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TO : 高照

Date : Mar.,29, 2013

HannStar Product Information **(Preliminary)**

Model: HSD101PWW1
-H-0220 (COG)**

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.

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Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Mar. 29, 2013	C** COG	Preliminary specification was first released.



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1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD101PWW1-H*-0220 COG type 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. This TFT LCD has a 10.1 (16:10) inch diagonally measured active display area with WXGA (1280 horizontal by 800 vertical pixel) resolution.

1.2 Features

- 10.1 (16:10 diagonal) inch configuration
- 262K color by 6 bit R.G.B signal input
- RoHS Compliance
- Halogen Free

1.3 Applications

- Mobile NB
- Digital Photo frame
- Display terminal for AV application
- Tablet PC

1.4 General information

Item	Specification	Unit
Overall Dimension	225.26(Typ) x 144.9(Typ) x 1.07 (Typ.)	mm
Display area	216.96(H) x 135.6(V)	mm
Number of Pixel	1280 RGB (H) x 800(V)	pixels
Pixel pitch	0.1695(H) x 0.1695(V)	mm
Pixel arrangement	RGB Vertical stripe	
Display color	262K	
Display mode	Normally Black	
NTSC	50	%
Surface treatment	Glare	
Weight	78g (typ.)	g
Power Consumption	0.95	W

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2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V_{DD}	3.0	3.6	V	
	V_{GH}	17	19	V	
	V_{GL}	-8.5	-6.5	V	
	AV_{DD}	9	10	V	

2.1.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T_{opa}	0	50	°C	
Storage Temperature	T_{stg}	-20	60	°C	

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3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast	CR	$\Theta = 0$	640	800	—		(1)(2)(4)
Response time	Tr+ Tf	Normal viewing angle	—	25	35	msec	(1)(3)
Color chromaticity (CIE1931)	White	W_x	-0.050	0.311	+0.050		(1)(4) CF Glass C light
		W_y		0.332			
	Red	R_x		0.596			
		R_y		0.330			
	Green	G_x		0.291			
		G_y		0.517			
	Blue	B_x		0.151			
		B_y		0.155			
Viewing angle	Hor.	Θ_L	CR>10	80	89	—	
		Θ_R		80	89	—	
	Ver.	Θ_U		80	89	—	
		Θ_D		80	89	—	
Transmittance (with polarizer)	T(%)		—	4.9	—		(5)

3.2 Measuring Condition

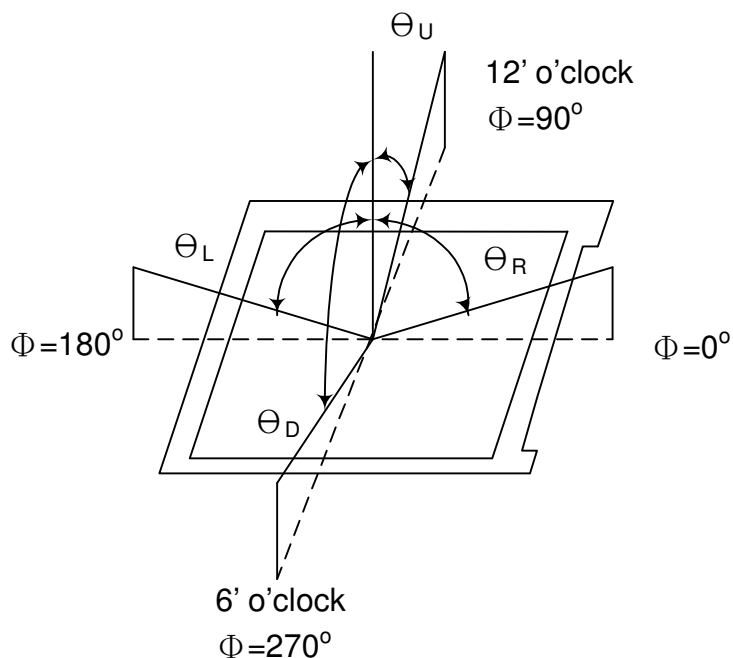
- Measuring surrounding : dark room
- Ambient temperature : $25 \pm 3^\circ\text{C}$
- 15min. warm-up time.
- LED Backlight Structure Details as shown below

3.3 Measuring Equipment

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

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Note (1) Definition of Viewing Angle:

