



Chunghwa Picture Tubes, Ltd. Technology Specification

To : 亨遠

Date : 130403

TFT LCD

CLAA080LJ01CW

ACCEPTED BY : V0.7

APPROVED BY	CHECKED BY	PREPARED BY
黃奕凱	李家銘	陳威

Prepared by :

Medium Product Planning Management General Division
Product Planning Management Center
CHUNGHWA PICTURE TUBES, LTD.

1127 Hopin Rd., Padeh, Taoyuan, Taiwan 334, R.O.C.
TEL: +886-3-3675151 FAX: +886-3-377-3858

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1. OVERVIEW

CLAA080LJ01CW 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 800×480 images are displayed on the 8" diagonal screen. Display 16.2M colors by R.G.B signal input.

General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	176.64(W) x 99.36(H)
Number of Pixels	800(H) × 3 (RGB) × 480(V)
Pixel Pitch (mm)	0.2208(W) x 0.2070(H)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of Colors	16.2M
Brightness (cd/m ²)	360(Min)/450(Typ.)
Response Time (ms)	25ms(typ)
Contrast Ratio	500:1(typ)
Viewing Angle (CR ≥ 10)	150degree (Horizontal.)
	130degree (Vertical)
Power Consumption (W)	2.27W(TYP)
Interface connection	TTL
Module Size (mm)	192.8(W) x 116.9(H) x 6.4(D)
Module Weight (g)	220g(MAX)
Backlight Unit	LED(30PCS)
Surface Treatment	Anti-Glare 3H

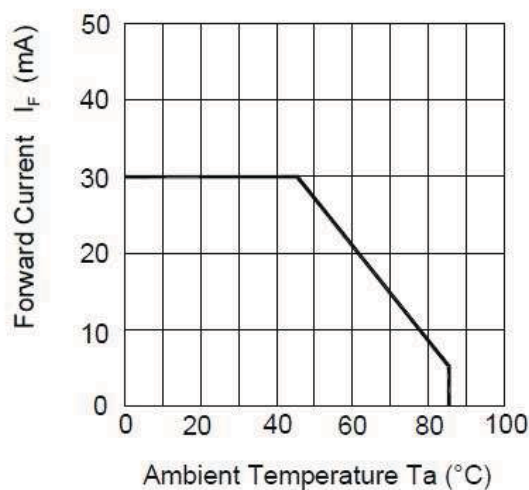
2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	DVDD	-0.3	+3.96	V	
Analog Supply Voltage	AVDD	-0.5	+14.8	V	
Gate On Voltage	VDDG	-0.3	+42	V	
Gate Off Voltage	VEEG	-20	+0.3	V	
Gate On-Gate Off Voltage	VDDG-VEEG	-0.3	40	V	
Forward Current (per LED)	I _f	-	30	mA	
Reverse Voltage (per LED)	VR	-	5	V	
Pulse forward current (per LED)	I _{fp}	-	80	mA	Note 1/2
Operation Temperature	T _{op}	-20	70	°C	Note 3
Storage Temperature	T _{stg}	-30	80	°C	Note 3

Remarks :

- *1) If the product were used out of the operation and storage range, it will have quality issue.
- *2) I_{fp} Conditions : Pulse Width ≤ 10msec , Duty ≤ 1/10.
- *3) Each one of LED operation must be follow diagram of Ambient Temperature and Allowable Forward Current.

