



SPECIFICATION

HannStar 

HSD043GDW1-A00-P

4.3" TFT – WVGA – RGB

Version: 1.0

Note: This specification is subject to change without prior notice

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TO :

Date :

HannStar Product Specification

4.3” Color TFT-LCD Module

Model: **HSD043GDW1-A00-P**

Note: (1) The information contained herein is tentative 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.



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Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0		A00	Product Specification was first released

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1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD043GDW1-A00-P 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, driving IC and a back light system. This TFT LCD has a 4.3" (15:9) inch diagonally measured active display area with WVGA (800 horizontal by 480 vertical pixel) resolution.

1.2 Features

- 4.3 (15:9 diagonal) inch configuration
- 16.2M color by 8 bit R.G.B. signal input
- ROHS / Halogen Free Compliance

1.3 General information

Item	Specification	Unit	
Outline Dimension	105.5(H) x 67.2(V) x 3.0(D)	mm	
Display area	95.04 (H) x 53.856 (V)	mm	
Number of Pixel	800 RGB (H) x 480(V)	pixels	
Pixel pitch	0.1188H) x 0.1122(V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display mode	Normally Black		
Interface	RGB interface		
NTSC	50 (Typ.)	%	
Surface treatment	AG		
Weight	40	g	
Power Consumption	Logic System	0.33(typ.)	W
	B/L System	0.6 (typ.)	W

1.4 Mechanical Information

	Item	Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	105.3	105.5	105.7	mm
	Vertical (V)	67.0	67.2	67.4	mm
	Depth (D)	2.85	3.0	3.15	mm
Weight		--	40	--	g

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2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V _{cc}	-0.3	5	V	GND=0
Logic Signal Input Level	V _I	-0.3	V _{cc} +0.5	V	

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) Ta =25±2°C

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T _{opa}	-20	70	°C	
Storage Temperature	T _{stg}	-30	80	°C	

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3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	$\Theta=0$ Normal viewing angle	—	800	—		(1)(2)
Response time	Rising	Tr+Tf		—	30	40	msec	(1)(3)
White luminance (Center)		Y_L		—	600	—	cd/m ²	(1)(4) ($I_L=40mA$)
Color chromaticity (CIE1931)	White	W_x		0.270	0.310	0.350		(1)(4)
		W_y		0.290	0.330	0.370		
	Red	R_x		0.552	0.592	0.632		
		R_y		0.308	0.348	0.388		
	Green	G_x		0.320	0.360	0.400		
		G_y		0.530	0.570	0.610		
	Blue	B_x		0.104	0.144	0.184		
		B_y	0.048	0.088	0.128			
Viewing angle	Hor.	Θ_L	$CR>10$	—	80	—		
		Θ_R		—	80	—		
	Ver.	Θ_U		—	80	—		
		Θ_D		—	80	—		
Brightness uniformity		B_{UNI}	$\Theta=0$	—	80	—	%	(5)
Optima View Direction		Free						(6)

3.2 Measuring Condition

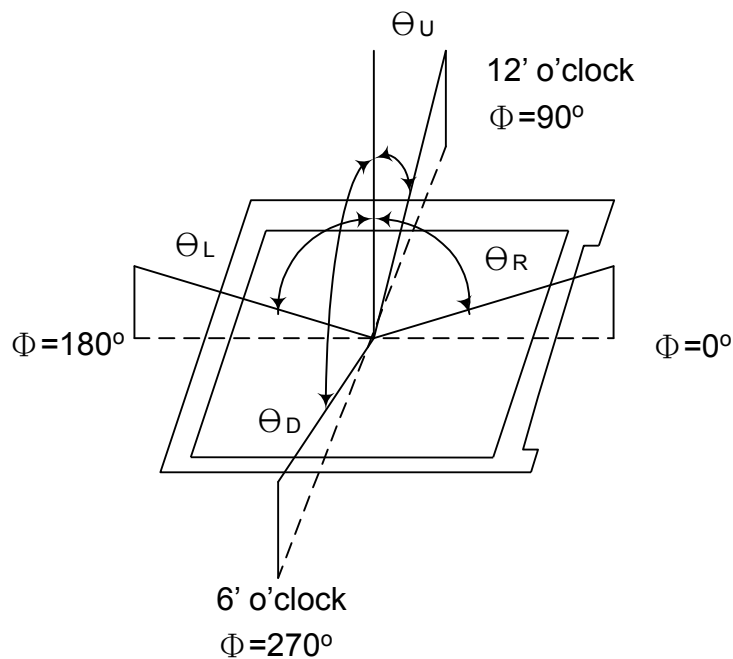
- Measuring surrounding : dark room
- LED current I_L : 40mA
- Ambient temperature : 25±2°C
- 15min. warm-up time.