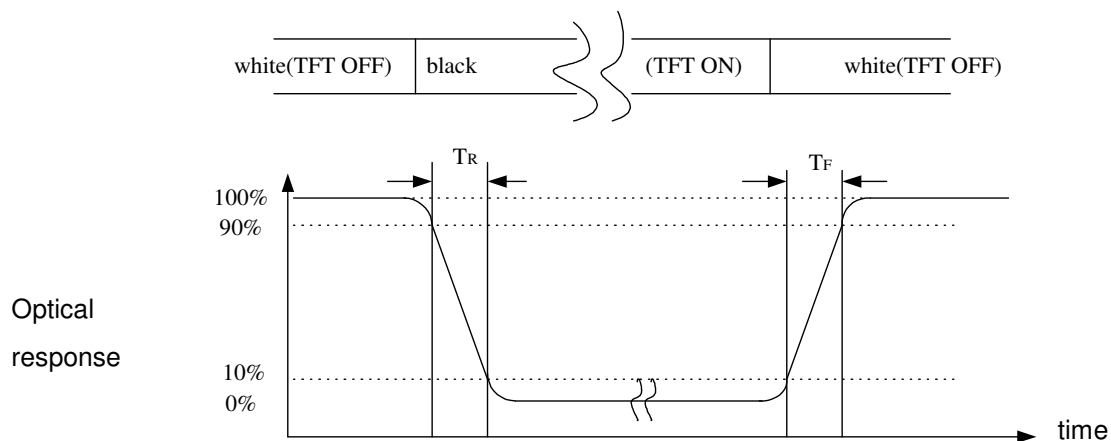


Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

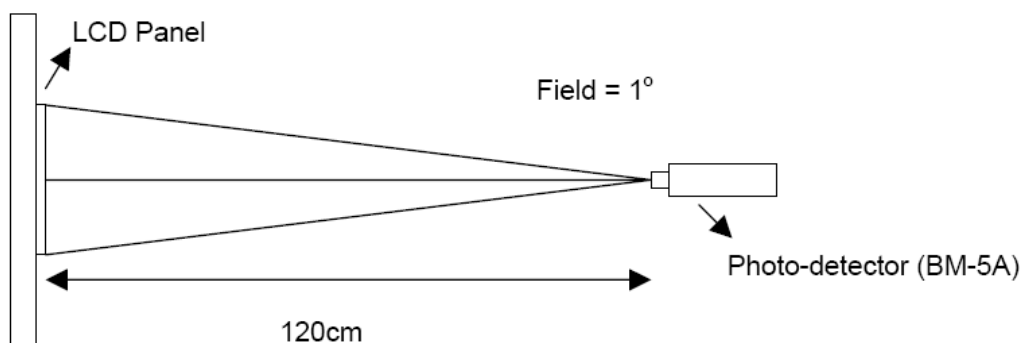
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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



Note (4) Definition of optical measurement setup

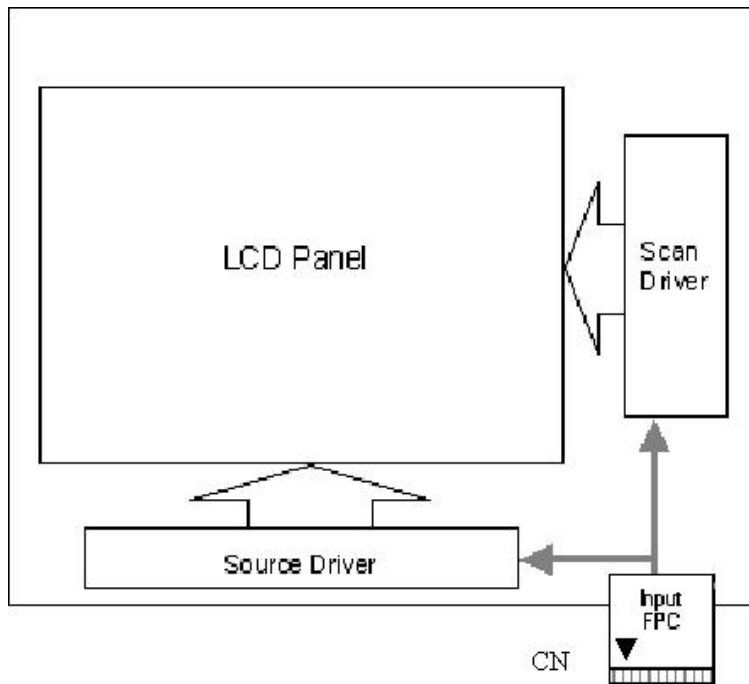


Note (5) Transmittance is measured at panel center area without signal input.
Transmittance base on using HUYA Polarizer , Reference Only

