Winstar Display Co., LTD
華凌光電股份有限公司

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SPECIFICATION

CUSTOMER　:

MODULE NO.:　　WF320234A-TXI#

APPROVED BY: (FOR CUSTOMER USE ONLY)	
	PCB VERSION:　　　　DATA:

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
ISSUED DATE:			

Winstar Display Co., LTD

華凌光電股份有限公司

MODLE NO :

RECORDS OF REVISION			DOC. FIRST ISSUE
VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2006.09.13		First issue

Winstar reserves the right to change products and specifications without notice at any time.

Contents

1.Module Classification Information

<u>W</u> <u>F</u>   <u>320234</u>   <u>A</u>－ <u>TXI</u>   #

Brand：WINSTAR DISPLAY CORPORATION

Display Type：H→Character Type, G→Graphic Type F→TFT Type

Display Font：320*234 Dots

Model serials no.

Backlight Type：	N→Without backlight	A→LED, Amber
	B→EL, Blue green	R→LED, Red
	D→EL, Green	O→LED, Orange
	W→EL, White	G→LED, Green
	F→CCFL, White	T→LED, White
	Y→LED, Yellow Green	

LCD Mode：	B→TN Positive, Gray	T→FSTN Negative
	N→TN Negative,	X→TFT Negative
	G→STN Positive, Gray	M→STN Negative, Blue
	Y→STN Positive, Yellow Green	
	F→FSTN Positive	

LCD Polarize Type/ Temperature range/ View direction	A→Reflective, N.T, 6:00	H→Transflective, W.T,6:00
	D→Reflective, N.T, 12:00	K→Transflective, W.T,12:00
	G→Reflective, W. T, 6:00	C→Transmissive, N.T,6:00
	J→Reflective, W. T, 12:00	F→Transmissive, N.T,12:00
	B→Transflective, N.T,6:00	I→Transmissive, W. T, 6:00
	E→Transflective, N.T.12:00	L→Transmissive, W.T,12:00

Special Code

2.Precautions in use of LCD Modules

2.1. Safety

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

2.2. 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 avoid scratch 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.

2.3. 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.

2.4. Storage

1. Store the module in a dark room where must keep at +25±10 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.

2.5. 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.

3.General Specification

Item	Dimension	Unit
Dot Matrix	320 x RGBx234(TFT)	dots
Module dimension	126.5 x 100.0 x 5.7	mm
Active area	113.28 x 84.708	mm
Dot pitch	0.118 x 0.362	mm
Driving IC package	COG	
Display number of colors	Full color	
LCD type	TFT, Negative, Transmissive	
View direction	6 o'clock	
Backlight Type	LED White	

*Epose the IC number blaze (Luminosity over than 1 cd) when using the LCM may cause IC operating failure.

*Color tone slight changed by temperature and driving voltage.

4.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-30	—	+80	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Power Supply Voltage	V_{GH}	-0.3	—	18	V
	V_{GL}	-15	—	0.3	V
	VCC	-0.3	—	7.0	V
	DDVDH	-0.3	—	7.0	V

5.Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	VCC	―	4.8	5.0	5.2	V
	V_{GH}	Ta=25℃	14.3	15.0	15.7	V
	V_{GL}	Ta=25℃	-10.5	-10	-9.5	V
Input High Volt.	V_{IH}	―	0.7 V_{CC}	―	V_{CC}	V
Input Low Volt.	V_{IL}	―	0	―	0.3Vcc	V
Supply Current	I_{cc}		―	10.0	20.0	mA (*NOTE1)

*NOTE1:MIN. and MAX. Voltage is specified ac the voltage within the condition

      Temperature rang -30℃~80℃

      Typ. Voltage is specified as module driving condition : Ta=25℃,Vop at Optimum Contrast

6.Optical Characteristics

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥10)	θ_L	$\Phi=180°$(9 o'clock)	55	65	-	degree	Note 1
	θ_R	$\Phi=0°$(3 o'clock)	55	65	-		
	θ_T	$\Phi=90°$(12 o'clock)	35	45	-		
	θ_B	$\Phi=270°$(6 o'clock)	55	65	-		
Response time	T_{ON}	Normal $\theta=\Phi=0°$	-	15	30	msec	Note 3
	T_{OFF}		-	20	40	msec	Note 3
Contrast ratio	CR		250	300	-	-	Note 4
Color chromaticity	W_X		0.25	0.30	0.35	-	Note 2 Note 5 Note 6
	W_Y		0.28	0.33	0.38	-	
Luminance	L		200	250	-	cd/m²	Note 6
Luminance uniformity	Y_U		70	75	-	-	Note 7

Test Conditions:
1. V_{CC}=5V, AV_{DD}=5V, I_L=20mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

6.1 Definition of optical characteristics

Note 1: Definition of viewing angle range
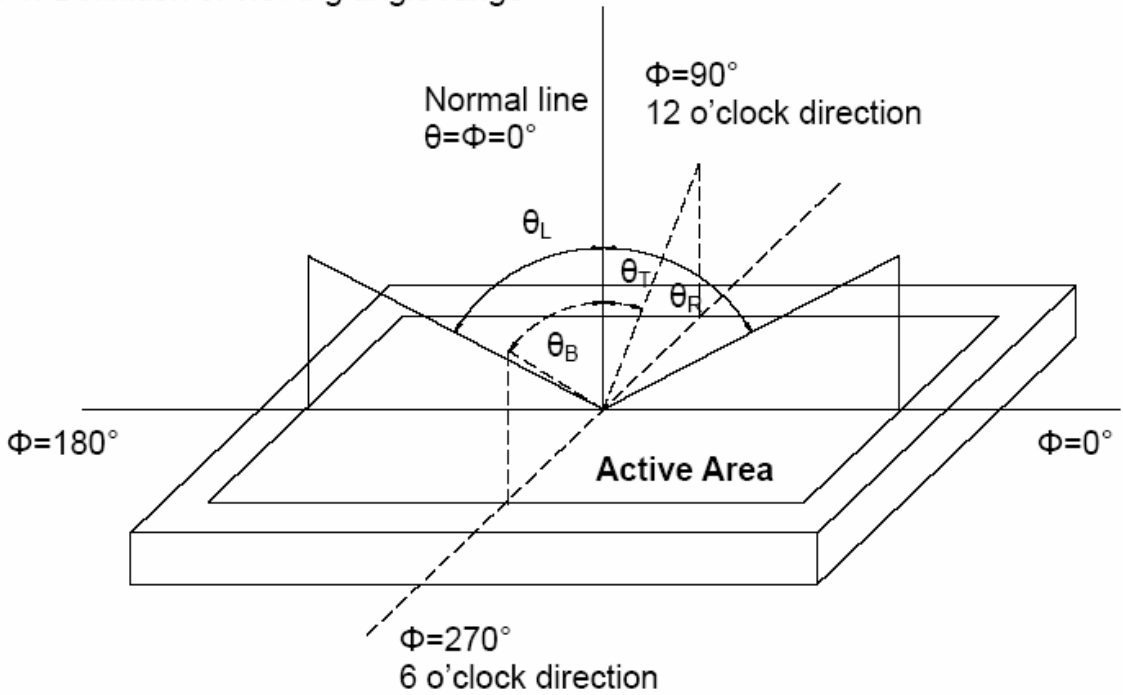
Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)
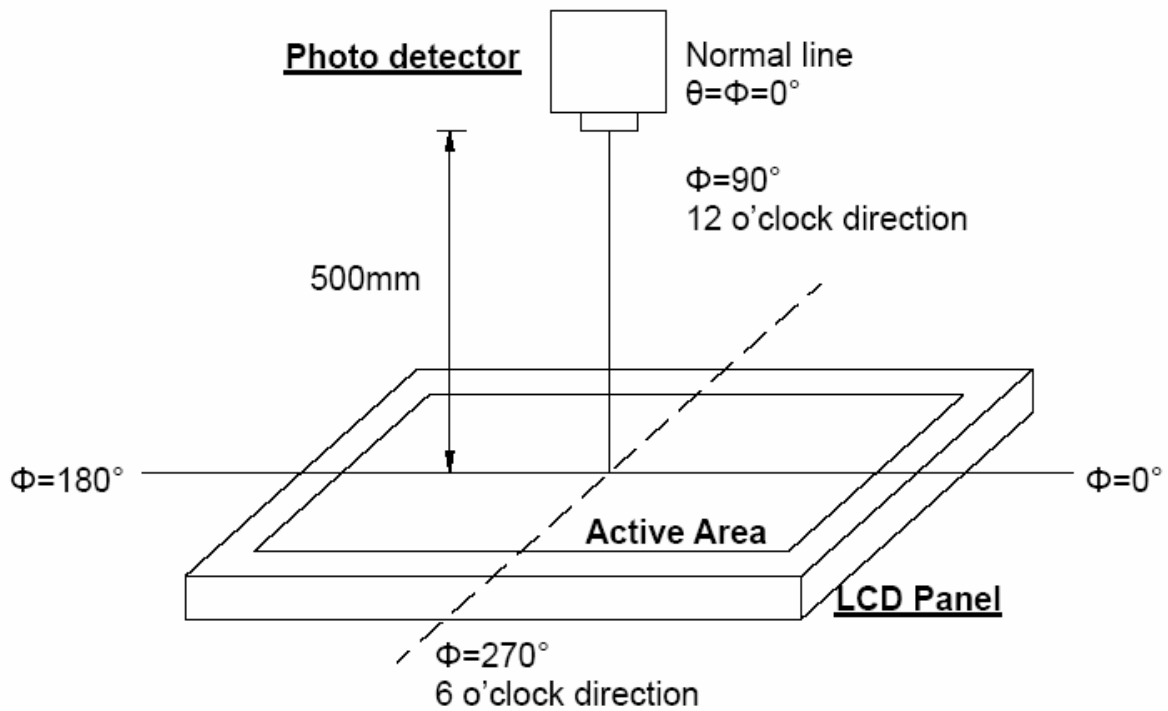
Note 3: Definition of Response time
   The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