Forward Current Derating Curve



3. ELECTRICAL CHARACTERISTICS

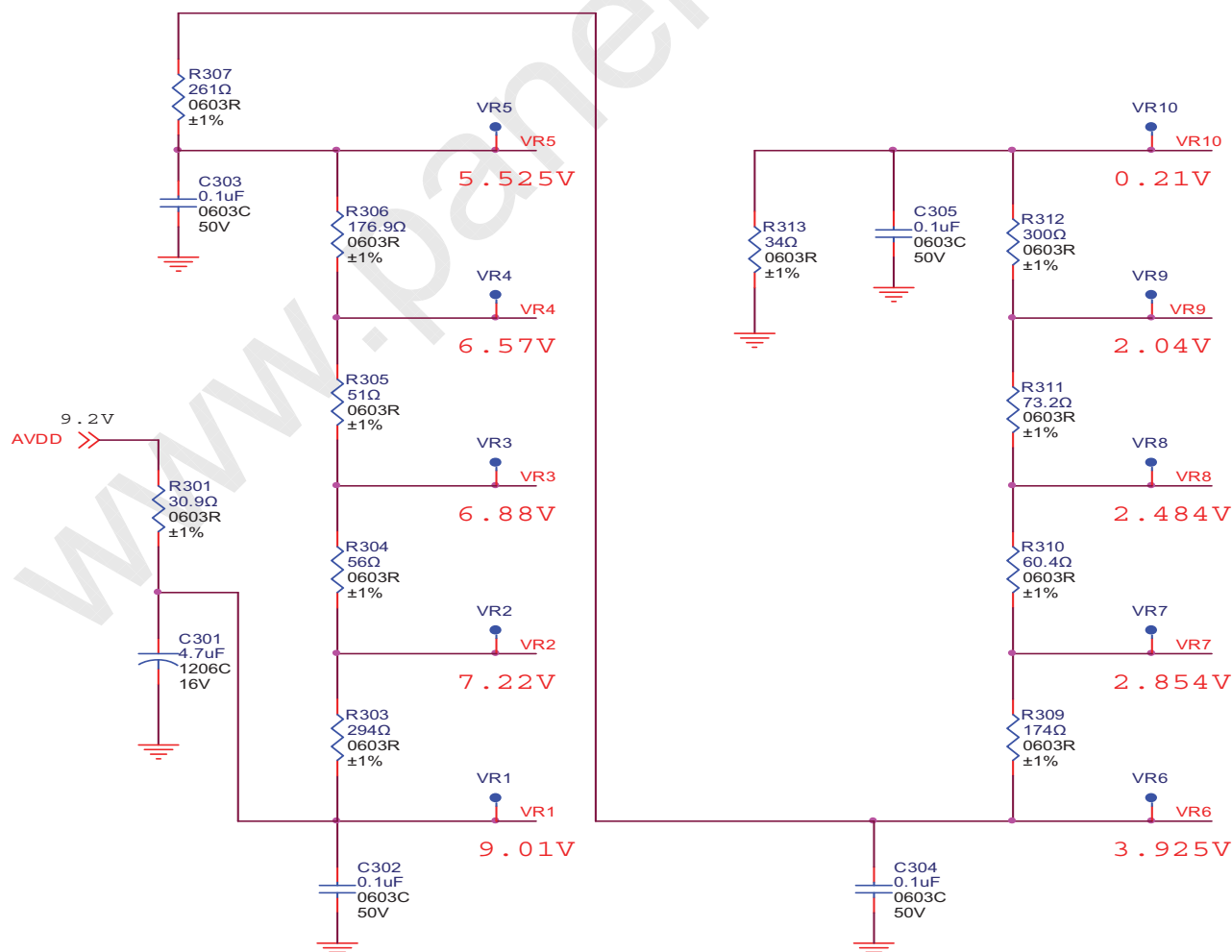
3.1 Typical operation conditions

Ta=25°C

Item	Symbol	Min.	Typ.	Max.	Unit.	Note.
Digital Supply Voltage	DVDD	3	3.3	3.6	V	
Analog Supply Voltage	AVDD	9.0	9.2	9.4	V	
Gate On Voltage	VDDG	17	18	19	V	
Gate Off Voltage	VEEG	-6.6	-6	-5.4	V	
Common Voltage	VCOM	(3.8)	(4.0)	(4.2)	V	Note1
Logic Input Voltage	VIH	0.7DVDD		DVDD	V	
	VIL	GND		0.3DVDD	V	
Gamma Voltage	V1		(9.01)		V	Note2
	V2		(7.22)		V	Note2
	V3		(6.88)		V	Note2
	V4		(6.57)		V	Note2
	V5		(5.525)		V	Note2
	V6		(3.925)		V	Note2
	V7		(2.854)		V	Note2
	V8		(2.484)		V	Note2
	V9		(2.04)		V	Note2
	V10		(0.21)		V	Note2

Note1 : Please adjust VCOM to make the flicker level be minimum.

Note2 : Gamma circuit for reference only



3.2 Current consumption

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note.
Gate on Current	IVDDG	VDDG = 18 V	-	0.5	1	mA	Note1
Gate off Current	IVEEG	VEEG = -6 V	-	0.5	1	mA	Note1
Digital Current	IDVDD	DVDD = 3.3V	-	10	15	mA	Note1
Analog Current	IAVDD	AVDD = (9.6) V	-	30	35	mA	Note1
Total Power Consumption	PC		-	321	396	mW	Note1

