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Custom Display

PCAP

Mechanical design

Production Custom designs Installation



MODEL NO : ET070WV02-T

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2022-10-24

☐ Preliminary Specification

☒ Final Product Specification

Customer : _____

Approved by	Notes

Youri Confirmation

Prepared by	Reviewed by	Approved by
John	Johnny	Wang

1. Introduction

1.1 Scope of application

This LCD module should be designed for mobile phone use.

LCD specification: Dots 800xRGBx480.

As to basic specification of the driver IC, refer to the IC (TBD) specification and data book.

All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;

12 O'CLOCK Type LCD

800 dot-segment and 480 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

24lane RGB interface

1.3 Applications:

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally White	--
Drive element	TFT active matrix	--
Number of pixels	800*3RGB(H)X480(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.1926(W)x 0.1790(H)	mm
Active area	154.08H) × 85.92 (V)	mm
Viewing direction	12 O'CLOCK	
TFT Driver IC	TBD	-
TFT interface	24lane RGB Interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	165.00(W) x100.00(H) x5.70(T)	mm
Touch structure	--	
Touch Driver IC	--	-
Touch Interface	--	



3. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-30	+80	°C
LCM Storage Temperature	T _{STG}	-30	+80	°C
Humidity	RH	10	90	%

4. Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
TFT Operation Frame rate	Hz	--	60	--	Hz	
Supply Voltage for(DC/DC)	VDD	3.0	3.3	3.6	V	
TFT Gate ON Voltage	VGH	14.5	15	15.5	V	Note 2
TFT Gate OFF Voltage	VGL	-10.5	-10	-9.5	V	Note 2
TFT Common Voltage	Vcom	3.54	4.04	4.54	V	Note 1
AVDD	Avdd	10.2	10.4	10.6	V	Note 3

Note 1: VCOM value should be adjusted by different condition to optimize Flicker Value.

Note 2: VGH and VGL are the operating voltages of TFT gate.

Note 3: Adjust the contrast, make the color bigger and darker, and make the color smaller and lighter.

4.2 Back-Light Unit Characteristics

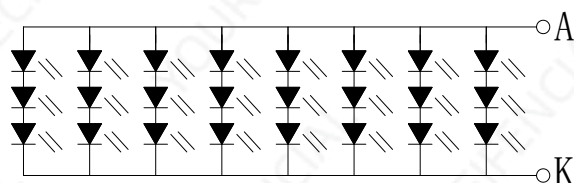
The back-light system is an edge-lighting type with 24 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	8.4	--	9.6	V	-
Forward current	I _F	--	200	--	mA	-
Luminance(With LCD)	L _v		550	--	cd/m ²	-
LED life time	N/A	--	30,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

LCM PIN Description:

Pin No.	Symbol	I/O	Function	Remark
1	V _{LED+}	P	Power for LED backlight (Anode)	
2	V _{LED+}	P	Power for LED backlight (Anode)	
3	V _{LED-}	P	Power for LED backlight (Cathode)	
4	V _{LED-}	P	Power for LED backlight (Cathode)	
5	GND	P	Power ground	
6	V _{COM}	I	Common voltage	
7	DV _{DD}	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	Note 1
9	DE	I	Data Input Enable	
10	VS	I	Vertical Sync Input	
11	HS	I	Horizontal Sync Input	
12	B7	I	Blue data(MSB)	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	Note 2
19	B0	I	Blue data(LSB)	Note 2
20	G7	I	Green data(MSB)	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	

26	G1	I	Green data	Note 2
27	G0	I	Green data(LSB)	Note 2
28	R7	I	Red data(MSB)	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	Note 2
35	R0	I	Red data(LSB)	Note 2
36	GND	P	Power Ground	
37	DCLK	I	Sample clock	Note 3
38	GND	P	Power Ground	
39	L/R	I	Left / right selection	Note 4,5
40	U/D	I	Up/down selection	Note 4,5
41	V _{GH}	P	Gate ON Voltage	
42	V _{GL}	P	Gate OFF Voltage	
43	AV _{DD}	P	Power for Analog Circuit	
44	RESET	I	Global reset pin.	Note 6
45	NC	-	No connection	
46	V _{COM}	I	Common Voltage	
47	DITHB	I	Dithering function	Note 7
48	GND	P	Power Ground	
49	NC	-	No connection	
50	NC	-	No connection	

I: input, O: output, P: Power

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE="0", DE must be grounded.