| White (TFT OFF) | Black (TFT ON) | White (TFT OFF) |
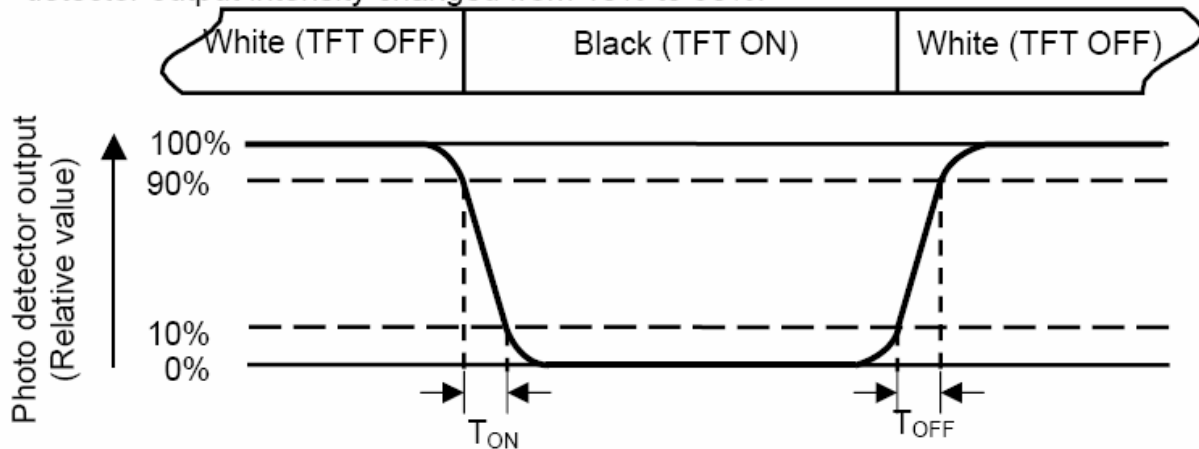
Note 4: Definition of contrast ratio

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

White $V_i = V_{i50\%} \pm 1.5$ V
Black $V_i = V_{i50\%} \mp 2.0$ V
" $\pm$ " means that the analog input signal swings in phase with V_{COM} signal.
" $\mp$ " means that the analog input signal swings out of phase with V_{COM} signal.
$V_{i50\%}$: The analog input voltage when transmission is 50%
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 5: Definition of color chromaticity (CIE1931)
   Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.

Note 7: Definition of Luminance Uniformity

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

L-------Active area length   W----- Active area width
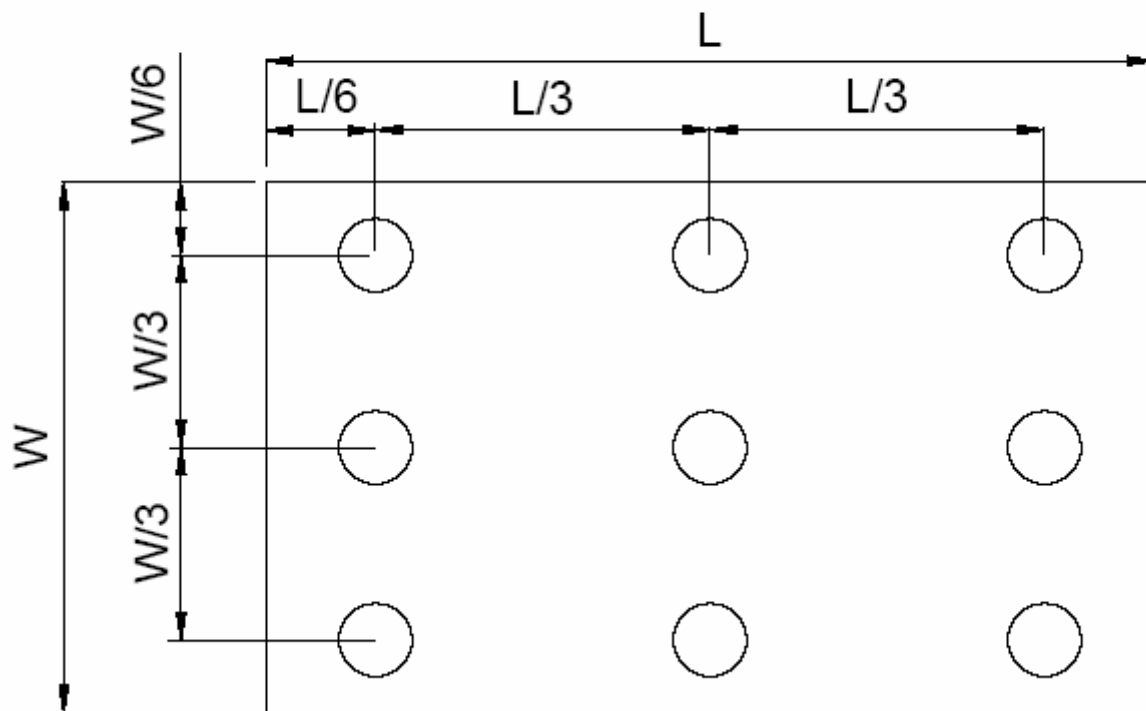
B_{max}: The measured maximum luminance of all measurement position.
B_{min}: The measured minimum luminance of all measurement position.