Note1: Typ. specification : Gray-level test Pattern

Max. specification : Black test Pattern



(a) Gray-level Pattern

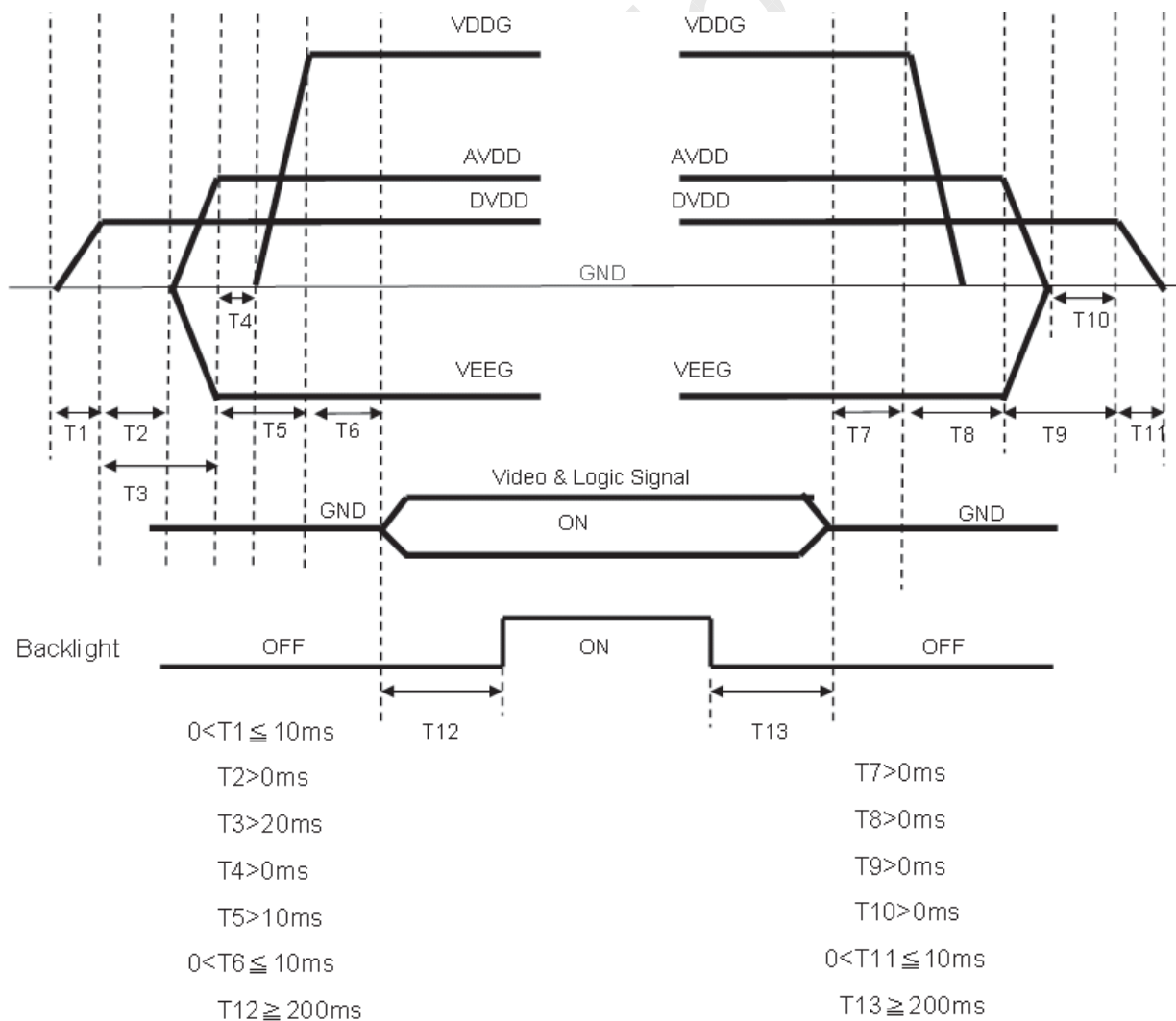


(b) Black Pattern

3.3 Power 、Signal sequence

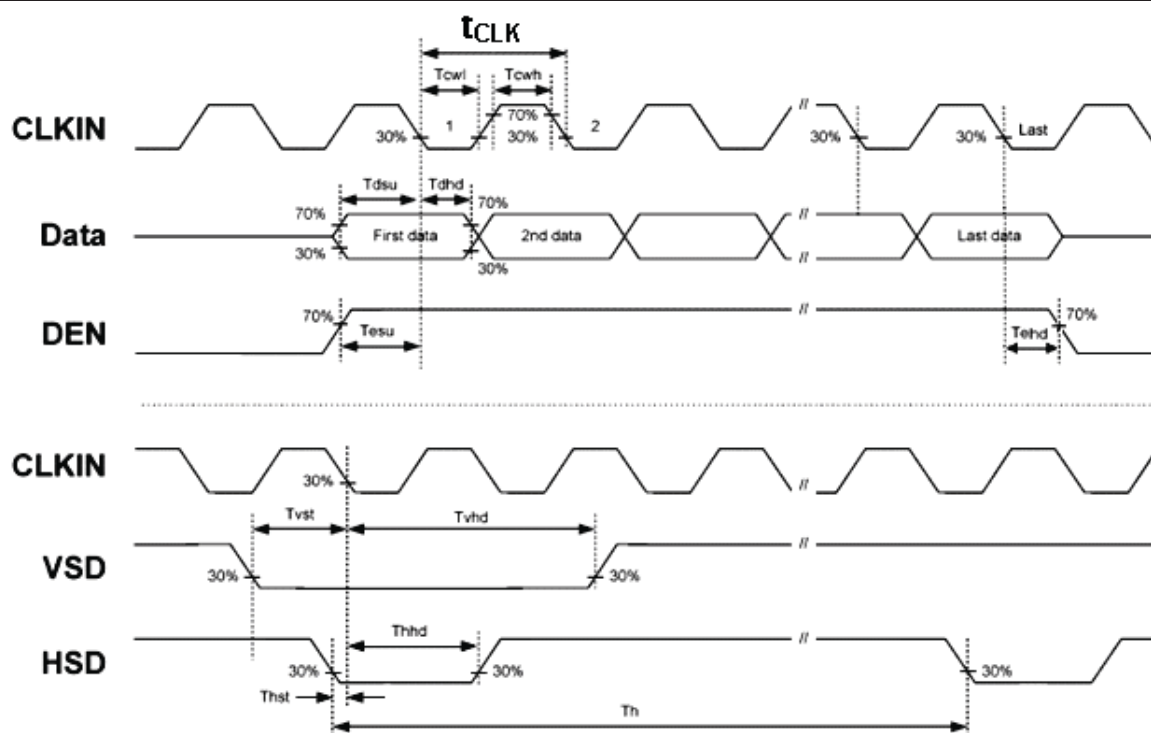
Power On : DVDD→AVDD/VEEG→VDDG→Video & Logic Signal→Backlight

Power Off : Backlight→ Video & Logic Signal→VDDG→AVDD/VEEG→DVDD



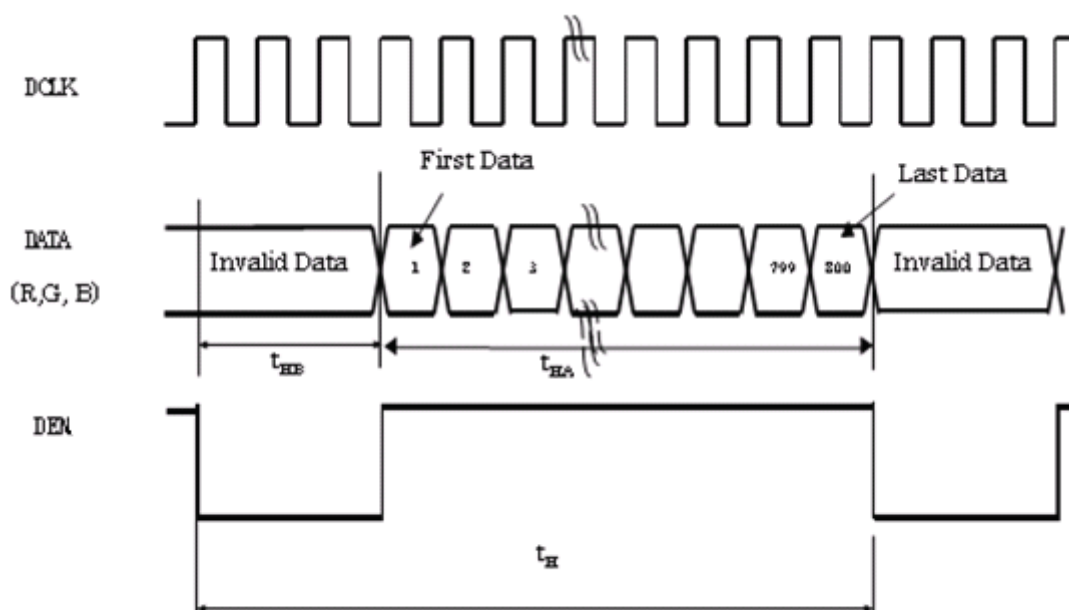
3.4 Timing characteristics of input signals