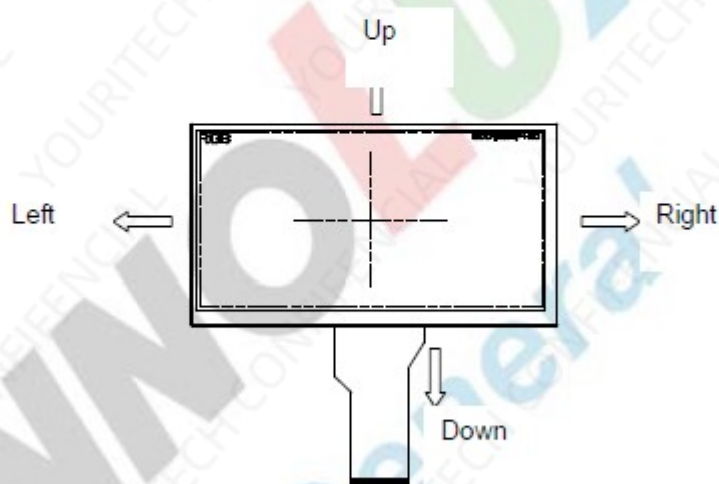
Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV _{DD}	Up to down, left to right
DV _{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV _{DD}	DV _{DD}	Down to up, left to right

Note 5: Definition of scanning direction.
Refer to the figure as below:



Note 6: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 7: Dithering function enable control, normally pull high.
When DITHB="1", Disable internal dithering function,
When DITHB="0", Enable internal dithering function,

6. Timing Characteristics

Power on/off Sequence

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power ON: VDD, VSS → VDDA, VSSA → V1 to V14

Power OFF: V1 to V14 → VDDA, VSSA → VDD, VSS

Power on/off control

HX8264-D03 has a power on/off sequence control function. In order to prevent IC from power on reset fail, the rising time (T_{POR}) of the digital power supply VDD should be maintained within the given specifications. Please refer to "AC Characteristics" for more detail on timing.

