TO ：

Date：2009/04/16

Customer Acceptance Specification

Model ： HSD260WX11 -A00

相關文件: IIS DC130-004016

Accepted by:	
Signature	Date
Proposed by: Technical Service Division	
Signature	Date

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.

Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Apr.,16, 2009	A00	Preliminary Product Specification was first issued.

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1.0 GENERAL DESCRIPTIONS

1.1 Introduction

HannStar Display model HSD260WX11-A 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, a driving circuit and a back light system.

This TFT LCD has a 26 inch diagonally measured active display area with WXGA resolution (768 vertical by 1366 horizontal pixel array) and can display up to 16.7 million colors.

1.2 Features

- 26INCH WXGA TFT LCD panel for TV application
- High brightness and wide view angle
- Fast response time & High color reproduction
- LVDS interface system.
- Long lamp lifetime.
- Front & Side Mount compatible
- RoHS Compliance

1.3 Applications

- High Definition TV application
- Public Display

1.4 General information

Item		Specification	Unit
Outline dimension		626.0×373.0×46.5 (typ.)	mm
Display area		575.77(H) x 323.71(V) (26” diagonal)	mm
Number of Pixel		1366(H) x 768(V)	Pixels
Pixel pitch		0.4215(H) x 0.4215(V)	mm
Pixel arrangement		RGB In Plane Switching (IPS) mode	
Display color		16.7 million	colors
Display mode		Normally Black	
Surface treatment		Antiglare, Hard-Coating(3H)	
Weight		6100(typ.)	g
Back-light		16-CCFLs	
Input signal		1-ch LVDS	
Power consumption	Logic system	6.0 (typ)	W
	B/L system(include inverter)	90.0 (typ)	W

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal(H)	625	626	627	mm
	Vertical(V)	372	373	374	mm
	Depth(D)	45.5	46.5	47.5	mm
Weight		--	6100	6405	g
Torque of customer screw hole		--	--	3.0	Kgf*Cm

Front Mount: Not Suggest.

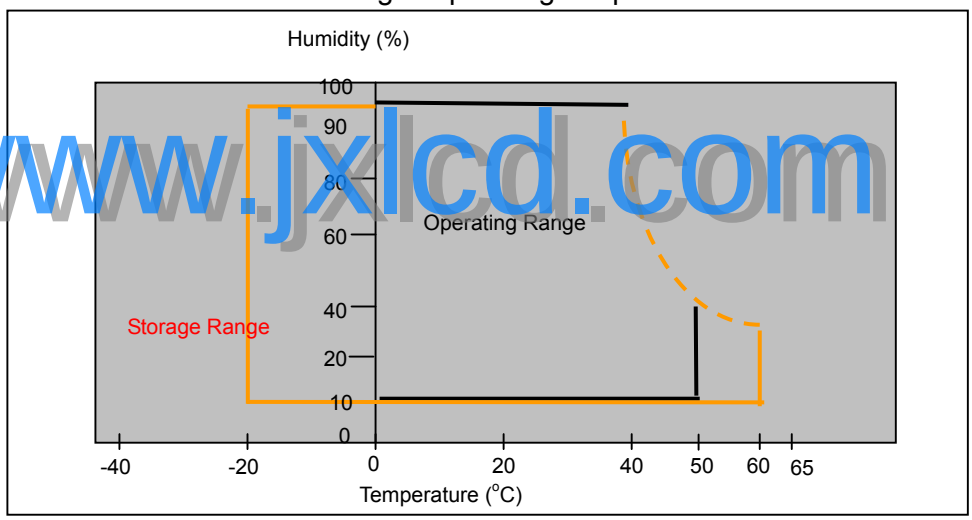
2.0ABSOLUTE MAXIMUM RATINGS

2.1 Absolute Rating of Environment

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T_{STG}	-20	60	°C	(1)
Operating temperature	T_{OPR}	0	50	°C	(1)
Vibration(non-operating)	V_{NOP}	--	1.5	G	(2)
Shock(non-operating)	S_{NOP}	--	50	G	(3)
Storage humidity	H_{STG}	10	90	%RH	(4)
Operating humidity	H_{OP}	10	80	%RH	(4)
Low pressure(operating)	P_{LOP}	697	--	HPa	(5)
Low pressure(non-operating)	P_{LNOP}	116	--	HPa	(6)

Note (1) Temperature and Humidity should be applied to the glass surface of a TFT module, not to the system installed with a module.

Storage /Operating temperature



(2)10-500Hz,Random, 30min/cycle, X/Y/Z each one cycle except for resonant frequency.

(3) 11ms, ±X, ±Y, ±Z direction, one time each.

(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	V_{DD}	-0.3	+6.0	V	(1)(2)

2.2.2 Inverter Unit:

Item	Symbol	Min.	Max.	Unit	Note
Power supply Voltage / Inverter	Vin	0	28.0	V	(1)(2)
B/L On/Off Control Input Voltage	ON/OFF	-0.3	5.0	V	(1)(2)
Brightness Control Input Voltage	V_{BRT}	0	3.3	V	(1)(2)

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) Within Ta=25±2°C

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	Θ=0° ϕ=0° Normal viewing angle	420	600	--		(1)(2)
Response time		Tr		--	9	16	msec	(1)(3) black to white + white to black
		Tf		--	7	14		
White luminance (center of screen)		Y_L		400	500		cd/m^2	(1)(4)(5)
Color chromatically (CIE1931)	Red	Rx		0.605	0.635	0.665		(1)(4)
		Ry		0.292	0.322	0.352		
	Green	Gx		0.246	0.276	0.306		
		Gy		0.580	0.610	0.640		
	Blue	Bx		0.113	0.143	0.173		
		By		0.038	0.068	0.098		
	White	Wx		0.247	0.277	0.307		
		Wy		0.248	0.278	0.308		
Viewing angle	Hor.	Θ_L	CR>30	85	88	--		
		Θ_R		85	88	--		
	Ver.	Θ_H		85	88	--		
		Θ_L		85	88	--		
Brightness uniformity		B_{UNI}	Θ=0° ϕ=0°	--	--	25	%	(6)

