HannStar Display Corp.

Document Title	HSD150MX14-A Specification	Page No.	1 / 32
Document No.		Revision	1.0

To :

Date : July. 09, 2007

HannStar Product Specification

Model : HSD150MX14 -A

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

Note : 1. The information contained herein is preliminary and may be changed without prior notices.
2. Please contact HannStar Display Corp. before designing your product based on this module specification.
3. 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	Description of change
1.0	July.09,2007	HSD150MX14-A Specification was first issued.

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1.0 GENERAL DESCRIPTIONS

1.1 Introduction

HannStar Display model HSD150MX14-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 15 inch diagonally measured active display area with XGA resolution (768 vertical by 1024 horizontal pixel array) and can display up to 8bit colors.

1.2 Features

- ■ High brightness with low power consumption
- ■ Wide viewing angle
- ■ Compact and light weight design
- ■ 2 CCFLs(Cold Cathode Fluorescent Lamp)
- ■ Hsync, Vsync and DE mode
- ■ LVDS interface with 1 pixel/clock

1.3 Applications

- ■ Desktop monitors
- ■ Moniputers
- ■ Display terminals for AV applications
- ■ Monitors for industrial applications

1.4 General information

Item	Specification	Unit
Outline dimension	321.0×249.0×11.5	mm
Display area	304.1(H) x 228.1(V)	mm
Number of Pixel	1024(H) x 768(V)	pixels
Pixel pitch	0.297(H) x 0.297(V)	mm
Pixel arrangement	RGB Vertical stripe	
Display color	16 million	colors
Display mode	Normally white	
Surface treatment	Antiglare, Hard-Coating(3H)	
Weight	(975g) Typ.	g
Back-light	2-CCFLs, Top & bottom edge side	
Input signal	1-ch LVDS interface with simulates 8-bit color data. (6-bit + FRC)	
Power consumption	11w(TYP)	W
Optimum viewing direction	6 o'clock	

1.5 Mechanical Information

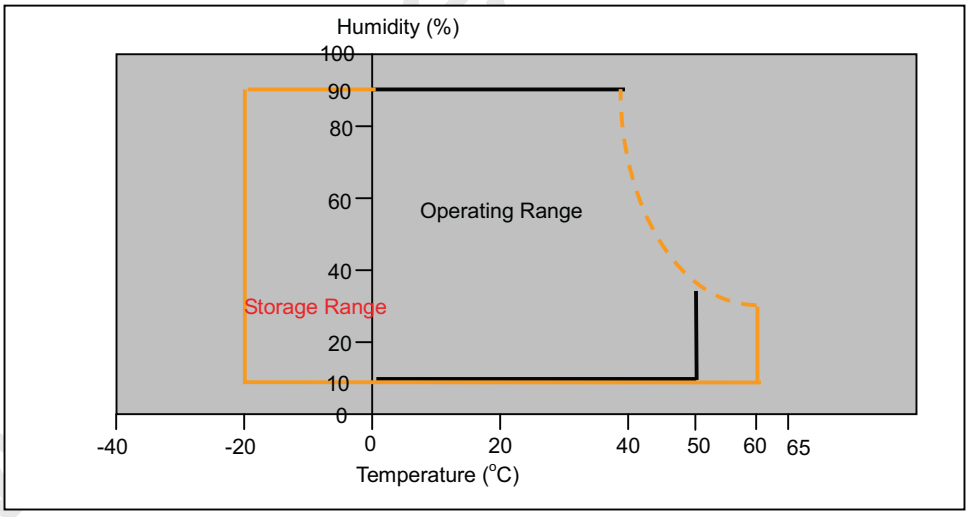
Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal(H)	320.5	321.0	321.5	mm
	Vertical(V)	248.5	249.0	249.5	mm
	Depth(D)	---	(11.5)	(12.0)	mm
Weight (Without inverter)		---	(975)	---	g

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Absolute Rating of Environment

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T_{STG}	-20	60	°C	
Operating temperature	T_{OPR}	0	50	°C	
Vibration(non-operating)	V_{NOP}	--	1.5	G	(1)
Shock(non-operating)	S_{NOP}	--	70	G	(2)
Storage humidity	H_{STG}	10	90	%RH	(3)
Operating humidity	H_{OP}	10	80	%RH	(3)
Low pressure(operating)	P_{LOP}	697	--	HPa	(4)
Low pressure(non-operating)	P_{LNOP}	116	--	HPa	(5)

Note (1) 5-500Hz sine wave, X,Y,Z each directions, 30 min/cycle.
(2) 11ms, ±X, ±Y, ±Z direction, one time each. For this shock test, it is necessary to fill the silicon rubber between the shock jig as buffer.
(3) Max wet bulb temp. =39°C
(4) 2 hrs. (10000 feet)
(5) 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	4.0	V	(1)
Logic input voltage	V_{IN}	-0.3	VDD+.3	V	(1)

2.2.2 Back-Light Unit

Item	Symbol	Min.	Max.	Unit	Note
Lamp voltage	V_L	0	2000	V_{rms}	(1)
Lamp current	I_L	--	(7.0)	mA	(1)
Lamp frequency	f_L	0	100	kHz	(1)

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normally operating conditions.

3.0 OPTICAL CHARACTERISTICS

3.1 Measuring Condition

- Measuring surrounding : dark room
- Lamp current I_{BL} : (6.5)±0.1mA, lamp freq. F_L=52KHz
- V_{DD1}=3.3V, f_V=60Hz, f_{DCLK}=65MHz
- Surrounding temperature : 25±2°C
- 30min. Warm-up time.

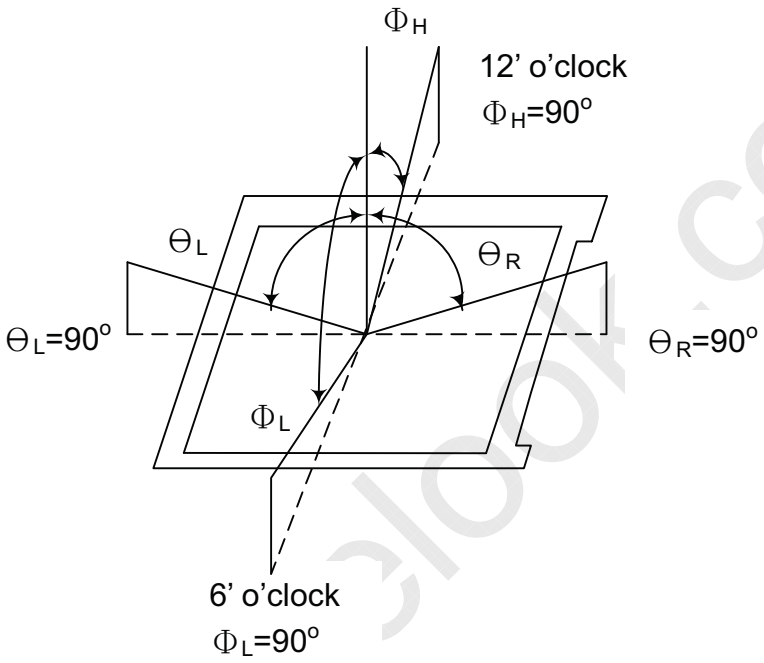
3.2 Measuring Equipment

- MD-3000V of Otsuka Electric Corp., which utilized MCPD-7000 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size : 10~12mm

3.3 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	Θ=0° ϕ=0° Normal viewing angle	300	400	--		(1)(2)
Response time	Rising	T_R		--	TR +TF = 35	--	msec	(1)(3)
	Falling	T_F		--		--		
White luminance (center of screen)		Y_L		--	(200)		cd/m^2	6.5mA
Color chromaticity (CIE1931)	Red	Rx		(0.596)	(0.626)	(0.656)		(1)(4)
		Ry		(0.308)	(0.338)	(0.368)		
	Green	Gx		(0.267)	(0.297)	(0.327)		
		Gy		(0.565)	(0.595)	(0.625)		
	Blue	Bx		(0.119)	(0.149)	(0.179)		
		By		(0.087)	(0.117)	(0.147)		
	White	Wx		(0.285)	(0.315)	(0.345)		
		Wy		(0.304)	(0.334)	(0.364)		
Viewing angle	Hor.	Θ_L	CR>10	--	60	--		
		Θ_R		--	60	--		
	Ver.	Θ_H		--	40	--		
		Θ_L		--	50	--		
Brightness uniformity		B_{UNI}	Θ=0°	75	80	--	%	(5)
Cross talk		CT(n)	ϕ=0°	--	--	1.3		(6)