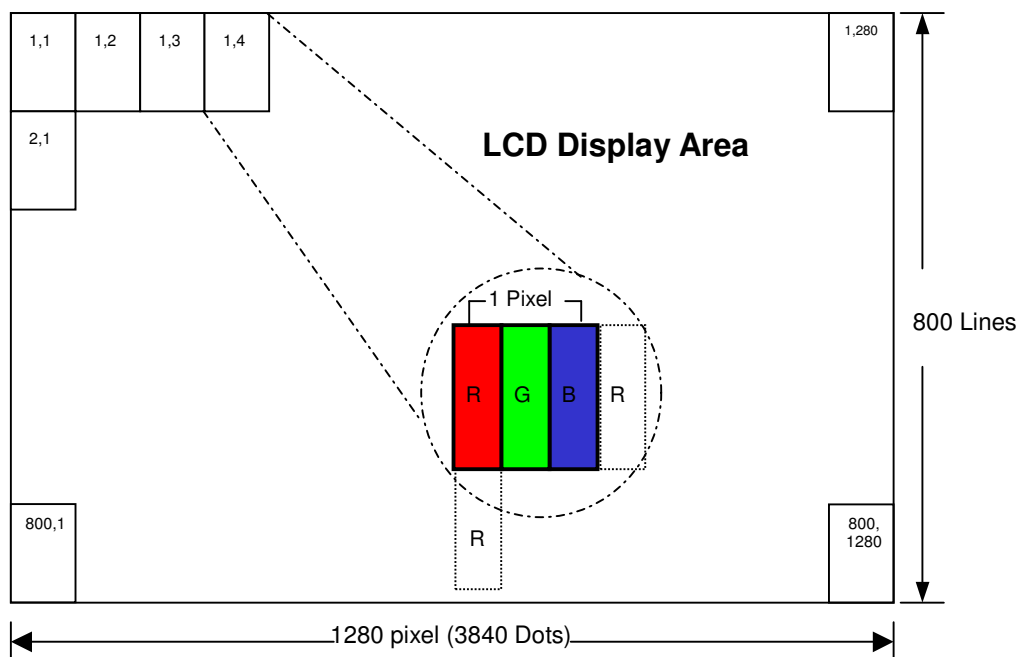
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4.0 BLOCK DIAGRAM

4.1 TFT LCD Module



4.2 Pixel Format



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Relationship Between Displayed Color and Input

	Display	MSB						LSB						MSB						LSB						Gray scale level
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	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	-						
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	-						
	Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	-						
	Light Blue	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	-						
	Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	-						
	Purple	H	H	H	H	H	H	L	L	L	L	L	L	L	H	H	H	H	H	-						
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	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	-						
Gray scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0						
	Dark ↕ Light	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L1						
		L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L2						
		⋮						⋮						⋮						L3...L60						
		H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L61						
		H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L62						
	Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	Red L63						
	Gray scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0					
Dark ↕ Light		L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L1						
		L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L2						
		⋮						⋮						⋮						L3...L60						
		L	L	L	L	L	L	H	H	H	H	L	H	L	L	L	L	L	L	L61						
		L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L62						
Green		L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	Green L63						
Gray scale of Blue		Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0					
	Dark ↕ Light	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	H	L	L2						
		⋮						⋮						⋮						L3...L60						
		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	H	L61						
		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L62						
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	Blue L63						
	Gray scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0					
Dark ↕ Light		L	L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L1						
		L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L	L2						
		⋮						⋮						⋮						L3...L60						
		H	H	H	H	L	H	H	H	H	L	H	H	H	H	H	L	H	L61							
		H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	L62						
White		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L63						

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5.0 INTERFACE PIN CONNECTION

Pin No.	Signal	Description
1	DUMMY	Dummy pads.
2	DUMMY	Dummy pads.
3	SVCOM	shielding VCOM.
4	SVCOM	shielding VCOM.
5	VDDN	Dummy pads.
6	VCOM	bottom VCOM.
7	VCOM	bottom VCOM.
8	DIO1	start pulse input/output SHL="H":Used as the start pulse input pin SHL="L":Used as the start pulse output pin
9	AVSS	Ground pins for analog circuits
10	AVSS	Ground pins for analog circuits
11	PAIR	mini-LVDS pair selects input for HIMAX
12	GND	Ground pins for digital circuits
13	GND	Ground pins for digital circuits
14	VDD	Power supply for digital circuits
15	VDD	Power supply for digital circuits
16	SHL	Controls the direction of the shift register in cascade connection.(default=H) SHL="H": DIO1 input, Y1->Y1200, DIO2 output. SHL="L": DIO2 input, Y1200->Y1, DIO1 output.
17	mLV1P	mini-LVDS differential data input
18	mLV1N	mini-LVDS differential data input
19	mLV2P	mini-LVDS differential data input
20	mLV2N	mini-LVDS differential data input
21	mLV3P	mini-LVDS differential data input
22	mLV3N	mini-LVDS differential data input
23	mLVCLKP	mini-LVDS differential clock input
24	mLVCLKN	mini-LVDS differential clock input
25	mLV4P	mini-LVDS differential data input
26	mLV4N	mini-LVDS differential data input
27	mLV5P	mini-LVDS differential data input
28	mLV5N	mini-LVDS differential data input