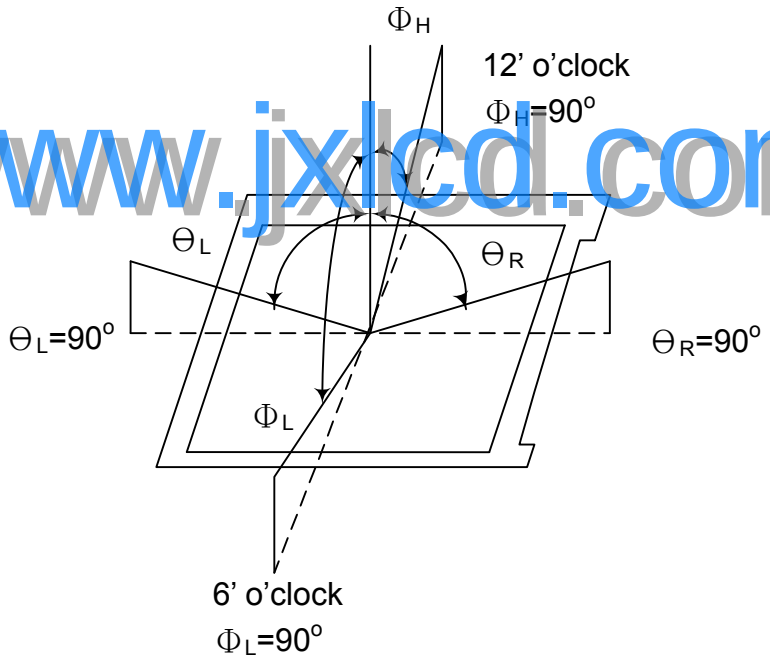
3.2 Measuring Condition

- Measuring surrounding : dark room
- Inverter Model : PLCD09261603(E-Max)
- V_{DD1}=5V, f_V=60Hz, f_{DCLK}=70MHz
- Surrounding temperature : 25±2°C
- 90min. Warm-up time.(Vertically Set)

3.3 Measuring Equipment

- FPM-520 with BM-5A of wastar Electric Corp., BM-5A for optical characteristics.
- Measuring spot size : 10 ~ 12 mm

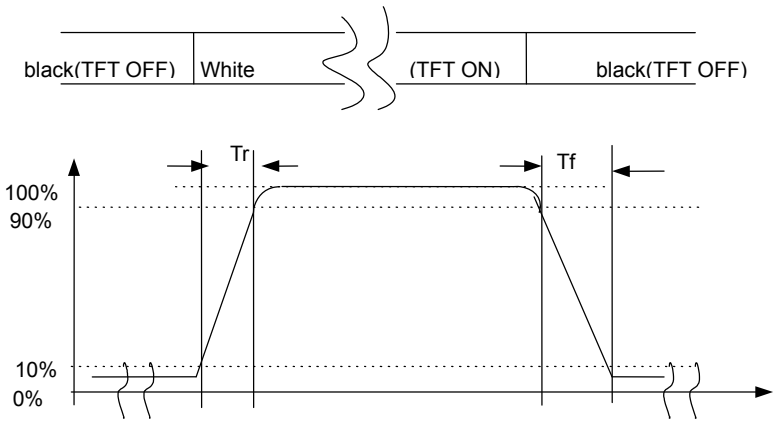
Note (1) Definition of Viewing Angle:



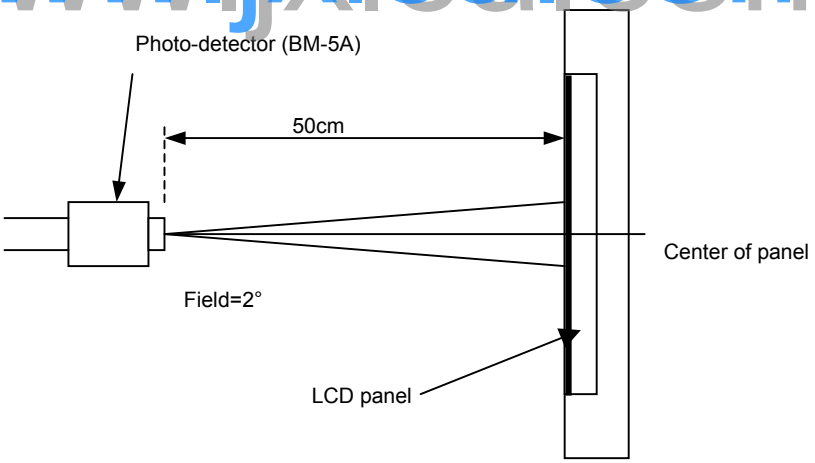
Note (2) Definition of Contrast Ratio (CR) :
Measured at the center point of panel

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

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

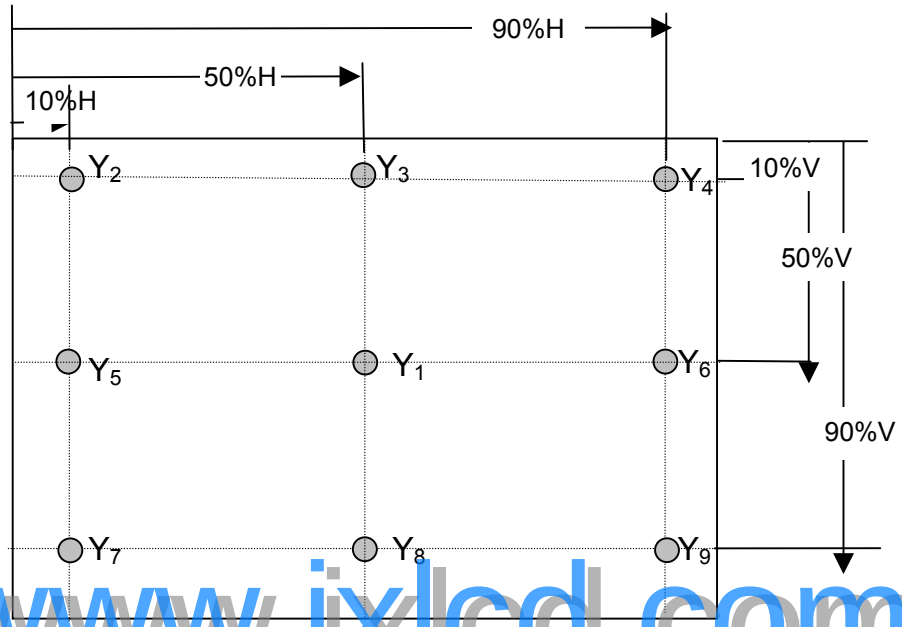


Note (4) Optical characteristic measurement setup



Note (5) Definition of Average Luminance of White (center)

