



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	1 / 27
Document No.		Revision	

To :

Date : Aug.20, 2008

# HannStar Product Information

(Preliminary)

Model : **HSD190MGW1**  
**- A04**

Note:

- 1.Please contact Hannstar Display Corp. before designing your product based on this module specification.
- 2.The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by Hannstar for any intellectual property claims or other problems that may result from application based on the module described herein.
- 3.The mark “\*\*” of Model means sub-model code.



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	2 / 27
Document No.		Revision	

**Record of Revisions**

Rev.	Date	Sub-Model.	Description of change
0	20 Aug., 2008	A04	Product information for HSD190MGW1-A04 was first issued.



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	3 / 27
Document No.		Revision	

## Contents

1.0	General Descriptions .....	p.4
2.0	Absolute Maximum Ratings .....	p.5
3.0	Optical Characteristics .....	p.7
4.0	Block Diagram .....	p.11
5.0	I/O Connection Pin Assignment .....	p.14
6.0	Electrical Characteristics .....	p.15
7.0	Outline Dimension .....	p.21
8.0	Lot Mark .....	p.24
9.0	Package Specification .....	p.25
10.0	General Precaution .....	p.26

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	4 / 27
Document No.		Revision	

## 1.0 GENERAL DESCRIPTIONS

### 1.1 Introduction

HannStar Display model **HSD190MGW1-A04** is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, the voltage reference, common voltage, DC-DC converter, column, and row driver circuit. This TFT LCD has a 19-inch diagonally measured active display area with WXGA+ resolution (900 vertical by 1440 horizontal pixel array).

### 1.2 Features

- 19" WXGA+ TN(Twisted Nematic) mode TFT LCD panel
- High speed response time
- 4 CCFLs Backlight system
- Supported WXGA+ (V:900 lines, H:1440 pixels) resolution
- Supported to 75Hz refresh rate
- LCD Timing Controller
- RoHS compliance

### 1.3 General information

Item	Specification	Unit
Outline dimension	428x278x18.5 (typ.)	mm
Display area	408.24 (H) x255.15 (V)	mm
Number of Pixel	1440(H) x 900(V)	Pixels
Pixel pitch	0.2835(H) x 0.2835(V)	mm
Pixel arrangement	RGB Vertical stripe	
Display color	16.2M (6-bit+FRC)	
Display mode	Normally white	
Surface treatment	Antiglare, Hard-Coating (3H)	
Weight	2200	G
Back-light	4-CCFLs, Top & bottom edge side	
Input signal	2-ch LVDS	
Power consumption	Logic system	(2.7) W
	B/L system	22 W
Optimum viewing direction	6 o'clock	

### 1.4 Applications

- Desktop and Multi-function monitors
- Display terminals for AV applications
- Monitors for industrial applications

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	5 / 27
Document No.		Revision	

**1.5 Mechanical Information**

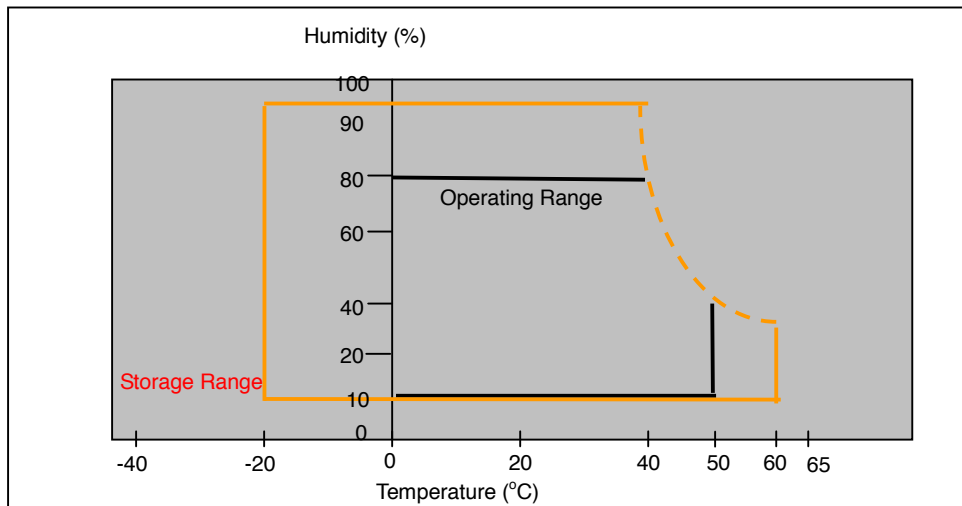
Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal(H)	427.5	428.0	428.5	mm
	Vertical(V)	277.5	278.0	278.5	mm
	Depth(D)	18.0	18.5	19.0	mm
Weight (without inverter)		2000	2200	2400	g
Torque of customer screw hole		--	--	3.0	Kgf*Cm

**2.0 ABSOLUTE MAXIMUM RATINGS**

**2.1 Absolute Rating of Environment**

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T <sub>STG</sub>	-20	60	°C	
Operating temperature	T <sub>OPR</sub>	0	50	°C	(1)
Vibration(non-operating)	V <sub>NOP</sub>	--	1.5	G	(2)
Shock(non-operating)	S <sub>NOP</sub>	--	50	G	(3)
Storage humidity	H <sub>STG</sub>	10	90	%RH	(3)
Operating humidity	H <sub>OP</sub>	10	80	%RH	(4)
Low pressure(operating)	P <sub>LOP</sub>	697	--	HPa	(5)
Low pressure(non-operating)	P <sub>LNOP</sub>	116	--	HPa	(6)

Note (1)Storage /Operating temperature



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	6 / 27
Document No.		Revision	

- (2) 10-300Hz sine wave, X,Y,Z each directions, 10min/cycle.
- (3) 11ms, ±X, ±Y, ±Z direction, one time each. For this shock test, It is necessary to fill the silicon rubber between the shock jigs as buffer.
- (4) Max wet bulb temp. =39°C
- (5) 2 hrs. (10000 feet)
- (6) 24hrs. (50000 feet)

**2.2 Electrical Absolute Rating:**

**2.2.1 TFT LCD Module:**

Item	Symbol	Min.	Max.	Unit.	Note
Power supply Voltage	VDD	-0.3	6.0	V(DC)	(1)(2)

**2.2.2 Back Light Unit:**

Item	Symbol	Min.	Max.	Unit	Note
Lamp current	I <sub>L</sub>	3.0	9.0	MA	(1)(2)(3)
Lamp frequency	f <sub>L</sub>	45	80	KHz	(1)(2)(3)

Note: (1) Permanent damage may occur to the LCD module if beyond this specification.

Functional operation should be restricted to the conditions described under Normal Operating Conditions.