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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

Note (1) Definition of Viewing Angle:

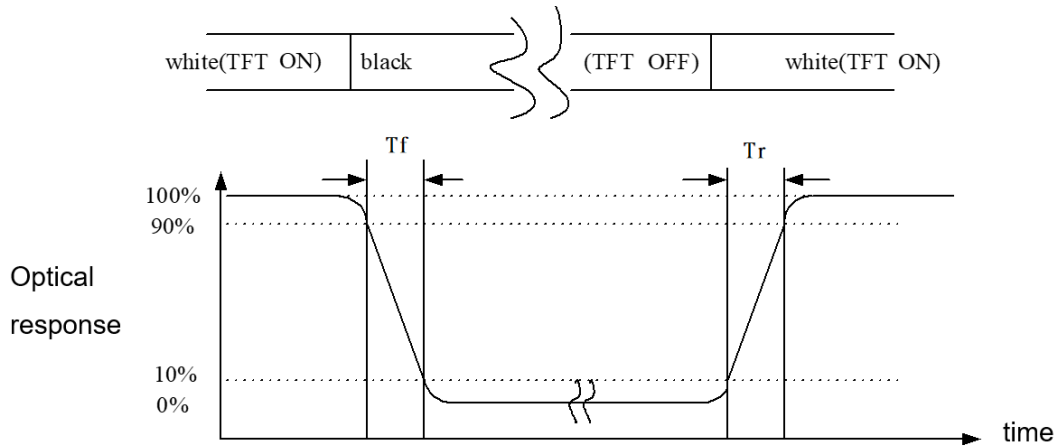


Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

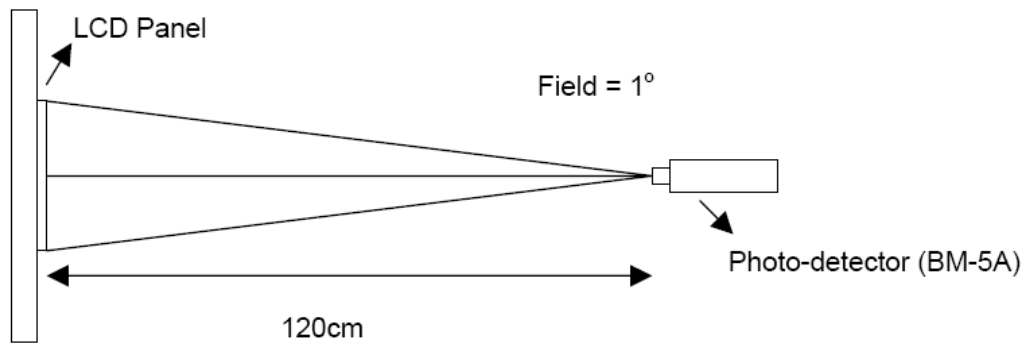
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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Note (3) Definition of Response Time : Sum of T_r and T_f