Average Luminance = Y_1



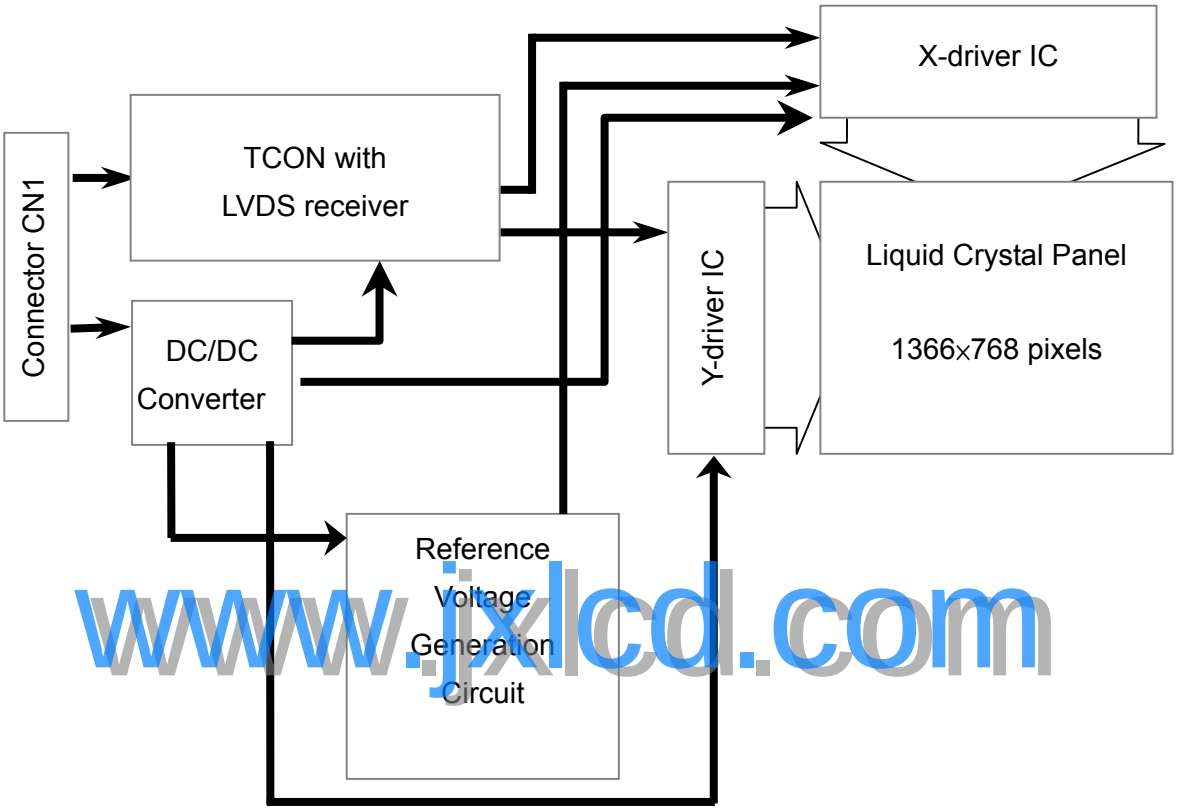
Note (6) Definition of brightness uniformity (9pt)

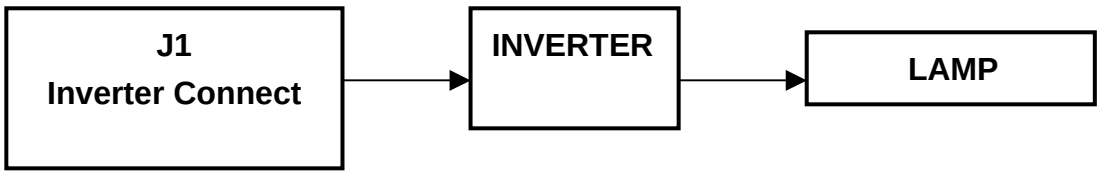
Luminance uniformity =

$$\frac{|(\text{Max Luminance of Y1~Y9 points or Min Luminance of Y1~Y9 points})-(\text{Average Luminance of Y1~Y9 points})|}{(\text{Average Luminance of Y1~Y9 points})} * 100\%$$

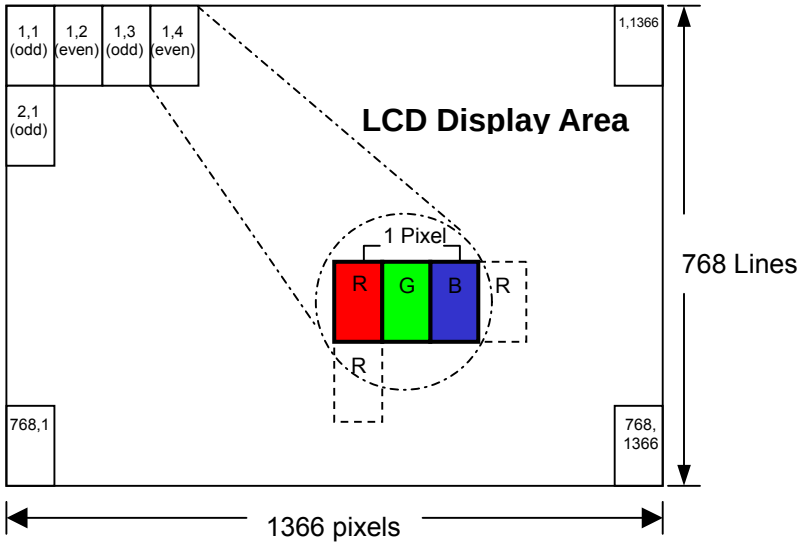
4.0 BLOCK DIAGRAM

4.1 LCD Module Block Diagram:





4.2 Pixel Format



4.3 Relationship between Displayed Color and Input

	Display	MSB R7	R6	R5	R4	R3	R2	R1	LSB R0	MSB G7	G6	G5	G4	G3	G2	G1	LSB G0	MSB B7	B6	B5	B4	B3	B2	B1	LSB B0	Gray scale Level
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
	Light	H	H	H	H	H	L	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L252
		H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L253
		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L254
	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	L	H	L	L	L	L	L	L	L	L	L1
	↑	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L2
	↓	:								:								:								L3···L251
	Light	L	L	L	L	L	L	L	L	H	H	H	H	H	L	H	H	L	L	L	L	L	L	L	L	L252
		L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L253
		L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L254
	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	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	L	L	H	L1
	↑	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
	↓	:								:								:								L3···L251
	Light	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	H	H	L252
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	H	L253
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	L	L254
	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	L	H	L	L	L	L	L	L	L	H	L1
	↑	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L2
	↓	:								:								:								L3···L251
	Light	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	L252
		H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	L253
		H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	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	H	White L255