- (2) To exceed 6.5mA, life time accelerate drop down and if to exceed 9.0mA has safety problem. If current lower than 3.5 mA, CCFL would be unstable or damaged.
- (3) Within Ta=25±2°C

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	7 / 27
Document No.		Revision	

### 3.0 OPTICAL CHARACTERISTICS

#### 3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	$\Theta=0^\circ$ $\phi=0^\circ$ Normal viewing angle	450	700	--		(1)(2)
Response time	Rising	TR		--	1.5	3	msec	(1)(3)
	Falling	TF		--	3.5	7		
White luminance (center of screen)		$Y_L$			240	300	--	cd/m <sup>2</sup>
White luminance (center of screen)		$Y_L$		280	350	--	cd/m <sup>2</sup>	(1)(4)(7) (IL=7.5mA)
Color chromaticity (CIE1931)	Red	Rx	Normal viewing angle	-0.03	(0.652)	+0.03		(1)(5)
		Ry			(0.335)			
	Green	Gx			(0.312)			
		Gy			(0.616)			
	Blue	Bx			(0.142)			
		By			(0.072)			
	White	Wx			0.340			
		Wy			0.350			
Viewing angle	Hor.	$\Theta_L$	CR>10	65	75	--		
		$\Theta_R$		65	75	--		
	Ver.	$\Theta_H$		65	75	--		
		$\Theta_L$		55	65	--		
Viewing angle	Hor.	$\Theta_L$	CR>5	75	85	--		
		$\Theta_R$		75	85	--		
	Ver.	$\Theta_H$		75	85	--		
		$\Theta_L$		65	75	--		
Brightness uniformity		$B_{UNI}$	$\Theta=0^\circ$ $\phi=0^\circ$	75	--	--	%	(6)

#### 3.2 Measuring Condition

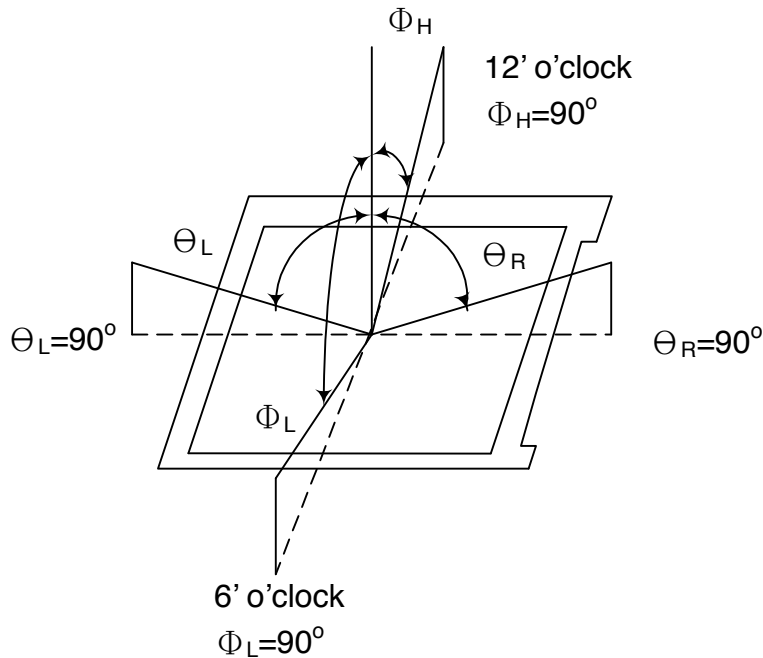
- Measuring surrounding: dark room
- Lamp current  $I_{BL}$ : 6.5 mA, lamp freq.  $F_L$ = 50KHz, Inverter: TDK TBD332LR
- $V_{DD1}$ =5.0V,  $f_V$ =60Hz,  $f_{DCLK}$ =53.25MHz
- Surrounding temperature: 25±2°C
- 30min. Warm-up time.

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	8 / 27
Document No.		Revision	

### 3.3 Measuring Equipment

- FPM520 of Westar Display technologic, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size : 20~21mm

Note (1) Definition of Viewing Angle:



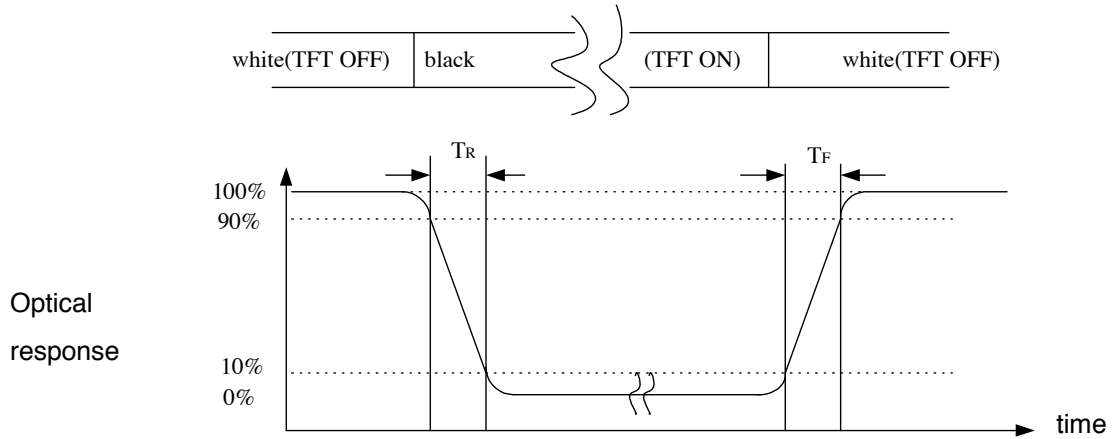
Note (2) Definition of Contrast Ratio(CR) :  
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white (L255)}}{\text{Luminance with all pixels black (L0)}}$$

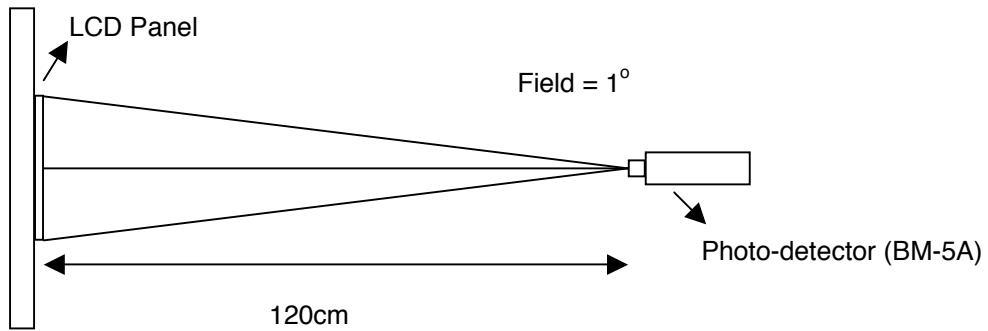


Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	9 / 27
Document No.		Revision	