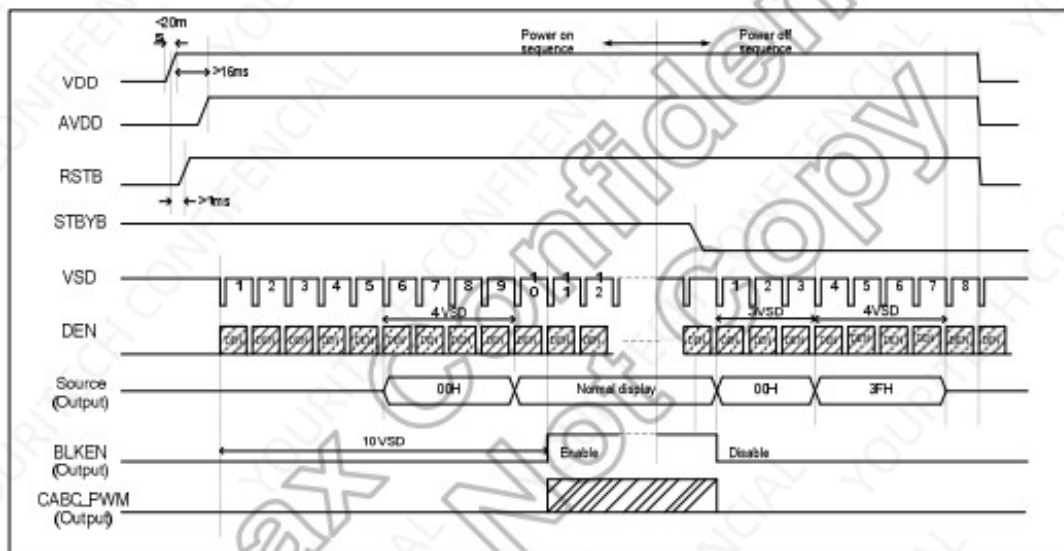


Figure 9.1: Power on/off Timing Sequence

Enter and exit standby mode sequence

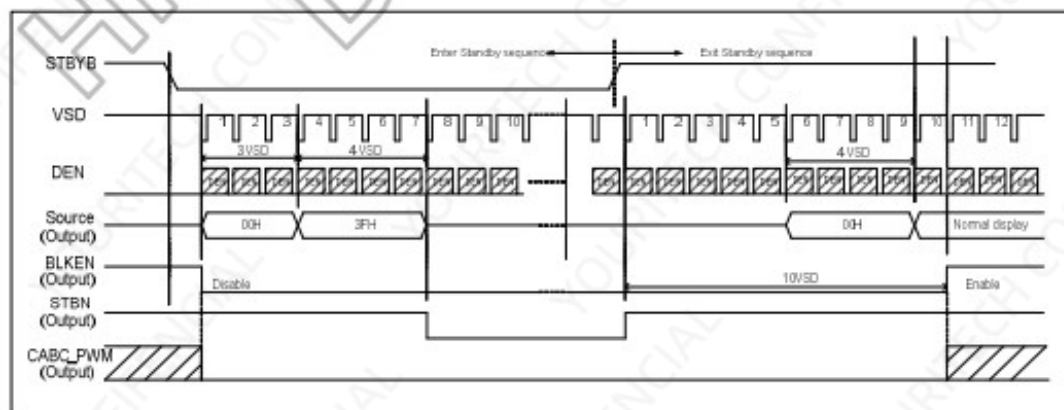


Figure 9.2: Enter and Exit Standby Mode Sequence

AC electrical characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	T_{hst}	8	-	-	ns
HS hold time	T_{hhd}	8	-	-	ns
VS setup time	T_{vst}	8	-	-	ns
VS hold time	T_{vhd}	8	-	-	ns
Data setup time	T_{dsu}	8	-	-	ns
Data hold time	T_{dhd}	8	-	-	ns
DE setup time	T_{esu}	8	-	-	ns
DE hold time	T_{ehd}	8	-	-	ns
VDD Power On Slew rate	T_{POR}	-	-	20	ms
RSTB pulse width	T_{Rst}	10	-	-	μ s
CLKIN cycle time	T_{cph}	20	-	-	ns
CLKIN pulse duty	T_{cwh}	40	50	60	%
Output stable time	T_{sst}	-	-	6	μ s