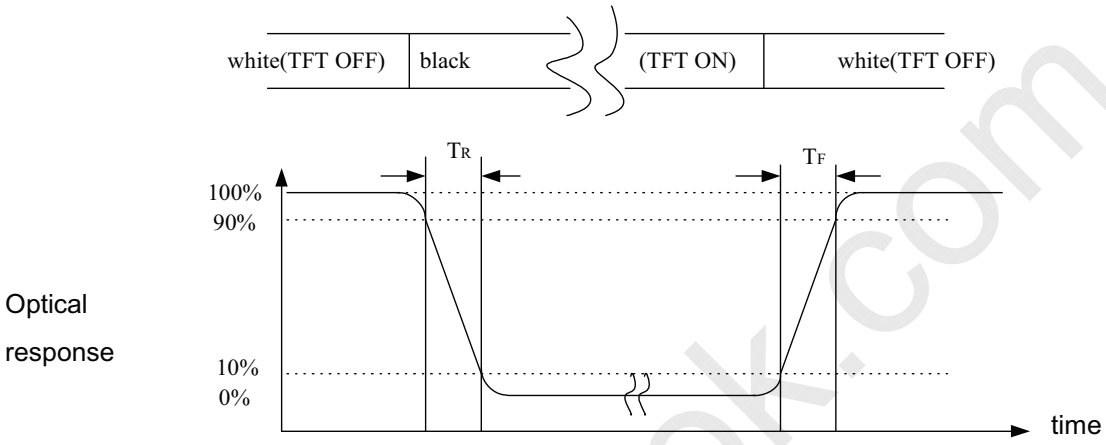
Note (1) Definition of Viewing Angle:



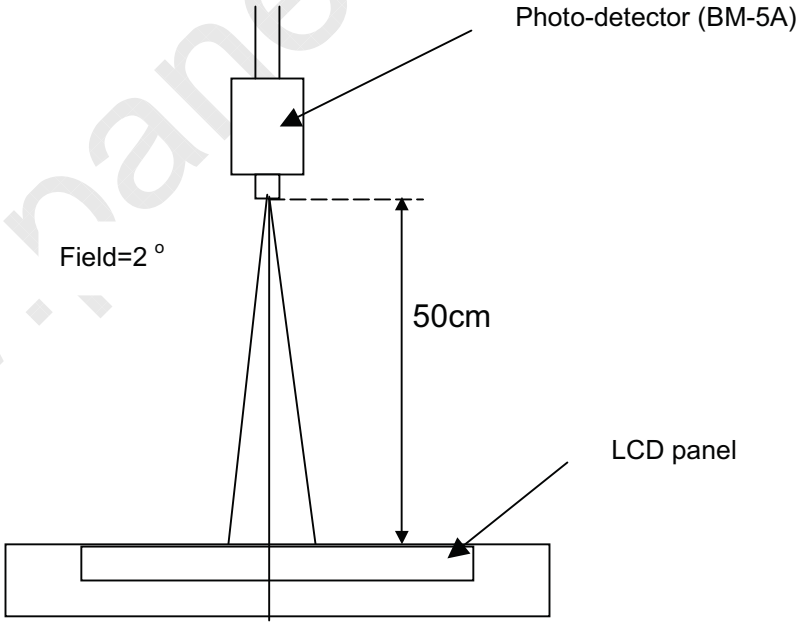
Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

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

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

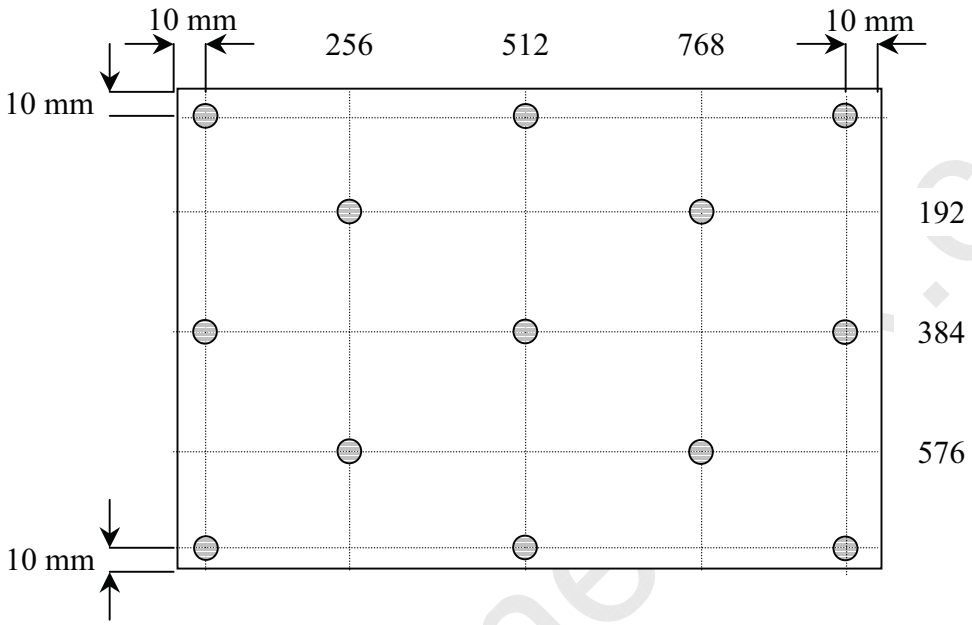


Note (4) Optical characteristic measurement setup



Note (5) Definition of brightness uniformity

Luminance uniformity =(Min Luminance)/(Max Luminance) x 100%



Note (6) Definition of crosstalk CT (1) ~ CT (4)

$$CT(n) = \frac{|L(n) - LB(n)|}{L(n)} \times 100\% \text{ , } n = 1 \sim 4$$

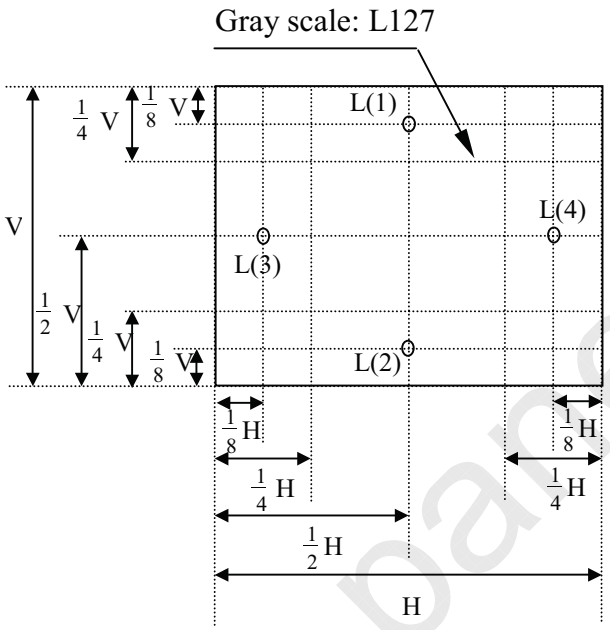
Where L(n) = Luminance of point "n" at pattern A (cd/m^2) , n=1～4

LB(n) = Luminance of point "n" at pattern B (cd/m^2) , n=1～4

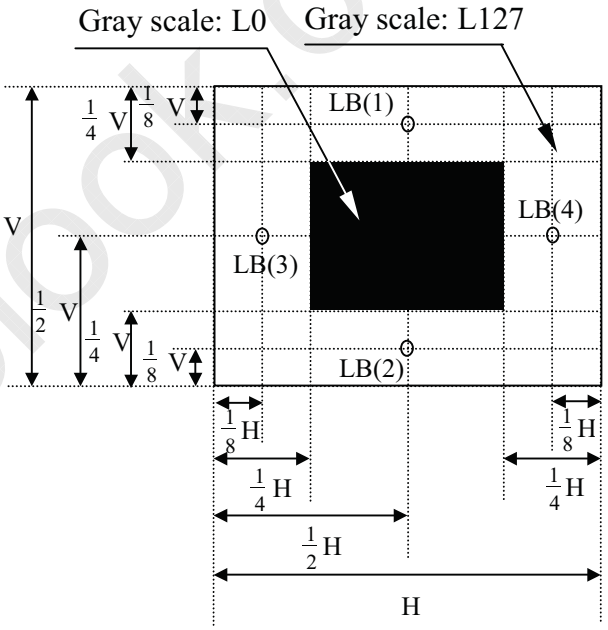
The location measured will be exactly the same in both patterns.