	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DCLK	Dot Clock	$1/t_{CLK}$	26	30	35	MHz	
	DCLK pulse duty	T_{cwh}	40	50	60	%	
DE	Setup Time	T_{esu}	8	-	-	ns	
	Hold time	T_{ehd}	8	-	-	ns	
	Horizontal Period	t_H	908	928	1000	t_{CLK}	
	Horizontal Valid	t_{HA}	800				
	Horizontal Blank	t_{HB}	108	128	200	t_{CLK}	
	Vertical Period	t_V	517	525	700	t_H	
	Vertical Valid	t_{VA}	480				
	Vertical Blank	t_{VB}	37	45	220	t_H	
SYNC	HSYNC Setup Time	T_{hst}	8	-	-	ns	
	HSYNC Hold Time	T_{hhd}	8	-	-	ns	
	VSYNC Setup Time	T_{vst}	8	-	-	ns	
	VSYNC Hold Time	T_{vhhd}	8	-	-	ns	
	Horizontal Period	t_H	908	928	1000	t_{CLK}	
	Horizontal Pulse Width	t_{HPW}	48			t_{CLK}	
	Horizontal Back Porch	t_{HB}	40			t_{CLK}	
	Horizontal Front Porch	t_{HFP}	20	40	112	t_{CLK}	
	Horizontal Valid	t_{HD}	800				
	Vertical Period	t_V	517	525	700	t_H	
	Vertical Pulse Width	t_{VPW}	3			t_H	
	Vertical Back Porch	t_{VB}	29			t_H	
	Vertical Front Porch	t_{VFP}	5	13	188	t_H	
	Vertical Valid	t_{VD}	480				
Frame	Frame Rate	--	55	60	-	Hz	-
DATA	Setup Time	T_{dsu}	8	-	-	ns	
	Hold Time	T_{dhd}	8	-	-	ns	

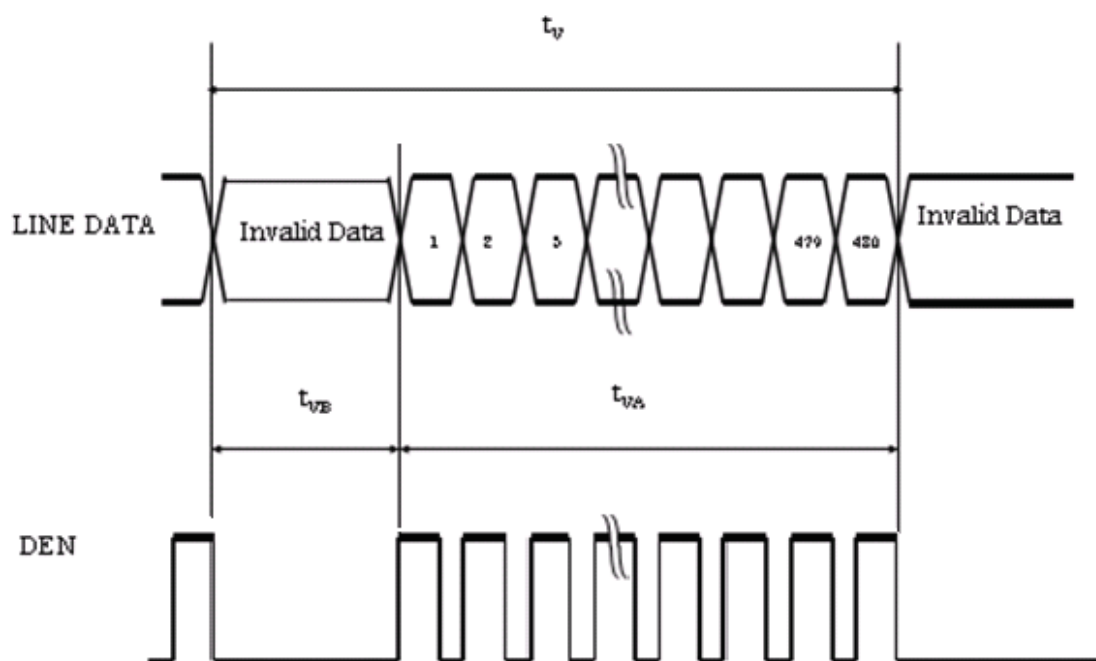


DE mode

Horizontal timing :