7.Interface Pin Function

Pin No.	Symbol	I/O	Function	Remark
1	GND	-	Ground	
2	V_{CC}	I	Supply voltage for logic control circuit scan driver	
3	V_{GL}	I	Negative power for scan driver	
4	V_{GH}	I	Positive power for scan driver	
5	STVR	I/O	Vertical start pulse	Note 1
6	STVL	I/O	Vertical start pulse	Note 1
7	CKV	I	Shift clock input for scan driver	
8	U/D	I	UP/DOWN scan control input	Note 1, 2
9	OEV	I	Output enable control for scan driver	
10	V_{COM}	I	Common electrode driving signal	
11	V_{COM}	I	Common electrode driving signal	
12	L/R	I	LEFT/RIGHT scan control input	Note 1, 2
13	MOD	I	Sequential sampling and simultaneous sampling setting	
14	OEH	I	Output enable control for data driver	
15	STHL	I/O	Start pulse for horizontal scan line	Note 1
16	STHR	I/O	Start pulse for horizontal scan line	Note 1
17	CPH3	I	Sampling and shifting clock pulse for data driver	
18	CPH2	I	Sampling and shifting clock pulse for data driver	
19	CPH1	I	Sampling and shifting clock pulse for data driver	
20	V_{CC}	I	Supply voltage for logic control circuit scan driver	

21	GND	-	Ground	
22	V_R	I	Alternated video signal (Red)	
23	V_G	I	Alternated video signal (Green)	
24	V_B	I	Alternated video signal (Blue)	
25	AV_{DD}	I	Supply voltage for analog circuit	
26	AV_{SS}	I	Ground for analog circuit	

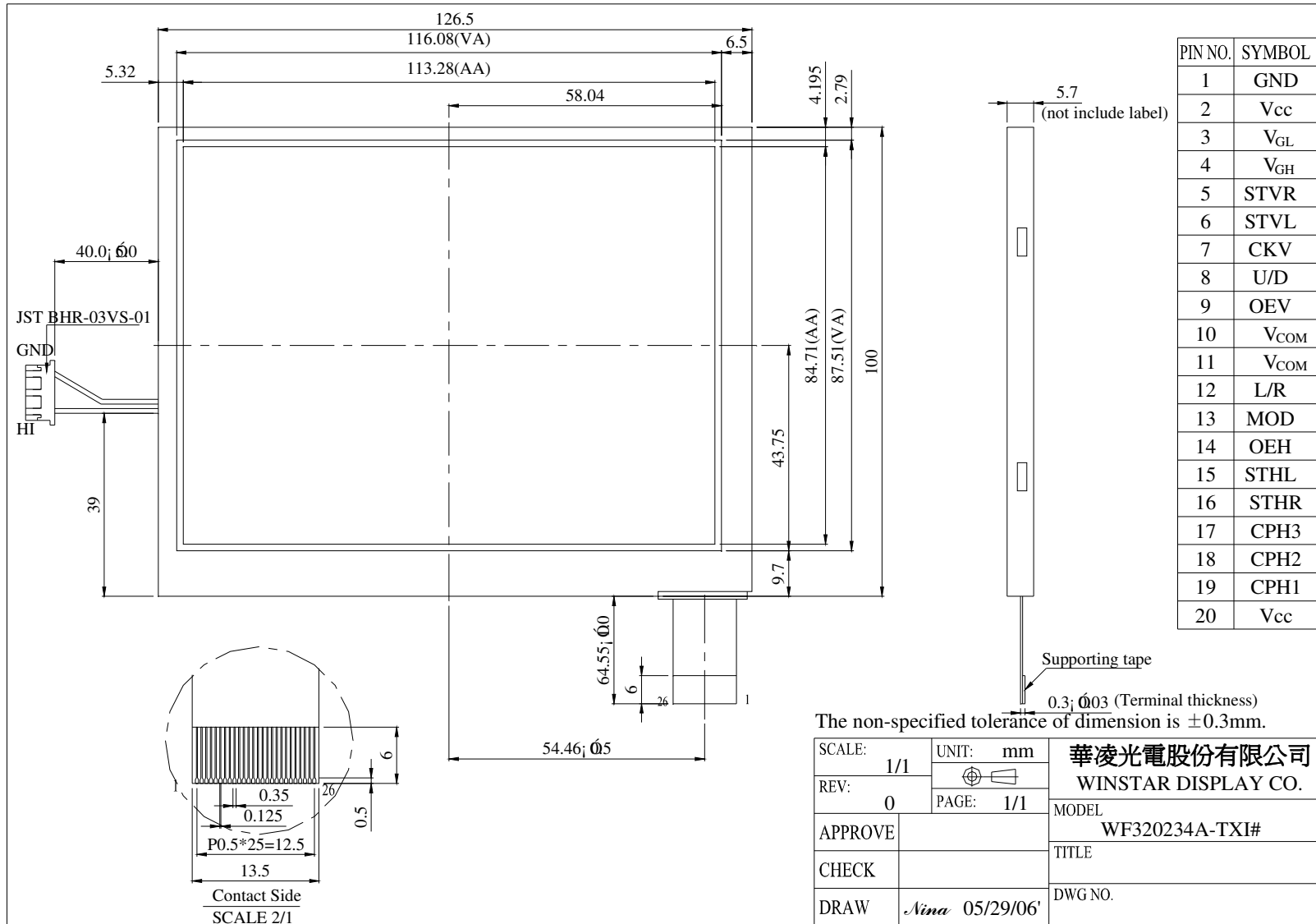I: input, O: output, P: Power

Note 1: Selection of scanning mode

Setting of scan control input		IN/OUT state for start pulse				Scanning direction
U/D	L/R	STVR	STVL	STHR	STHL	
GND	V_{CC}	O	I	O	I	Up to down, left to right
V_{CC}	GND	I	O	I	O	Down to up, right to left
GND	GND	O	I	I	O	Up to down, right to left
V_{CC}	V_{CC}	I	O	O	I	Down to up, left to right

Note 2: Definition of scanning direction.
Refer to the figure as below:
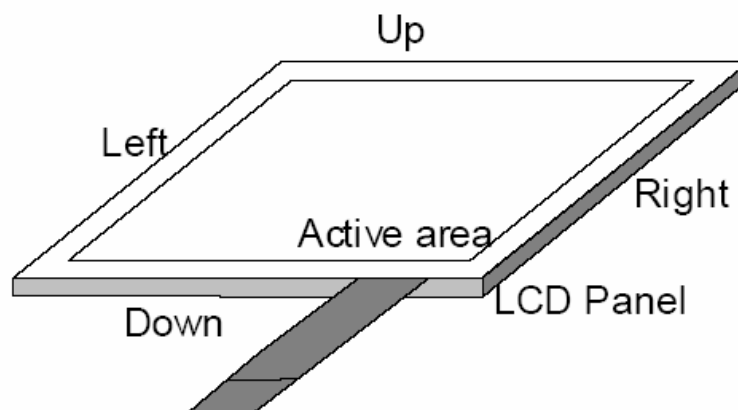
Note 3: MOD=H: Simultaneous sampling.
MOD=L: Sequential sampling.
Please set CPH2 and CPH3 to GND when MOD=H.