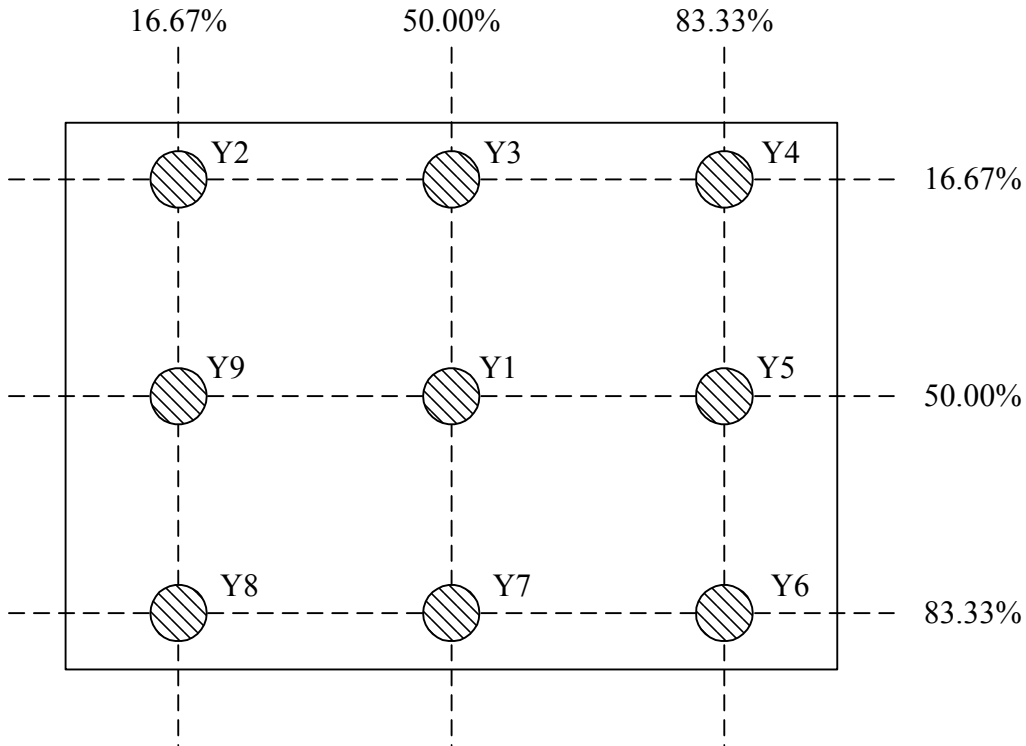


Note (4) Definition of optical measurement setup



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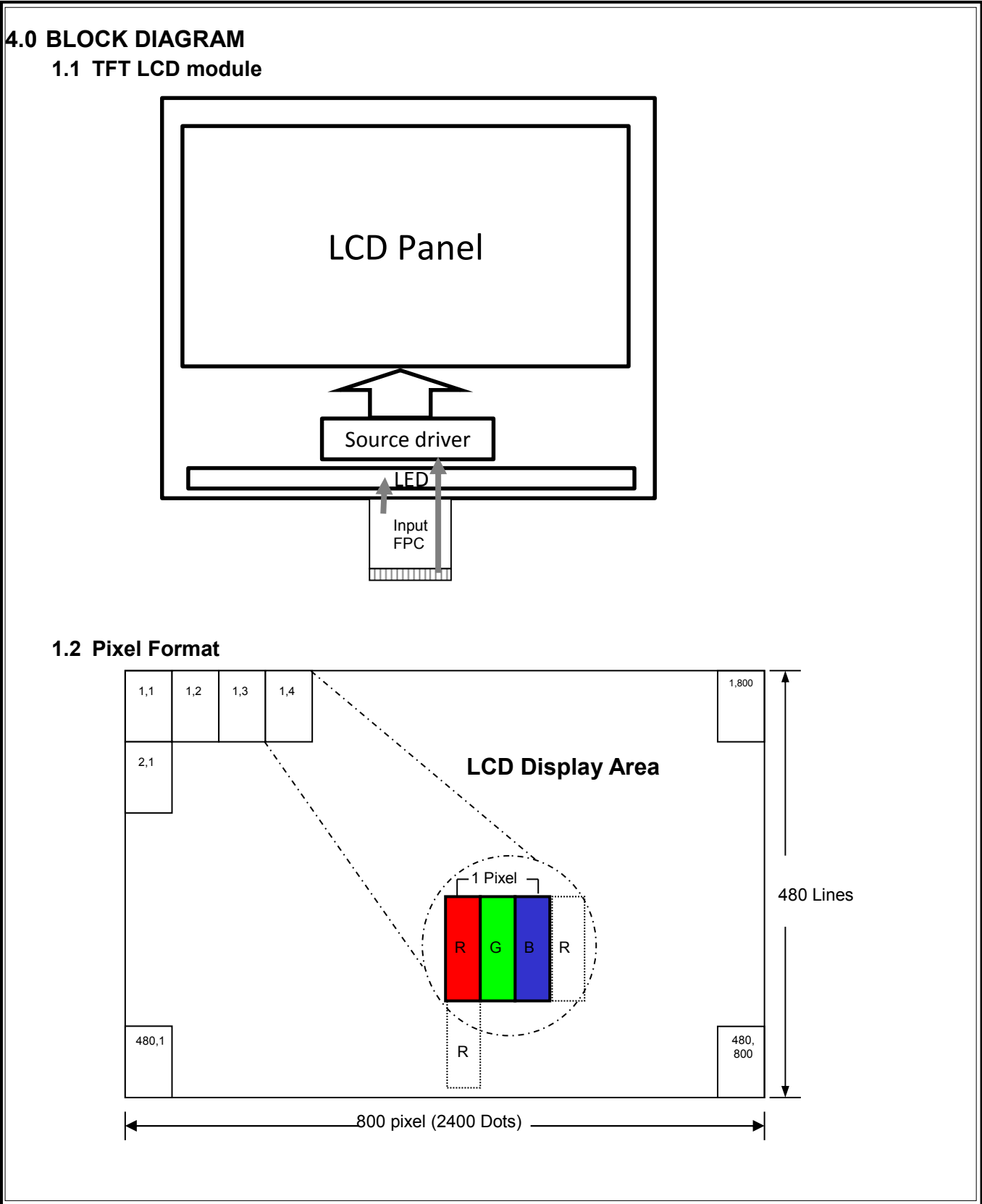
Note (5) Definition of brightness uniformity