DATA SHEET V03

Data input format

● Horizontal timing

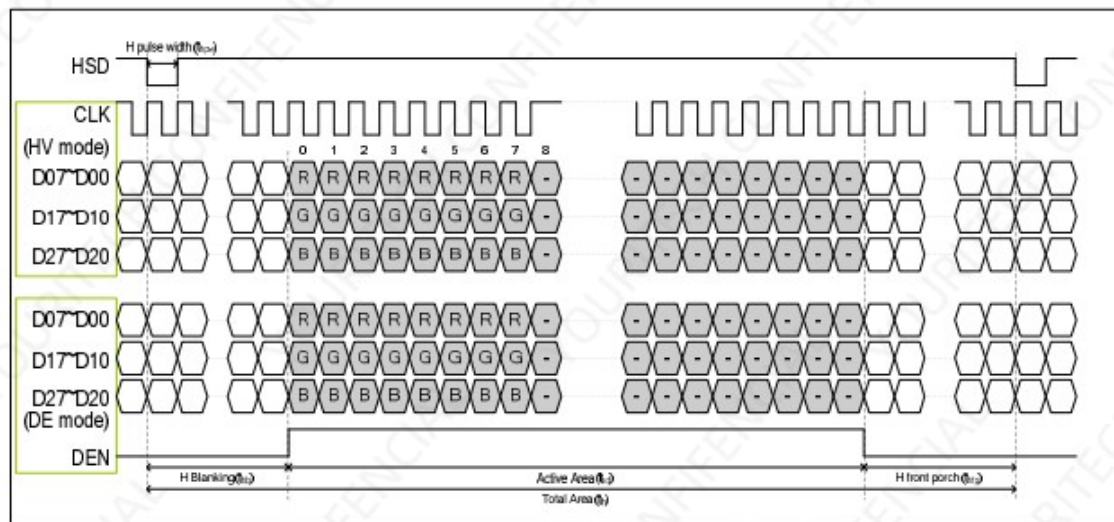


Figure 11.1: Horizontal Input Timing Diagram

● Vertical timing

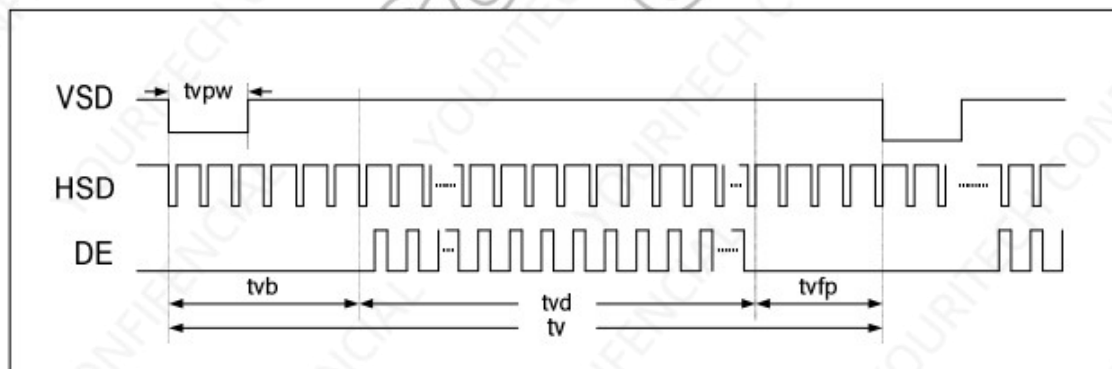


Figure 11.2: Vertical Input Timing Diagram

7. Optical Characteristics

Item		Symbol	Conditions	Specifications			Unit	Note	
				Min.	Typ.	Max.			
Transmittance (w/o DBEF)		T%	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	4.42%	5.02%	--	%	All left side data are based on Innolux's following condition – 1.LC : TN 2.Light Source : C-Light 3. Polarizer : CF: NWF-LNSWQAGS1 TFT: NWF-LNSWQ 4.Machine : DMS 900 5. By quick VLC dark ≥ 4.9 V, VLC white = 0.5 V	
Contrast Ratio		CR		500	800	--	--		
Response Time		$T_{on} + T_{off}$		-	25	50	ms		
Viewing Angle	Hor.	θ_{X+} (3 o'clock)	Center CR>10	60	70	--	deg.		
		θ_{X-} (9 o'clock)		60	70	--			
	Ver.	θ_{Y+} (12 o'clock)		50	60	--			
		θ_{Y-} (6 o'clock)		60	70	--			
CF only Color Chromaticity (CIE 1931)	Red	Rx	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	0.561	0.581	0.601	-		Under C light Simulation
		Ry		0.291	0.311	0.331	-		
	Green	Gx		0.291	0.311	0.331	-		
		Gy		0.535	0.555	0.575	-		
	Blue	Bx		0.116	0.136	0.156	-		
		By		0.099	0.119	0.139	-		
	White	Wx		0.290	0.310	0.330	-		
		Wy		0.310	0.330	0.350	-		
	Color Gamut			41	51	--	%		