8.Contour Drawing

PIN NO.	SYMBOL
1	GND
2	Vcc
3	V_{GL}
4	V_{GH}
5	STVR
6	STVL
7	CKV
8	U/D
9	OEV
10	V_{COM}
11	V_{COM}
12	L/R
13	MOD
14	OEH
15	STHL
16	STHR
17	CPH3
18	CPH2
19	CPH1
20	Vcc

126.5
116.08(VA)
113.28(AA)
58.04
6.5
5.32
4.195
2.79
5.7
(not include label)
40.0±0.0
JST BHR-03VS-01
GND
HI
39
84.71(AA)
87.51(VA)
100
43.75
9.7
64.55±0.0
6
26
1
54.46±0.5

Supporting tape
0.3±0.03 (Terminal thickness)
The non-specified tolerance of dimension is ±0.3mm.

0.35
0.125
0.5
6
26
1
P0.5*25=12.5
13.5
Contact Side
SCALE 2/1

SCALE: 1/1	UNIT: mm	華凌光電股份有限公司
REV: 0	PAGE: 1/1	WINSTAR DISPLAY CO.
APPROVE		MODEL WF320234A-TXI#
CHECK		TITLE
DRAW	Nina 05/29/06'	DWG NO.

9.Timing Characteristics

9.1   AC Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Rising time	t_r	-	-	60	ns	Note 1
Falling time	t_f	-	-	60	ns	Note 1
High and low level pulse width	t_{CPH}	150	154	158	ns	CPH1~CPH3
CPH pulse duty	t_{CWH}	40	50	60	%	CPH1~CPH3
CPH pulse delay	t_{C12}	30	$t_{CPH}/3$	$t_{CPH}/2$	ns	CPH1~CPH3
	t_{C23}					
	t_{C31}					
STH setup time	t_{SUH}	20	-	-	ns	STHR, STHL
STH hold time	t_{HDH}	20	-	-	ns	STHR, STHL
STH pulse width	t_{STH}	-	1	-	t_{CPH}	STHR, STHL
STH period	t_H	61.5	63.5	65.5	μs	STHR, STHL
OEH pulse width	t_{OEH}	-	7	-	μs	
Sample and hold disable time	t_{DIS1}	-	55	--	μs	
OEV pulse width	t_{OEV}	-	27		μs	
CKV pulse width	t_{CKV}	16	-	40	μs	
Clean enable time	t_{DIS2}	-	16	--	μs	
Horizontal display start	t_{SH}	-	0	-	$t_{CPH}/3$	
Horizontal display timing range	t_{DH}	-	960	-	$t_{CPH}/3$	
STV setup time	t_{SUV}	400	-	-	ns	STVL, STVR
STV hold time	t_{HDV}	400	-	-	ns	STVL, STVR

STV pulse width	t_{STV}	-	-	1	t_H	STVL, STVR
Horizontal lines per field	t_V	256	262.5	268	t_H	Note 2
Vertical display start	t_{SV}	-	3	-	t_H	
Vertical display timing range	t_{DV}	-	234	-	t_H	
VCOM rising time	t_{rCOM}	-	-	5	µs	
VCOM falling time	t_{fCOM}	-	-	5	µs	
VCOM delay time	t_{DCOM}	-	-	3	µs	
RGB delay time	t_{DRGB}	-	-	1	µs	

Note 1: For all of the logic signals
Note 2: Please don't use odd horizontal lines to drive LCD panel for both odd and even field simultaneously.