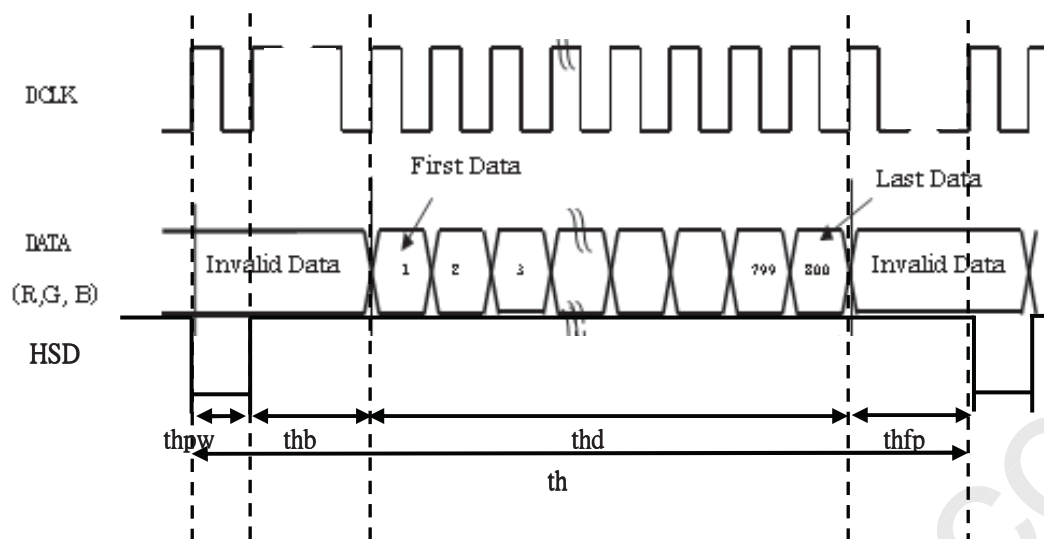


Vertical timing :

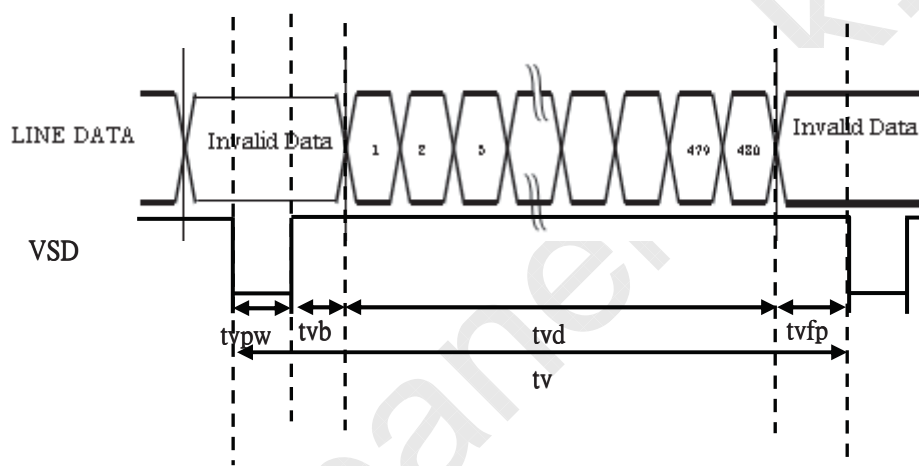


SYNC mode

Horizontal timing :



Vertical timing :



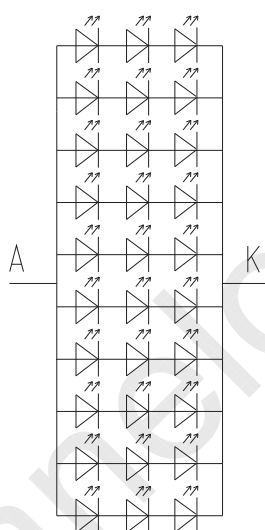
3.5 Backlight

Ta=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARKS
LED current	IL	Ta=25°C Each serial=20mA	-	200	-	mA	
LED voltage	VL	Ta=25°C Each serial=20mA	8.55	9.75	10.8	V	
Power consumption	WL	Ta=25°C Each serial=20mA	-	1.950	-	W	
LED Lifetime	-	Ta=25°C Each serial=20mA	30000			Hr	

【Note】：

*1)LED Circuit Diagram：



*2) A：Anode(+)，K：Cathode(—)

*3) LED control must use the constant current control to avoid the leakage light and brightness quality issue.