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29	mLV6P	mini-LVDS differential data input
30	mLV6N	mini-LVDS differential data input
31	AVDD	Power supply for analog circuits
32	AVDD	Power supply for analog circuits
33	V1	GAMMA voltage
34	V2	GAMMA voltage
35	V3	GAMMA voltage
36	V4	GAMMA voltage
37	V5	GAMMA voltage
38	V6	GAMMA voltage
39	V7	GAMMA voltage
40	V8	GAMMA voltage
41	V9	GAMMA voltage
42	V10	GAMMA voltage
43	V11	GAMMA voltage
44	V12	GAMMA voltage
45	V13	GAMMA voltage
46	V14	GAMMA voltage
47	AVSS	Ground pins for analog circuits
48	AVSS	Ground pins for analog circuits
49	VA	OP bias current selection for HIMAX
50	Load	latch input
51	CS1	charge sharing scheme selection pin for HIMAX
52	POL	Polarity input signal, control the polarity of the output.
53	VDD	Power supply for digital circuits
54	VDD	Power supply for digital circuits
55	GND	Ground pins for digital circuits
56	GND	Ground pins for digital circuits
57	AVDD	Power supply for analog circuits
58	AVDD	Power supply for analog circuits
59	DIO2	start pulse input/output SHL="H":Used as the start pulse output pin SHL="L":Used as the start pulse input pin
60	OP0	Low power selection pin for ORISE

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61	OP1	Low power selection pin for ORISE
62	VCOM	bottom VCOM.
63	VCOM	bottom VCOM.
64	VDD18	Dummy pads.
65	SVCOM	shielding VCOM.
66	SVCOM	shielding VCOM.
67	XON	When XON goes low, all gate outputs are fixed to VGH. A 10k ohm pull-up resistor is connected between this pin and VCC. XON signal has priority over OE.
68	OE	The OE signal controls the output enable.
69	U_D	Shift direction control pin U_D=H, STV1-->STV2 U_D=L, STV2-->STV1
70	CPV	Shift clock input
71	STV2	start pulse input/output pin
72	STV1	start pulse input/output pin
73	DUMMY	Dummy pads.
74	VGH	Positive power supply for G1 ~ G800 outputs
75	VGH	Positive power supply for G1 ~ G800 outputs
76	DUMMY	Dummy pads.
77	VGL	Negative power supply for G0 ~ G801 outputs
78	VGL	Negative power supply for G0 ~ G801 outputs
79	VDD	Power supply for digital circuits
80	VDD	Power supply for digital circuits
81	GND	Ground pins for digital circuits
82	GND	Ground pins for digital circuits
83	DUMMY	Dummy pads.
84	DUMMY	Dummy pads.

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6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