L0: Luminance with all pixels black

L255: Luminance with all pixels white



Pattern A



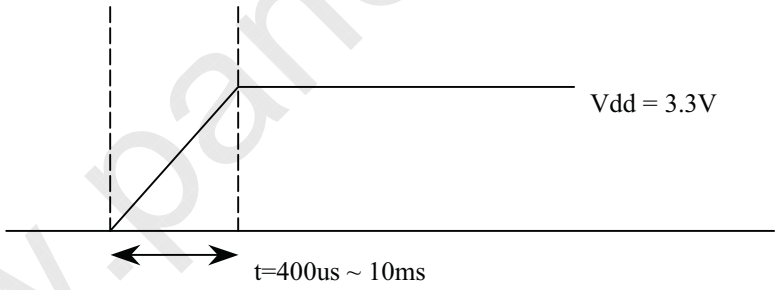
Pattern B

4.0 ELECTRICAL CHARACTERISTICS

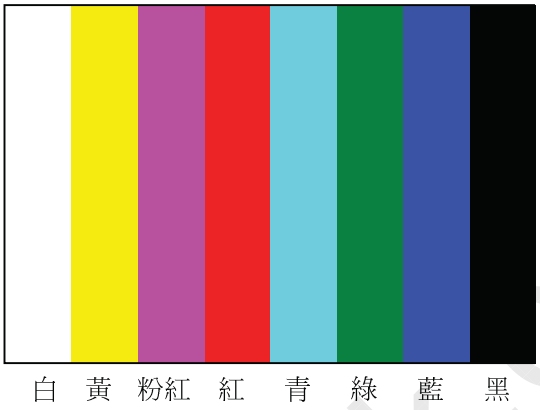
4.1 TFT LCD Module

Item	Symbol	Condition	Value			Unit	Note
			Min.	Typ.	Max.		
Voltage of power supply	V_{DD}		3.0	3.3	3.6	V	
Input Rush Current	Irush	Vdd=+3.3V Each Iout=max			1.5	A	(1)
Differential Signal Input voltage	V_{IH}	High Level	--	--	100	mV	V_{com}=1.2v
	V_{IL}	Low Level	-100	--	--	mV	V_{com}=1.2v
Current of power supply	I_{DD1}	Color Bar	(404)	(504)	(604)	mA(rms)	(2)
	I_{DD2}	Mosaic	(509)	(609)	(709)	mA(rms)	(3)
Vsync frequency	f_V		--	60.00	75.00	Hz	(4)
Hsync frequency	f_H		--	48.35	60.00	KHz	
Main frequency	f_{DCLK}		--	32.50	39.37	MHz	

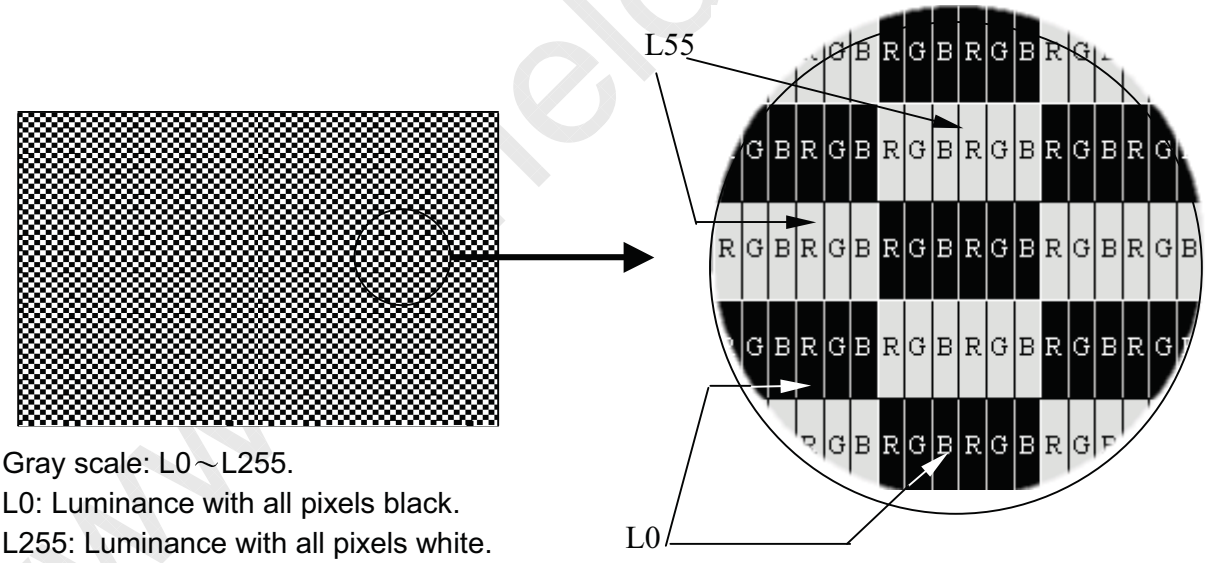
Note (1) Inrush current conditions



Note (2) Color Bar



Note (3) Mosaic : Dot checker image



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

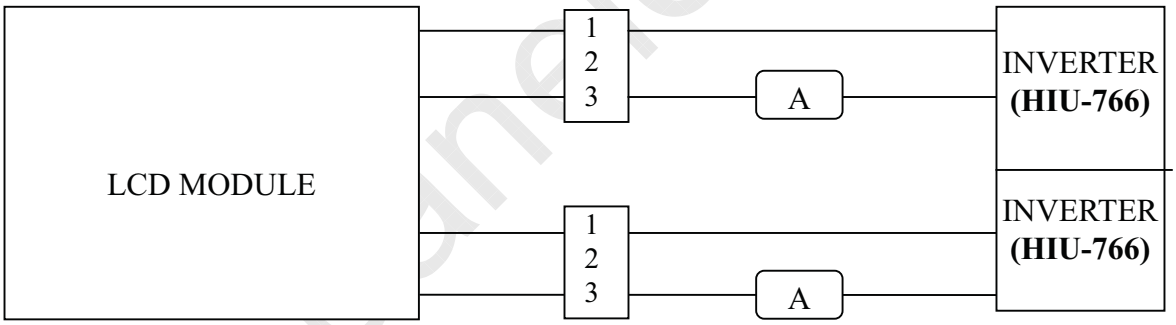
Note (4) When f_v is too low, a flicker may be occurred on the display.

4.2 Back-Light Unit:

The backlight system is an edge-lighting type with 2-CCFL (Cold Cathode Fluorescent Lamp). The characteristics of two lamps are shown in the following tables.

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp current	I_L	3.0	(6.5)	(7.0)	mA(rms)	(1)
Lamp voltage	V_L	--	727	--	V(rms)	I_L=6.5 mA
Frequency	f_L	50	55	80	KHz	(2)
Operating lamp life time	Hr	30,000	—	—	Hour	(3)
Startup voltage	Vs	1300	—	—	V(rms)	at 25°C
		1350				at 0°C

Note: (1) Lamp current is measured with current meter for high frequency as shown below. Specified values are for a lamp.



(2) Lamp frequency may produce interference with horizontal synchronous frequency and this may cause line flow on the display. Therefore lamp frequency shall be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.

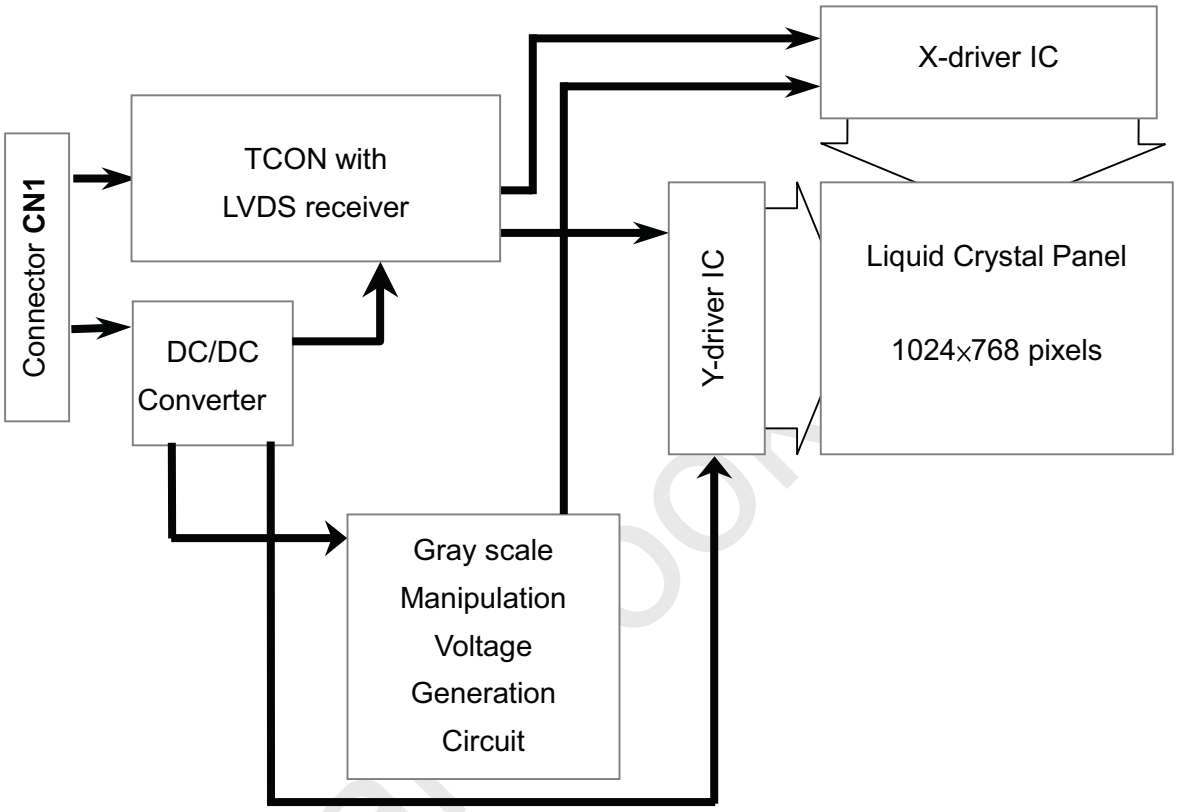
(3) Life time (Hr) can be defined as the time in which it continues to operate under the condition: Temp. =25±3ºC, I_L=6mA(rms.) and f_L=52 KHz until one of the following event occurs:

1.When the brightness becomes 50%.