5.0 I/O CONNECTION PIN ASSIGNMENT

5.1 Interface Connector (30-pins x 1)

CN1(INPUT SIGNAL) : JAE FI-E30S or equivalent
mating connector: JAE FI-X30C2L

Pin No.	Symbol	Description
1	NC	
2	NC	
3	NC	
4	GND	GND(0V)
5	INO-	LVDS Data(-)signal
6	INO+	LVDS Data(+)signal
7	GND	GND(0V)
8	IN1-	LVDS Data(-)signal
9	IN1+	LVDS Data(+)signal
10	GND	GND(0V)
11	IN2-	LVDS Data(-)signal
12	IN2+	LVDS Data(+)signal
13	GND	GND(0V)
14	CLK-	LVDS Clock(-)signal
15	CLK+	LVDS Clock(+)signal
16	GND	GND(0V)
17	IN3-	LVDS Data(-)signal
18	IN3+	LVDS Data(+)signal
19	GND	GND(0V)
20	NC	
21	NC	
22	NC	
23	GND	GND(0V)
24	GND	GND(0V)
25	GND	GND(0V)
26	VDD	Power Supply, 5v (typical)
27	VDD	Power Supply, 5v (typical)
28	VDD	Power Supply, 5v (typical)
29	VDD	Power Supply, 5v (typical)
30	VDD	Power Supply, 5v (typical)

Note:. NC pin should be open ,Don't connect it to ground nor to other signal input.

5.2 Inverter Connector Pin Assignment

J1(INPUT SIGNAL) : JST S14B-PH-SM3-TB or equivalent
mating connector: JST PHR14

Pin No.	Symbol	Description
1	Vin	24V Input Voltage
2	Vin	24V Input Voltage
3	Vin	24V Input Voltage
4	Vin	24V Input Voltage
5	Vin	24V Input Voltage
6	GND	
7	GND	
8	GND	
9	GND	
10	GND	
11	NC	Do not connected
12	ON/OFF	Backlight on/off control
13	BRT	Internal PWM control
14	NC	Do not connected

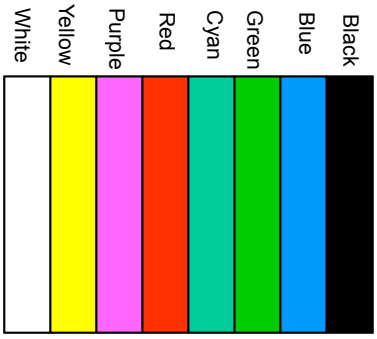
6.1 ELECTRICAL CHARACTERISTICS

6.2 TFT LCD Module:

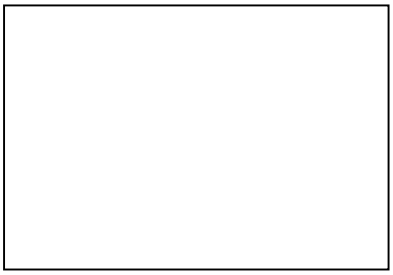
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of power supply		V_{DD}	4.5	5.0	5.5	V	
Current of power supply	Black	I_{DD0}	670	870	1070	mA	(1)(2)
	V-Color	I_{DD1}	950	1150	1350	mA	(1)(2)
	White	I_{DD2}	1070	1270	1470	mA	(1)(2)
Vsync frequency		f_V	50	60	60	Hz	ref 6.5 t1
Hsync frequency		f_H	38.8	47..4	48	kHz	ref 6.5 t4
Frequency		f_{DCLK}	56.65	72..33	79.23	MHz	ref 6.5 t7
Input rush current		I_{RUSH}	---	---	2.0	A	(2)

Note (1) 1). Black Pattern:

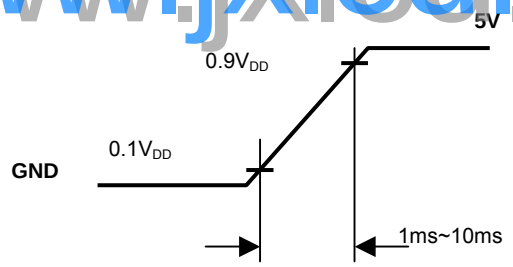
2). V-Color :



3). White Pattern:



Note (2) Input Rush Current condition



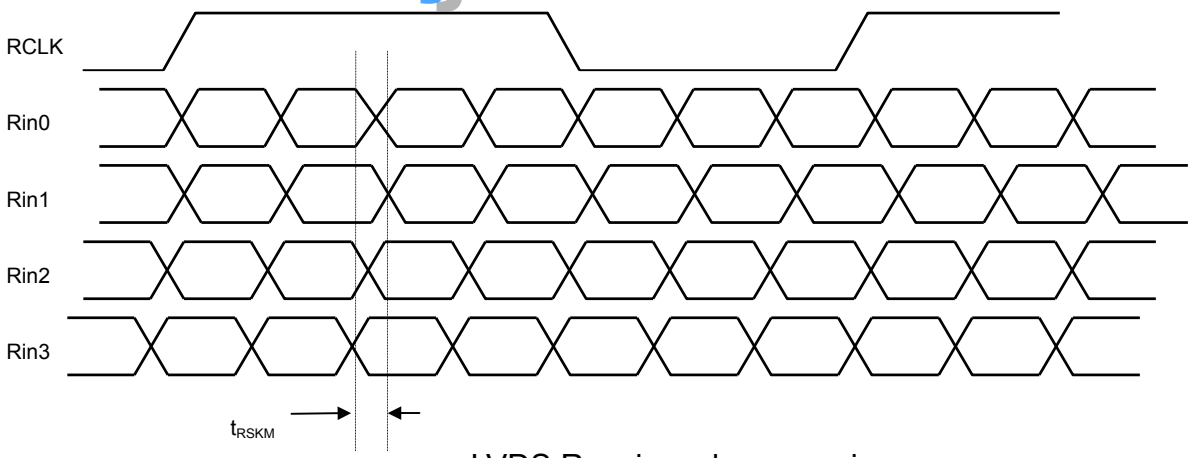
6.2 Inverter Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Voltage of Power Supply	Vin	21.6	24	26.4	V	
B/L ON/OFF Control Input Voltage	ON/OFF	2.5	-	5.0	V	CFL(turn ON)
	ON/OFF	-0.0	-	0.6	V	CFL(turn OFF)
Brightness Control Input Voltage	V_{BRT}	0	--	3.3	V	3.3V : Min. brightness control 0V : Max. brightness control
Input Current of Power Supply	Iin	--	4.0	5.5	A	Vin=24.0V, V_{BRT}=0.0V, stable condition
Lamp Lifetime		50,000	--	--	Hrs	Note(1)

Note(1) Lamp life time (Hr) can be defined as the time in which it continues to operate under the condition : Ta=25±3°C, typical lamp current until the brightness becomes less than 50%.