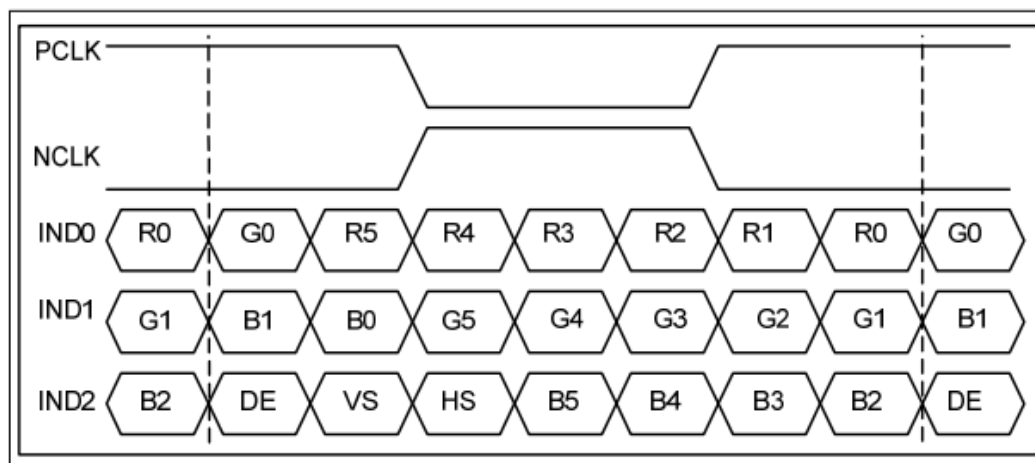
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
	V_{GH}	17	18	19	V	
	V_{GL}	-8.5	-7.5	-6.5	V	
	AV_{DD}	9	9.5	10	V	
VCOM	V_{COMin}	1.93	2.93	3.93	V	
Input signal voltage	V_{iH}	0.7 V_{DD}	-	V_{DD}	V	
	V_{iL}	0	-	0.3 V_{DD}	V	
Current of power supply	I_{DD}	-	20	-	mA	$V_{DD}=3.3V$
	I_{ADD}	-	48	-	mA	$AV_{DD}=9.5V$
	I_{GH}	-	0.5	-	mA	$V_{GH}=18V$
	I_{GL}	-	0.6	-	mA	$V_{GL}=-7.5V$
	I_{vcom}	0.5	--	--	mA	$V_{com}=2.9V$

6.2 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	V_{th}	—	—	100	mV	$V_{CM}=1.2V$
Differential Input Low Threshold	V_{tl}	-100	—	—	mV	
Input Current	I_{IN}	-10	—	+10	uA	
Differential input Voltage	$ V_{ID} $	0.2	—	0.6	V	
Common Mode Voltage Offset	V_{CM}	0.7	1.2	1.6	V	