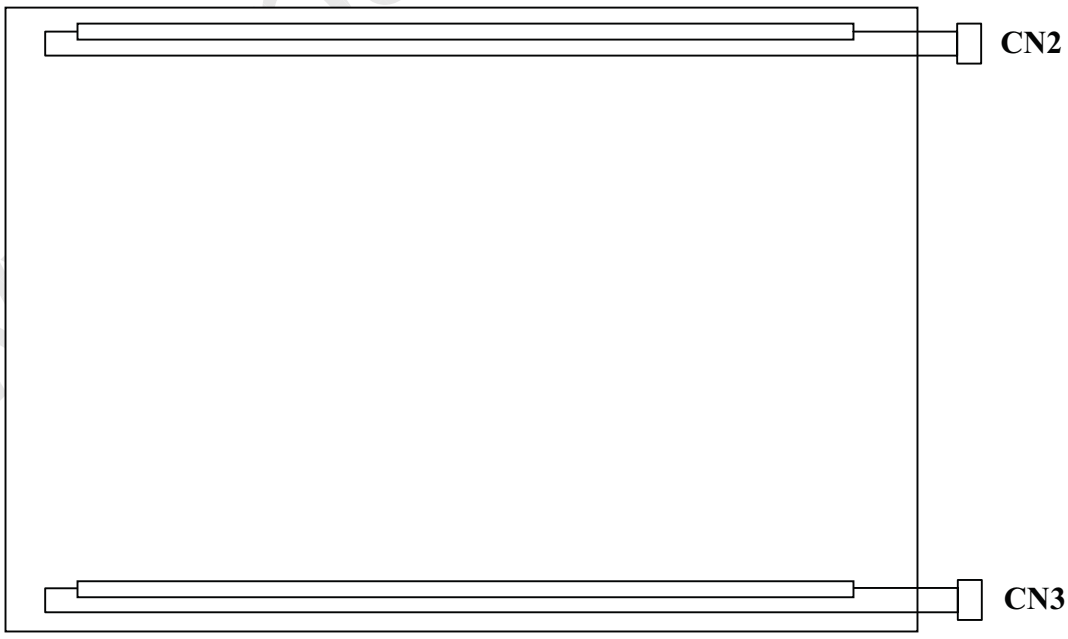
2.When the startup voltage (Vs) at 0ºC becomes higher than the maximal value of Vs specified above.

5.0 BLOCK DIAGRAM

5.1 TFT LCD Module



5.2 Back Light Unit (CCFL):



6.0 INTERFACE PIN CONNECTION

6.1 TFT LCD Module

CN1[1)2)3)] INPUT SIGNAL LVDS, Connector : Hirose DF14A-20P-1.25H[1) 2) 3)]

MATING CONNECTOR: Hirose DF14-20S-1.25C

PIN NO	SYMBOL	FUNCTION	POLARITY	Output Pin# (LVDS Tx)
1	VDD	Power Supply +3.3V		
2	VDD	Power Supply +3.3V		
3	GND	Power Ground		
4	GND	Power Ground		
5	RXIN0-	LVDS Receiver Signal(-)	Negative	PIN#48
6	RXIN0+	LVDS Receiver Signal(+)	Positive	PIN#47
7	GND	Ground	—	
8	RXIN1-	LVDS Receiver Signal(-)	Negative	PIN#46
9	RXIN1+	LVDS Receiver Signal(+)	Positive	PIN#45
10	GND	Ground	—	
11	RXIN2-	LVDS Receiver Signal(-)	Negative	PIN#42
12	RXIN2+	LVDS Receiver Signal(+)	Positive	PIN#41
13	GND	Ground	—	
14	RXCLK IN-	LVDS Receiver Clock Signal(-)	Negative	PIN#40
15	RXCLK IN+	LVDS Receiver Clock Signal(+)	Positive	PIN#39
16	GND	Ground	—	
17	RXIN3-	LVDS Receiver Signal(-)	Negative	PIN#38
18	RXIN3+	LVDS Receiver Signal(+)	Positive	PIN#37
19	GND	Ground	—	
20	NC	Reserved	—	

1) Please connect NC pin to nothing. Don't connect it to ground nor to other signal input. (NC pin should be open.)

2) Please connect GND pin to ground. Don't use it as no-connect nor connect with high impedance.

3) 16 million colors are displayed by the combinations of 24 bits data.

6.2 Back-Light Unit

CN2[1)] CCFL Power Source (BHR-03VS-1/Japan Solderless Terminal MFG Co., LTD)
Mating Connector : SM02 (8.0) B-BHS/Japan Solderless Terminal MFG Co., LTD)

Terminal no.	Symbol	Function
1	VL1	CCFL power supply (high voltage)
2	NC[1)]	
3	GL1	CCFL power supply (low voltage)

CN3[1)] CCFL Power Source (BHR-03VS-1/Japan Solderless Terminal MFG Co., LTD)
Mating Connector : SM02 (8.0) B-BHS/Japan Solderless Terminal MFG Co., LTD)

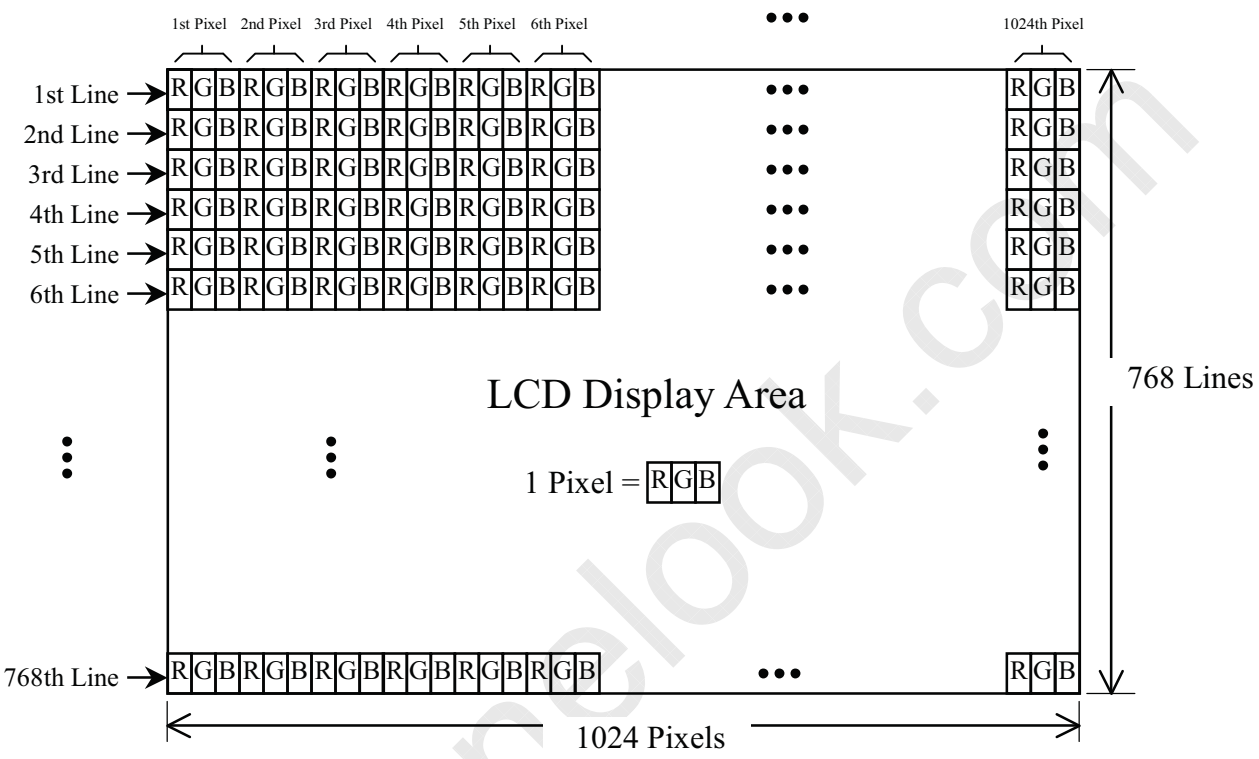
Terminal no.	Symbol	Function
1	VL2	CCFL power supply (high voltage)
2	NC[1)]	
3	GL2	CCFL power supply (low voltage)

Note 1) Please connects NC pin to nothing. Don't connect it to ground nor to other signal Input. (NC pin should be open.)