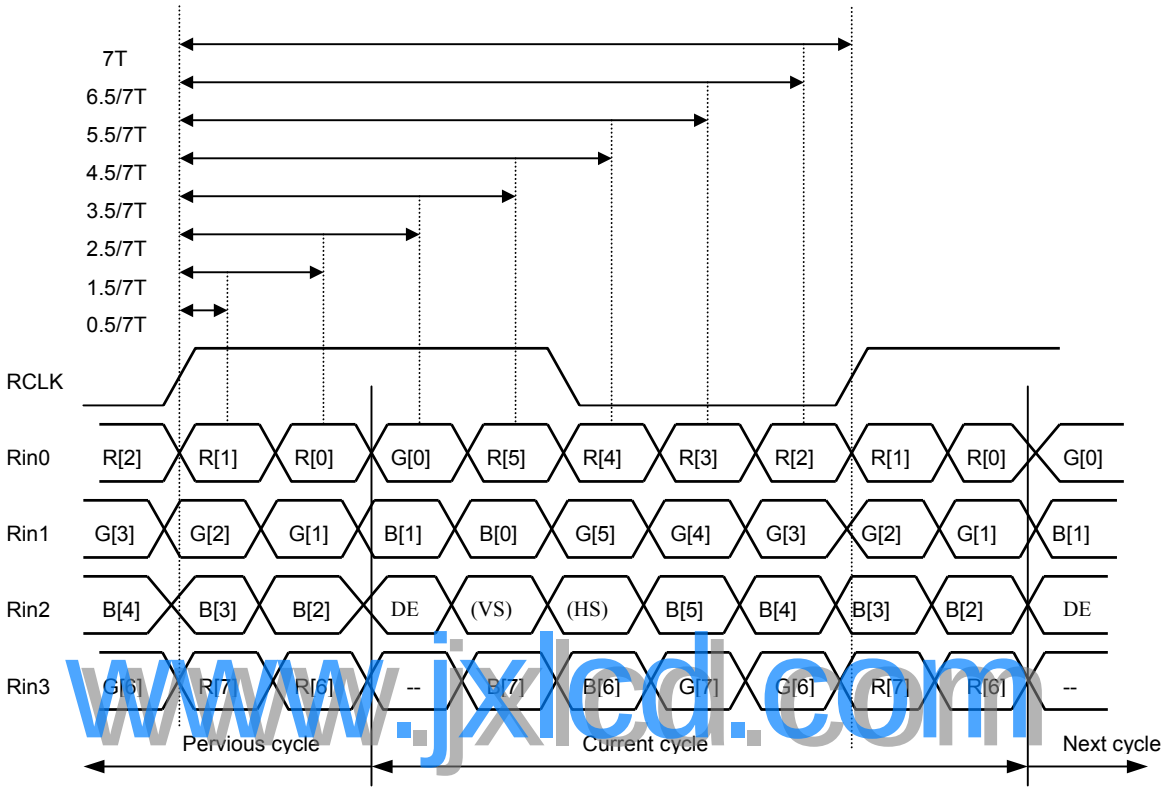
6.3 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	—	—	100	mV	V_{CM}=1.2V
Differential Input Low Threshold	Vtl	-100	—	—	mV	
Input Current	I_{IN}	—	—	±10	uA	V_{IN}=1.78V,V_{DD}=3.6V
		—	—	±10	uA	V_{IN}=0.8V,V_{DD}=3.6V
Input Voltage Range(Signal ended)	V_{IN}	1.1-(|V_{ID}|)/2	—	1.45+(|V_{ID}|)/2	V	
Differential input Voltage	|V_{ID}|	0.1	—	0.6	V	
Common Mode Voltage Offset	V_{CM}	1.1	—	1.45	V	
Clock Frequency	fc	56.65	72.33	79.23	MHz	
LVDS Skew Margin	t_{RSKM}	—	—	400	pS	At fc=72.05MHz
LVDS Input Clock Jitter Tolerance	—	—	—	±2.5	%	center spread



