TITLE : HV121X03-100
Product Specification

Rev. O

BOE HYDIS TECHNOLOGY

REVISION HISTORY

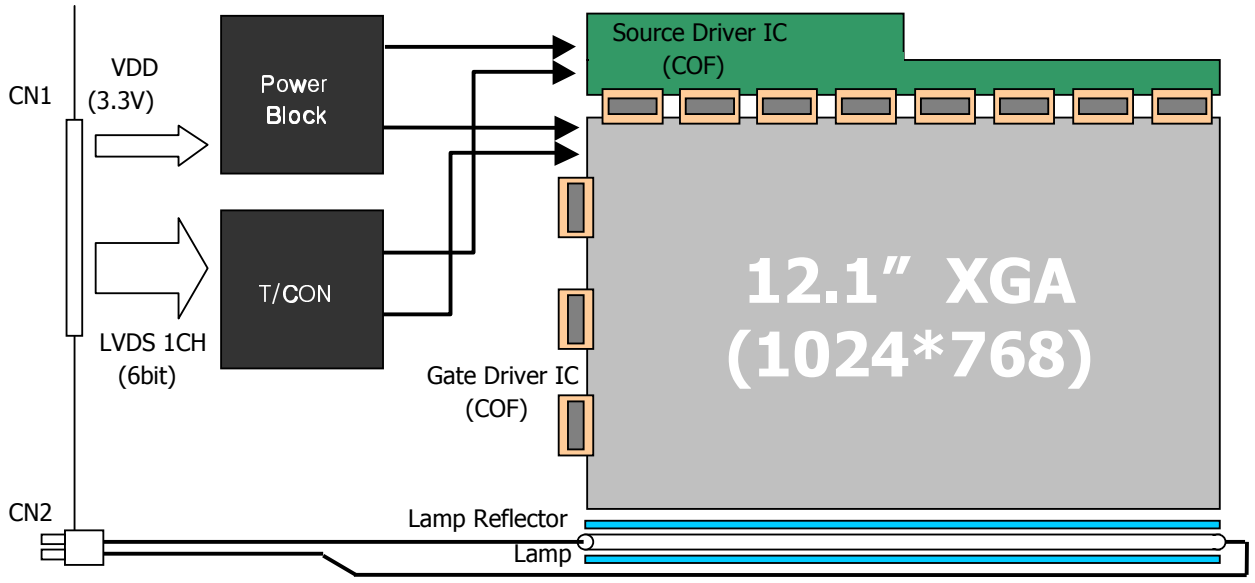
REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
0	-	Initial Release	06.12.26	J.Y.JUNG

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

12.1”XGA is a color active matrix TFT LCD module using AFFS(Advanced Fringe Field Switching: Wide viewing technology) mode and amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 12.1 inch diagonally measured active area with XGA resolutions (1024 horizontal by 768 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 262,144 colors. The TFT-LCD panel used for this module is a low reflection and higher color type.



1.2 Features

- LVDS Interface with 1pixel / clock
- High-speed response
- 6-bit color depth, Display 262,144 colors
- Incorporated edge type back-light (1 lamp)
- High luminance and contrast ratio, low reflection and wide viewing angle
- DE (Data Enable) mode only
- RoHS

1.3 Applications

- Pen-type & Tablet PC

1.3 General Specification

The followings are general specifications at the model HV121X03-100

Parameter	Specification	Unit	Remarks
Active area	245.76 X 184.32	mm	
Number of pixels	1024(H) X 768(V)	pixels	
Pixel pitch	0.240(H) X 0.240(V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display colors	262,144	colors	
Display mode	Normally Black		
Dimensional outline	270.0+/-0.3(H)X199.0+/-0.3(V)X 4.8 @ Lamp , 6.7 Typ@Pouch	mm	Note 2
Weight	305 typ.	g	
Back-light	Bottom edge side 1-CCFL type		Note 1
Surface treatment	AG(H40%)/LR/2H		

Note 1. CCFL (Cold Cathode Fluorescent Lamp)
2. LCM Height 4.8 [mm] Typical (lamp), 6.7[mm] Typical (Pouch)

2.0 ABSOLUTE MAXIMUM RATINGS

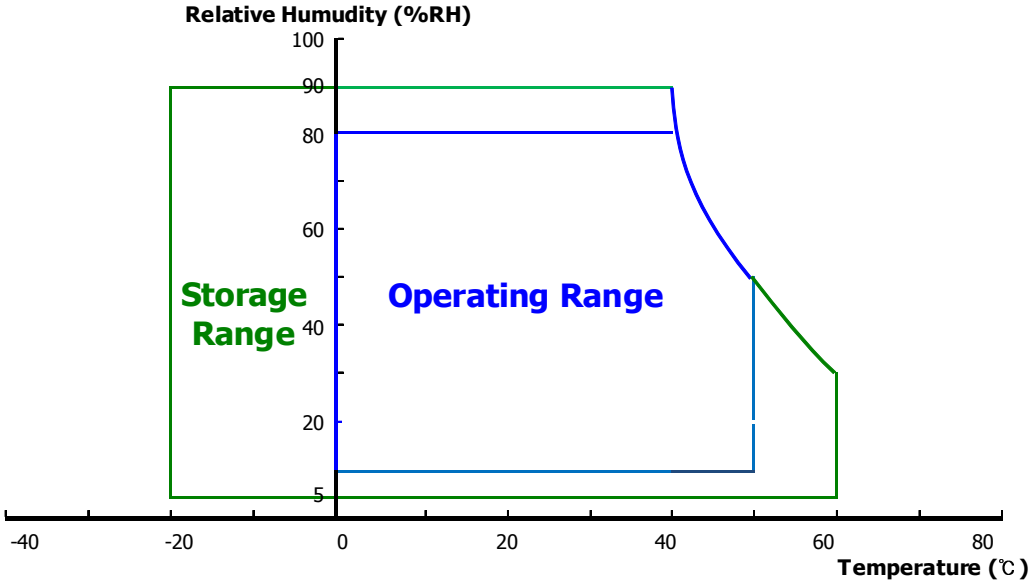
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit.

VSS = GND = 0V

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-0.3	4.0	V	
Logic Supply Voltage	V_{IN}	-0.3	V_{DD}+0.3	V	
Lamp Current	I_{BL}	2.0	6.0	mArms	Note 1
Lamp frequency	F_L	30	80	kHz	Note 1
Operating Temperature (Humidity)	T_{OP} RH	0 8	+50 80	℃ %	Note 2
Storage Temperature (Humidity)	T_{SP} RH	-20 5	+60 90	℃ %	Note 2

Note 1. Permanent damage to the device may occur if maximum values are exceeded Functional operation should be restricted to the condition described under normal operating conditions.

2. Temperature and relative humidity range are shown in the figure below.
95 % RH Max. (40 ^{O}C ≥ Ta)
Maximum wet - bulb temperature at 39 ^{O}C or less. (Ta > 40 ^{O}C) No condensation.