6.3 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

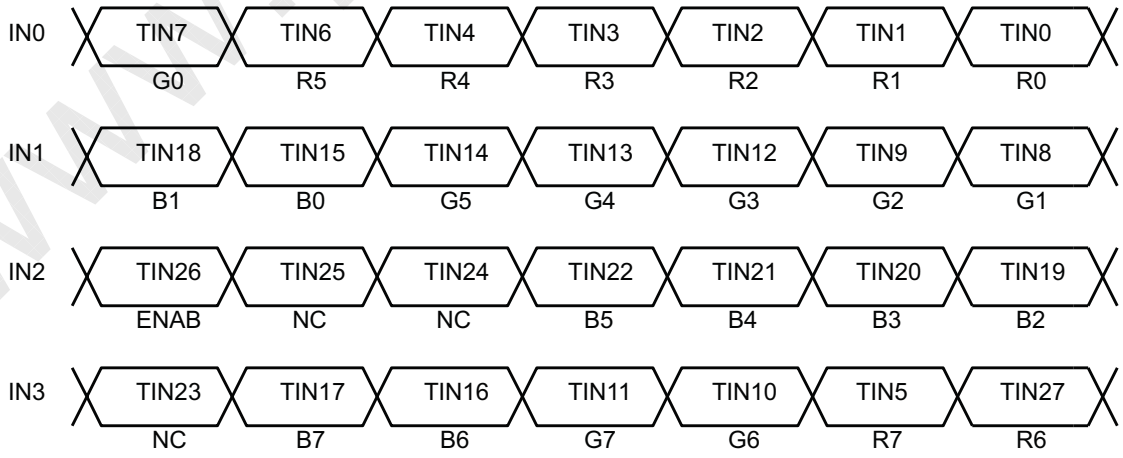
6.4 Pixel Format



6.5 RECOMMENDED TRANSMITTER TO HSD150MX14-A INTERFACE ASSIGNMENT

DATA (8bit transmitter)

DS90CF383					DF14A-20P-1.25H Interface (CN1)	
Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol		
Symbol	Terminal	Symbol	Function		Terminal	Symbol
TIN0	51	R0	Red Pixels Display Data (LSB)	TOUT0- TOUT0+	No.5 No.6	IN0- IN0+
TIN1	52	R1	Red Pixels Display Data			
TIN2	54	R2	Red Pixels Display Data			
TIN3	55	R3	Red Pixels Display Data			
TIN4	56	R4	Red Pixels Display Data			
TIN6	3	R5	Red Pixels Display Data			
TIN7	4	G0	Green Pixels Display Data(LSB)			
TIN8	6	G1	Green Pixels Display Data	TOUT1- TOUT1+	No.8 No.9	IN1- IN1+
TIN9	7	G2	Green Pixels Display Data			
TIN12	11	G3	Green Pixels Display Data			
TIN13	12	G4	Green Pixels Display Data			
TIN14	14	G5	Green Pixels Display Data			
TIN15	15	B0	Blue Pixels Display Data (LSB)			
TIN18	19	B1	Blue Pixels Display Data			
TIN19	20	B2	Blue Pixels Display Data	TOUT2- TOUT2+	No.11 No.12	IN2- IN2+
TIN20	22	B3	Blue Pixels Display Data			
TIN21	23	B4	Blue Pixels Display Data			
TIN22	24	B5	Blue Pixels Display Data			
TIN24	27	NC	Non Connection(open)			
TIN25	28	NC	Non Connection(open)			
TIN26	30	ENAB	Compound Synchronization Signal			
TIN27	50	R6	Red Pixels Display Data	TOUT3- TOUT3+	No.17 No.18	IN3- IN3+
TIN5	2	R7	Red Pixels Display Data(MSB)			
TIN10	8	G6	Green Pixels Display Data			
TIN11	10	G7	Green Pixels Display Data(MSB)			
TIN16	16	B6	Blue Pixels Display Data			
TIN17	18	B7	Blue Pixels Display Data(MSB)			
TIN23	25	Res	Reserved pin. Must be tied low			
CLK IN	31	NCLK	Data Sampling Clock	TCLK OUT- TCLK OUT+	No.14 No.15	CLK- CLK+



7.0 INTERFACE TIMING [1)2)3)4)]

7.1 Timing Parameters (Hsync, Vsync and DE mode)

Item		Symbol	Min.	Typ.	Max.	Unit	Remarks
Vertical display term	Period	t1	773×t4		1024×t4	— ms	1) 5)
	Active	t2	—	768×t4	—	— ms	1)
	Display start	t3	5×t4	—	256×t4	— ms	1)
Horizontal display term	Period	t4	1052×t7		2048×t7	— μs	1) 5)
	Active	t5	1×t7	1024×t7	—	— μs	1)
	Display Start	t6	28×t7	—	1024×t7	— μs	1)
Clock	Period	t7	12.50	15.38	—	ns	5)
	Low time	t8	5	—	—	ns	
	High time	t9	5	—	—	ns	
Data	Setup time	t10	4	—	—	ns	
	Hold time	t11	4	—	—	ns	

Note 1) Refer to TIMING CHART at page18, 19 and 20.

Note 2) In case of using the long frame period, the deterioration of display quality, noise etc. may be occurred.

Note 3) When ENAB is fixed to “L” level after NCLK input, the panel is displayed as black. However, a flicker may be occurred on the display. When ENAB is fixed to “H” level after NCLK input, the panel will be damaged.

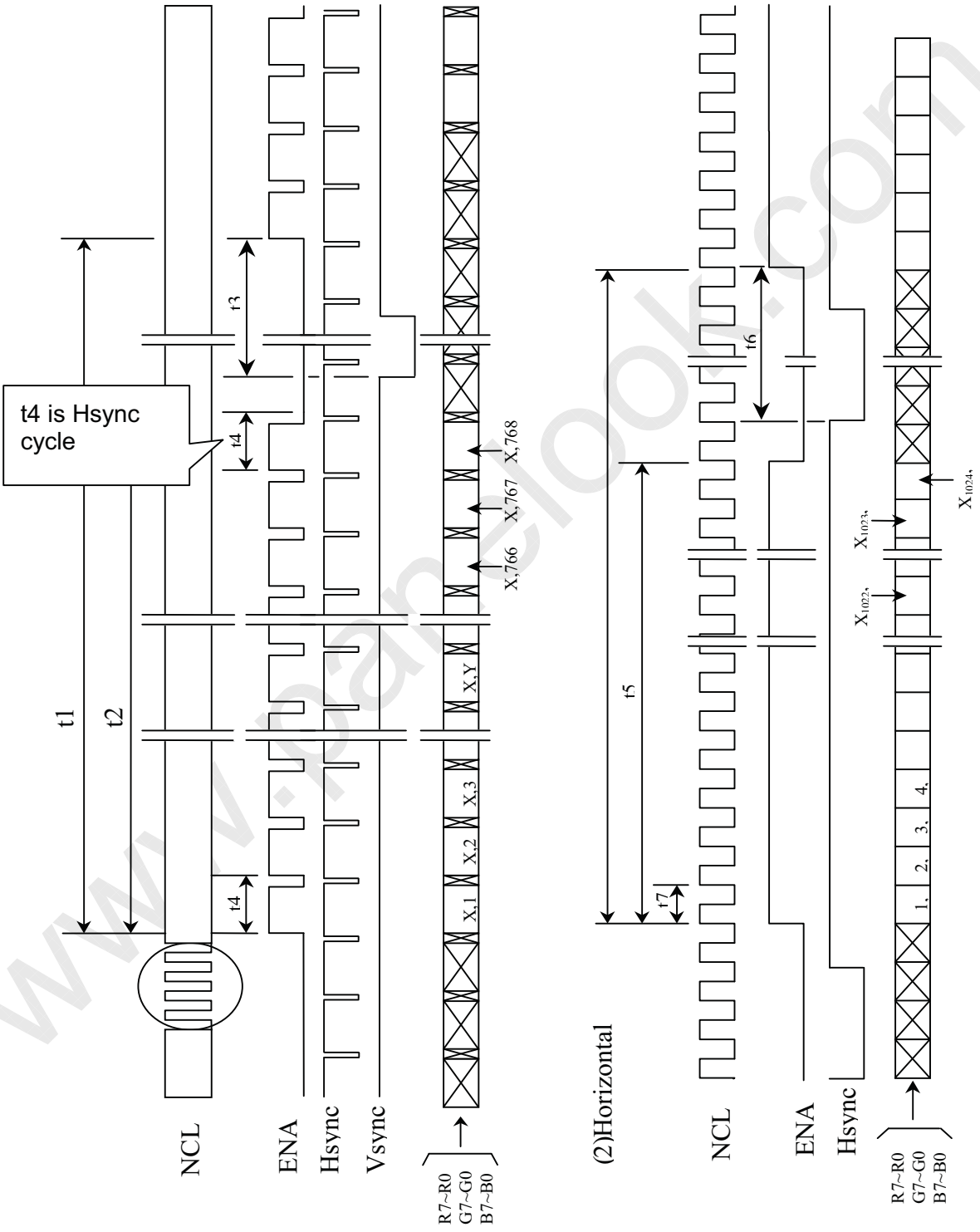
Note 4) Do not fix NCLK to “H” or “L” level while the V_{DD} (+3.3V) is supplied. If NCLK is fixed to “H” level or “L” level for certain period while the V_{DD} (+3.3V) is supplied, the panel may be damaged.