Note (3) Definition of Response Time: Sum of  $T_R$  and  $T_F$



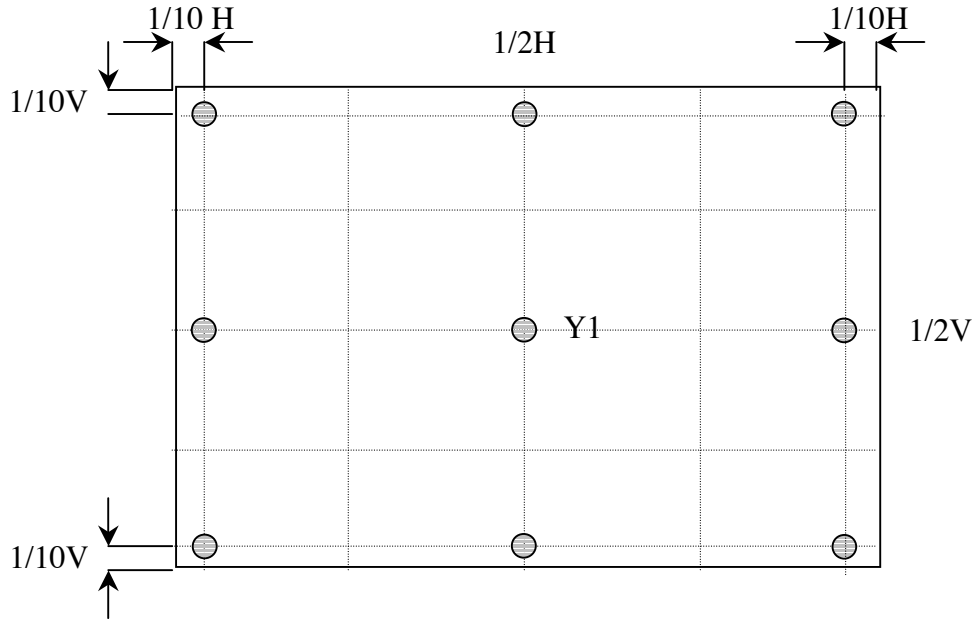
Note (4) Optical characteristic measurement setup



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	10 / 27
Document No.		Revision	

Note (5) Definition of Center Luminance of White

Center Luminance= Y1



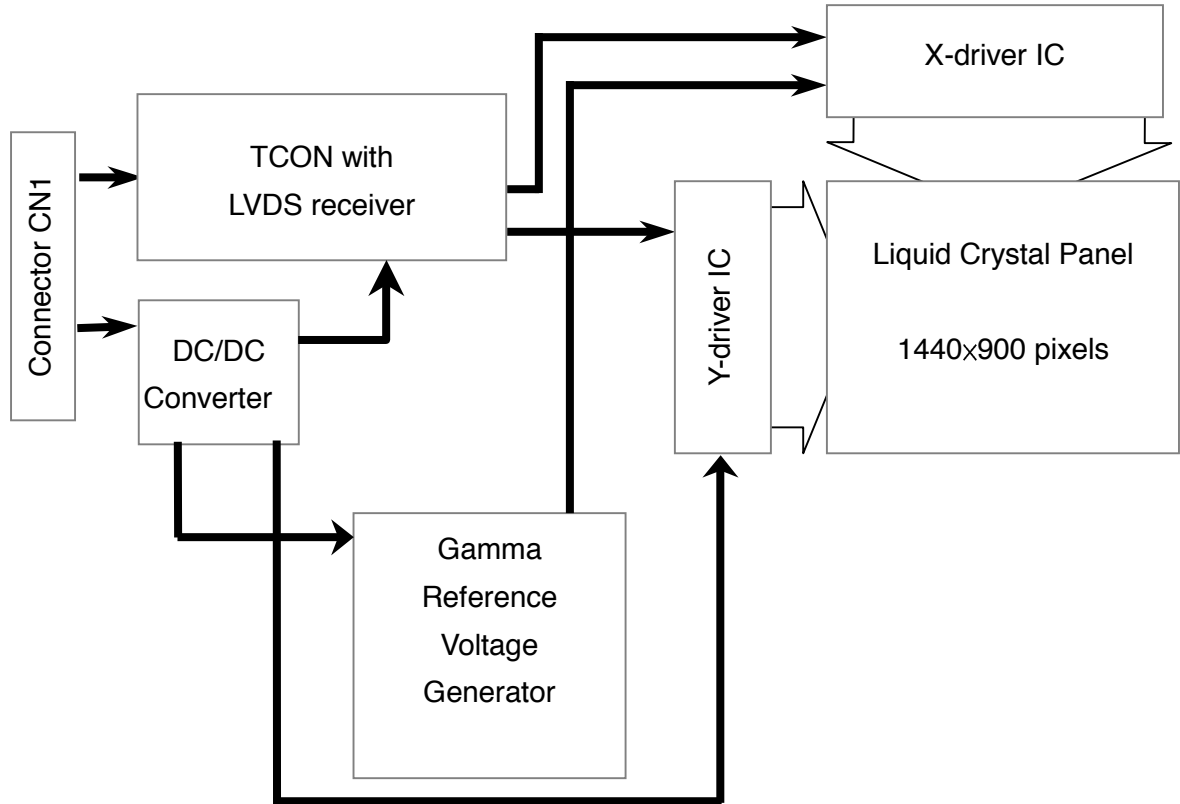
Note (6) Definition of brightness uniformity

$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	11 / 27
Document No.		Revision	