3.0 ELECTRICAL SPECIFICATIONS

[Ta = 25± 2℃]

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
Power Supply Current	I_{DD}	-	240	-	mA	Note 1
CCFL Ignition Time	t	-	-	1.0	sec	
Permissible Input Ripple Voltage	V_{RF}	-	-	100	mV	At V_{DD} = 3.3V
High Level Differential Input Signal Voltage	V_{IH}	-	-	+ 100	mV	Vcm = 1.2 V Typ
Low Level Differential Input Signal Voltage	V_{IL}	- 100	-	-	mV	
Back-light Lamp Voltage	V_{BL}	700	560	540	V_{rms}	
Back-light Lamp Current	I_{BL}	2.0	5.5	6.0	mA	Note 2
Back-light Lamp operating Frequency	F_L	40	60	80	KHz	Note 3
Lamp Start Voltage		1,050	-	-	V_{rms}	25 ℃, Note 4
		1,310	-	-	Vrms	0 ℃, Note 4
Lamp Life		10,000	-	-	Hrs	I_{BL} = 2.0~6.0 mA
Power Consumption	P_D	-	0.7	1.4	W	
	P_{BL}	-	3.2	3.5	W	I_{BL} = 5.5 mA Note 5
	P_{total}	-	3.9	4.9	W	

Notes :

1. The supply voltage is measured and specified at the interface connector of LCM.
   The current draw and power consumption specified is for VDD = 3.3V, Frame rate = 60 Hz and Clock frequency = 65MHz.
   Test Pattern of power supply current
   a) Typ : Windows XP pattern
   b) Max : Gray 28 @ Vertical 2 Skip line pattern
2. Minimum value of lamp current : In case of current adjustment method
3. The lamp frequency should be selected as different as possible from the horizontal synchronous frequency and its harmonics to avoid interference, which may cause line flow on the display.
4. For starting the backlight unit, the output voltage of DC/AC's transformer should be larger than the minimum lamp starting voltage.(1,050 Vrms at 25 ℃ & 1,310 Vrms at 0 ℃).
   If an inverter has shutdown function it should keep its output for more than 1 second even if the lamp connector open. Otherwise the lamps may not to be turned on.
5. Calculated value for reference (VBL × IBL) excluding inverter loss.

4.0 OPTICAL SPECIFICATION

The measurement shall be executed after 30 minutes warm-up period.
Measuring equipment: TOPCON-BM5.

[VDD=3.3V, Frame rate=60Hz, Clock=65MHz, I_{BL} = 5.0mA, Ta = 25±2℃]

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	89	-	Deg.	Note 1
		Θ_9		-	89	-	Deg.	
	Vertical	Θ_{12}		-	89	-	Deg.	
		Θ_6		-	89	-	Deg.	
Luminance Contrast ratio		CR		-	500:1	-		Note 2
Luminance of White		Y_w		175	190	-	cd/m^2	Note 3
		ΔY_w5		165	180	-	cd/m^2	Note 3
White Luminance uniformity		Δ Y5		80	-	-	%	Note 4
		Δ Y13		65	-	-	%	
White Chromaticity		x_w		0.298	0.313	0.328		Note 5
		y_w		0.314	0.329	0.344		
Reproduction of color	Red	x_R		0.542	0.572	0.603		
		y_R		0.302	0.332	0.362		
	Green	x_G		0.278	0.308	0.338		
		y_G		0.506	0.536	0.566		
	Blue	x_B		0.119	0.149	0.179		
		y_B		0.128	0.158	0.188		
Color reproduction				-	43.5	-	%	
Response Time		Total (Td+Tr)	Θ = 0°	-	40	-	ms	Note 6
Cross Talk		CT		-	-	2.0	%	Note 7

Notes :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface. (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of $\Theta = 0°$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Luminance of white is defined as a center point(#1) on LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display. (Back-light Lamp Current=5.5mA)

4. The White luminance uniformity on LCD surface is then expressed as : ΔY = Minimum Luminance of 5 points (L1 ~ L5) / Maximum Luminance of 5 points (L1 ~ L5) and Minimum Luminance of 13 points (L1 ~ L13) / Maximum Luminance of 13 points (L1 ~ L13) (see FIGURE 2) - Without protection film.

5. The color chromaticity coordinates specified in Table 4 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

6. The electro-optical response time measurements shall be made as FIGURE 3by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

7. Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark. (See FIGURE 4)

5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

CN 1 : Interface connector : DF19L-20P-1H (Hirose)
User side connector : DF19G-20S-1C (Hirose)

Terminal	Symbol	Functions	Remarks
1	VDD	Power supply +3.3 V	
2	VDD	Power supply +3.3 V	
3	VSS	Ground	
4	VSS	Ground	
5	RIN0 -	LVDS Negative data signal (-)	Tx pin #48
6	RIN0 +	LVDS Positive data signal (+)	Tx pin #47
7	VSS	Ground	
8	RIN1 -	LVDS Negative data signal (-)	Tx pin #46
9	RIN1 +	LVDS Positive data signal (+)	Tx pin #45
10	VSS	Ground	
11	RIN2 -	LVDS Negative data signal (-)	Tx pin #42
12	RIN2 +	LVDS Positive data signal (+)	Tx pin #41
13	VSS	Ground	
14	RCLKIN -	LVDS Negative clock signal (-)	Tx pin #40
15	RCLKIN +	LVDS Positive clock signal (+)	Tx pin #39
16	VSS	Ground	
17	EDID 3.3V	EDID 3.3V	
18	VSS	Ground	
19	EDID Clk	EDID Clk	
20	EDID Data	EDID Data	

5.2. Back-light Interface

The Back-light interface connector is a model BHSR-02VS-1 manufactured by JST or equivalent.

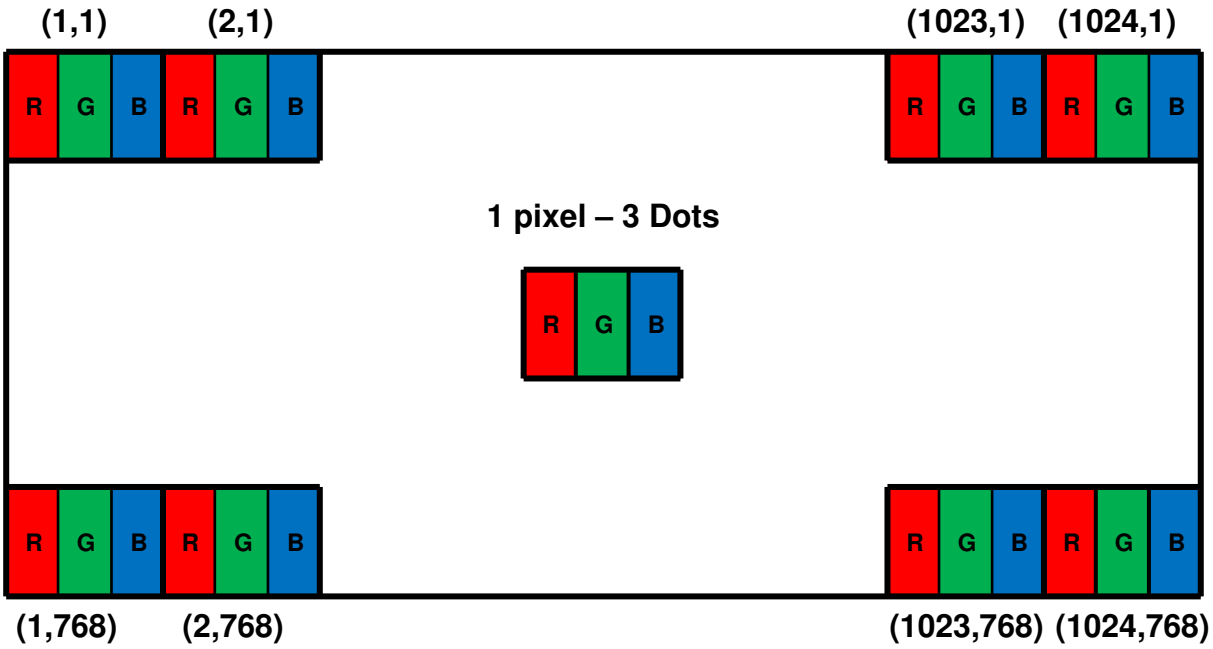
Pin No.	Symbol	Function	Color
1	HOT	High voltage	Pink
2	COLD	Ground	White

5.3. LVDS Interface

LVDS Transmitter THC63LVDM83A or equivalent.