*4) Definition of the LED life time：Luminance will decay less than 50%

4. INTERFACE CONNECTION:

4.1 CN1(Signal of interface)

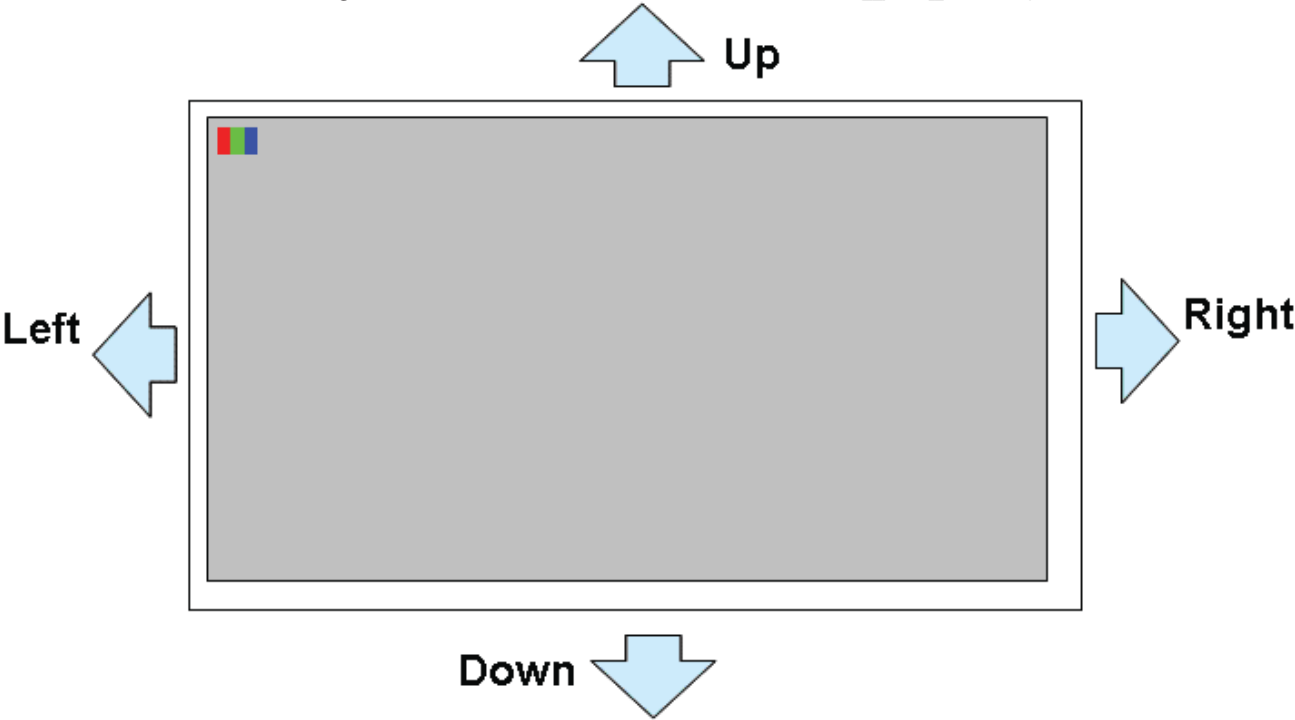
Pin NO.	SYMBOL	DESCRIPTION
1	AGND	Analog Ground
2	AVDD	Analog Power
3	DVDD	Digital Power
4	R0	Data Input(LSB)
5	R1	Data Input
6	R2	Data Input
7	R3	Data Input
8	R4	Data Input
9	R5	Data Input
10	R6	Data Input
11	R7	Data Input(MSB)
12	G0	Data Input(LSB)
13	G1	Data Input
14	G2	Data Input
15	G3	Data Input
16	G4	Data Input
17	G5	Data Input
18	G6	Data Input
19	G7	Data Input(MSB)
20	B0	Data Input(LSB)
21	B1	Data Input
22	B2	Data Input
23	B3	Data Input
24	B4	Data Input
25	B5	Data Input
26	B6	Data Input
27	B7	Data Input(MSB)
28	DCLK	Clock input
29	DE	Data Enable signal
30	HSD	Horizontal sync input. Negative polarity
31	VSD	Vertical sync input. Negative polarity
32	MODE	DE/SYNC mode select. Normally pull high H: DE mode. L: HSD/VSD mode
33	RSTB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=47K Ω , C=1 μ F)
34	STBYB	Standby mode, normally pull high STBYB="1", normal operation STBYB="0",timming control, source driver will turn off, all output are high-Z
35	SHLR	Left or Right Display Control
36	DVDD	Digital Power
37	UPDN	Up / Down Display Control
38	GND	Digital Ground
39	AGND	Analog Ground
40	AVDD	Analog Power
41	VCOM	Common Voltage
42	DITH	Dithering setting DITH="H" 6bit resolution(last 2 bit of input data truncated) (default setting) DITH="L" 8bit resolution
43	NC	Not connect
44	NC	Not connect
45	V10	Gamma correction voltage reference
46	V9	Gamma correction voltage reference
47	V8	Gamma correction voltage reference
48	V7	Gamma correction voltage reference
49	V6	Gamma correction voltage reference
50	V5	Gamma correction voltage reference

51	V4	Gamma correction voltage reference
52	V3	Gamma correction voltage reference
53	V2	Gamma correction voltage reference
54	V1	Gamma correction voltage reference
55	NC	Not connect
56	VDDG	Positive Power for TFT
57	DVDD	Digital Power
58	VEEG	Negative Power for TFT
59	GND	Digital Ground
60	NC	Not connect

【Note1】 SHLR : left or right setting
UPDN : up or down setting

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

Definition of scanning direction.



4.2 CN2 (backlight)

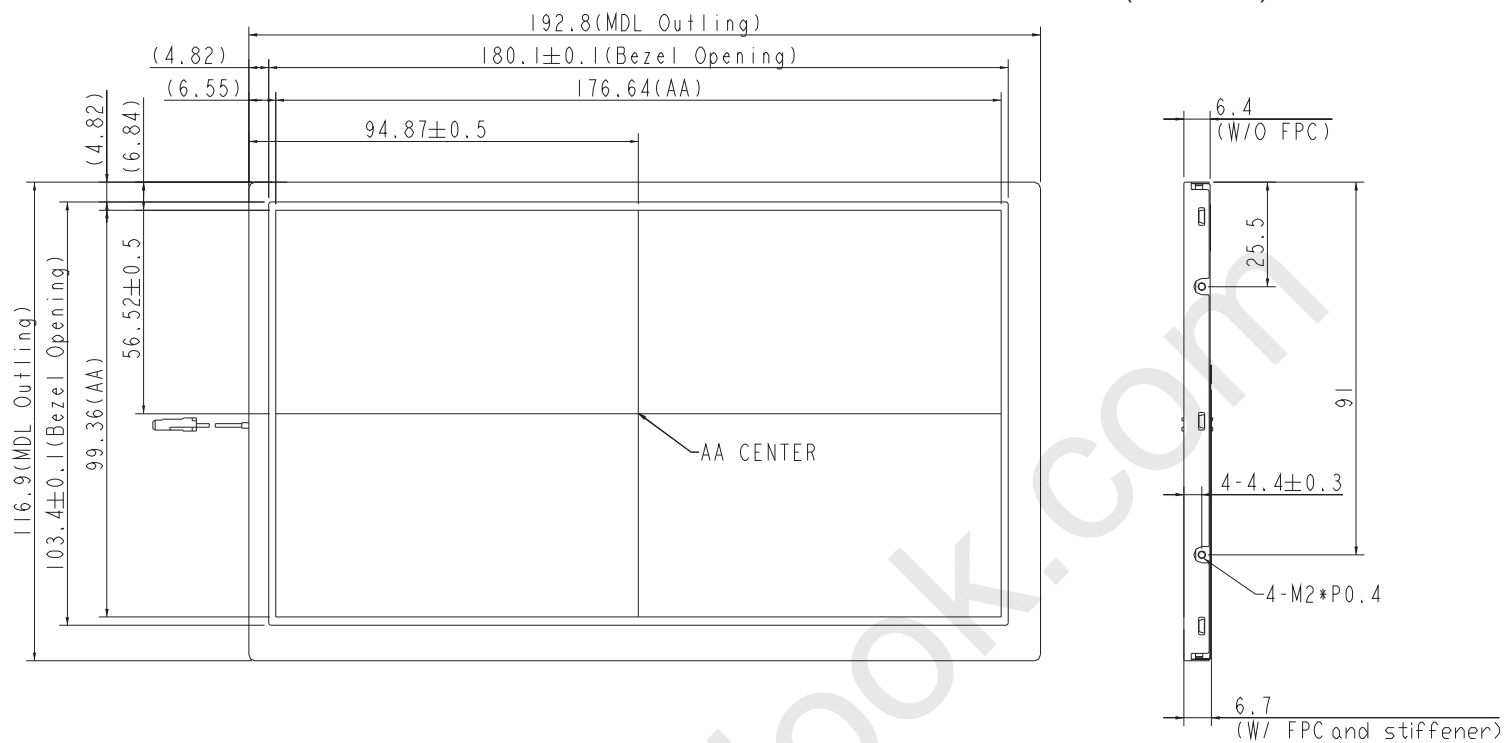
Pin No.	SYMBOL	FUNCTION
1	A	Anode
2	K	Cathode