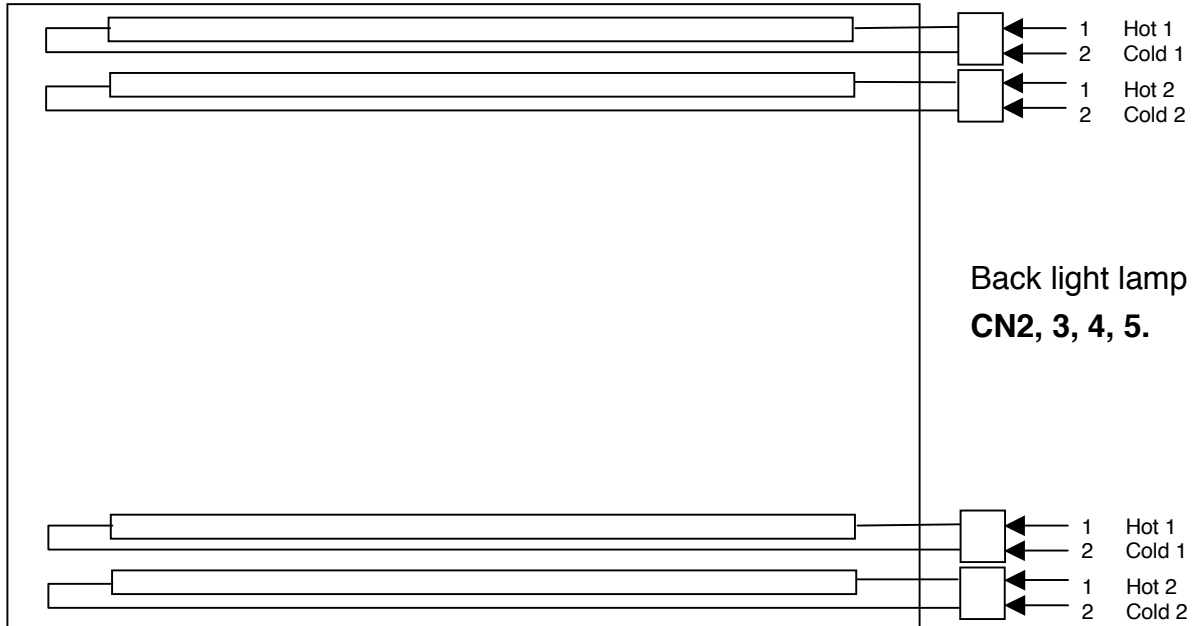
#### 4.0 BLOCK DIAGRAM

##### 4.1 LCD Module Block Diagram:

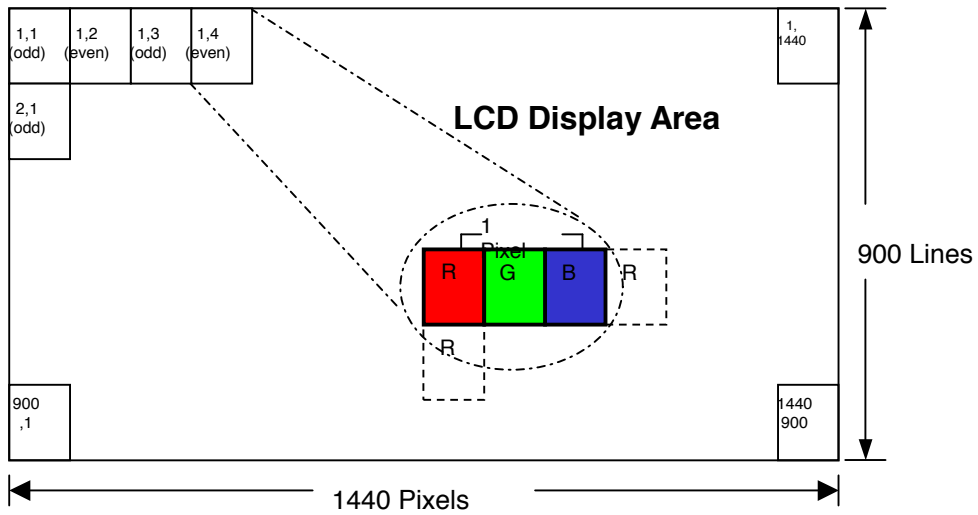


Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	12 / 27
Document No.		Revision	

### 4.2 Back Light Unit



### 4.3 Pixel Format





Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	13 / 27
Document No.		Revision	

#### 4.4 Relationship Between Displayed Color and Input

Display	MSB				LSB				MSB				LSB				MSB				LSB				Gray scale Level	
	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0		
Basic color	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	Light Blue	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Purple	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	-
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	-
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-
Gray scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
	↑	:								:								:								L3...L251
		↓	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	Light		H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L255
	Red	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	Red L255
Gray scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L2
	↑	:								:								:								L3...L251
		↓	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L255
	Light		L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L255
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L255
	Green	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	Green L255	
Gray scale of Blue	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L2
	↑	:								:								:								L3...L251
		↓	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L
	Light		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	H	L
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L255
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	Blue L255
Gray scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L	L	L	L	H	L	L1	
		L	L	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L2	
	↑	:								:								:								L3...L251
		↓	H	H	H	H	H	L	L	H	H	H	H	H	L	L	H	H	H	H	H	L	L	L	L252	
	Light		H	H	H	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	L	H	L	L253	
		H	H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	L	L254
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L255	

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	14 / 27
Document No.		Revision	

## 5.0 I/O CONNECTION PIN ASSIGNMENT

### 5.1 Interface Connector (30-pins) (JAE: FI-XB30SSRL-HF16 or equivalent)

Pin No.	Signal	Description
1	RinO0-	Receiver Signal (-)
2	RinO0+	Receiver Signal (+)
3	RinO1-	Receiver Signal (-)
4	RinO1+	Receiver Signal (+)
5	RinO2-	Receiver Signal (-)
6	RinO2+	Receiver Signal (+)
7	VSS	Ground
8	RinOC-	Clock Signal (-)
9	RinOC+	Clock Signal (+)
10	RinO3-	Receiver Signal (-)
11	RinO3+	Receiver Signal (+)
12	RinE0-	Receiver Signal (-)
13	RinE0+	Receiver Signal (+)
14	VSS	Receiver Signal (+)
15	RinE1-	Receiver Signal (-)
16	RinE1+	Receiver Signal (+)
17	VSS	Ground
18	RinE2-	Receiver Signal (-)
19	RinE2+	Receiver Signal (+)
20	RinEC-	Clock Signal (-)
21	RinEC+	Clock Signal (+)
22	RinE3-	Receiver Signal (-)
23	RinE3+	Receiver Signal (+)
24	VSS	Ground
25	NC	NC
26	NC	NC
27	NC	NC
28	VDD+5V	Power Supply, 5V (Typical)
29	VDD+5V	Power Supply, 5V (Typical)
30	VDD+5V	Power Supply, 5V (Typical)

### 5.2 Back Light Unit (CCFL) Connectors:

**CN2, 3, 4, 5:** CCFL Power Source (Yeonho 35001H5-02 or equivalent)

Pin No.	Symbol	Color	Function
1	Hot1	Pink	CCFL power supply (High voltage)
2	Cold1	White	Ground

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	15 / 27
Document No.		Revision	

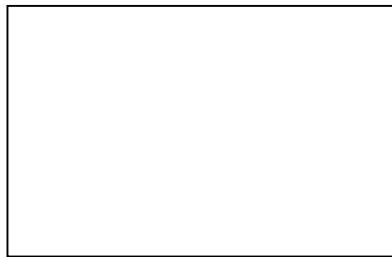
## 6.0 ELECTRICAL CHARACTERISTICS

### 6.1 TFT LCD Module:

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of power supply	$V_{DD}$	4.5	5.0	5.5	V	
Current of power supply	$I_{DD1}$	(435)	(535)	(635)	mA	(1)
	$I_{DD2}$	(615)	(715)	(815)	mA	(1)
Vsync frequency	$f_V$	60	60	75	Hz	(2)
Hsync frequency	$f_H$	55.5	59.9	75	KHz	
Frequency	$f_{DCLK}$	44.375	53.25	68.375	MHz	
Input rush current	$I_{RUSH}$	---	---	1.5	A	(3)

Note (1)

(a)White:

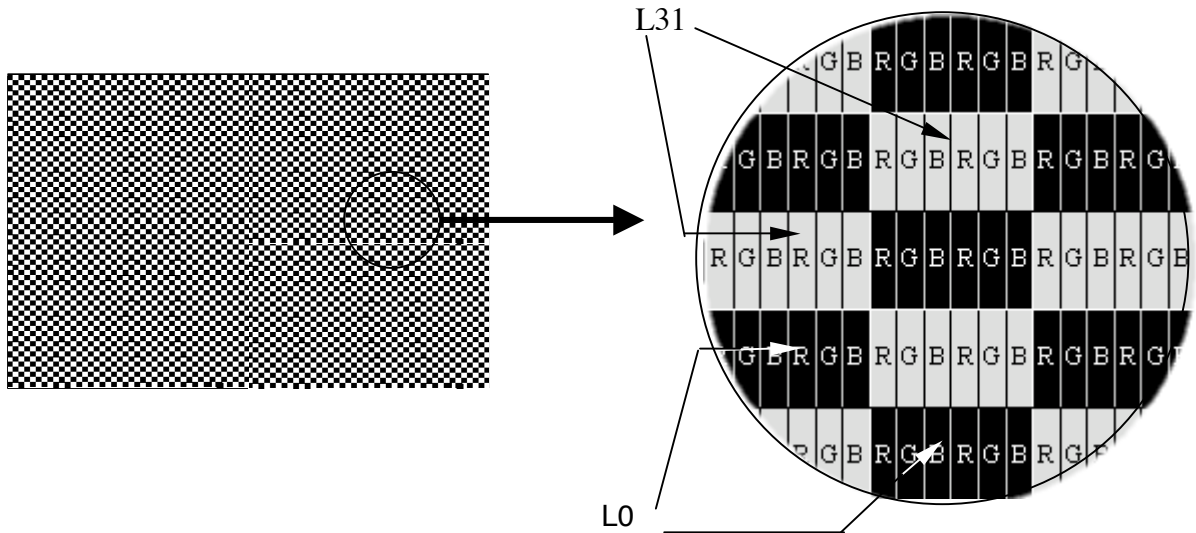


(b).V-Color :