Input Signal	Transmitter		Interface		DF19L-20P-1H	Remarks
	Pin No.	Pin No.	System (Tx)	TFT-LCD (Rx)	Pin No.	
R0	51	48 47	OUT0 – OUT0 +	IN0 – IN0 +	5 6	
R1	52					
R2	54					
R3	55					
R4	56					
R5	3					
G0	4					
G1	6	46 45	OUT1 – OUT1 +	IN1 – IN1 +	8 9	
G2	7					
G3	11					
G4	12					
G5	14					
B0	15					
B1	19					
B2	20	42 41	OUT2 – OUT2 _+	IN2 – IN2 +	11 12	
B3	22					
B4	23					
B5	24					
HSYNC	27					
VSYNC	28					
DE	30					
MCLK	31	40	CLKOUT -	CLKIN -	14	
		39	CLKOUT +	CLKIN +	15	

5.4. Data input Format



Display position of input data

6.0. SIGNAL TIMING SPECIFICATION

6.1 The 12.1" XGA LCM is operated by the only DE (Data enable) mode (LVDS Transmitter Input)

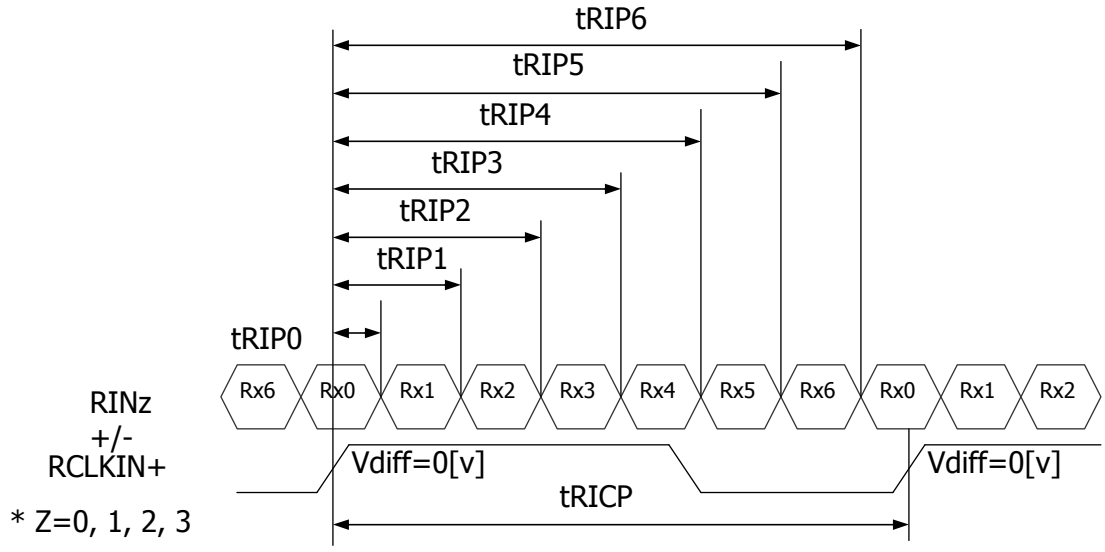
Item		Symbols	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	-	65	80	MHz
	High Time	Tch	4.5	-	-	ns
	Low Time	Tcl	4.5	-	-	ns
Data	Setup Time	Tds	2.7	-	-	ns
	Hold Time	Tdh	0	-	-	ns
Data Enable Setup Time		Tes	2.7	-	-	ns
Frame Period		Tv	772	806	1022	lines
Vertical Display Period		Tvd	768	768	768	lines
One Line Scanning Period		Th	1100	1344	2046	clocks
Horizontal Display Period		Thd	1024	1024	1024	clocks

6.2 LVDS Rx Interface timing parameter

The specification of the LVDS Rx interface timing parameter

<LVDS Rx Interface Timing Specification>

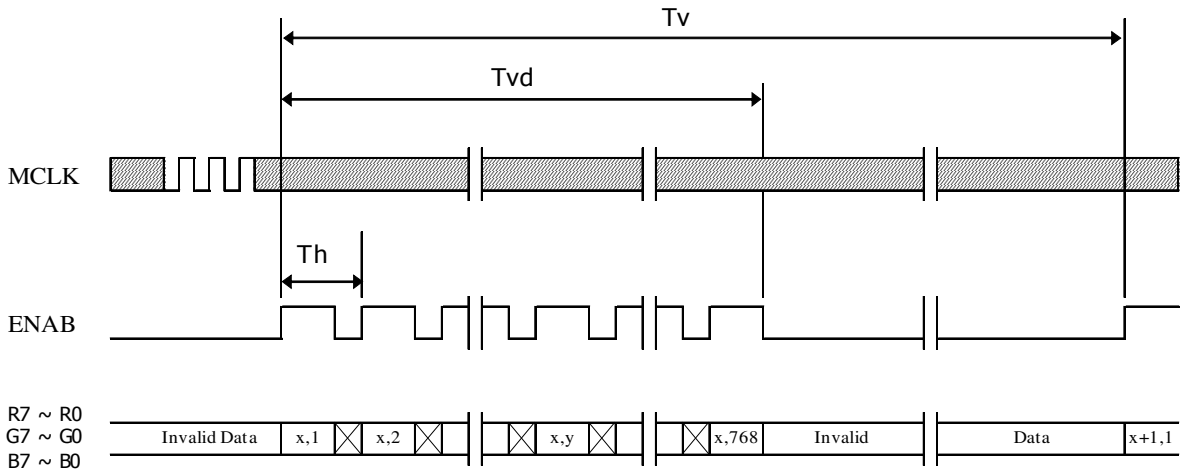
Item	Symbol	Min	Typ	Max	Unit	Remarks
CLKIN Period	tRICP	12.50	15.38	-	ns	
Input Data 0	tRIP0	-0.4	0.0	+0.4	ns	
Input Data 1	tRIP1	tRICP/7-0.4	tRICP/7	tRICP/7+0.4	ns	
Input Data 2	tRIP2	2xtRICP/7-0.4	2xtRICP/7	2xtRICP/7+0.4	ns	
Input Data 3	tRIP3	3xtRICP/7-0.4	3xtRICP/7	3xtRICP/7+0.4	ns	
Input Data 4	tRIP4	4xtRICP/7-0.4	4xtRICP/7	4xtRICP/7+0.4	ns	
Input Data 5	tRIP5	5xtRICP/7-0.4	5ztRICP/7	5xtRICP/7+0.4	ns	
Input Data 6	tRIP6	6xtRICP/7-0.4	6xtRICP/7	6xtRICP/7+0.4	ns	