Timing diagram
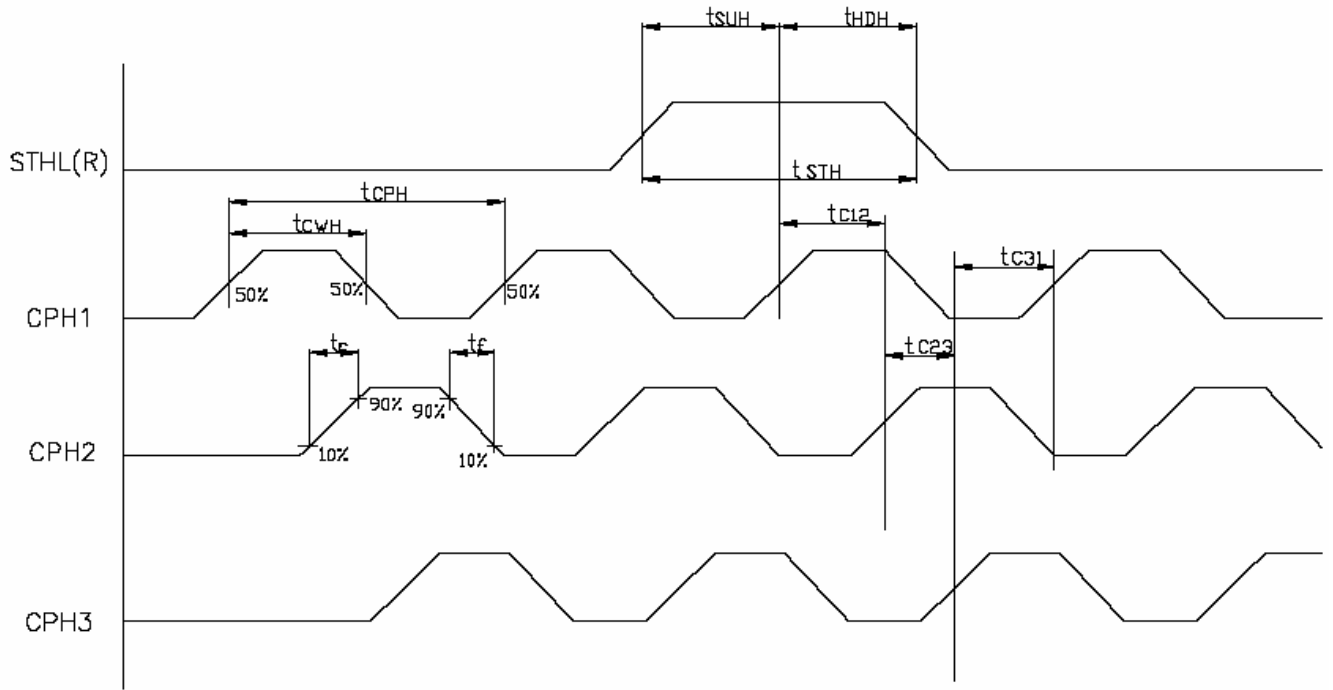
Fig.1 Sampling clock timing
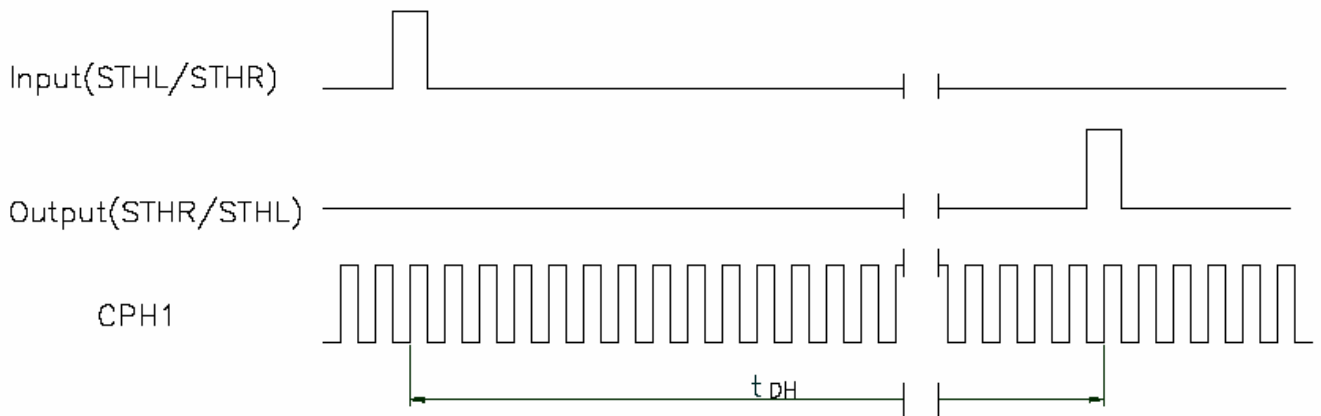
Fig.2 Horizontal display timing range
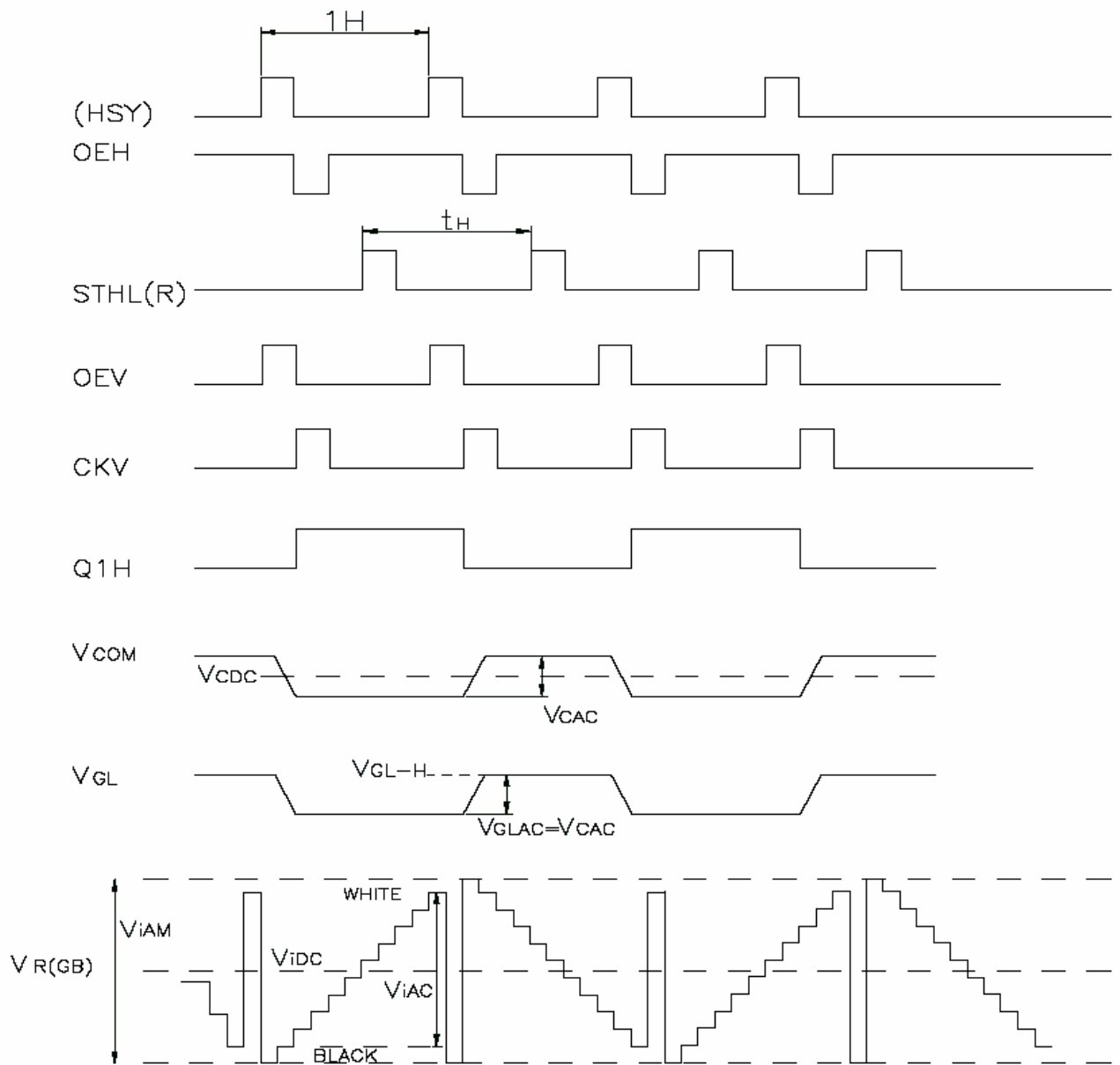
Fig.3-(a) Horizontal timing
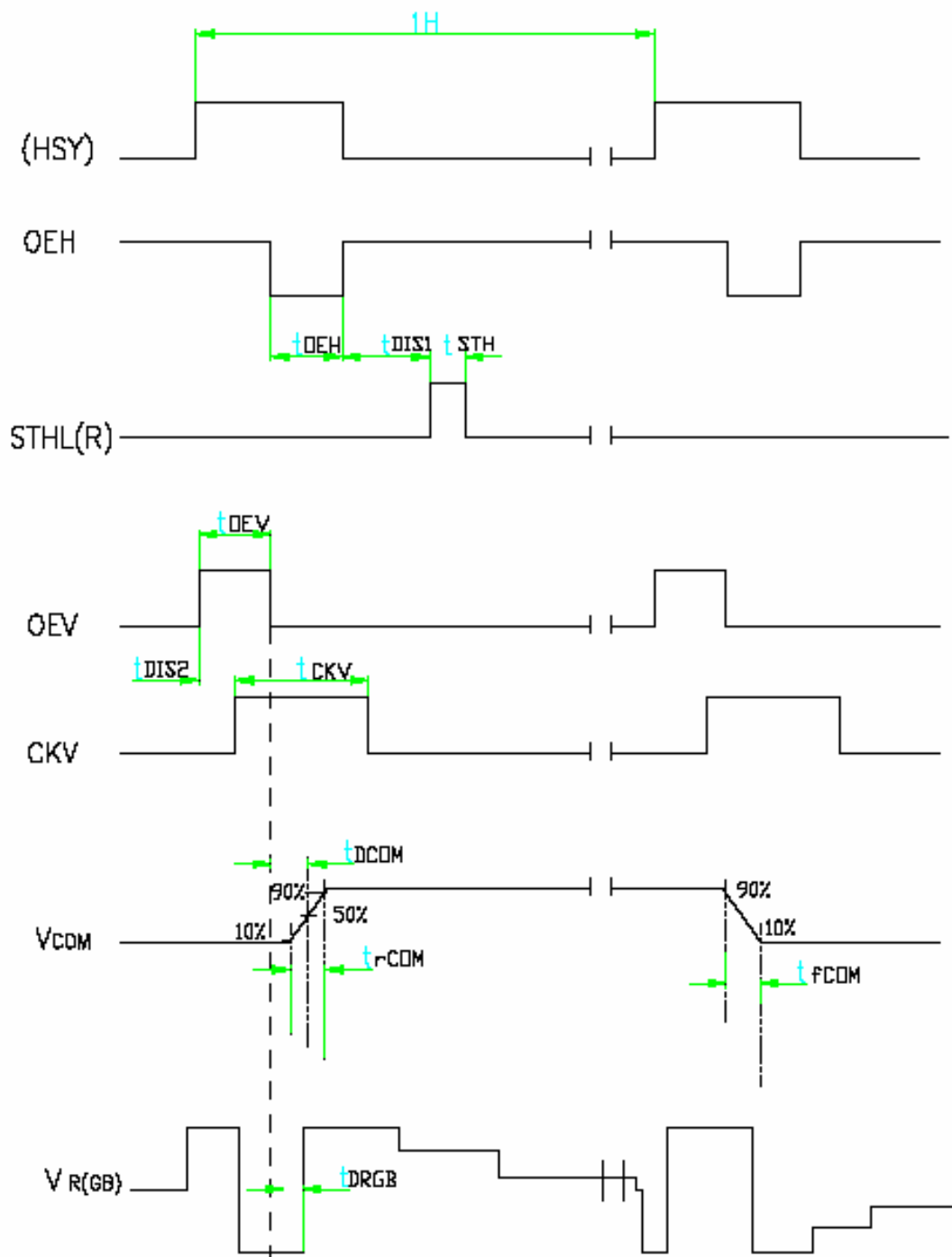
Note: The falling edge of OEV should be synchronized with the falling edge of OEH