LVDS Receiver skew margin

6.4 Bit Mapping & Interface Definition

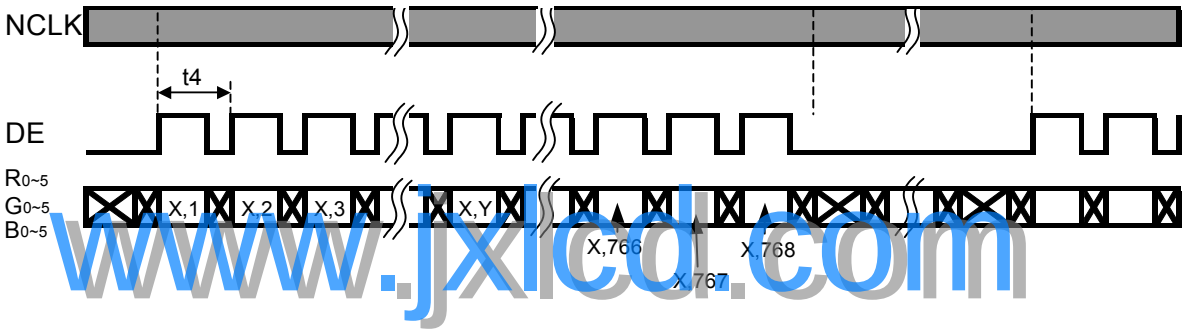


LVDS Input Timing Definition

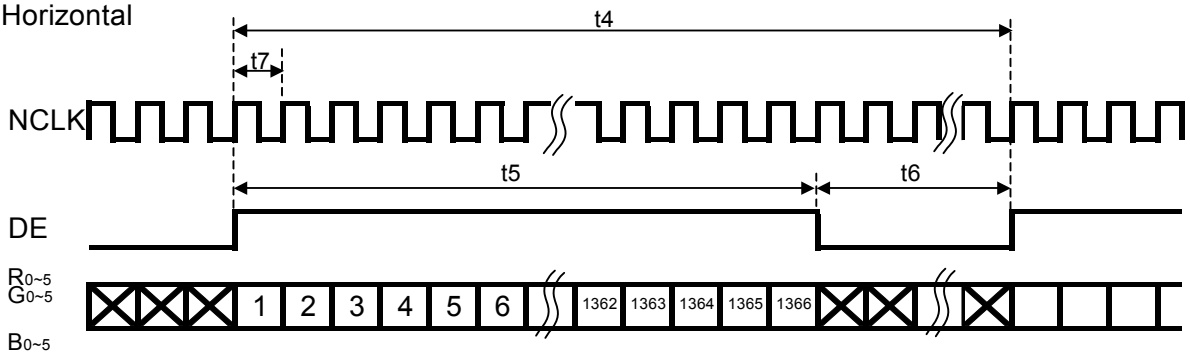
6.5 Interface Timing (DE mode) [1)2)]

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Period	t1	776	790	800	line
Vertical Display Time	t2	—	768	—	line
Vertical Blanking Time	t3	8	22	32	line
1 Line Scanning Time	t4	1460	1526	1650	CLK
Horizontal Display Time	t5	—	1366	—	CLK
Horizontal Blanking Time	t6	94	160	284	CLK
Clock Period	t7(CLK)	12.62	13.83	17.65	ns

Timing Diagram of Interface Signal (DE mode)

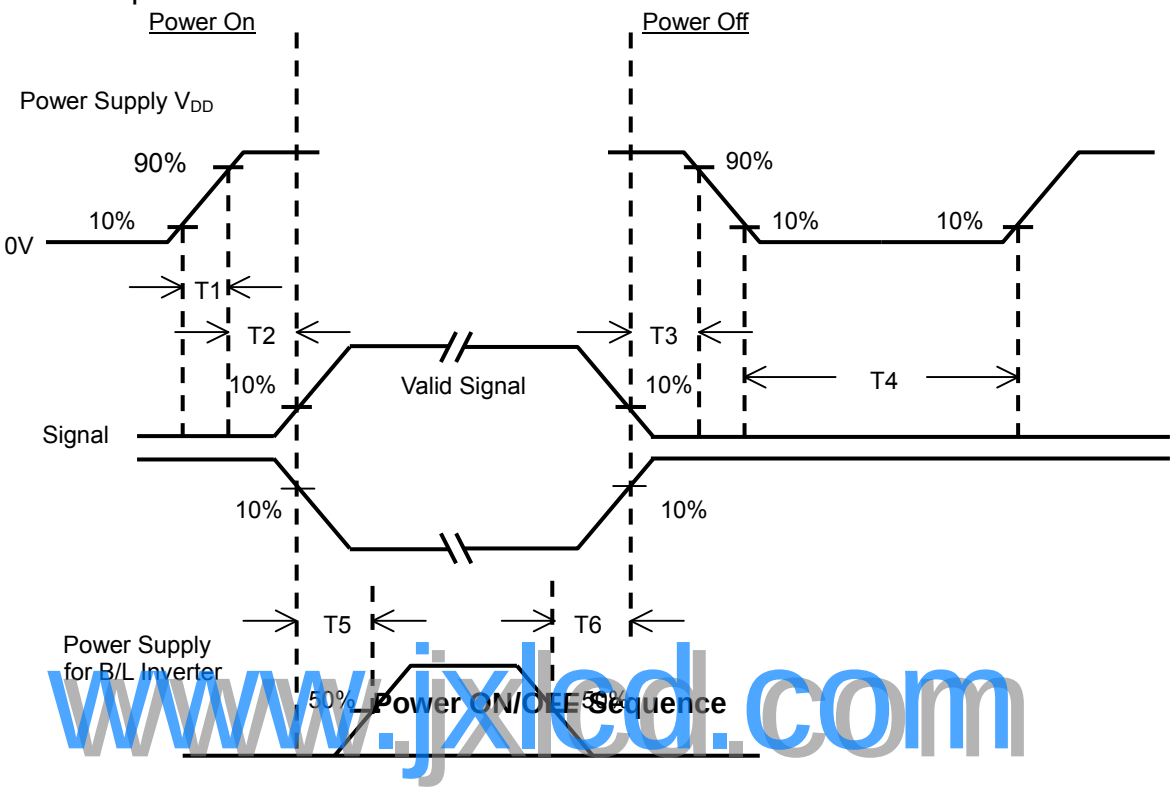


(2)Horizontal



6.6 Power ON/OFF Sequence

6.6.1 Sequence for LCD Module



1msec < T1 ≤ 10 msec

0 < T2 ≤ 50 msec

0 < T3 ≤ 50 msec:

Back-light:

1s ≤ T4

200 msec ≤ T5 (Recommended)

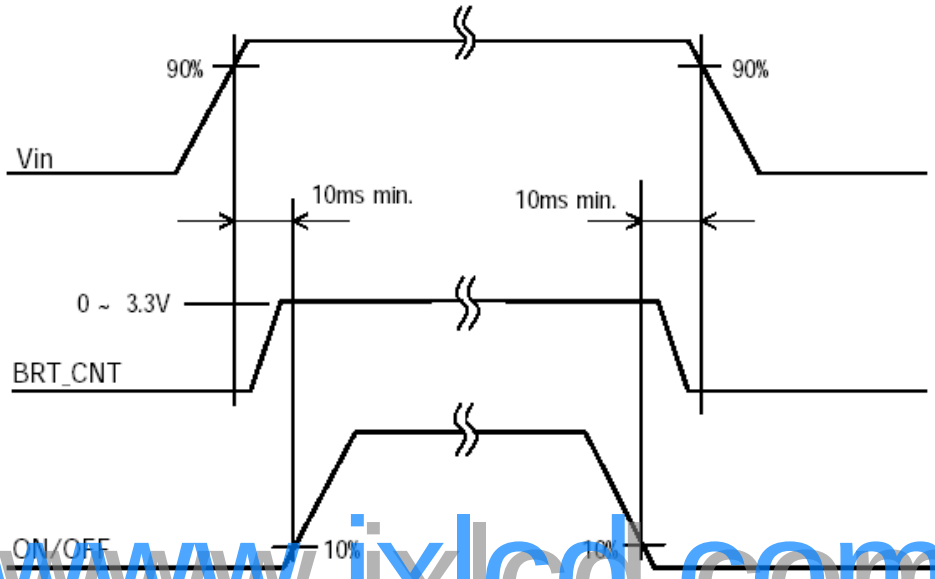
200 msec < T6 (Recommended)

Note (1) Apply the lamp volatge within the LCD operation range. When the back-light turns on before the LCD operation or the LCD truns off before the back-light turns off. the display may momentarily become white.