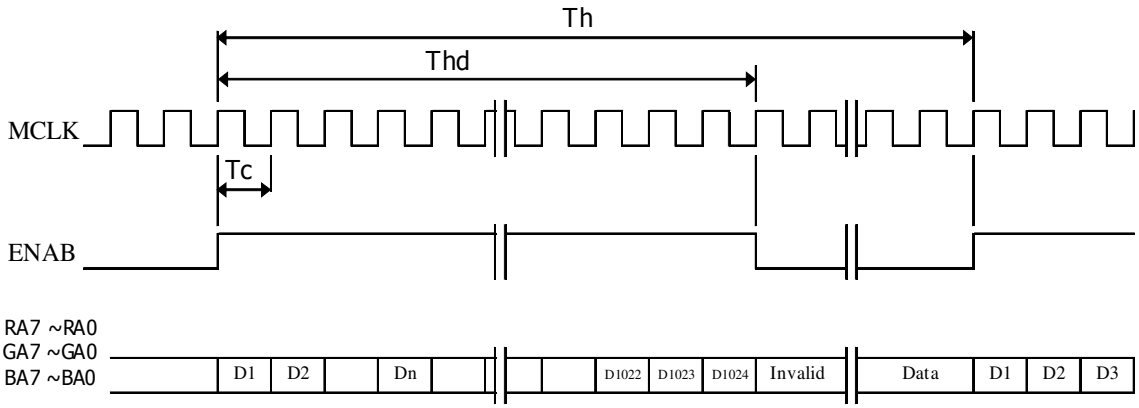


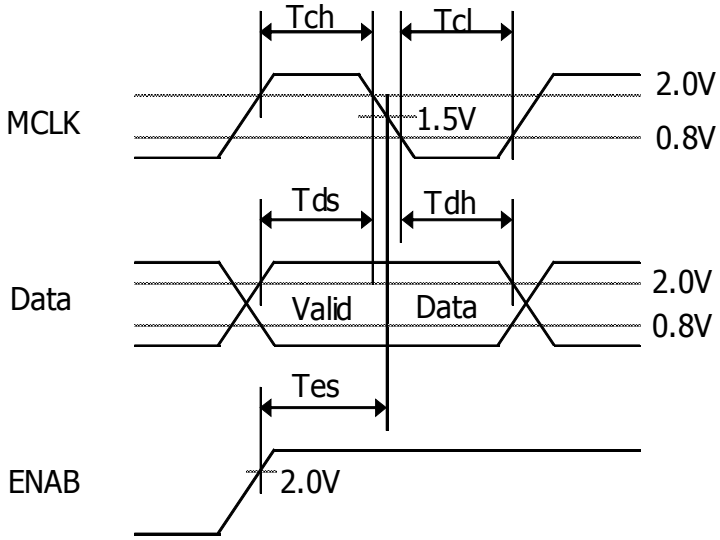
* Vdiff = (RINz+)-(RINz-), (RCLKIN+)-(RCLKIN-)

7.0 SIGNAL TIMING WAVEFORMS

Timing wave forms of interface signal





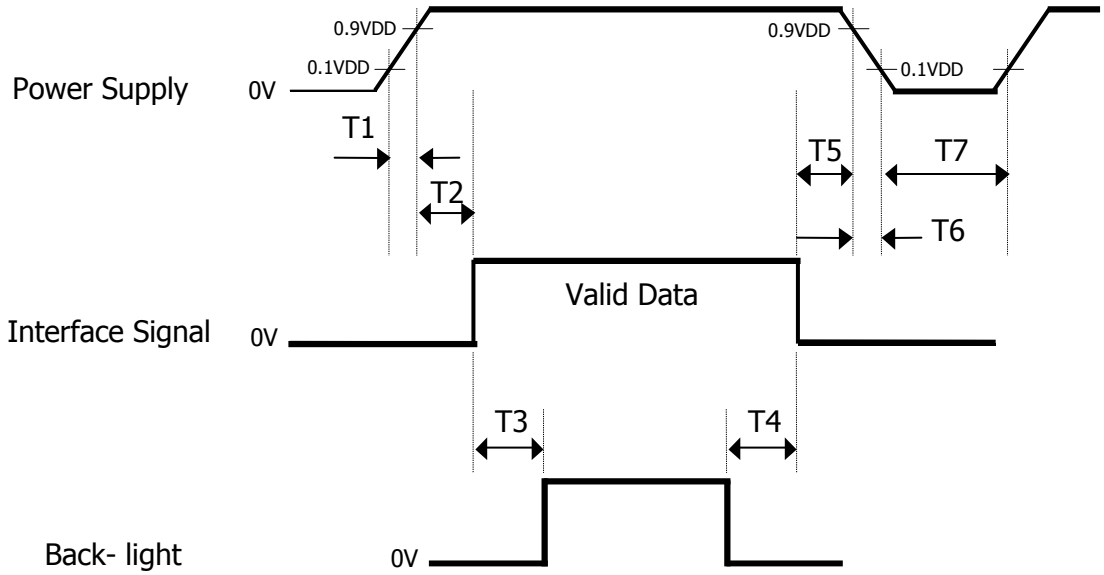


8.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

	Colors &	Data signal																	
	Gray scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Light Blue	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Purple	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
Gray scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽			↓						↓						↓			
	Brighter			↓						↓						↓			
		1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	▽	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	▽				↓						↓						↓		
	Brighter				↓						↓						↓		
		0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	▽				↓						↓						↓		
	Brighter				↓						↓						↓		
		0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Gray scale of White & Black	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
		0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
	▽				↓						↓						↓		
	Brighter				↓						↓						↓		
		1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1
	▽	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

9.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below



- 0 < T1 ≤ 10 ms
- 0 < T2 ≤ 50 ms
- 200 ms ≤ T3
- 0 ms ≤ T4, 0 ms ≤ T5
- 0 ≤ T6 ≤ 10ms
- 150ms ≤ T7

Notes : 1. When the power supply VDD is 0V, Keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
3. Back Light must be turn on after power for logic and interface signal are valid.

10.0 MECHANICAL CHARACTERISTICS

10.1 Dimensional Requirements

FIGURE 5, 6 shown in appendix shows mechanical outlines for the model.
(Remark : Without protection plate)

Parameter	Specification	Unit
Dimensional outline Horizontal Vertical Thickness	 270.0 ± 0.3 199.0 ± 0.3 4.8 Typ @ Lamp, 6.7 Typ @ Pouch	mm
Weight	305 (Typ), 315 (Max)	gram
Active Area	245.76 (H) X 184.32 (V)	mm
Pixel Pitch	0.240 (H) X 0.240 (V)	mm
Number of Pixels	1024 (H) X 768 (V)	pixels
Torque of insert nut for mounting digitizer	3.0 (Max)	kgf
Torque of digitizer screw	1.5 (Max)	kgf

10.2 Mounting

See FIGURE 5. (shown in Appendix)

10.3 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an anti-glare coating to minimize reflection and a coating to reduce scratching.