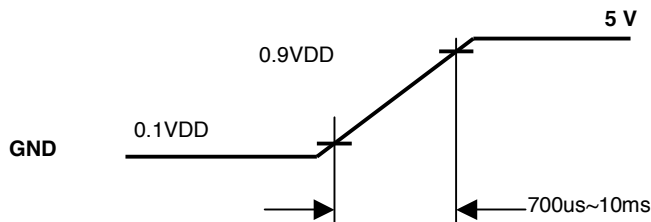
Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	16 / 27
Document No.		Revision	

(c)Mosaic: 2 Dot checker image



Grey scale: L0~L255  
 L0: Luminance with all pixels black.  
 L255: Luminance with all pixels white.

Note (2) When  $f_v$  is too low, a flicker may be occurred on the display.  
 Note (3) Input Rush Current condition



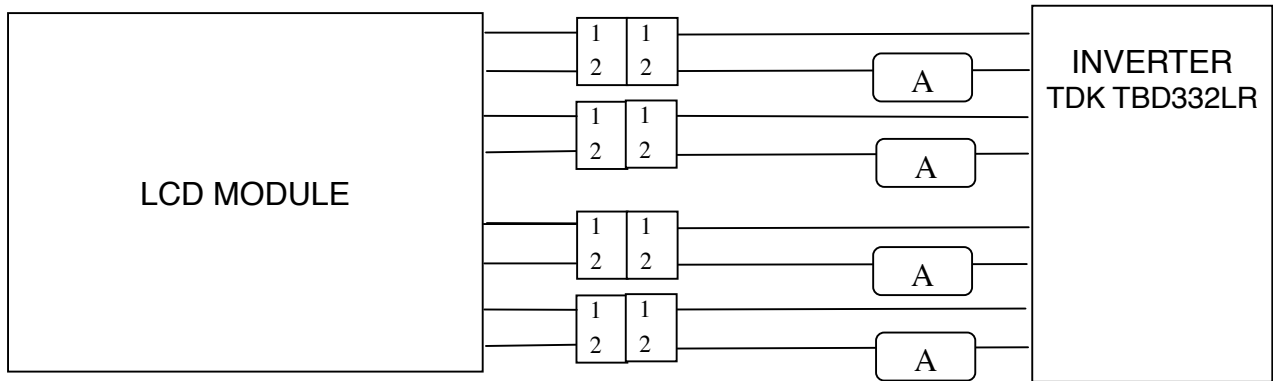


Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	17 / 27
Document No.		Revision	

### 6.2 Back-Light Unit

The back-light system is an direct-lighting type with 4CCFLs (Cold Cathode Fluorescent Lamp). The characteristics of the lamp are shown in the following tables.

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp current	IL	3.0	6.5	9.0	mA(rms)	(1)
Lamp voltage	VL	648	720	792	V(rms)	$I_L=7.5mA$
Lamp voltage	VL	612	680	748	V(rms)	$I_L=6.5mA$
Frequency	fL	40	50	80	KHz	(2)
Operating Lifetime	Hr	50,000	--	--	Hour	6.5mA(3)
	Hr	40,000	--	--	Hour	7.5mA(3)
Startup voltage	Vs	1,450	--	--	V(rms)	at 25°C
		1,700				at 0°C



**Note (1)**

Lamp current is measured with current meter for high frequency as shown below. Specified values are for a single lamp. To exceed 6.5 mA, life time accelerate drop down and if to exceed 9.0 mA has safety problem. If current lower than 3.5 mA, CCFL would be unstable or damaged.

**Note (2)**

Lamp frequency may produce interference with horizontal synchronous frequency and this may cause ripple noise on the display. Therefore lamp frequency shall be kept away from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.

**Note (3)**

Lamp life time (Hr) can be defined as the time in which it continues to operate under the condition :  $T_a=25\pm3^\circ C$ , Typical IL value indicated in the above table and  $f_L=48$  kHz until the brightness becomes less than 50%

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	18 / 27
Document No.		Revision	

**Note (4)**

CCFL inverter should be able to provide a voltage over specified value (Vs) in the above table. Lamp units need at least Vs value shown above to ignition.

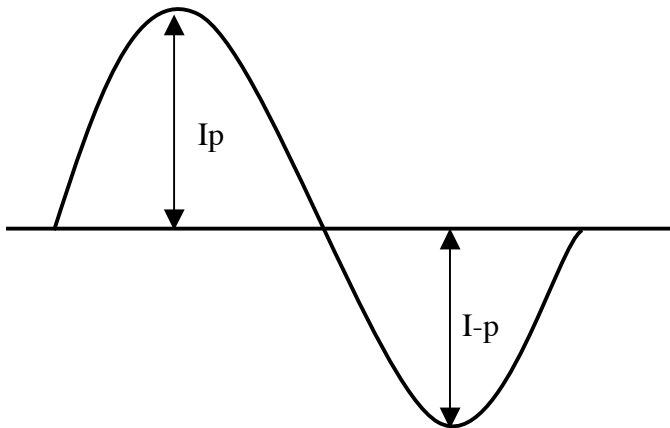
**Note (5)**

The voltage over specified value (Vs) should be applied to the lamp more than 1 second after startup. Otherwise, the lamp may not be turned on. The used lamp current is the lamp typical current.

**Note (6)**

The output voltage waveform and current waveform of the inverter must be symmetrical (Unsymmetrical ratio is less than 10%). Please do not use the inverter which has unsymmetrical voltage and current waveform, and spike waveform. The inverter design which can provide the best optical performance, power efficiency, and lamp life should under the following conditions.