Fig.3-3-(b) Detail horizontal timing
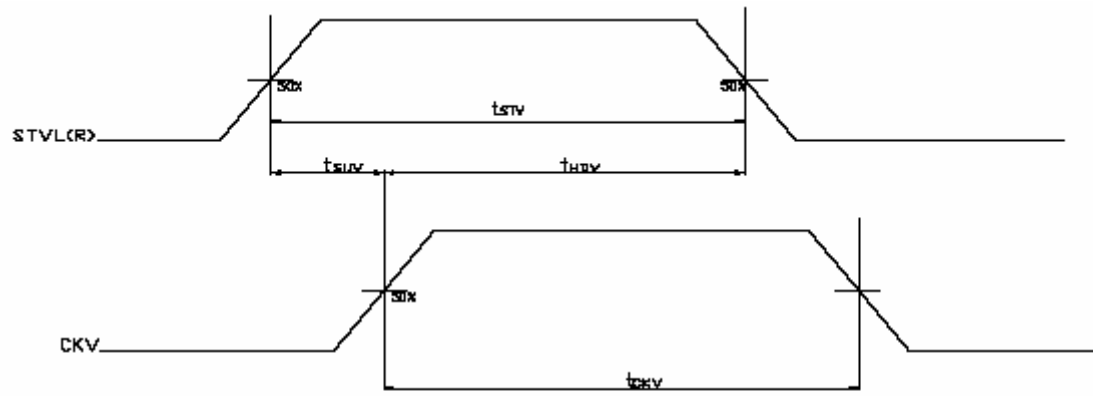
Fig.3-4 Vertical shift clock timing
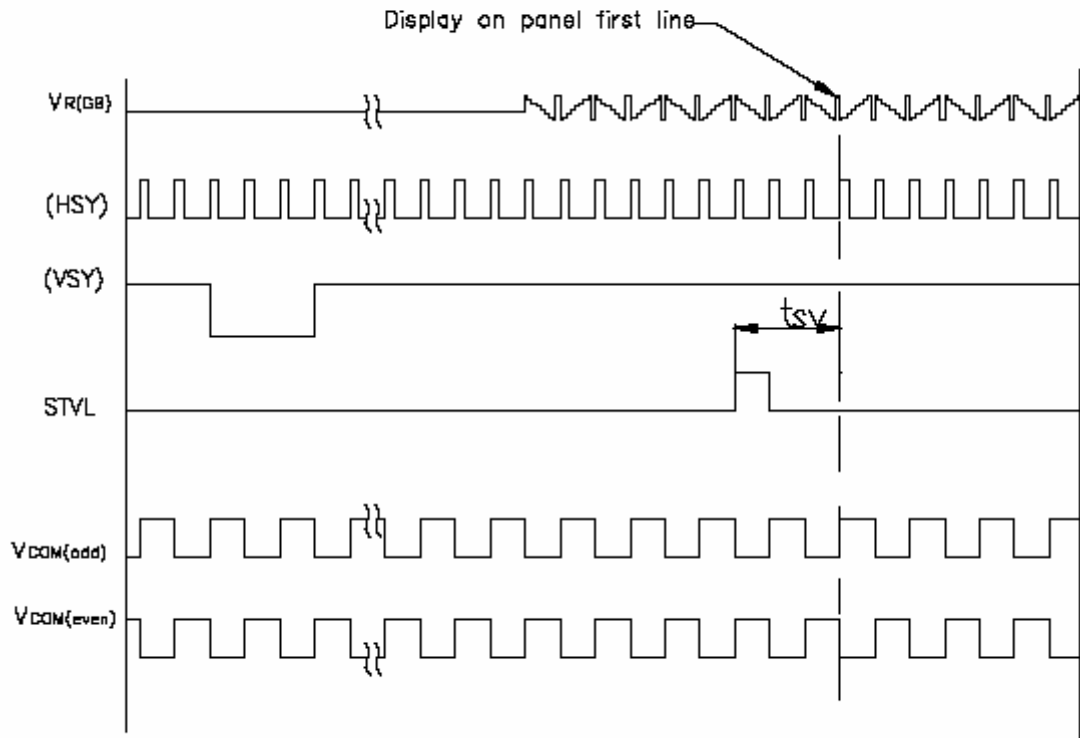
Fig.3-5(a) Vertical timing (from up to down)
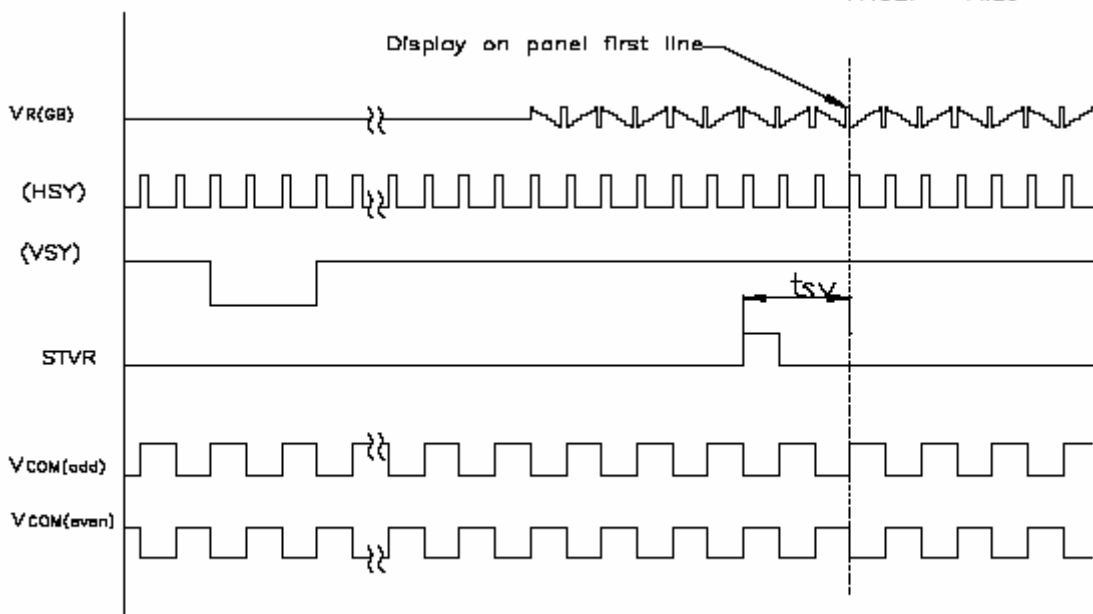
Fig.3-5(b) Vertical timing (from down to up)

10.Reliability

Content of Reliability Test (wide temperature, -30℃~70℃)

Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30℃ 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	80℃ 200hrs	——
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-30℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -30℃ 25℃ 80℃ 30min 5min 30min 1 cycle	-30℃/80℃ 10 cycles	——
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time	——

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal

   Temperature and humidity after remove from the test chamber.