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6.3 Bit LVDS input

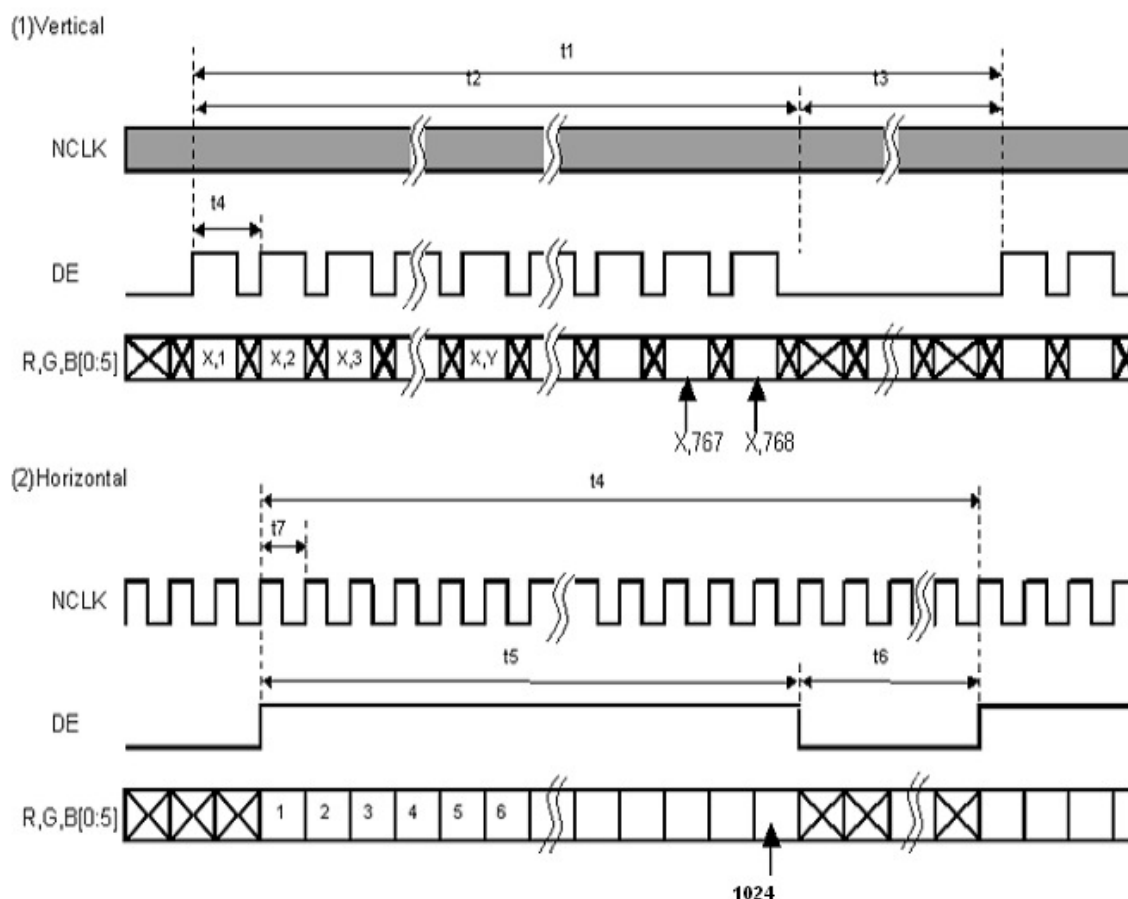


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6.4 Interface Timing (DE mode)

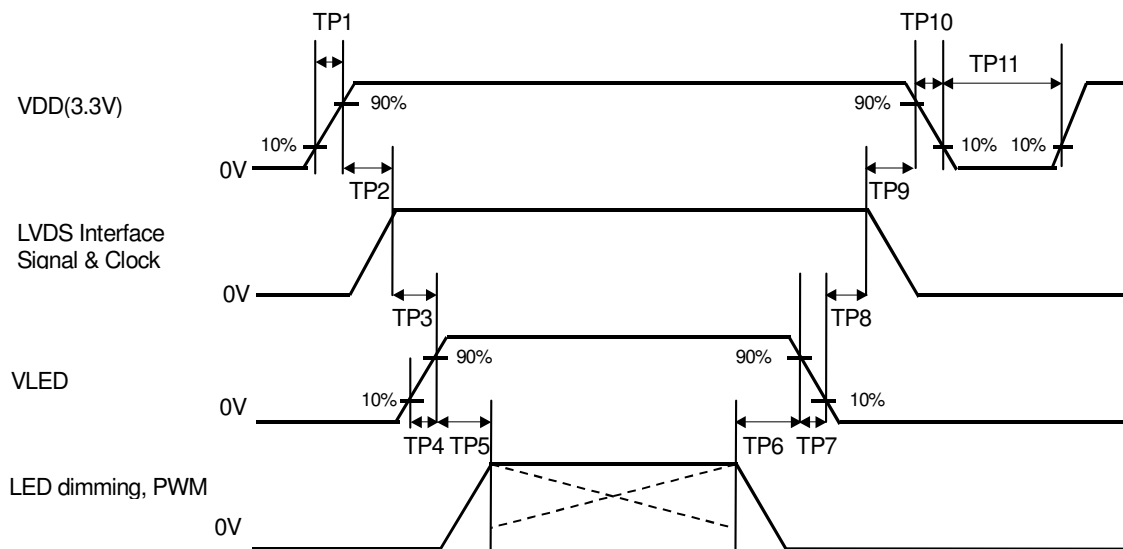
Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	55	60	65	Hz
Frame Period	t1	803	823	1023	line
Vertical Display Time	t2	800	800	800	line
Vertical Blanking Time	t3	3	23	223	line
1 Line Scanning Time	t4	1334	1440	1961	clock
Horizontal Display Time	t5	1280	1280	1280	clock
Horizontal Blanking Time	t6	54	160	681	clock
Clock Rate	t7	64.3	71.1	85	MHz

Timing Diagram of Interface Signal (DE mode)



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6.5 Power On / Off Sequence



Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	200	--	--	msec	
TP4	0.5	--	10	msec	
TP5	10	--	--	msec	
TP6	10	--	--	msec	
TP7	0	--	10	msec	
TP8	200	--	--	msec	
TP9	0	--	50	msec	
TP10	1	--	10	msec	
TP11	1000	--	--	msec	

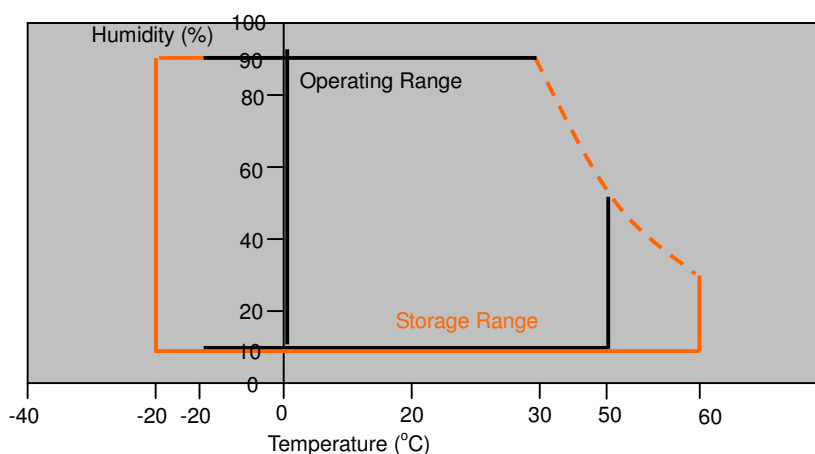
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7.0 Reliability test items