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

5. MECHANICAL DIMENSION

5.1 Front Side

(Unit : mm)



NOTE:

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

(Unit : mm)



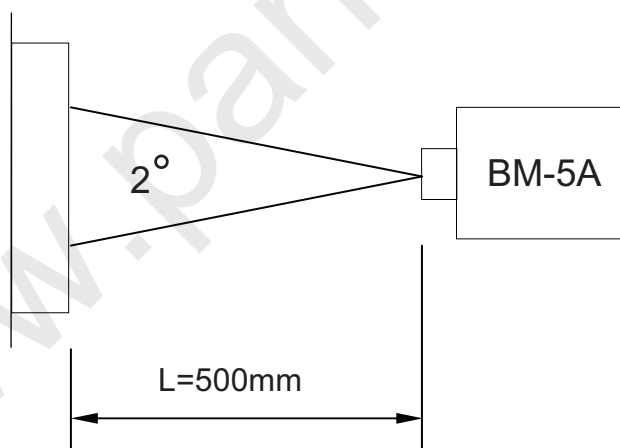
6. OPTICAL CHARACTERISTICS

(Use CPT LED backlight)

Ta=25°C

ITEM		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Contrast Ratio		CR	Point-5	400	500		--	1, 2, 3
Luminance(CEN)		Lw	Point-5	360	450		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	-	50	-	%	1, 3
Viewing Angle	Horizontal		CR ≥ 10 Point-5	130	150	--	°	1, 3
	Vertical			110	130	--	°	1, 2, 4
Color Coordinate	White	Wx Wy	Point-5	0.260 0.280	0.310 0.330	0.360 0.380	--	1, 3
	Red	Rx Ry		0.547 0.298	0.597 0.348	0.647 0.398		
	Green	Gx Gy		0.303 0.541	0.353 0.591	0.403 0.641		
	Blue	Bx By		0.110 0.098	0.160 0.148	0.210 0.198		

Note1: Measure condition : 25°C±2°C , 60±10%RH , under10 Lux in the dark room.BM-5A (TOPCON) , viewing angle2° , IL=200 mA (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.6-1

Definition of Luminance Uniformity: Measure white luminance on the point1~9 as figure.6-1

$$\Delta L = [L(\text{MIN})/L(\text{MAX})] \times 100$$

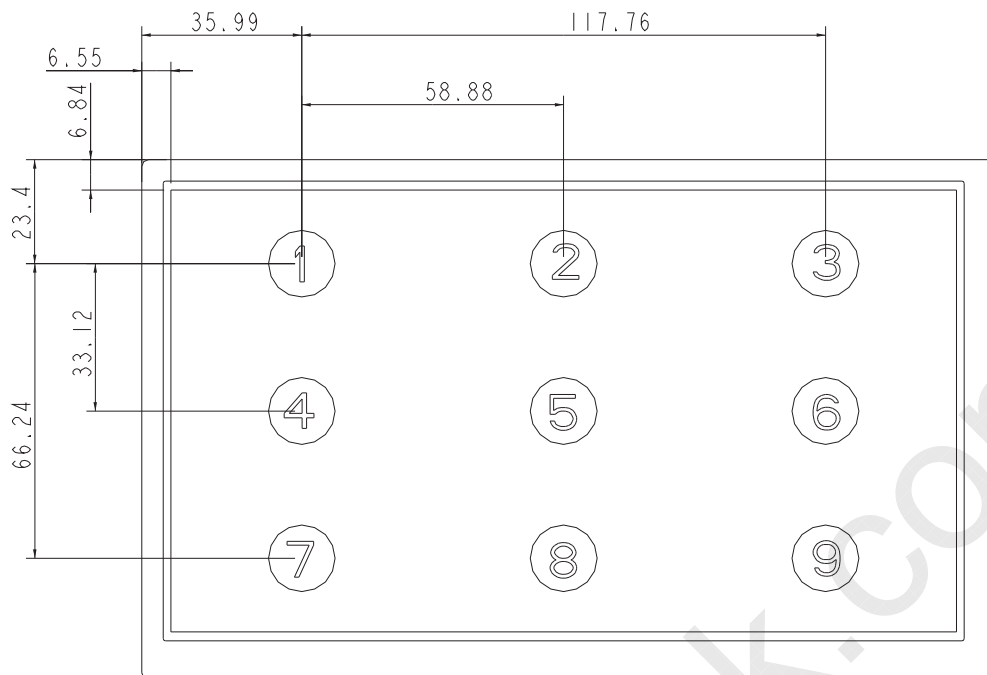


Fig.6-1 Measuring point

Note 4: Definition of Viewing Angle(θ, ψ), refer to Fig.6-2 as below :