Note3: Vibration test will be conducted to the product itself without putting it in a container.

11.Backlight Information

Specification
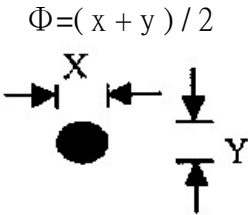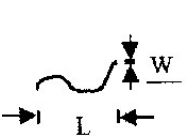
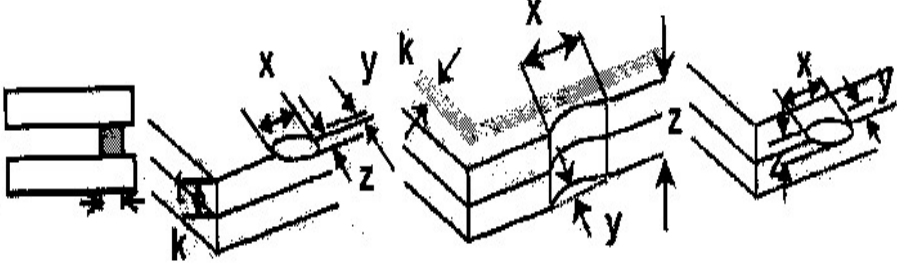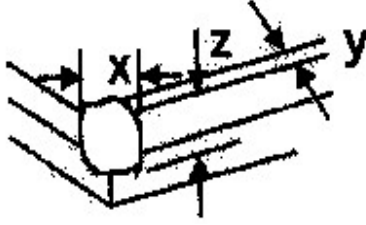| Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LED voltage	V_L	-	9.9	10.5	V	Note 2
LED current	I_L	-	20	-	mA	Note 2
LED life time	-	20,000	-	-	Hr	Note 1

Note 1: The "LED life time" is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25℃ and I_L =20mA.
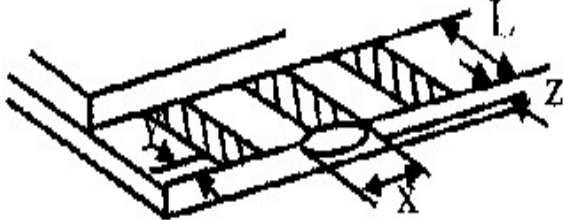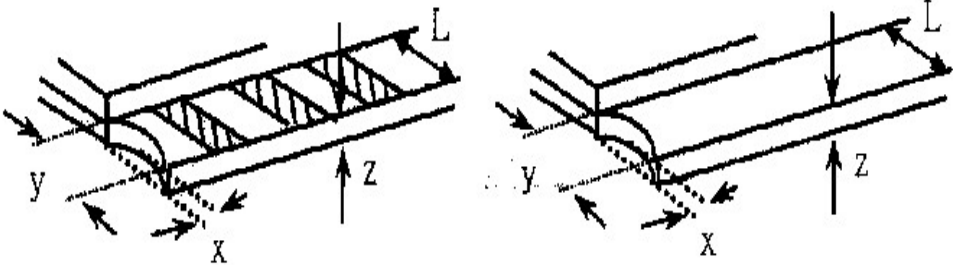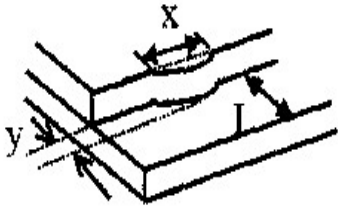
Note 2: The LED driving condition is defined for each LED module.(3 LED Serial)
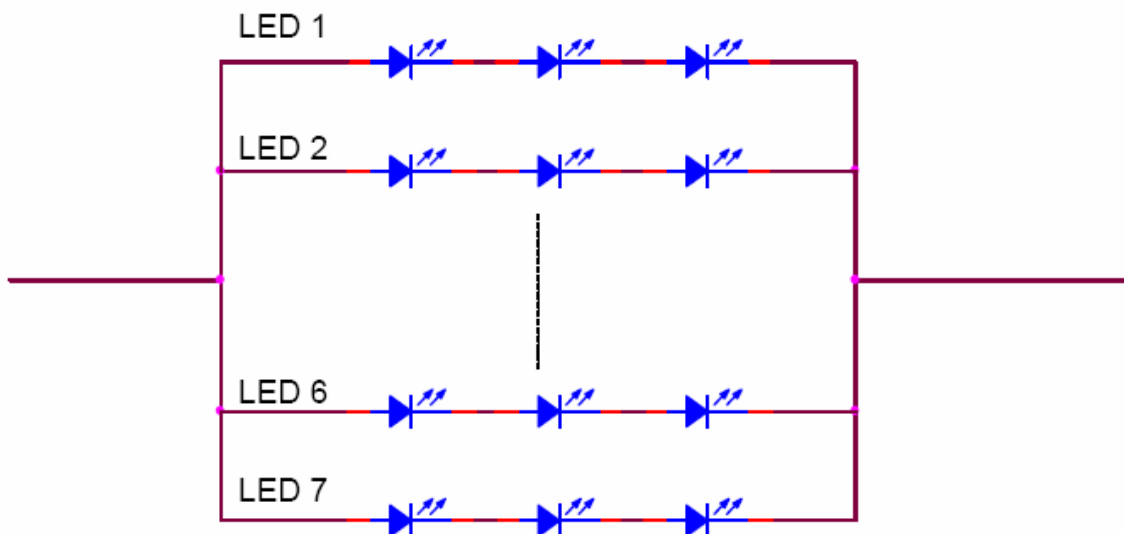
12. Inspection specification

NO	Item	Criterion	AQL
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character , dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Contrast defect.	0.65
02	Black or white spots on LCD (display only)	2.1 White and black spots on display $\leqq 0.25$mm, no more than three white or black spots present. 2.2 Densely spaced: No more than two spots or lines within 3mm	2.5
03	LCD black spots, white spots, contamination (non-display)	3.1 Round type : As following drawing $\Phi = (x + y) / 2$ | SIZE	Acceptable Q TY
---	---
$\Phi \leqq 0.10$	Accept no dense
$0.10 < \Phi \leqq 0.20$	2
$0.20 < \Phi \leqq 0.25$	1
$0.25 < \Phi$	0		2.5
		3.2 Line type : (As following drawing) | Length	Width	Acceptable Q TY
---	---	---
---	$W \leqq 0.02$	Accept no dense
$L \leqq 3.0$	$0.02 < W \leqq 0.03$	2
$L \leqq 2.5$	$0.03 < W \leqq 0.05$	
---	$0.05 < W$	As round type		2.5
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction. | Size Φ	Acceptable Q TY
---	---
$\Phi \leqq 0.20$	Accept no dense
$0.20 < \Phi \leqq 0.50$	3
$0.50 < \Phi \leqq 1.00$	2
$1.00 < \Phi$	0
Total Q TY	3		2.5

NO	Item	Criterion	AQL
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination	
06	Chipped glass	Symbols Define: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length: 6.1 General glass chip : 6.1.1 Chip on panel surface and crack between panels:	2.5

6.1.1 Chip on panel surface and crack between panels:

z: Chip thickness	y: Chip width	x: Chip length
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$
$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 1/8a$

⊙If there are 2 or more chips, x is total length of each chip.