10.4 Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 350lux.

11.0 RELIABLITY TEST (Without protection plate)

The Reliability test items and its conditions are shown in below.

No	Test Items	Conditions
1	High temperature storage test	Ta = 60 ℃, 240 hrs
2	Low temperature storage test	Ta = -20 ℃, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 ℃, 80~85%RH, 1000 hrs
4	Life Test	Ta = 25 ℃, 1000 hrs
5	High temperature operation test	Ta = 50 ℃, 240 hrs
6	Low temperature operation test	Ta = 0 ℃, 240 hrs
7	On/Off test	Ta = 25℃, 1 min, On/Off 30000 cycles
8	Thermal shock	Ta = -20 ℃ ↔ 60 ℃ (30 min), 100 cycle
9	Vibration test (non-operating)	1.5G, 10~200Hz for X,Y,Z axis 30 min for each axis
10	Shock test (non-operating)	210 G, 3 msec, half sine for X, Y, Z axis 50G, 18 msec, trapezoidal for X, Y, Z axis
11	Altitude Test	53.3 Kpa (Altitude 5000m), 24 hrs
12	Open / Short Test	DS158, Open/Short Test Plan
13	Electro-static discharge test (non-operating)	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV

12.0 HANDLING & CAUTIONS

(1) Cautions when taking out the module
- Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module
- As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD module is operating.
- Put the module display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation
- When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

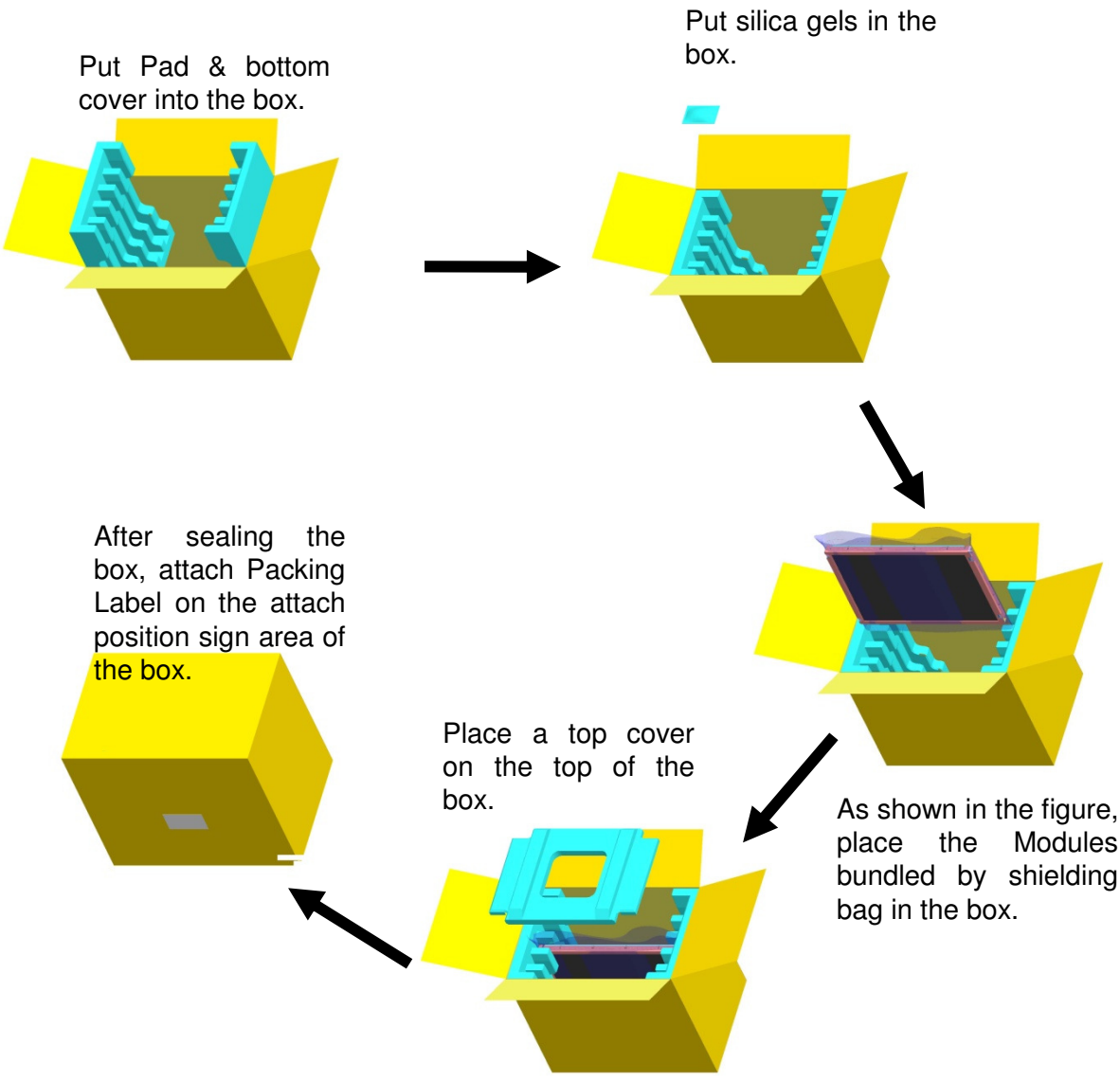
(4) Cautions for the atmosphere
- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics
- Do not apply fixed pattern data signal to the LCD module at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions
- Do not disassemble and/or re-assemble LCD module.
- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

13.0 Packing

13.1 Packing Order



Notes

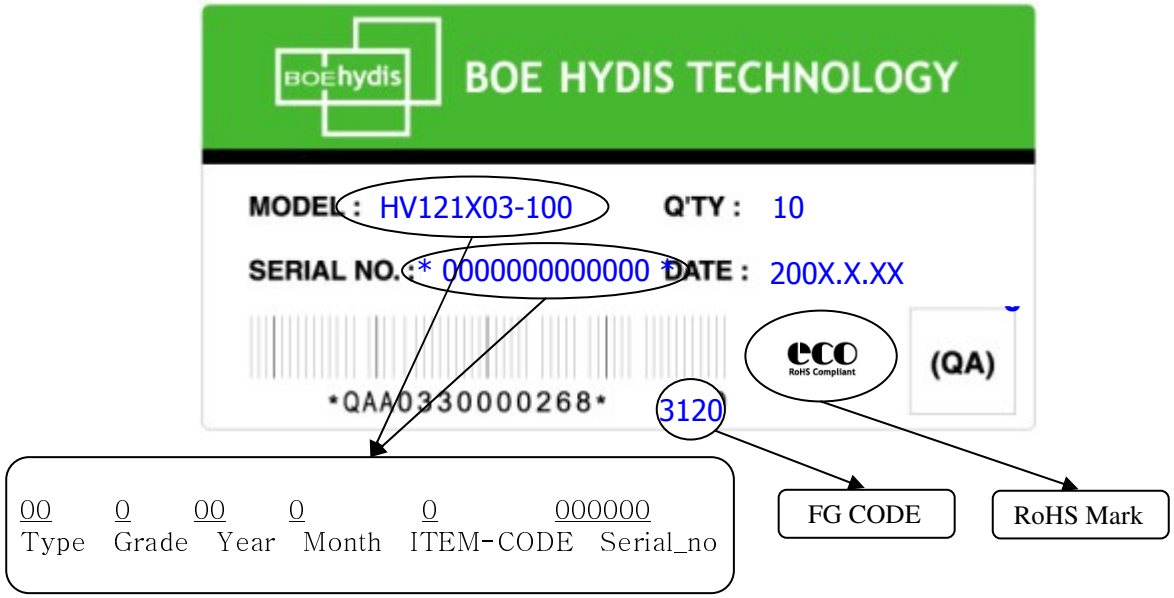
- Box Dimension: 349 mm (W) X 261 mm (D) X 311 mm (H)
- Package Quantity in one Box: 10pcs