*Note(1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

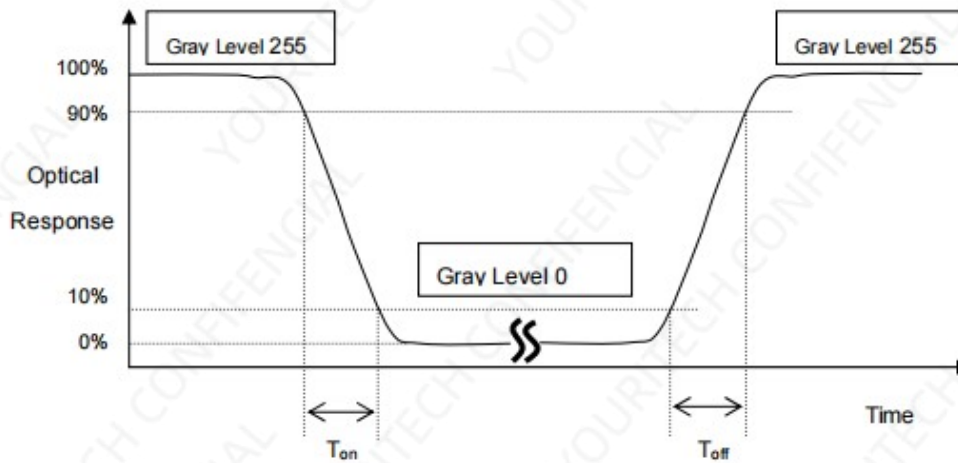
L255 : Luminance of gray level 255

L 0: Luminance of gray level 0

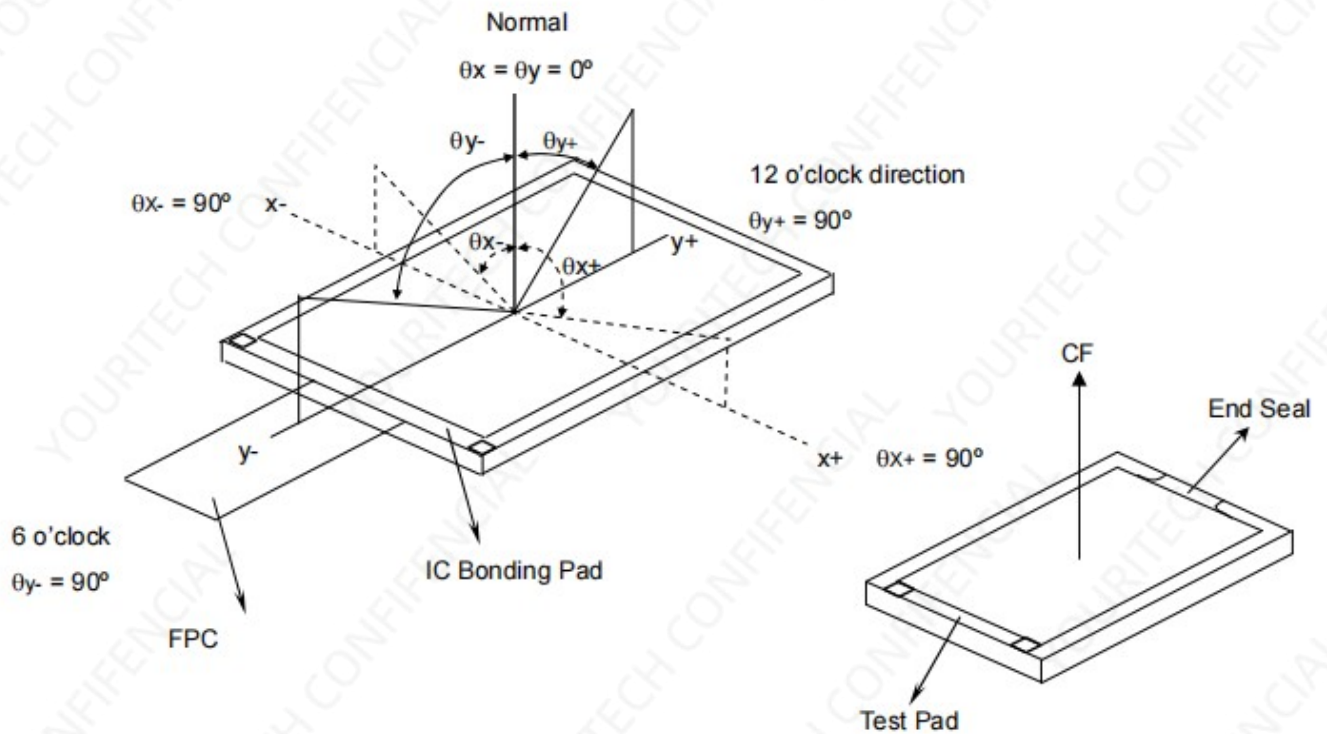
$$CR = CR(5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (T_{on} , T_{off}):