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+60°C, 240hrs	
2	Low Temperature Storage	Ta=-20°C, 240hrs	
3	High Temperature Operation	Ta=+50°C, 300hrs	
4	Low Temperature Operation	Ta=0°C, 300hrs	
5	Thermal Cycling Test (non operation)	-20°C(30min)→+60°C(30min),100 cycles	

Note : There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

Storage / Operating temperature



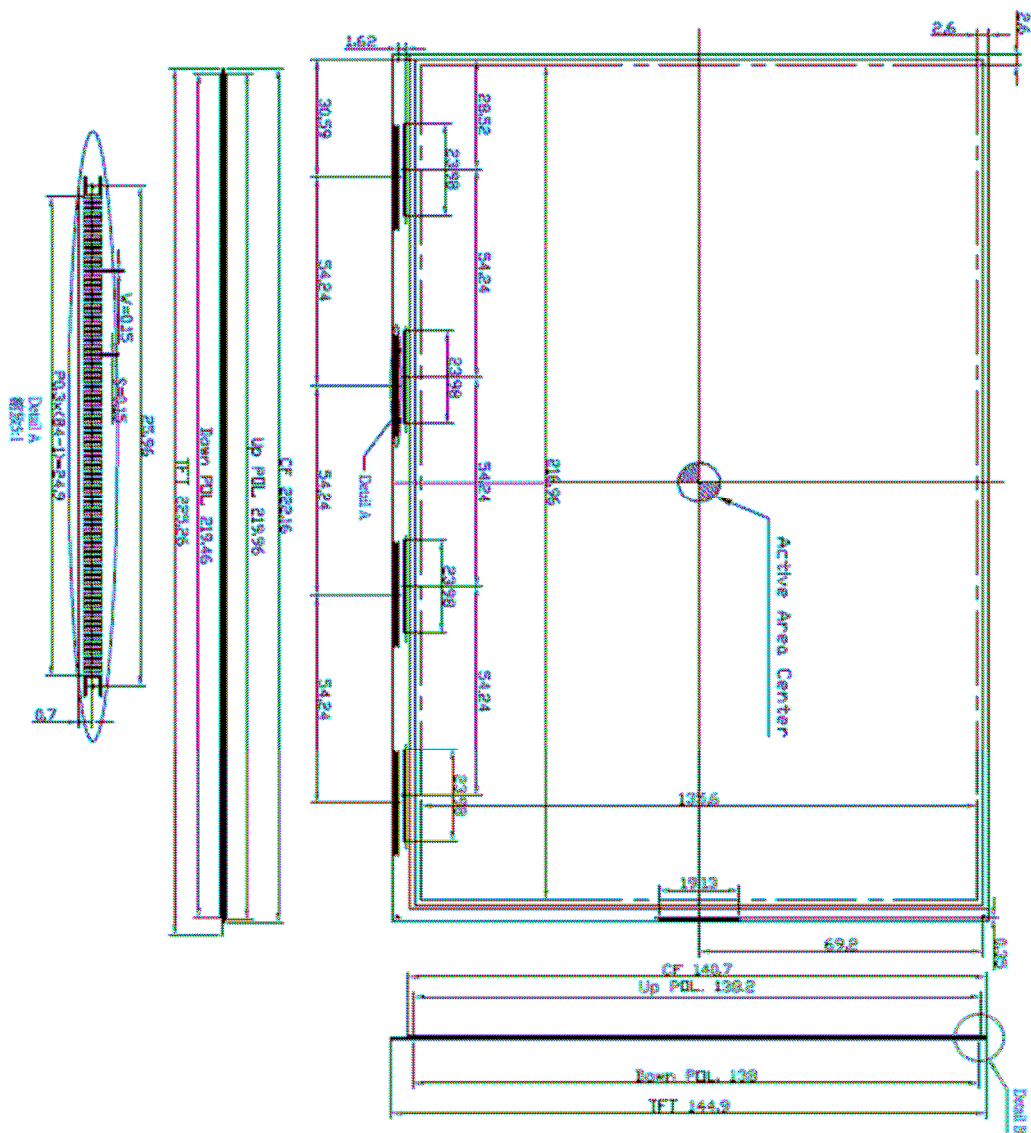
Note .Max wet bulb temp.=39°C

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8.0 OUTLINE DIMENSION

Unit : mm

8.1 Front/Back View Outline Dimension



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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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mark	6	7	8	9	0	1	2	3	4	5