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

Note (6) : Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.)

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5.0 INTERFACE PIN CONNECTION

5.1 FPC Pin Assignment:

FPC: signal and power input.

Terminal no.	Symbol	I/O	Function
1	LED_K	P	LED back light(Cathode)
2	LED_A	P	LED back light(Anode)
3	GND	P	Digital Ground
4	V _{CC}	P	Digital Power
5	R0	I	Data Input(LSB)
6	R1	I	Data Input
7	R2	I	Data Input
8	R3	I	Data Input
9	R4	I	Data Input
10	R5	I	Data Input
11	R6	I	Data Input
12	R7	I	Data Input(MSB)
13	G0	I	Data Input(LSB)
14	G1	I	Data Input
15	G2	I	Data Input
16	G3	I	Data Input
17	G4	I	Data Input
18	G5	I	Data Input
19	G6	I	Data Input
20	G7	I	Data Input(MSB)
21	B0	I	Data Input(LSB)
22	B1	I	Data Input
23	B2	I	Data Input
24	B3	I	Data Input
25	B4	I	Data Input
26	B5	I	Data Input
27	B6	I	Data Input
28	B7	I	Data Input(MSB)
29	GND	P	Digital Ground
30	PCLK	I	Clock input
31	DISP	I	Standby mode select pin
32	HSYNC	I	Horizontal sync input in RGB mode.
33	VSYNC	I	Vertical sync input in RGB mode.
34	DE	I	Data input Enable.
35	NC	I	No connection
36	GND	P	Digital Ground
37	NC/XR	I	No connection/Touch panel control pin
38	NC/YD	I	No connection/Touch panel control pin
39	NC/XL	I	No connection/Touch panel control pin
40	NC/YU	I	No connection/Touch panel control pin

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5.2 Relationship Between Displayed Color and Input

	Display	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	
	Light ↓	H	H	H	H	H	H	L	L	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	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	L2		
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251	
	Light ↓	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L252		
		L	L	L	L	L	L	L	L	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	L	L	L	L	L	L	L	L	L	L254		
Green	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	H	L	L	L	L	L	L	L	H	L1	
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L2	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251	
	Light ↓	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L252		
		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	H	H	H	H	H	H	L	L	L254		
Blue	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	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	H	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	H	L	L	L	L	L	L	L	H	L2				
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	L3...L251		
	Light ↓	H	H	H	H	H	L	L	H	H	H	H	L	L	H	H	H	H	L	L	H	H	H	H	L	L	L252
		H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	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	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	H	White L255	