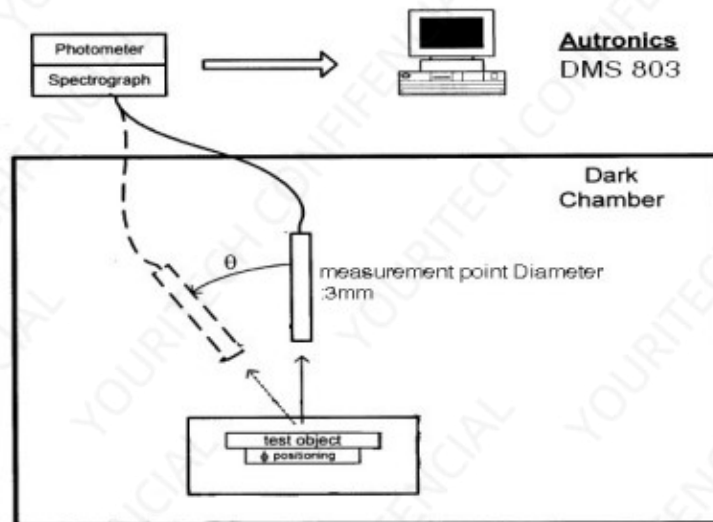


*Note(3) Definition of Viewing Angle

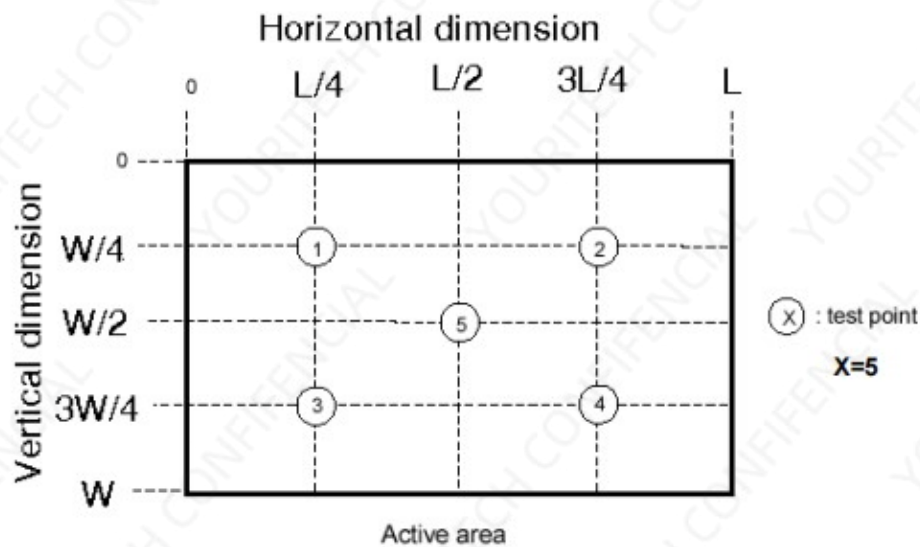


***Note (4) Measurement Set-Up:**

The LCD module should be stabilized at a given temperature 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)**



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°C / 96H	1. Functional test is OK. Missing Segment, short, unclear segment non-display, display abnormally and liquid crystal leakage un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Temp. Operating	+80°C / 96H	
4	Low Temp. Operating	-30°C / 96H	
5	High Temperature / Humidity storage	60°C x 90%RH / 96H	
6	Thermal and cold shock	Static state, -20°C (30min) ~70°C (30min), 50 cycles	

9. Packing Method----TBD

- END -