- a. The asymmetry rate of the inverter waveform should be less than 10%.
- b. The distortion tae of the waveform should be within  $\sqrt{2} \pm 10\%$ .
- c. The inverter output waveform should be better similar to the ideal sine wave.



$$\text{Asymmetry rate} = |I_p - I_{-p}| / I_{rms} \times 100\%$$

$$\text{Distortion rate} = I_p \text{ (or } I_{-p}) / I_{rms}$$

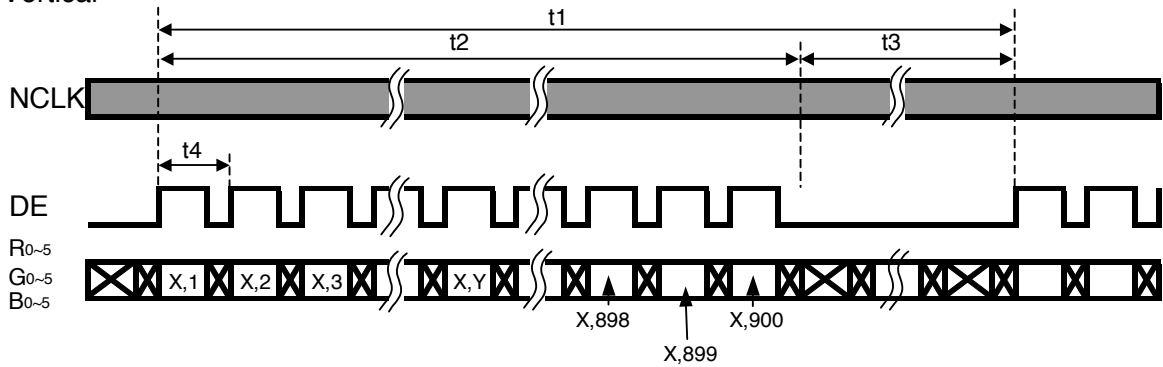
Document Title	HSD190MGW1- A04 Product Information	Page No.	19 / 27
Document No.		Revision	

### 6.3 Interface Timing ( DE mode)

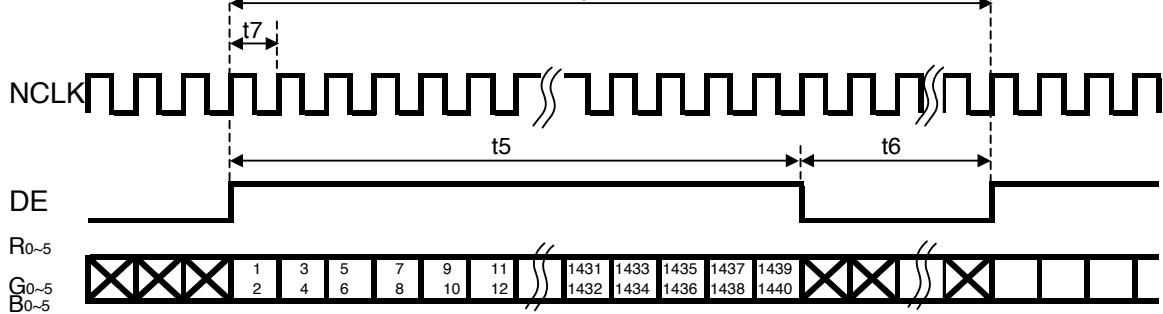
Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	56	60	75	Hz
Frame Period	t1	910	934	1050	line
Vertical Display Time	t2	900	900	900	line
Vertical Blanking Time	t3	10	34	150	line
1 Line Scanning Time	t4	800	952	968	clock
Horizontal Display Time	t5	720	720	720	clock
Horizontal Blanking Time	t6	60	232	248	clock
Clock Rate	t7	44.375	53.25	68.375	MHz

#### Timing Diagram of Interface Signal (DE mode)

(1) Vertical

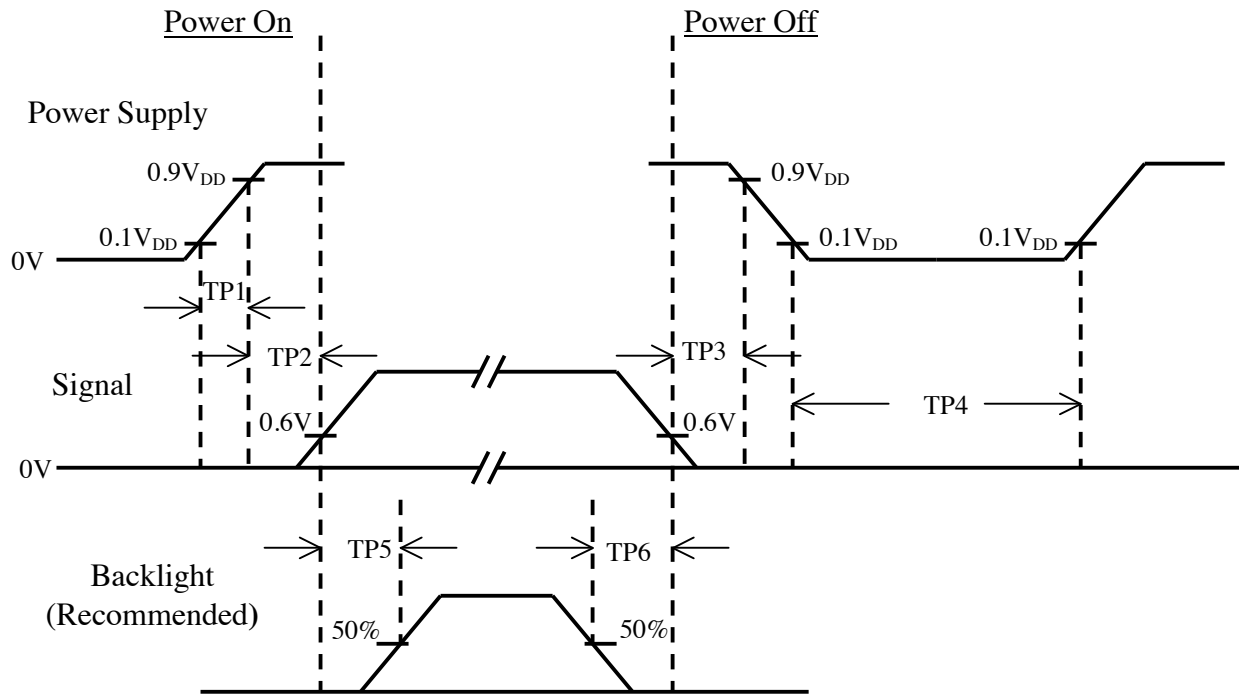


(2) Horizontal



Document Title	HSD190MGW1- A04 Product Information	Page No.	20 / 27
Document No.		Revision	

### 6.4 Power On / Off Sequence :



Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	200	--	--	msec	
TP6	200	--	--	msec	