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6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	Vcc	3.0	3.3	3.6	V	
Current of power supply	Ivcc	-	100	143	mA	Vcc=3.3V @ 60Hz
Input signal voltage	ViH	0.7*Vcc	-	Vcc	V	
	ViL	0	-	0.3*Vcc	V	

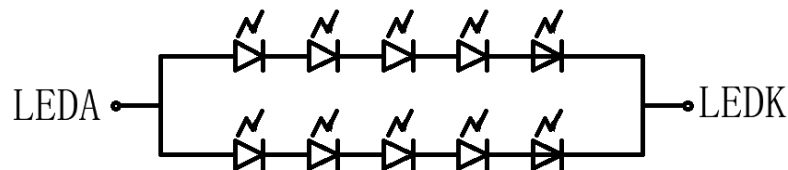
6.2 Backlight Unit

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I _L	--	40	--	mA	Ta=25°C
LED Voltage	V _F	14	15	16	Volt	Ta=25°C
LED Life-Time	N/A	50,000	--	--	Hour	Ta=25°C Note (2)

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

Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C. and I_L=40mA. The LED lifetime could be decreased if operating I_L is larger than 40mA. The constant current driving method is suggested.

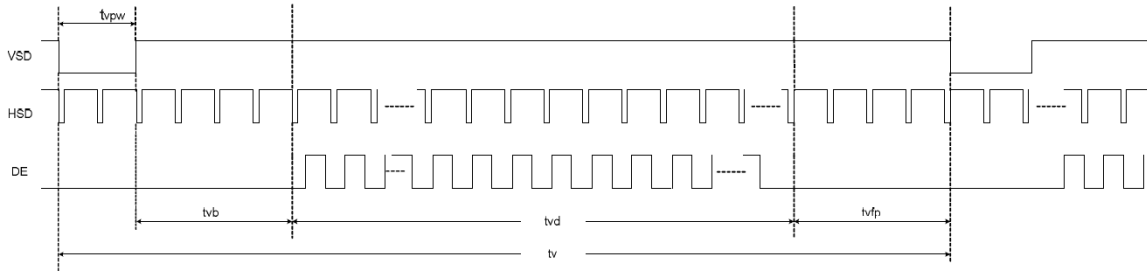
Note (3) LED Light Bar Circuit



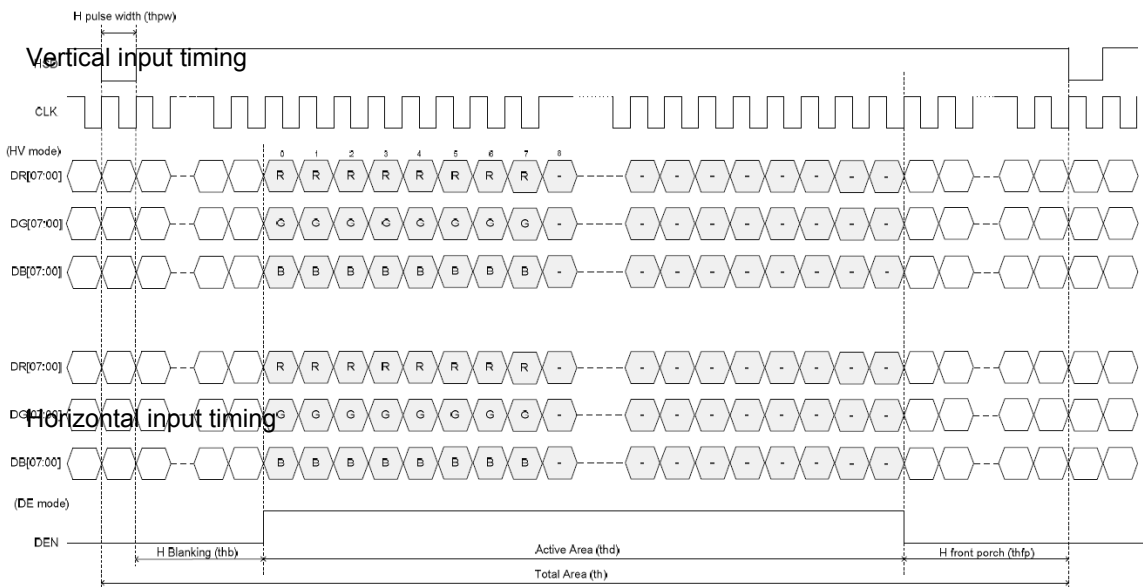
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6.3 Interface Timing

