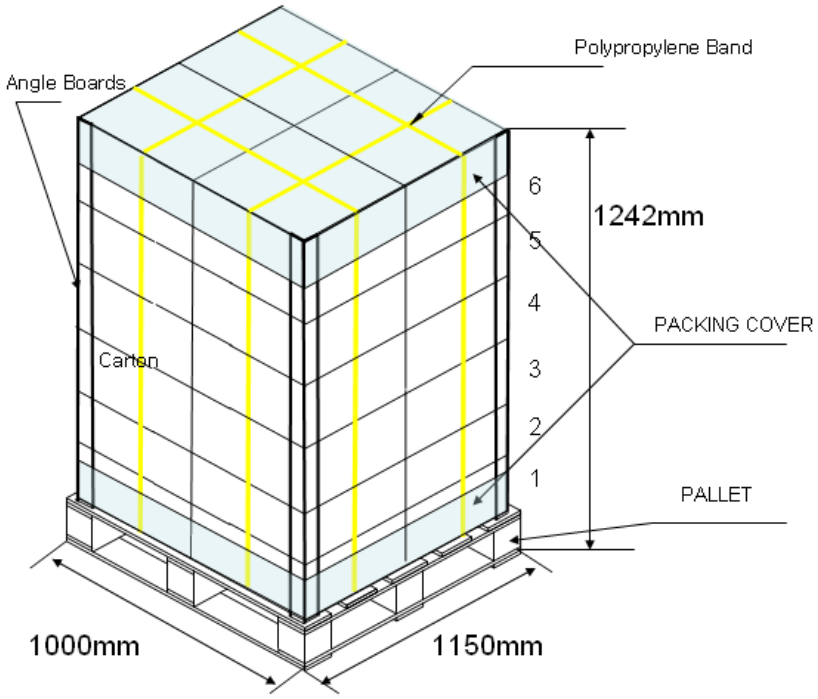
9.2.1 PALLET specification

(1) 24 box (max.) / 1 pallet

(2) Pallet: 1150(L) X 1000(W) X 133(H) mm

(3) Pallet stack: 1150(L) X 1000(W) X1243(H) mm

(4) Angle boards: L 1110 X 50 X 50mm



10. WARRANTY

10.1 The period is within 12 months since the date of shipping out under normal using and storage conditions.

10.2 The warranty will be avoided in case of defect induced by customer