(2) In case of V_{DD} = off level, please keep the level of input signal on 0 voltage.

(3) T4 should be measured after the module has been fully discharged between power off and on period.

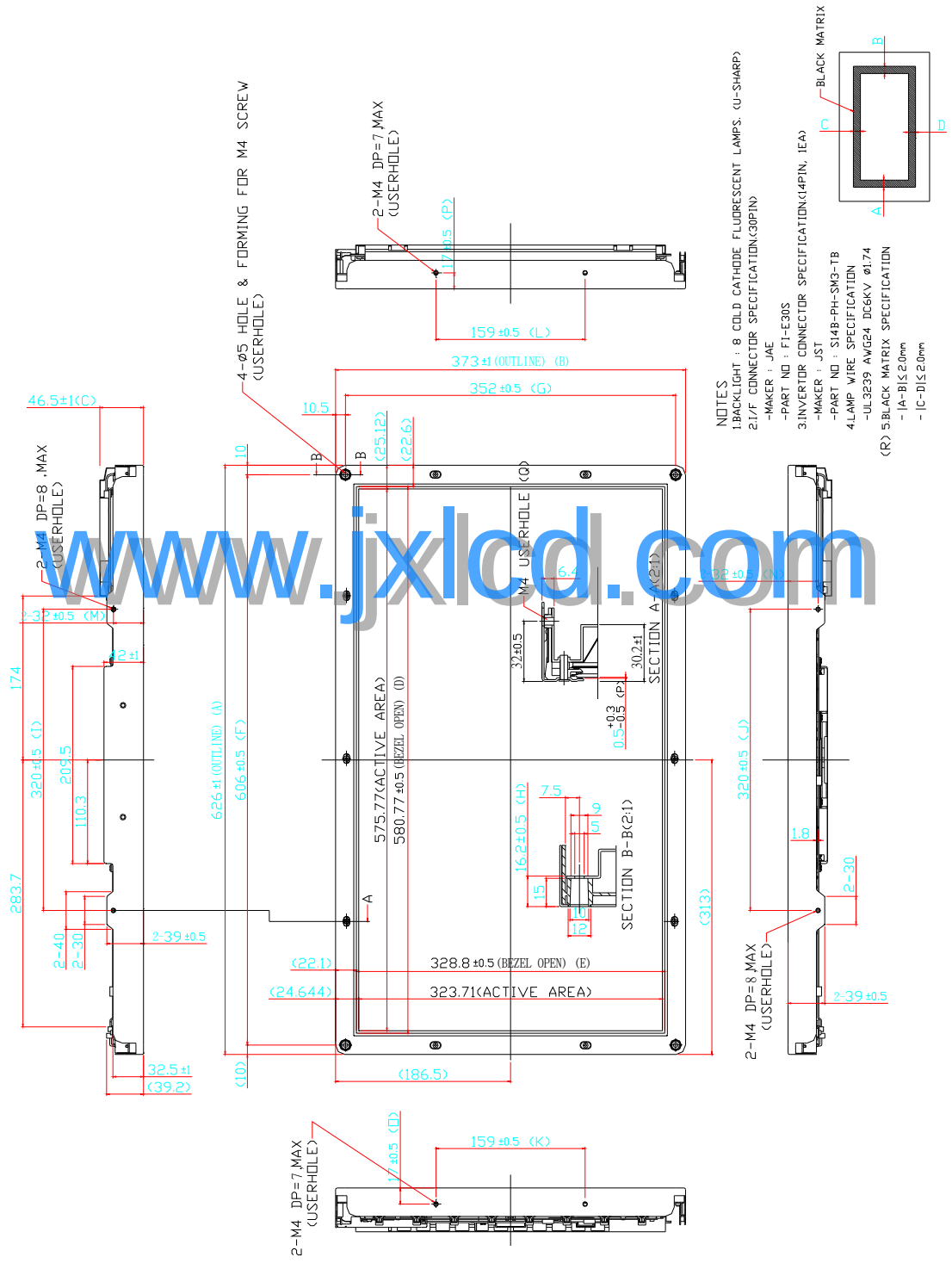
6.6.2 Sequence for Inverter



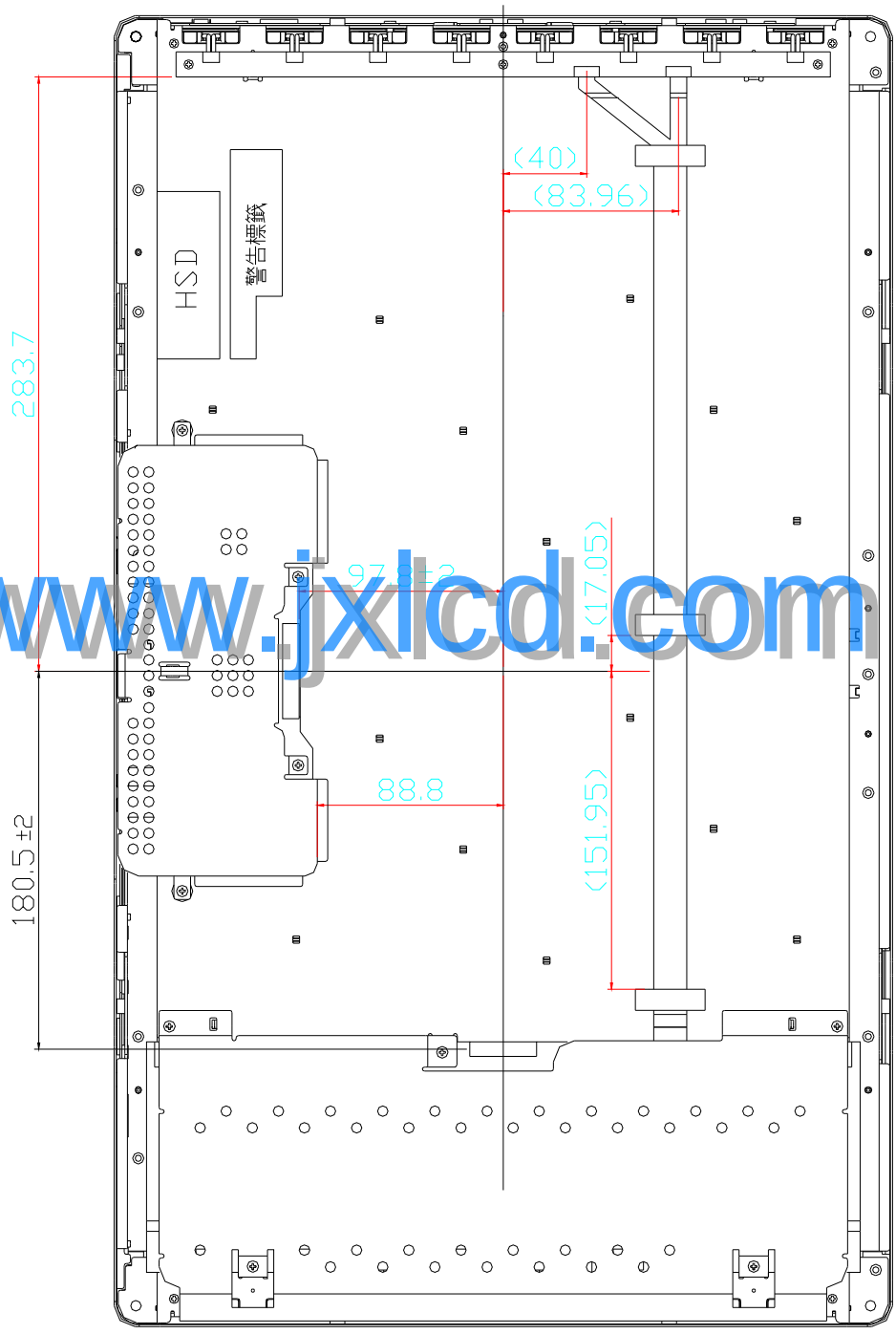
7.0 OUTLINE DIMENSION

Unit : mm

7.1 Front View:



7.2 Back View:



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

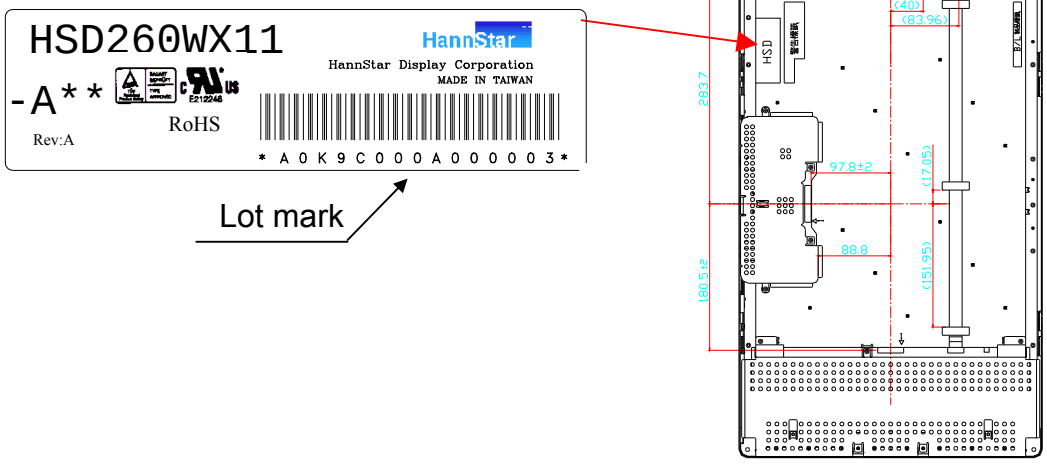
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mark	3	4	5	6	7	8	9	0	1	2

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

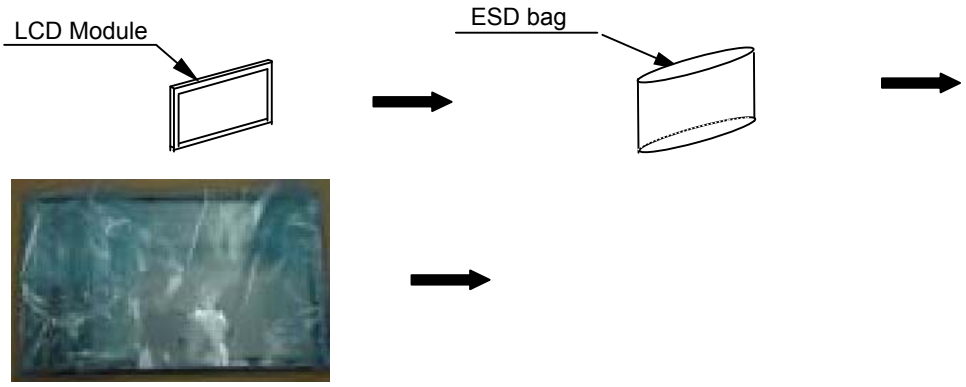
(1) The label is attached to the backside of the LCD module.