6.3.1 Vertical timing



6.3.2 Horizontal timing



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6.3.3 Input timing table

Horizontal input timing

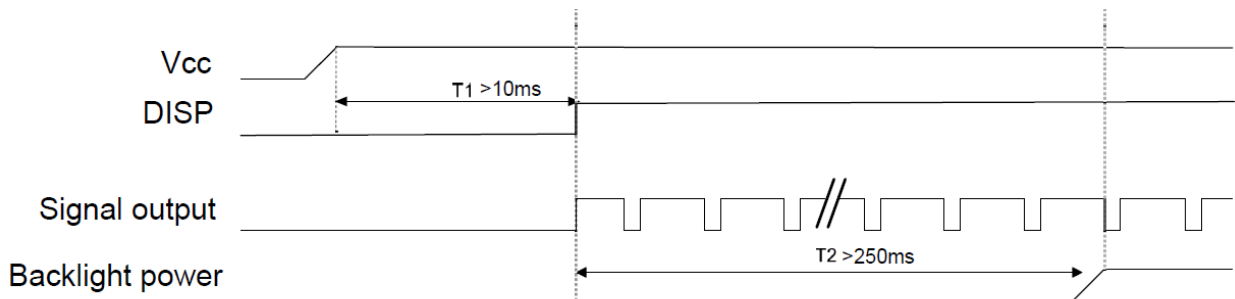
Parameter	Symbol	Value			Unit	Note
Horizontal display area	thd	800			DCLK	
DCLK frequency	fclk	Min.	Typ.	Max	MHz	
		20	33.3	50		
1 Horizontal Line	th	908	928	1088	DCLK	thb+thpw=88 DCLK is fixed.
HSD pulse width	thpw	1	48	87		
HSD Back Porch (Blanking)	thb	87	40	1		
HSD Front Porch	thfp	20	40	200		

Vertical input timing

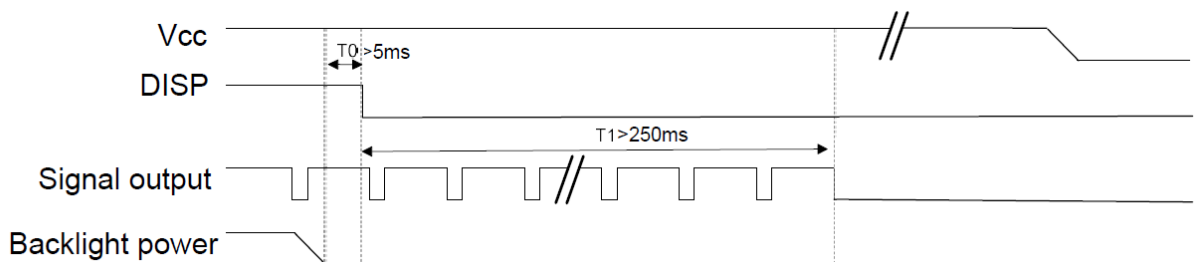
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Vertical display area	tvd	480			H	
VSD period time	tv	517	525	712	H	tvpw+tvb=32H Is fixed
VSD pulse width	tvpw	1	1	3	H	
VSD Back Porch (Blanking)	tvb	31	31	29	H	
VSD Front Porch	tvfp	5	13	200	H	

6.4 Power on/off sequence

6.4.1 Power on sequence



6.4.2 Power off sequence



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7.0 RELIABILITY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80°C, 240hrs	
2	Low Temperature Storage	Ta=-30°C, 240hrs	
3	High Temperature Operation	Ta=+70°C, 240hrs	
4	Low Temperature Operation	Ta=-20°C, 240hrs	
5	High Temperature and High Humidity (operation)	Ta=+60°C, 90%RH, 240hrs	
6	Thermal Cycling Test (non operation)	-30°C (30min)→+80°C (30min),100 cycles	