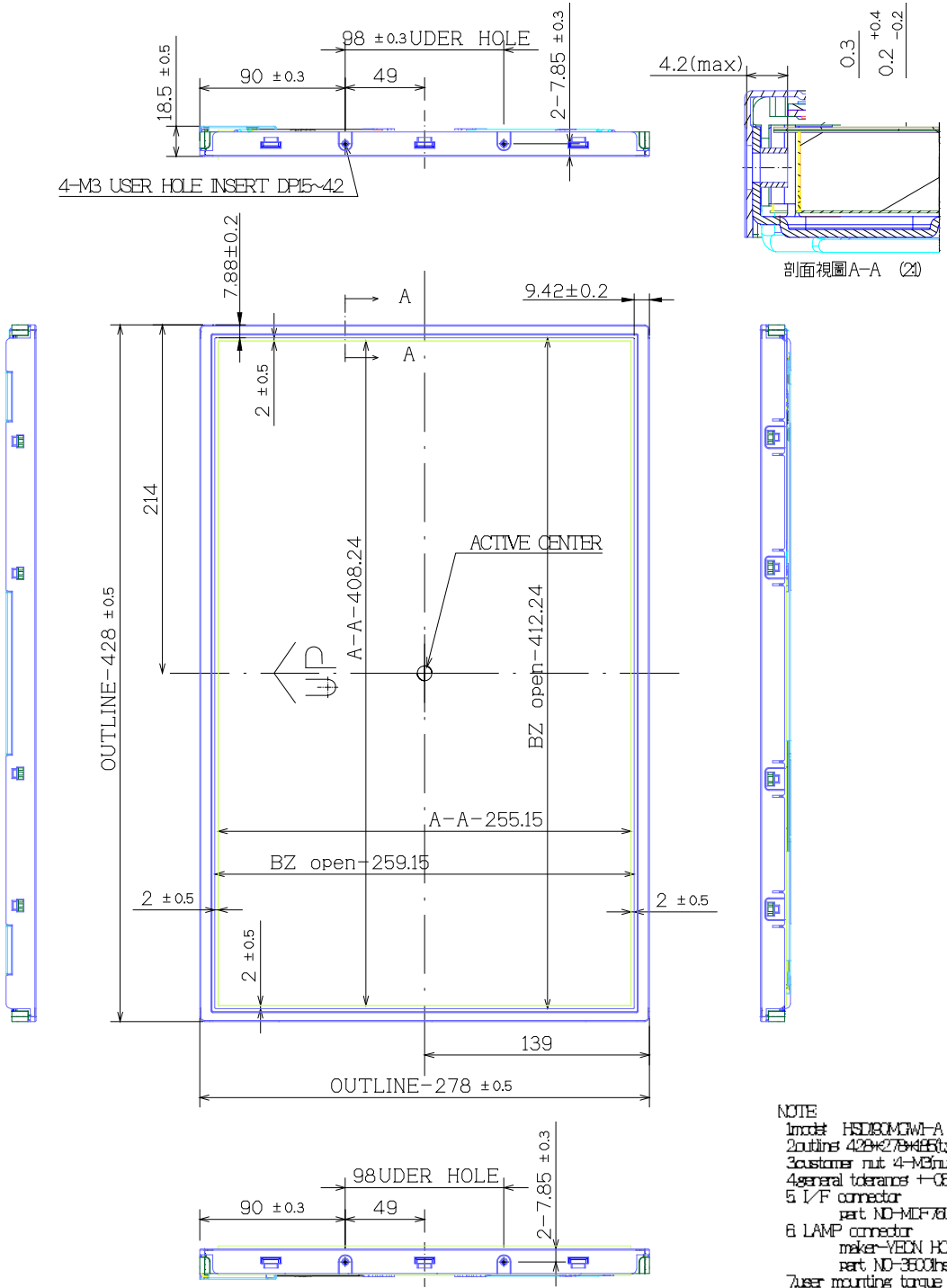
- Note : (1) The supply voltage of the external system for the module input should be the same as the definition of V<sub>DD</sub>.
- (2) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.
- (3) In case of V<sub>DD</sub> = off level, please keep the level of input signal on the low or keep a high impedance.
- (4) TP4 should be measured after the module has been fully discharged between power off and on period.
- (5) Interface signal shall not be kept at high impedance when the power is on.

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	21 / 27
Document No.		Revision	

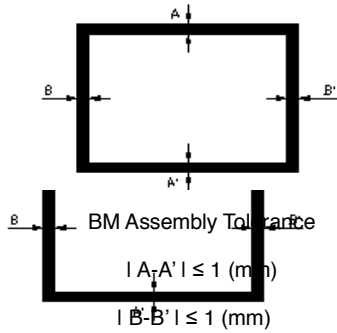
## 7.0 OUTLINE DIMENSION

### 7.1 Front View:

Date: 2005.12.05



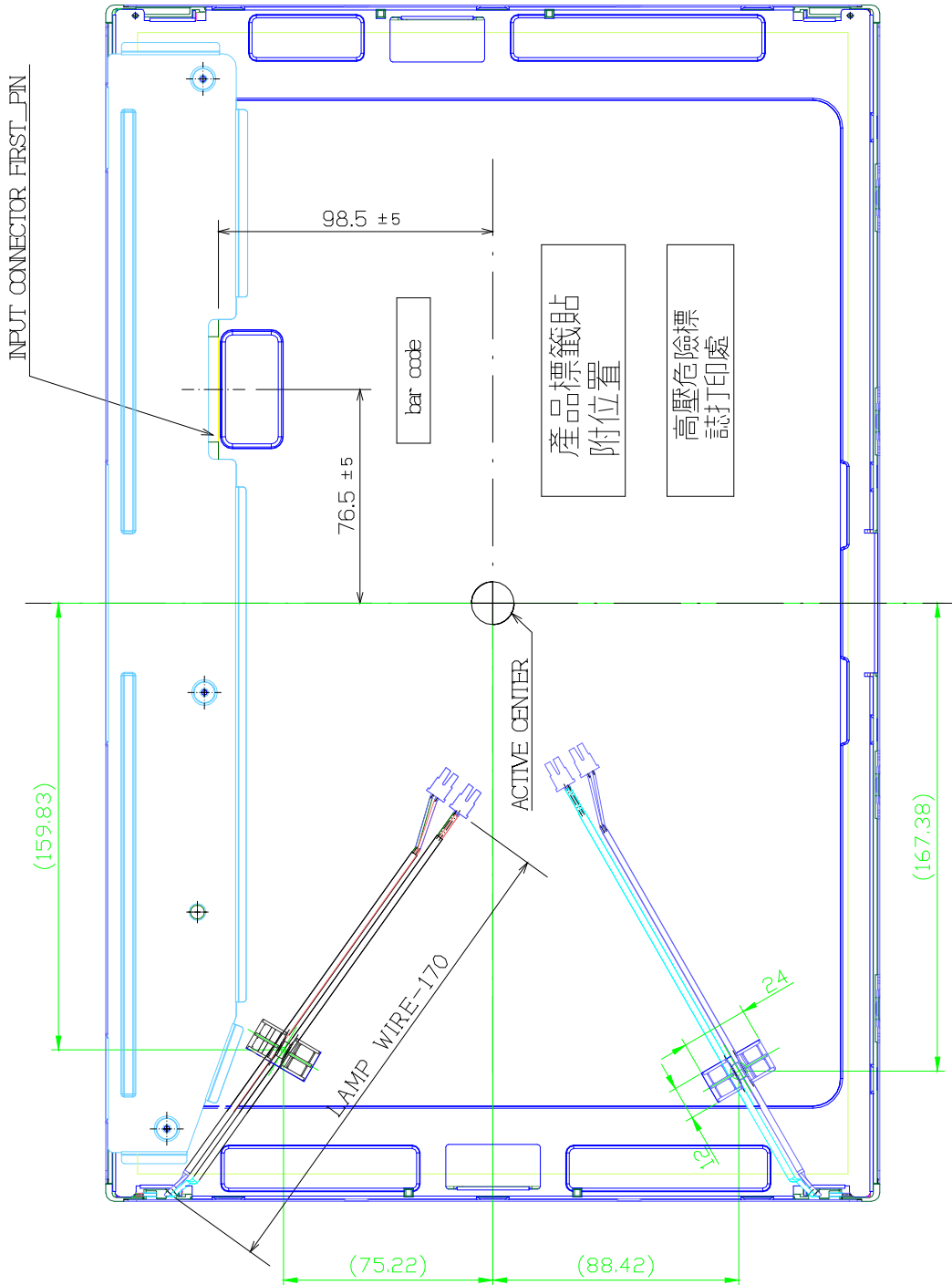
Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	22 / 27
Document No.		Revision	



Document Title	HSD190MGW1- A04 Product Information	Page No.	23 / 27
Document No.		Revision	

7.2 Back View:

Date: 2006.01.26



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	24 / 27
Document No.		Revision	

## 8.0 LOT MARK

### 8.1 Lot Mark

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

code 1,2,3,4,5,6: HannStar internal flow control code.

code 7: production location.

code 8: production year.

code 9: production month.

code 10,11,12,13,14,15: serial number.