14.0 Label

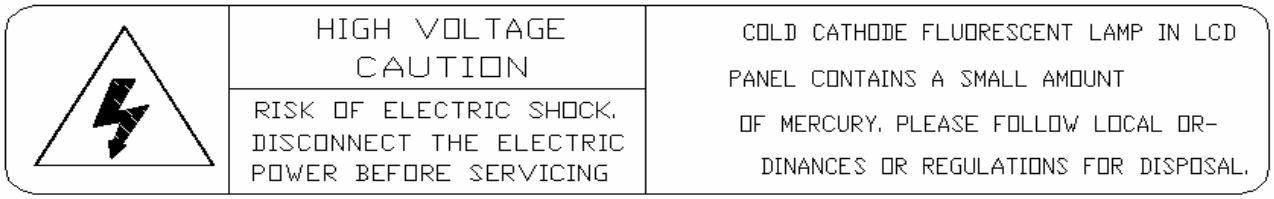
14.1 Packing Label

- Label size : 108 mm (L) X 56 mm (W)
- Contents

Model : HV121X03-100
Q'ty : Module Q'ty in one box
Serial No. : Box Serial No. See next figure for detail description
Date : Packing Date
FG Code : FG Code of Product



14.2 Mercury disposal & High voltage caution



14.3 Product Label

(1) Product label

1	2	3	4	5	6	7
X X	X	X	X X	1	0 0 X X	X X X X X X

Type designation

No 1. Control Number

No 2. Rank / Grade

No 3. Company (H:BOE HYDIS, O:BOE OT)

No 4. Year (5 : 2005, 6: 2006, …)

No 5. Month (1, 2, 3, …, 9, X, Y, Z)

No 6. Product Identification (FG)

No 7. Serial Number

15.0 Appendix

Figure 1. Measurement Set up

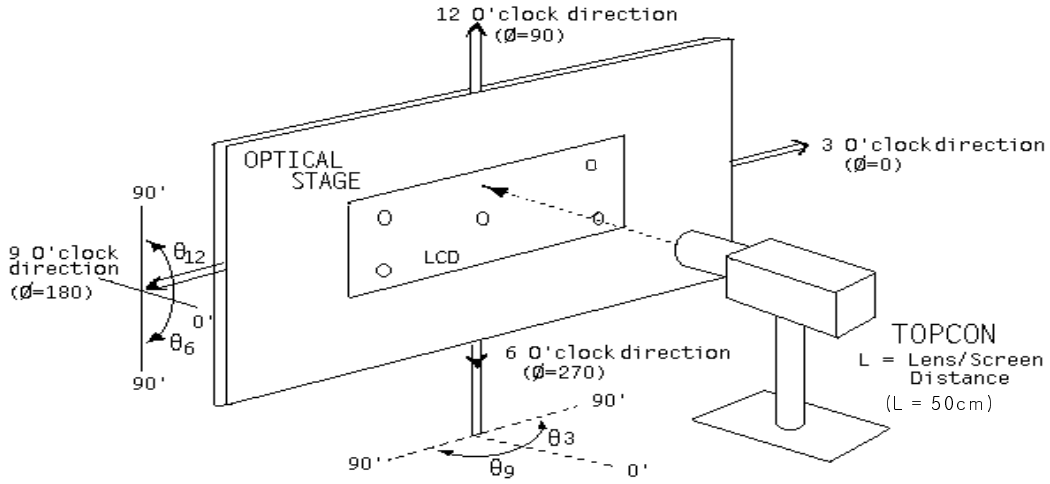


Figure 2. Average Luminance Measurement Locations, 5 points & 13 points Uniformity Measurement Locations

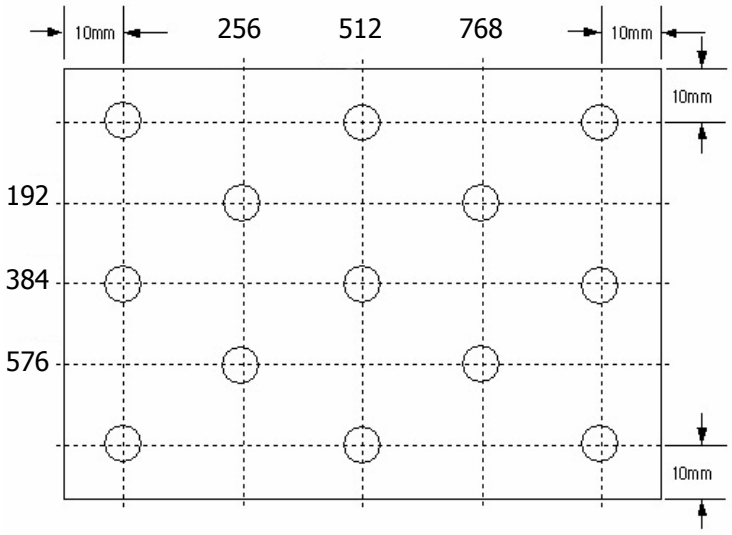


Figure 3. Response Time Testing

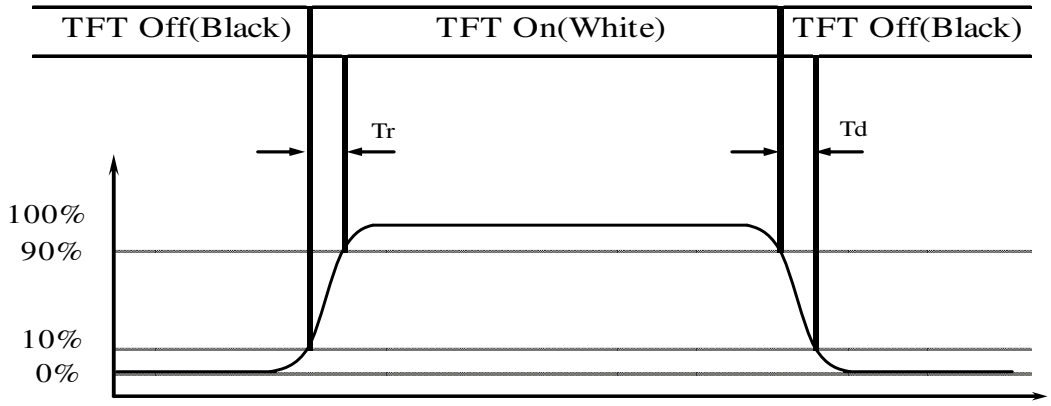
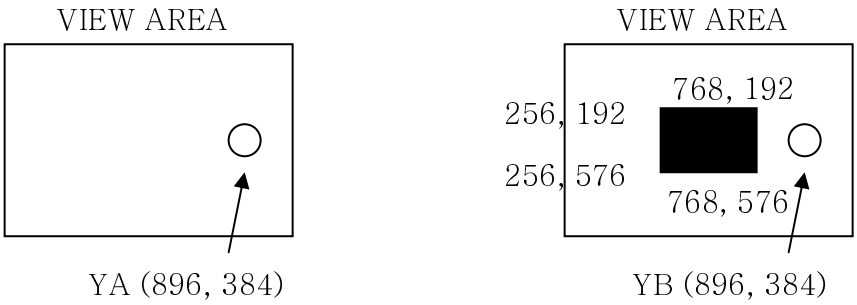