Note1: There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

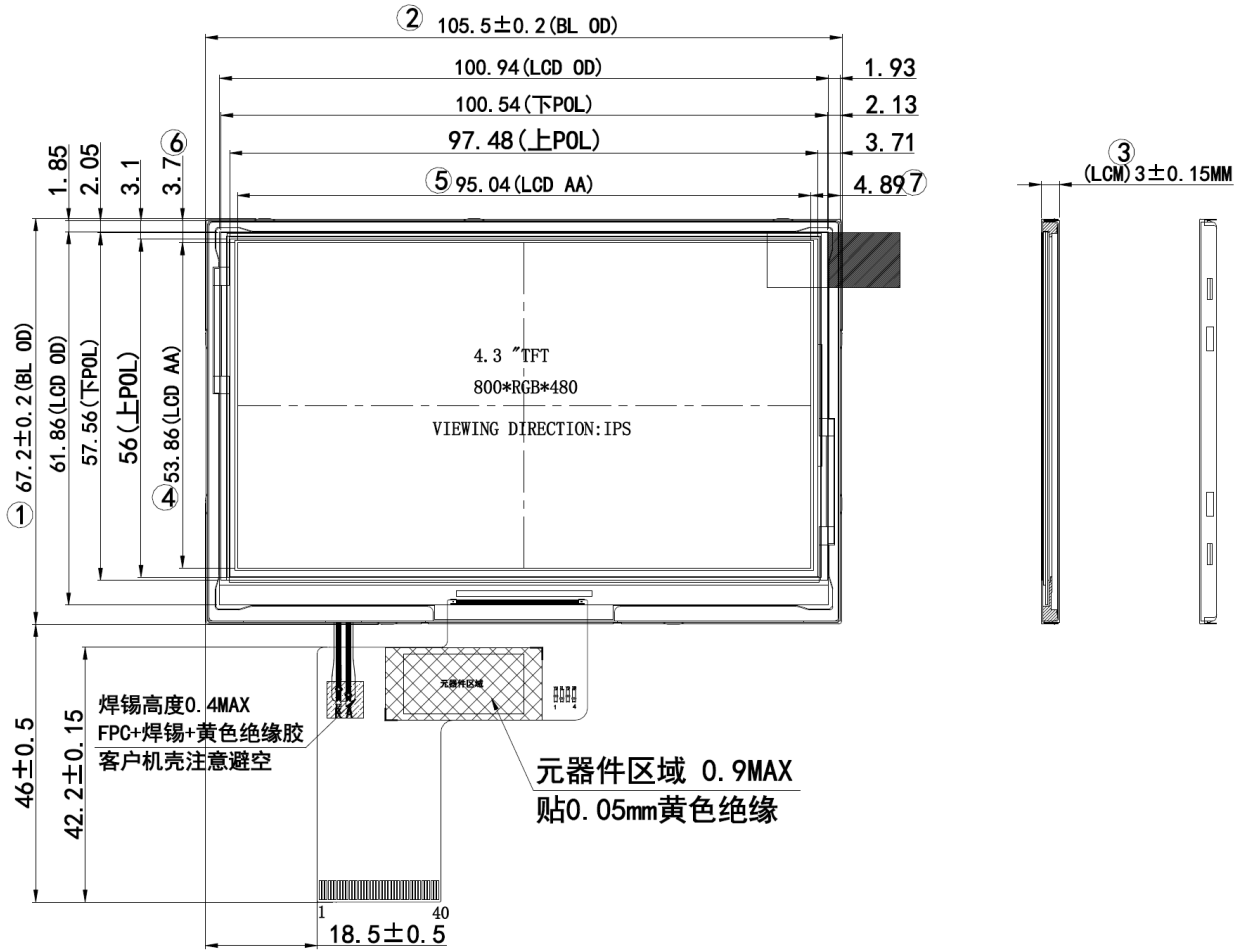
Note2: All of the function & cosmetic Judgment basis base on room temperature.
(The tested module must have enough recovery time at least 2 hours at room temperature.)

Note3: The test condition definition panel's surface temperature.