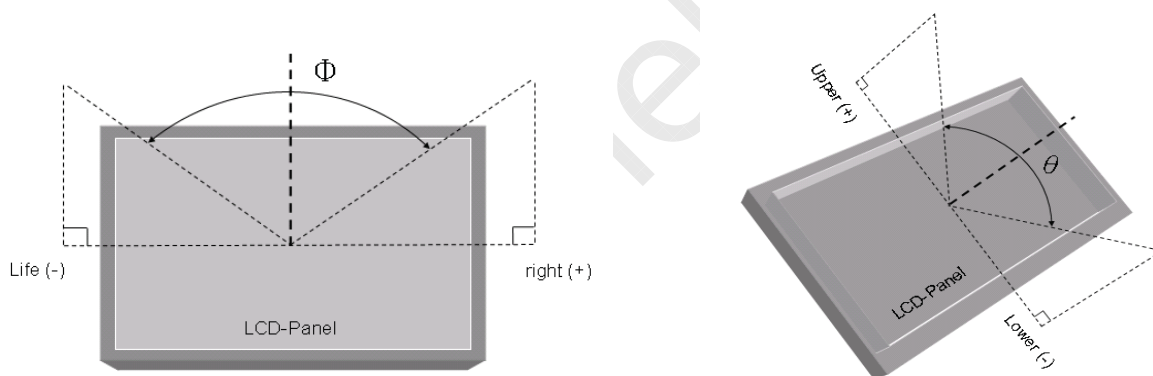


Fig.6-2 Definition of Viewing Angle

Note5: Definition of Response Time.(White-Black)

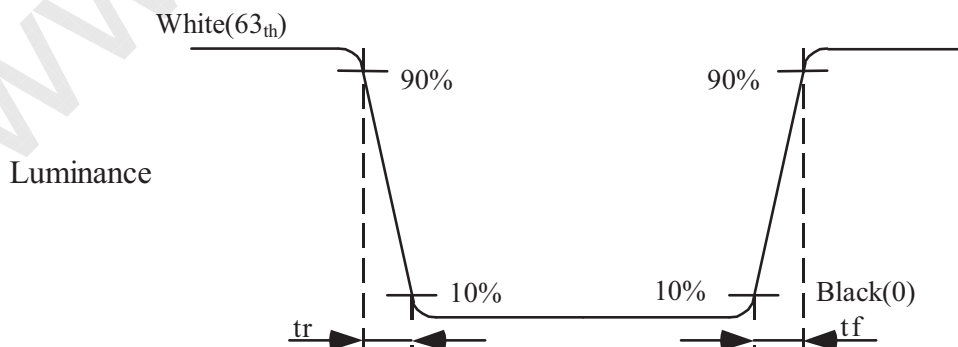


Fig.6-3 Definition of Response Time(White-Black)

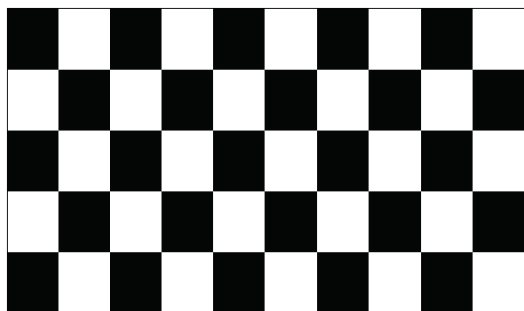
7. RELIABILITY TEST

7.1 Temperature and Humidity

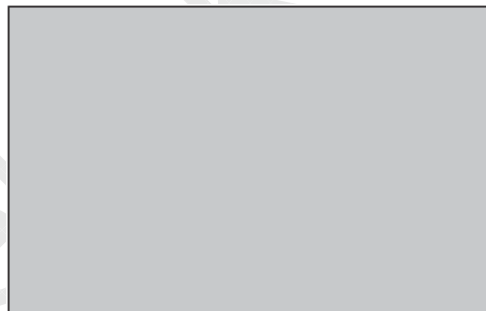
TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	70℃ ; 240hrs	
High Temperature Storage	80℃ ; 240hrs	
High Temperature High Humidity Operation	60℃ ; 90%RH ; 240hrs	
Low Temperature Operation	-20℃ ; 240hrs	
Low Temperature Storage	-30℃ ; 240hrs	
Thermal Shock	-30℃ (0.5hr) ~ 80℃ (0.5hr) ; 200 Cycles	Non-Operating
Image Sticking	25℃ ; 4hrs	Note 1

Note 1: 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 .



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

7.2 Shock and Vibration

ITEMS	CONDITIONS
Shock (Non-Operation)	● Shock level : 980m/s²(equal to 100G). ● Waveform : 1/2 Sine wave,6msec ● ±X , ±Y , ±Z , each axis 1 times
Vibration (Non-Operation)	1.Random: ● 1.04Grms, 5~500Hz, X/Y/Z, ● 30min/each direction 2. Sine: ● Freq. Range: 8~33.3Hz ● Stoke: 1.3mm ● Sweep: 2.9G, 33.3~400Hz ● X/Z: 2hr, Y: 4hr, cyc: 15min

7.3 Electrostatic Discharge

TEST ITEM	CONDITIONS
ESD	[MM] 200pF, 0Ω, ±200V, once for each terminal [HM] 150pF, 330Ω, ±8 & 15kV, 25 times/point, 4points/panel(Air mode) [HM] 150pF, 330Ω, ±8 & 15kV,25 times/point(Contact mode)

Note: Measure

- 1: LCD glass and metal bezel
- 2: IF connector pins

7.4 Judgment Standard

The judgment of the above test should be made as follow:

Pass: Normal display image with no obvious non-uniformity and no line defect.

Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.

8. WARRANTY

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

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