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

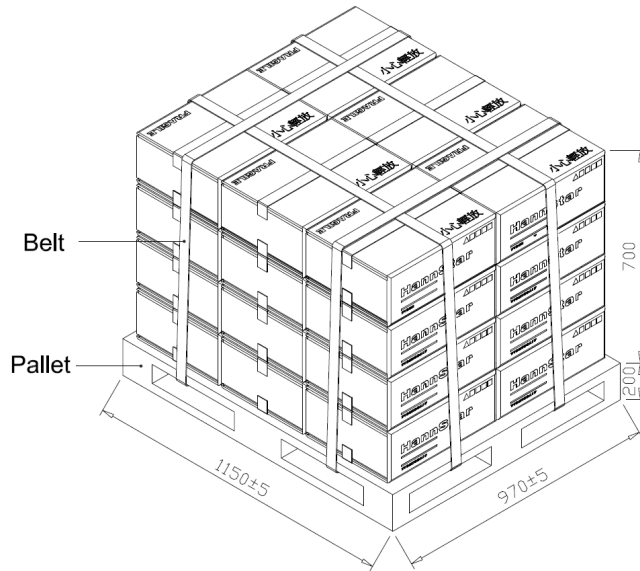
- (1) Location : The label is attached to the backside of the LCD module. See Product back view. (Section 8.0 : OUTLINE DIMENSION)
- (2) Detail of the Mark : As attached below
- (3) This is subject to change without prior notice.



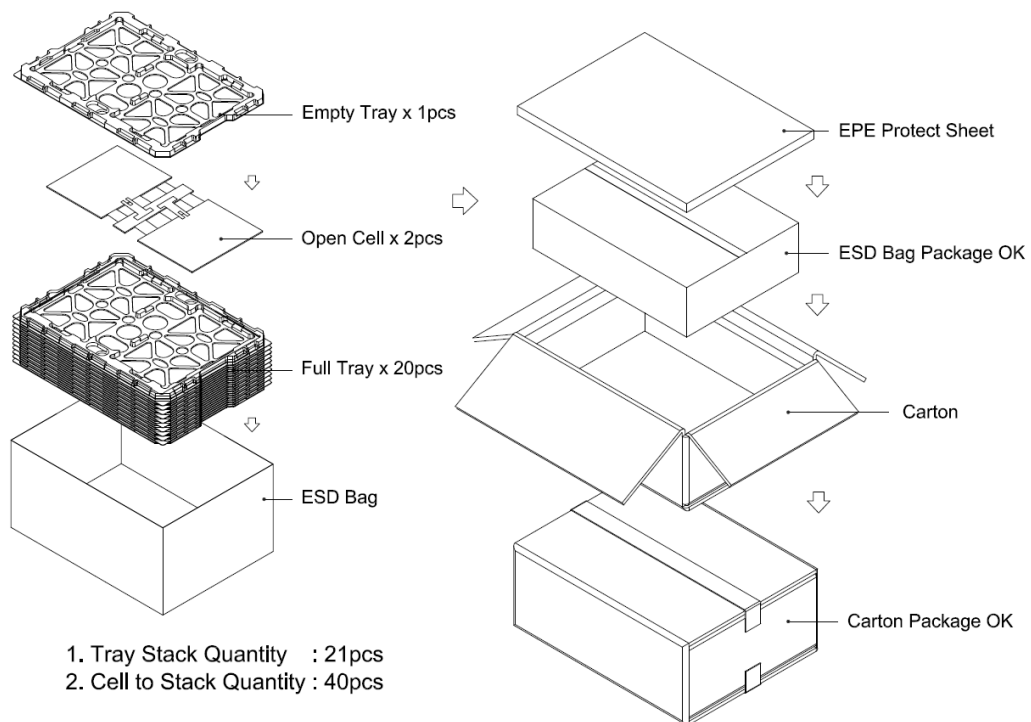
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10.0 PACKAGE SPECIFICATION

10.1 Packing form



10.2 Packing assembly drawings



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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 LED cable.
- 11.4.3. Do not touch the parts inside LCD modules and the fluorescent LED'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.

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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 mounting 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.