(2) This is subject to change without prior notice.



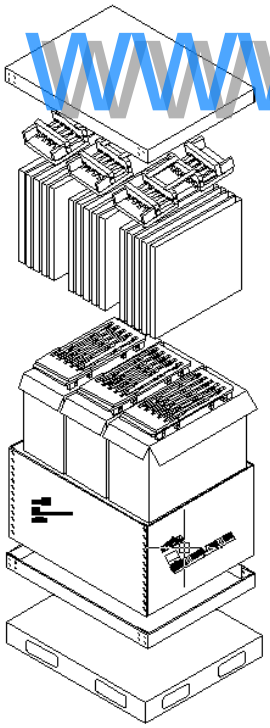
9.0 PACKAGE SPECIFICATION

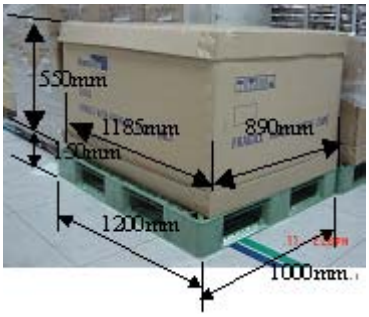
(1) package quantity in one carton:15 pieces

(2)carton size: 1185±10mm×890±10 mm×550±10 mm.



Fold ESD bag





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.

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

10.6.2 Handle the LCD module for incoming inspection or assembly.

10.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

10.6.4 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.

10.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene 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.