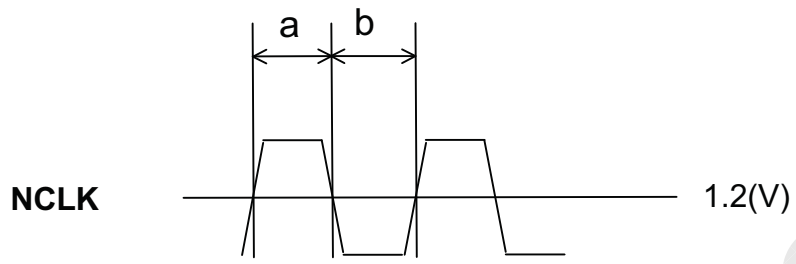
Note 5) Do not change t1 and t4 values in the operation. When t1 or t4 is changed, the panel is displayed as black.

Note 6) Please adjust LCD operating signal timing and FL driving frequency, to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and FL driving condition (especially driving frequency).

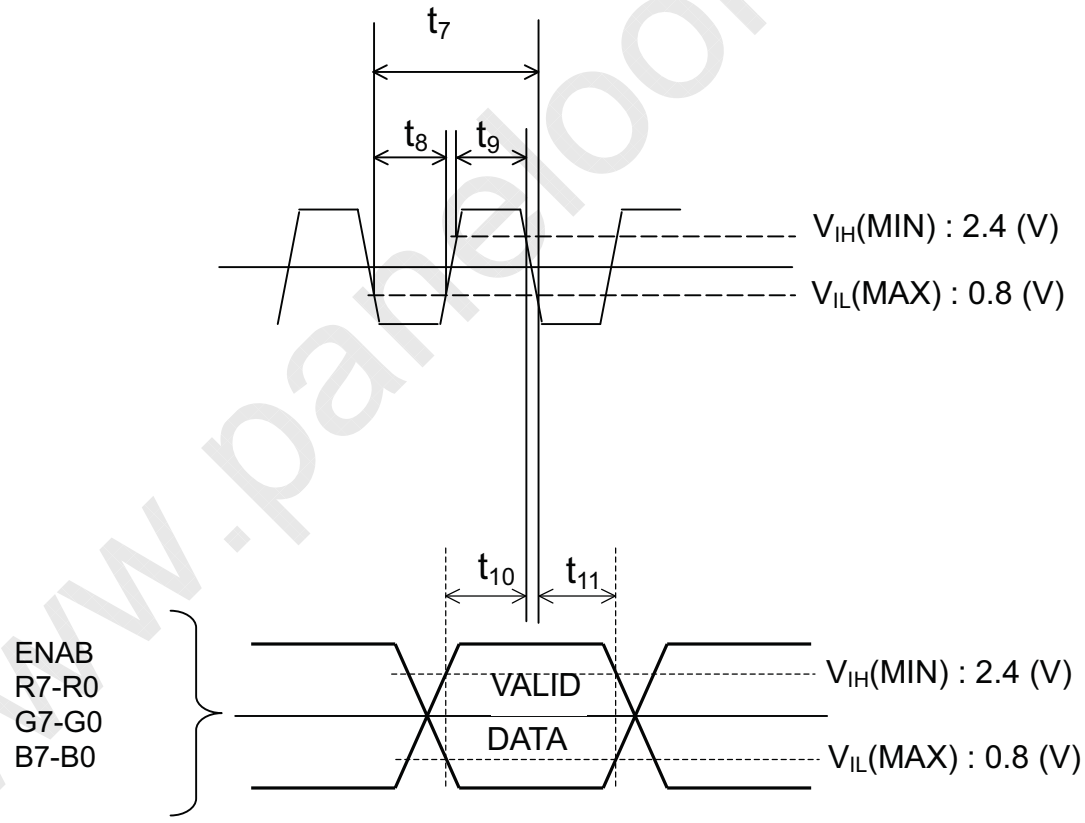
7.2 Timing Diagram of Interface Signal (Hsync, Vsync and DE mode)

24 Bit two pixel/clock input mode

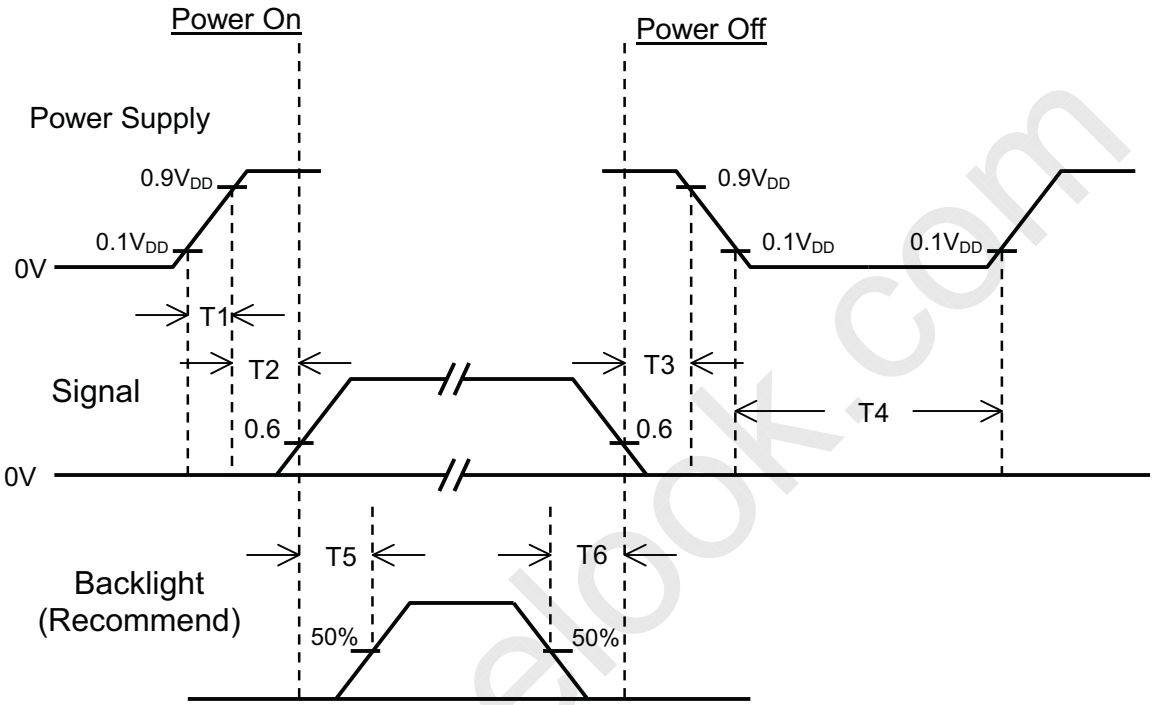




Duty(a,b) : 50±10%



7.3 Power ON/OFF Sequence



Item	Min.	Typ.	Max.	Unit	Remark
T1	0.4	—	10	msec	
T2	100	—	200	msec	
T3	0	—	50	msec	
T4	1	—	—	sec	
T5	200	—	—	msec	
T6	200	—	—	msec	

Note (1) The supply voltage of the external system for the module input should be the same as the definition of V_{DD}.

(2) 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.

(3) In case of V_{DD} = off level, please keep the level of input signal on the low or keep a high impedance.