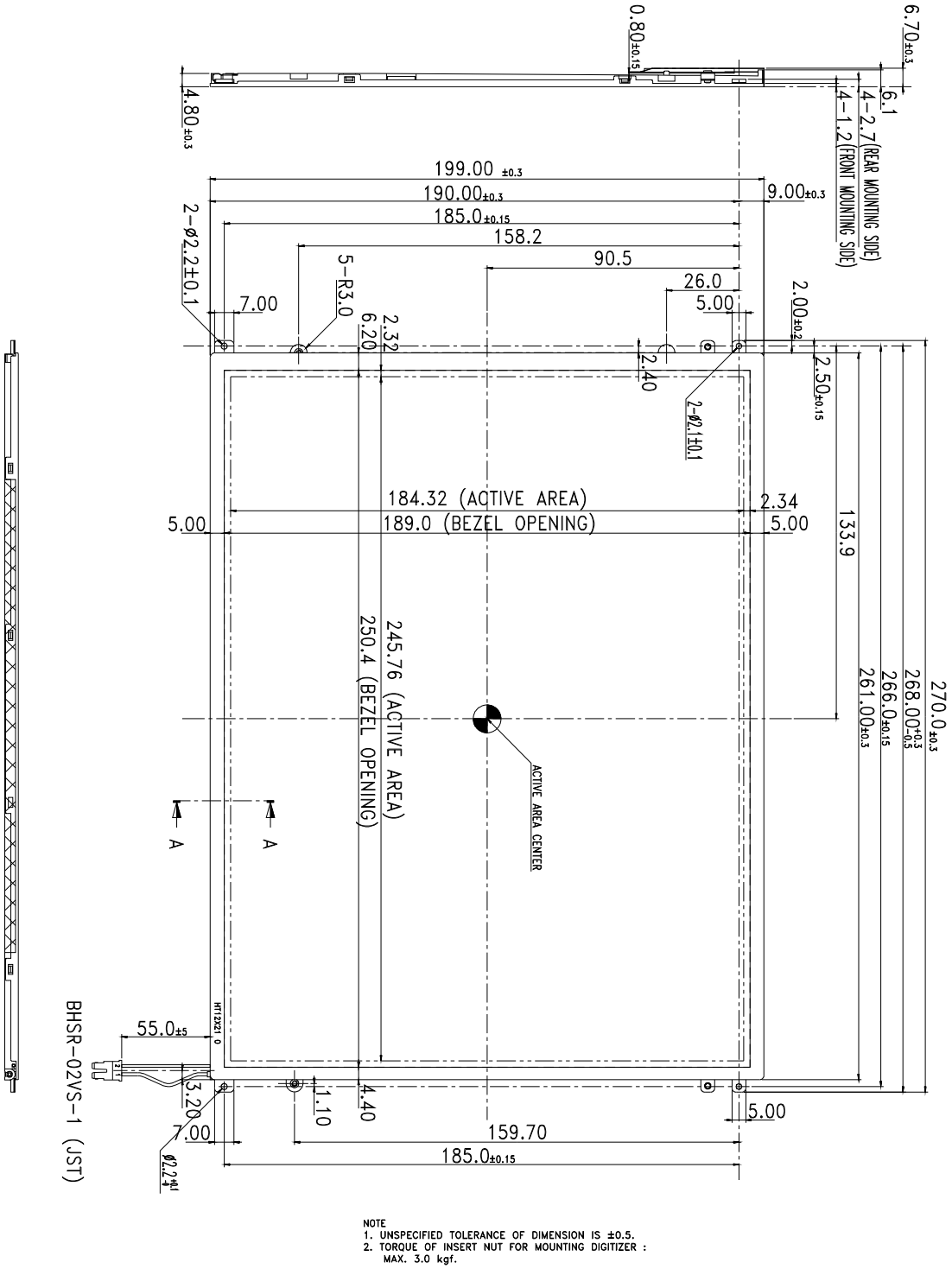
Figure 4. Cross Modulation Test Description



$$\text{Cross Talk} = \frac{YB - YA}{YA} \times 100$$

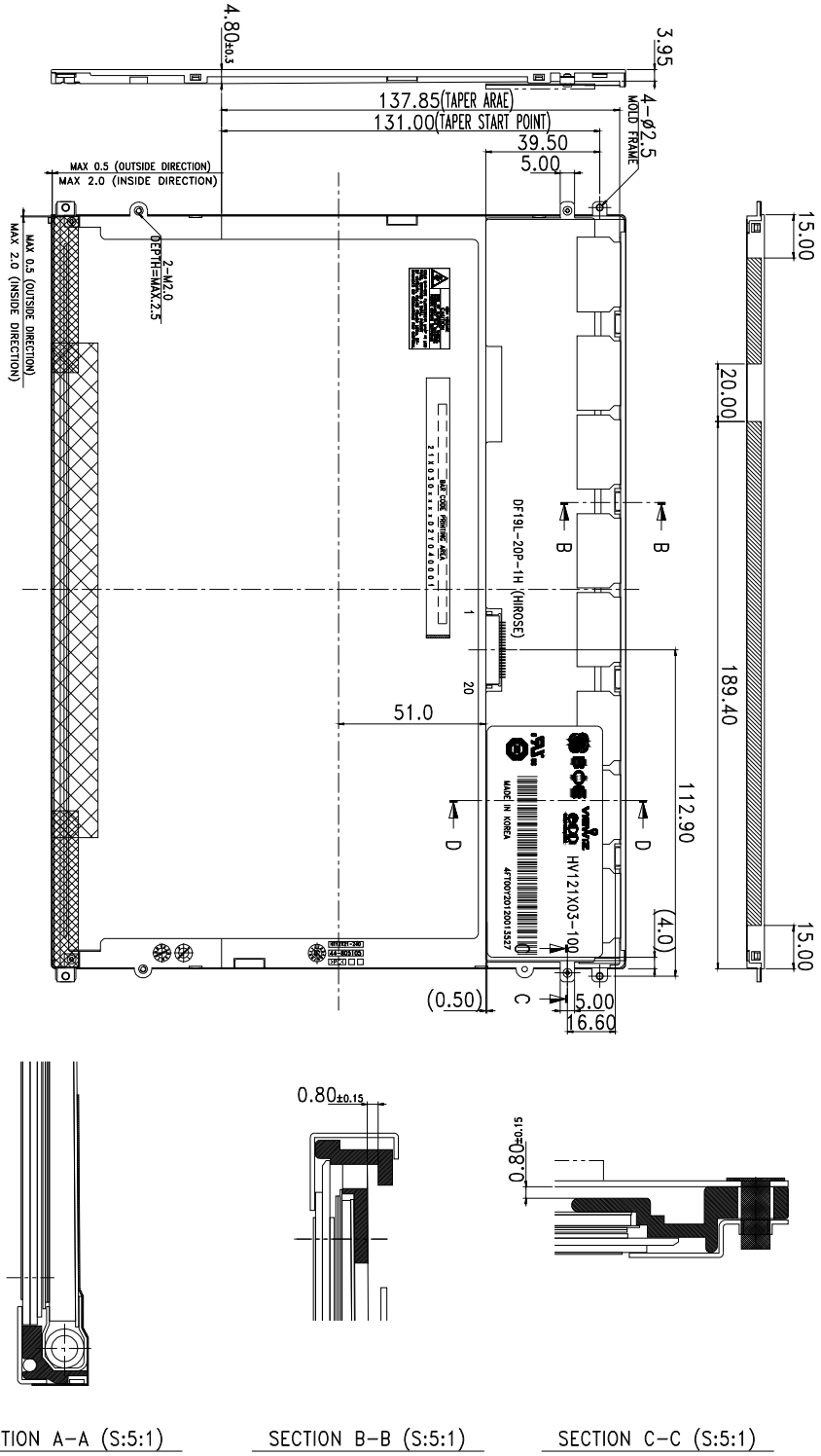
Where:
YA = Initial luminance of measured area (cd/m2)
YB = Subsequent luminance of measured area (cd/m2)
The location measured will be exactly the same in both patterns.