6.1.2 Corner crack:

z: Chip thickness	y: Chip width	x: Chip length
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$
$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 1/8a$

⊙If there are 2 or more chips, x is the total length of each chip.

NO	Item	Criterion	AQL
06	Glass crack	Symbols : x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.2 Protrusion over terminal : 6.2.1 Chip on electrode pad : <table><tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr><tr><td>y ≦ 0.5mm</td><td>x ≦ 1/8a</td><td>0 < z ≦ t</td></tr></table> 6.2.2 Non-conductive portion: <table><tr><td>y: Chip width</td><td>x: Chip length</td><td>z: Chip thickness</td></tr><tr><td>y ≦ L</td><td>x ≦ 1/8a</td><td>0 < z ≦ t</td></tr></table> ⊙If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙If the product will be heat sealed by the customer, the alignment mark not be damaged. 6.2.3 Substrate protuberance and internal crack. <table><tr><td>y: width</td><td>x: length</td></tr><tr><td>y ≦ 1/3L</td><td>x ≦ a</td></tr></table>	2.5

NO	Item	Criterion	AQL
07	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
08	Backlight elements	8.1 Illumination source flickers when lit. 8.2 Spots or scratched that appear when lit must be judged. Using LCD spot, lines and contamination standards. 8.3 Backlight doesn't light or color wrong.	0.65 2.5 0.65
09	Bezel	9.1 Bezel may not have rust, be deformed or have fingerprints, stains or other contamination. 9.2 Bezel must comply with job specifications.	2.5 0.65
10	PCB、COB	10.1 COB seal may not have pinholes larger than 0.2mm or contamination. 10.2 COB seal surface may not have pinholes through to the IC. 10.3 The height of the COB should not exceed the height indicated in the assembly diagram. 10.4 There may not be more than 2mm of sealant outside the seal area on the PCB. And there should be no more than three places. 10.5 No oxidation or contamination PCB terminals. 10.6 Parts on PCB must be the same as on the production characteristic chart. There should be no wrong parts, missing parts or excess parts. 10.7 The jumper on the PCB should conform to the product characteristic chart. 10.8 If solder gets on bezel tab pads, LED pad, zebra pad or screw hold pad, make sure it is smoothed down.	2.5 2.5 0.65 2.5 2.5 0.65 0.65 2.5
11	Soldering	11.1 No un-melted solder paste may be present on the PCB. 11.2 No cold solder joints, missing solder connections, oxidation or icicle. 11.3 No residue or solder balls on PCB. 11.4 No short circuits in components on PCB.	2.5 2.5 2.5 0.65

NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP. 12.2 No cracks on interface pin (OLB) of TCP. 12.3 No contamination, solder residue or solder balls on product. 12.4 The IC on the TCP may not be damaged, circuits. 12.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it cause the interface pin to sever. 12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color. 12.7 Sealant on top of the ITO circuit has not hardened. 12.8 Pin type must match type in specification sheet. 12.9 LCD pin loose or missing pins. 12.10 Product packaging must the same as specified on packaging specification sheet. 12.11 Product dimension and structure must conform to product specification sheet.	2.5 0.65 2.5 2.5 2.5 2.5 2.5 0.65 0.65 0.65 0.65

winstar   **<u>LCM Sample Estimate Feedback Sheet</u>**

Module Number：_____   **Page: 1**

1、**<u>Panel Specification</u>**：

    1.   Panel Type：   ☐ Pass   ☐ NG ,_____

    2.   View Direction：   ☐ Pass   ☐ NG ,_____

    3.   Numbers of Dots：   ☐ Pass   ☐ NG ,_____

    4.   View Area：   ☐ Pass   ☐ NG ,_____

    5.   Active Area：   ☐ Pass   ☐ NG ,_____

    6.   Operating Temperature：   ☐ Pass   ☐ NG ,_____

    7.   Storage Temperature：   ☐ Pass   ☐ NG ,_____

    8.   Others：_____

2、**<u>Mechanical Specification</u>**：

    1.   PCB Size：   ☐ Pass   ☐ NG ,_____

    2.   Frame Size：   ☐ Pass   ☐ NG ,_____

    3.   Material of Frame：   ☐ Pass   ☐ NG ,_____

    4.   Connector Position：   ☐ Pass   ☐ NG ,_____

    5.   Fix Hole Position：   ☐ Pass   ☐ NG ,_____

    6.   Backlight Position：   ☐ Pass   ☐ NG ,_____

    7.   Thickness of PCB：   ☐ Pass   ☐ NG ,_____

    8.   Height of Frame to PCB：   ☐ Pass   ☐ NG ,_____

    9.   Height of Module：   ☐ Pass   ☐ NG ,_____

    10. Others：   ☐ Pass   ☐ NG ,_____

3、**<u>Relative Hole Size</u>**：

    1.   Pitch of Connector：   ☐ Pass   ☐ NG ,_____

    2.   Hole size of Connector：   ☐ Pass   ☐ NG ,_____

    3.   Mounting Hole size：   ☐ Pass   ☐ NG ,_____

    4.   Mounting Hole Type：   ☐ Pass   ☐ NG ,_____

    5.   Others：   ☐ Pass   ☐ NG ,_____

4、**<u>Backlight Specification</u>**：

    1. B/L Type：   ☐ Pass   ☐ NG ,_____

    2. B/L Color：   ☐ Pass   ☐ NG ,_____

    3. B/L Driving Voltage (Reference for LED Type)：   ☐ Pass   ☐ NG ,_____

    4. B/L Driving Current：   ☐ Pass   ☐ NG ,_____

    5. Brightness of B/L：   ☐ Pass   ☐ NG ,_____

    6. B/L Solder Method：   ☐ Pass   ☐ NG ,_____

    7. Others：   ☐ Pass   ☐ NG ,_____

＞＞ **Go to page 2** ＜＜

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5、Electronic Characteristics of Module：

  1. Input Voltage：   ☐ Pass   ☐ NG , _____

  2. Supply Current：   ☐ Pass   ☐ NG , _____

  3. Driving Voltage for LCD： ☐ Pass   ☐ NG , _____

  4. Contrast for LCD：   ☐ Pass   ☐ NG , _____

  5. B/L Driving Method：   ☐ Pass   ☐ NG , _____

  6. Negative Voltage Output： ☐ Pass   ☐ NG , _____

  7. Interface Function：   ☐ Pass   ☐ NG , _____

  8. LCD Uniformity：   ☐ Pass   ☐ NG , _____

  9. ESD test：   ☐ Pass   ☐ NG , _____

10. Others：   ☐ Pass   ☐ NG , _____

6、Summary：

Sales signature： _____

Customer Signature： _____   **Date**： _____ / _____ / _____