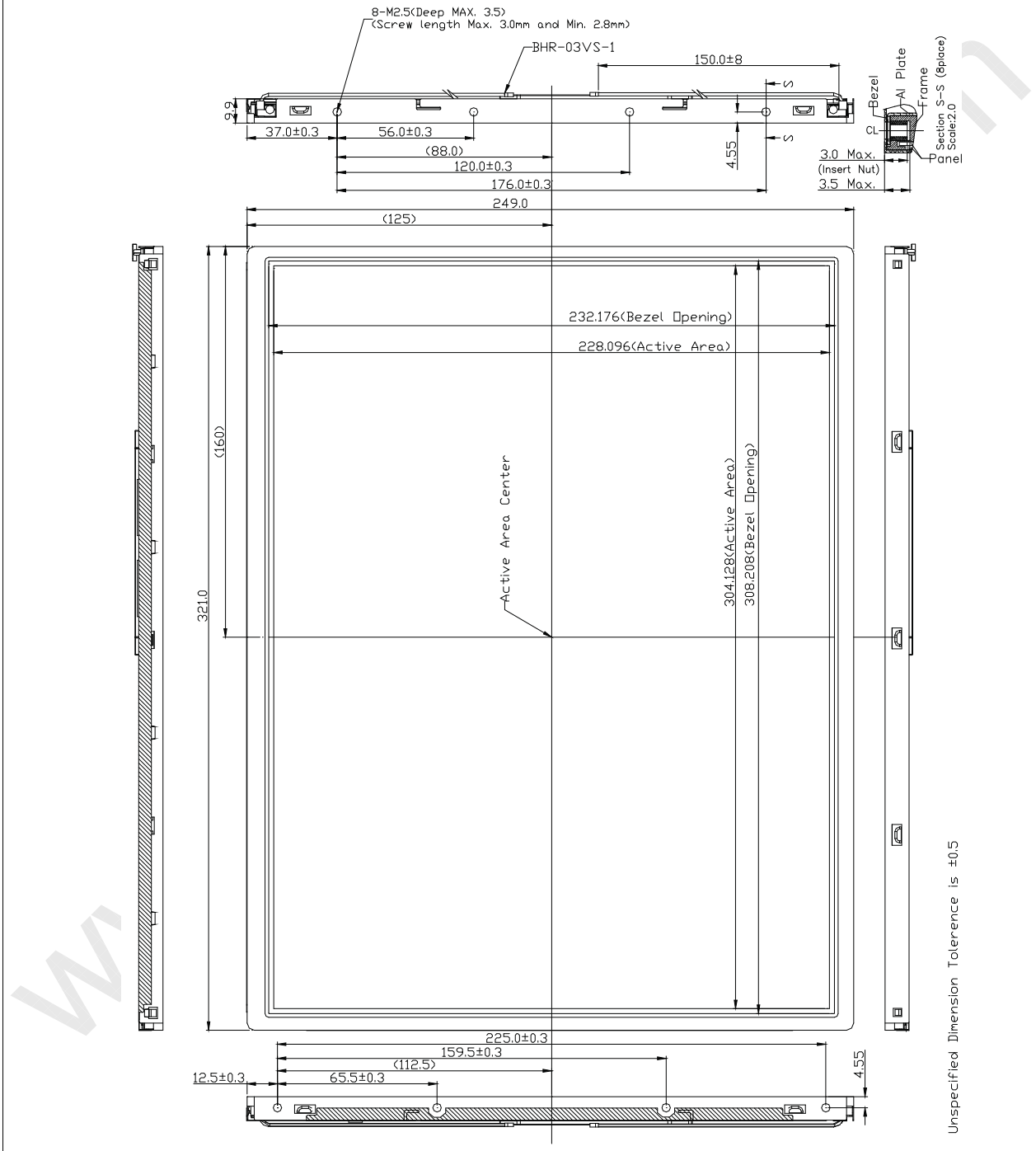
(4) T4 should be measured after the module has been fully discharged between power off and on period.

(5) Interface signal shall not be kept at high impedance when the power is on.

8.0 OUTLINE DIMENSION

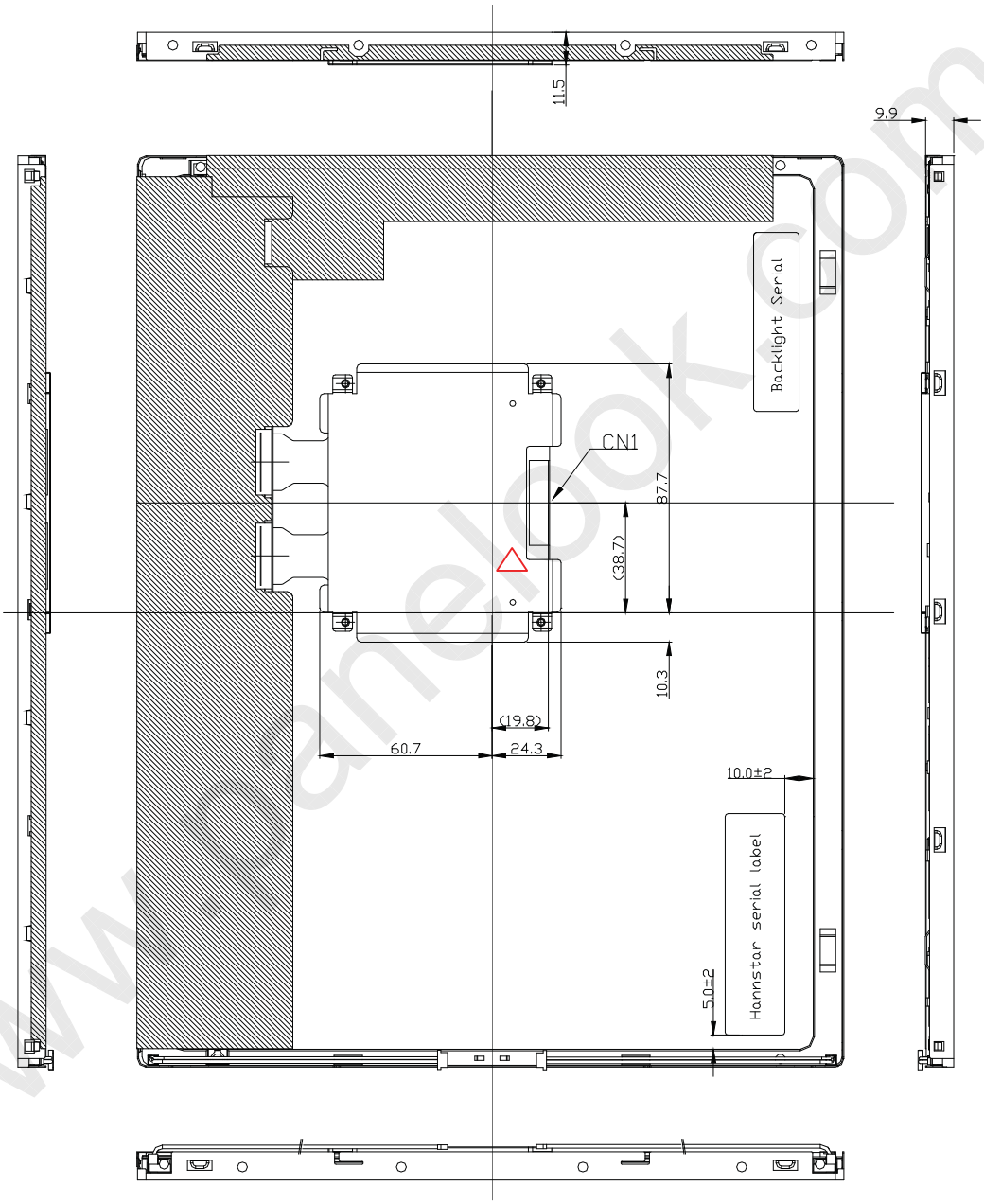
8.1 Front View Outline Dimension

Unit : mm



8.2 Back View Outline Dimension

Unit : mm



Note:
1. UNSPECIFIED DIMENSIONAL TOLERANCE ARE ±0.5mm
2. CN1 CONNECTOR: DF14-20P-1.25H(**)(HIROSE ELEECTRIC CO.,LTD)

9.0 LOT MARK

9.1 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

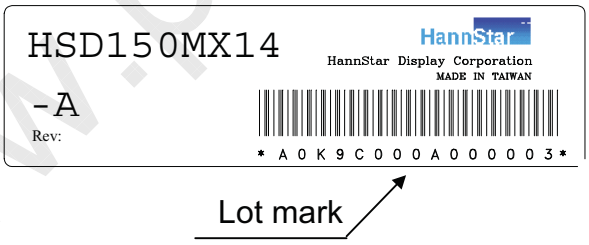
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mark	9	0	1	2	3	4	5	6	7	8

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

9.2 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.