#### Note (1) Production Year

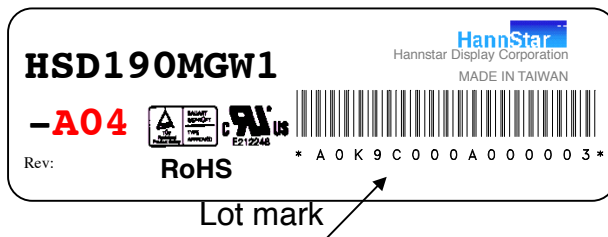
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mark	9	0	1	2	3	4	5	6	7	8

#### Note (2) Production Month

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

### 8.2 Location of Lot Mark

- (1) The label is attached to the backside of the LCD module.
- (2) This is subject to change without prior notice.





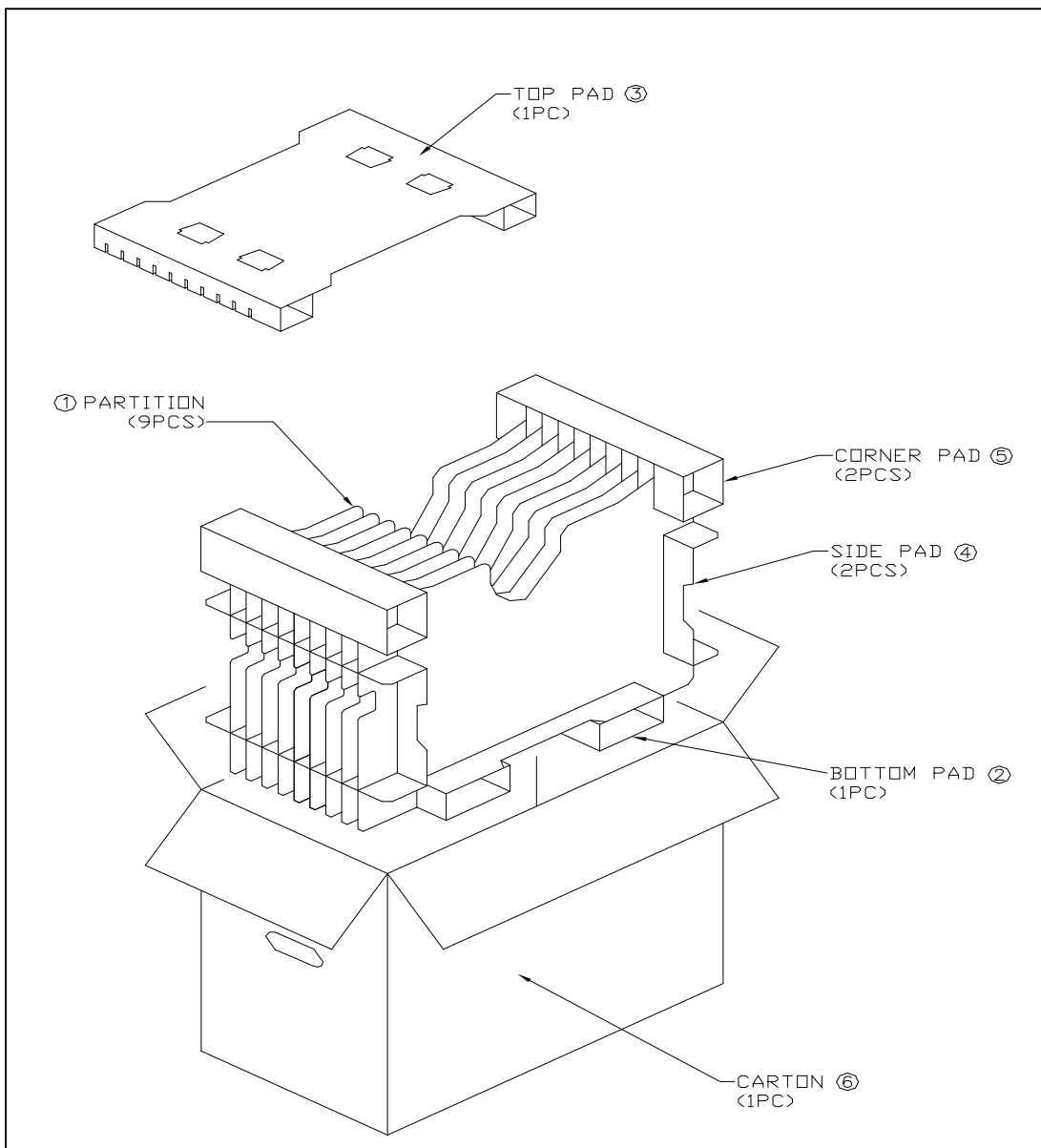
Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	25 / 27
Document No.		Revision	

## 9.0 PACKAGE SPECIFICATION

### 9.1 Packing form

- (1) package quantity in one carton: 8 pieces.
- (2) carton size: 544 mm x 308 mm x<sup>H</sup>406 mm.
- (3) for domestic transportation only.

### 9.2 Packing assembly drawings



Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	26 / 27
Document No.		Revision	

## 10.0 GENERAL PRECAUTION

### 10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

### 10.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

### 10.3 Breakage of LCD Panel

- 10.3.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
- 10.3.2 If liquid crystal contacts mouth or eyes, rinse out with water immediately.
- 10.3.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
- 10.3.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.

### 10.4 Electric Shock

- 10.4.1 Disconnect power supply before handling LCD module.
- 10.4.2 Do not pull or fold the CCFL cable.
- 10.4.3 Do not touch the parts inside LCD modules and the fluorescent lamp's connector or cables in order to prevent electric shock.

### 10.5 Absolute Maximum Ratings and Power Protection Circuit

- 10.5.1 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
- 10.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
- 10.5.3 It's recommended employing protection circuit for power supply.

Document Title	<b>HSD190MGW1- A04</b> Product Information	Page No.	27 / 27
Document No.		Revision	

## 10.6 Operation

- 10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when Persons handle the LCD module for incoming inspection or assembly.
- 10.6.2 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
- 10.6.3 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.
- 10.6.4 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

## 10.7 Mechanism

Please mount LCD module by using mounting holes arranged in four corners tightly.

## 10.8 Static Electricity

- 10.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
- 10.8.2 Because LCD module uses CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.
- 10.8.3 Persons who handle the module should be grounded through adequate methods.

## 10.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

## 10.10 Disposal

When disposing LCD module, obey the local environmental regulations.