Figure 5. TFT-LCD Module Outline Dimension (Front View)



NOTE
1. UNSPECIFIED TOLERANCE OF DIMENSION IS ±0.5.
2. TORQUE OF INSERT NUT FOR MOUNTING DIGITIZER : MAX. 3.0 kgf.

Figure 6. TFT-LCD Module Outline Dimensions (Rear View)



16.0 EDID Table

Address (HEX)	Function	Hex	Dec	values.	Notes
00	Header	00	0	0	EDID Header
01		FF	255	255	
02		FF	255	255	
03		FF	255	255	
04		FF	255	255	
05		FF	255	255	
06		FF	255	255	
07		00	0	0	
08	ID Manufacturer Name	30	48	LEN	ID = LEN
09		AE	174		
0A	ID Product Code	2	2	XGA	XGA FFS
0B		40	64		
0C	32-bit serial No.	00	0		
0D		00	0		
0E		00	0		
0F		00	0		
10	Week of manufacture	0	0	0	
11	Year of Manufacture	10	16	2006	Manufactured in 2006
12	EDID Structure Ver.	01	1	1	EDID Ver 1.0
13	EDID revision #	03	3	3	EDID Rev. 0.3
14	Video input definition	80	50	-	
15	Max H image size	19	25	25	25 cm (Approx)
16	Max V image size	12	18	18	18 cm (Approx)
17	Display Gamma	78	120	2.2	Gamma curve = 2.2
18	Feature support	EA	234		RGB display, Preferred Timming mode
19	Red/Green low bits	8D	141	-	Red / Green Low Bits
1A	Blue/White low bits	51	81	-	Blue / White Low Bits
1B	Red x high bits	92	146	0.572	Red (x) = 10010010 (0.572)
1C	Red y high bits	55	85	0.332	Red (y) = 01010101 (0.332)
1D	Green x high bits	4E	78	0.308	Green (x) = 01001110 (0.308)
1E	Green y high bits	89	137	0.536	Green (y) = 10001001 (0.536)
1F	Blue x high bits	26	38	0.149	Blue (x) = 00100110 (0.149)
20	BLue y high bits	28	40	0.157	Blue (y) = 00101000 (0.157)
21	White x high bits	4E	78	0.305	White (x) = 01001110 (0.305)
22	White y high bits	54	84	0.329	White (y) = 01010100 (0.329)

Address (HEX)	Function	Hex	Dec	values.	Notes
23	Established timing 1	21	33	-	
24	Established timing 2	8	8	-	
25	Established timing 3	00	0	-	
26	Standard timing #1	01	1		Not Used
27		01	1		
28	Standard timing #2	01	1		Not Used
29		01	1		
2A	Standard timing #3	01	1		Not Used
2B		01	1		
2C	Standard timing #4	01	1		Not Used
2D		01	1		
2E	Standard timing #5	01	1		Not Used
2F		01	1		
30	Standard timing #6	01	1		Not Used
31		01	1		
32	Standard timing #7	01	1		Not Used
33		01	1		
34	Standard timing #8	01	1		Not Used
35		01	1		
36	Detailed timing/monitor descriptor #1 (60Hz)	64	100	65.00	65MHz Main clock
37		19	25		
38		00	0	1024	Hor Active = 1024
39		40	64	320	Hor Blanking = 320
3A		41	65	-	4 bits of Hor. Active + 4 bits of Hor. Blanking
3B		00	0	768	Ver Active = 768
3C		26	38	38	Ver Blanking = 38
3D		30	48	-	4 bits of Ver. Active + 4 bits of Ver. Blanking
3E		18	24	24	Hor Sync Offset = 24
3F		88	136	136	H Sync Pulse Width = 136
40		36	54	3	V sync Offset = 3 line
41		00	0	6	V Sync Pulse width : 6 line
42		F5	245	245	Horizontal Image Size = 245 mm (Low 8 bits)
43		B8	184	184	Vertical Image Size = 184 mm (Low 8 bits)
44		00	0	-	4 bits of Hor Image Size + 4 bits of Ver Image Size
45		00	0	0	Hor Border (pixels)
46		00	0	0	Vertical Border (Lines)
47		18	24	-	

Address (HEX)	Function	Hex	Dec	values.	Notes
48	Detailed timing/monitor descriptor #2	00	0		
49		00	0		
4A		00	0		
4B		10	16		Dummy descriptor
4C		00	0		
4D		00	0		
4E		00	0		
4F		00	0		
50		00	0		
51		00	0		
52		00	0		
53		00	0		
54		00	0		
55		00	0		
56		00	0		
57		00	0		
58		00	0		
59		00	0		
5A	Detailed timing/monitor descriptor #3	00	0		
5B		00	0		
5C		00	0		
5D		0F	0		Manufacturer specified
5E		00	0		
5F		61	97		1024
60		43	67		4:3
61		3C	60		60Hz
62		00	0		Not supported
63		00	0		Not supported
64		00	0		Not supported
65		13	19		195
66		2	2		FFS
67		00	0		Reserved
68		9	9	BOE	BOE
69		E5	229		
6A		00	0		
6B		00	0		

Address (HEX)	Function	Hex	Dec	values.	Notes
6C	Detailed timing/monitor descriptor #4	00	0		Product Name Tag (ASCII)
6D		00	0		
6E		00	0		
6F		FE	254		
70		00	0		
71		48	72	H	Model name : HV121X03-100
72		56	86	V	
73		31	49	1	
74		32	50	2	
75		31	49	1	
76		58	88	X	
77		30	48	0	
78		33	51	3	
79		2D	45	-	
7A		31	49	1	
7B		30	48	0	
7C		30	48	0	
7D		0A	10		
7E	Extension flag	00	0		
7F	Checksum	5C	92	-	