10.0 PACKAGE SPECIFICATION

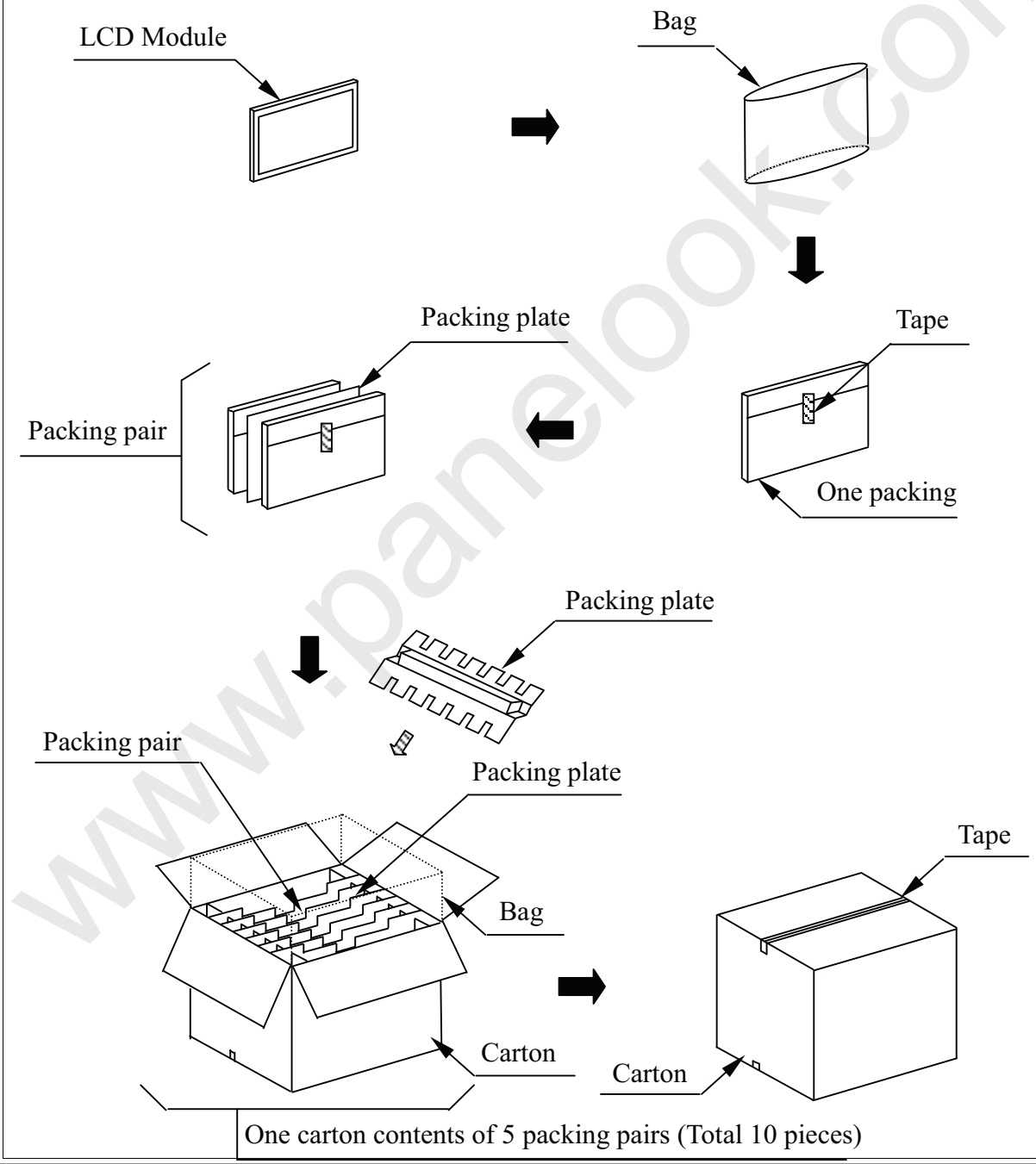
10.1 packing form

(1) package quantity in one carton: 10 pieces.

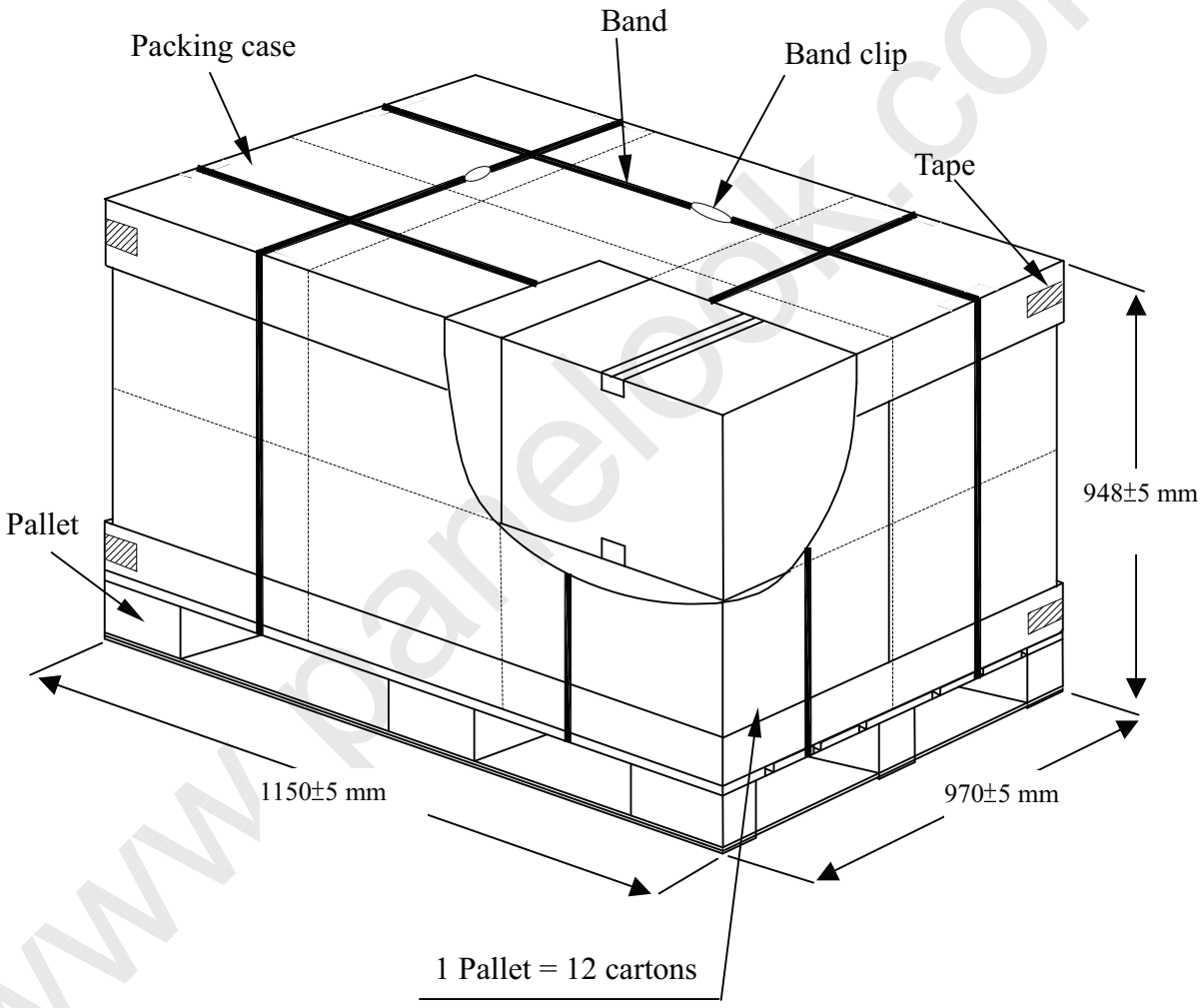
(2) carton size: 453±3 mm×360±3 mm×403±3 mm.

(3) for domestic transportation only.

10.2 packing assembly drawings



10.3 Pallet transportation specification



11.0 GENERAL PRECAUTION

11.1 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.

11.2 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.

11.3 Breakage of LCD Panel

11.3.1 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.

11.3.2 If liquid crystal contacts mouth or eyes, rinse out with water immediately.

11.3.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

11.3.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.

11.4 Electric Shock

11.4.1 Disconnect power supply before handling LCD module.

11.4.2 Do not pull or fold the CCFL cable.

11.4.3 Do not touch the parts inside LCD modules and the fluorescent lamp's connector or cables in order to prevent electric shock.

11.5 Absolute Maximum Ratings and Power Protection Circuit

11.5.1 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.

11.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

11.5.3 It's recommended to employ protection circuit for power supply.

11.6 Operation

11.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

11.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

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

11.6.4 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.

11.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

11.7 Mechanism

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

11.8 Static Electricity

11.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

11.8.2 Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

11.9 Strong Light Exposure

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

11.10 Disposal

When disposing LCD module, obey the local environmental regulations.