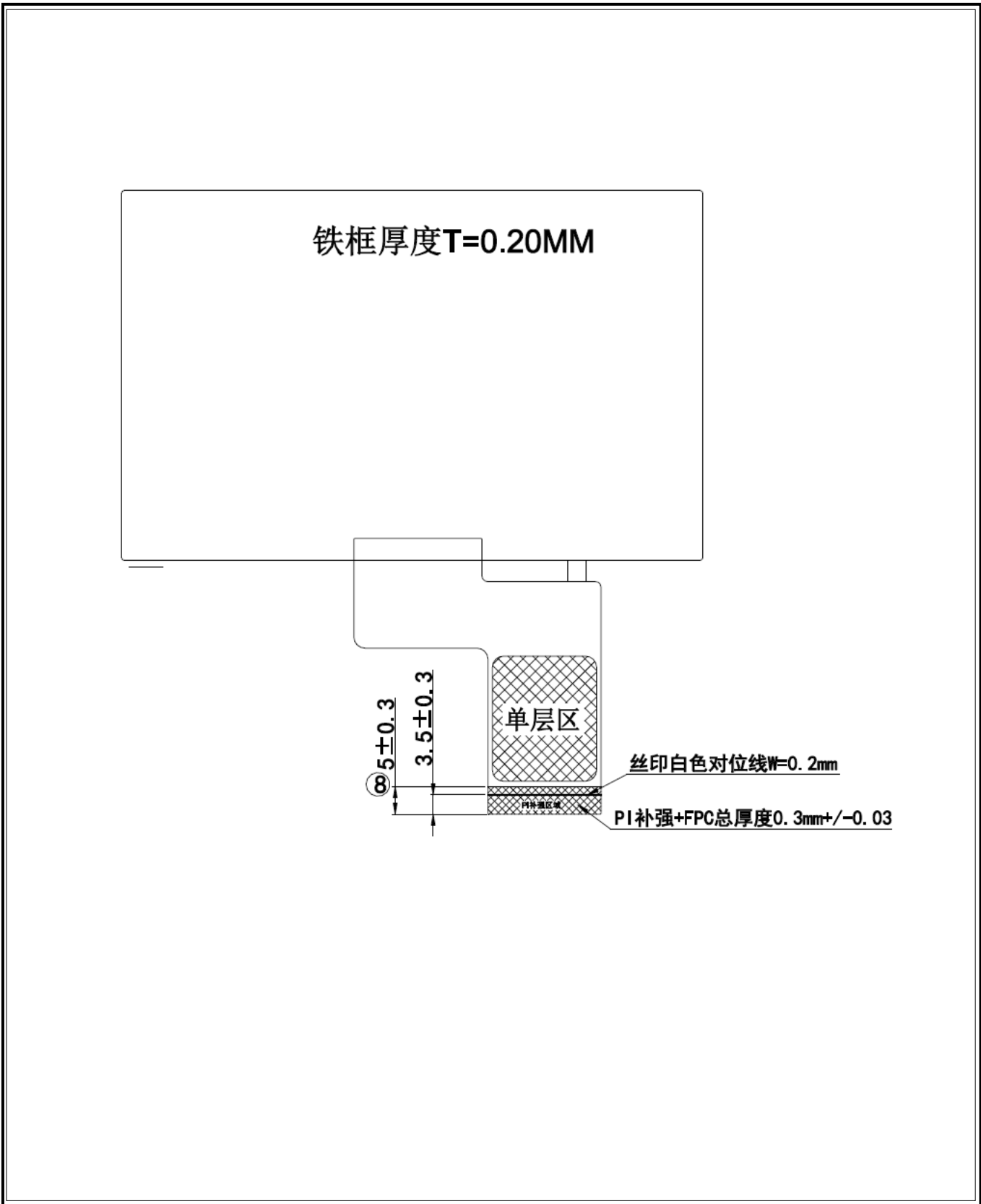
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8.0 OUTLINE DIMENSION

Unit : mm



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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: Code 8 is defined by the last number of the year, for example

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Mark	6	7	8	9	0	1	2	3	4	5	6

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 Detail of Lot Mark

- (1) Below label is attached on the backside of the LCD module. See Section 8.0: Outline Dimension.
- (2) The detail of Lot Mark is attached as below.
- (3) This is subject to change without prior notice.



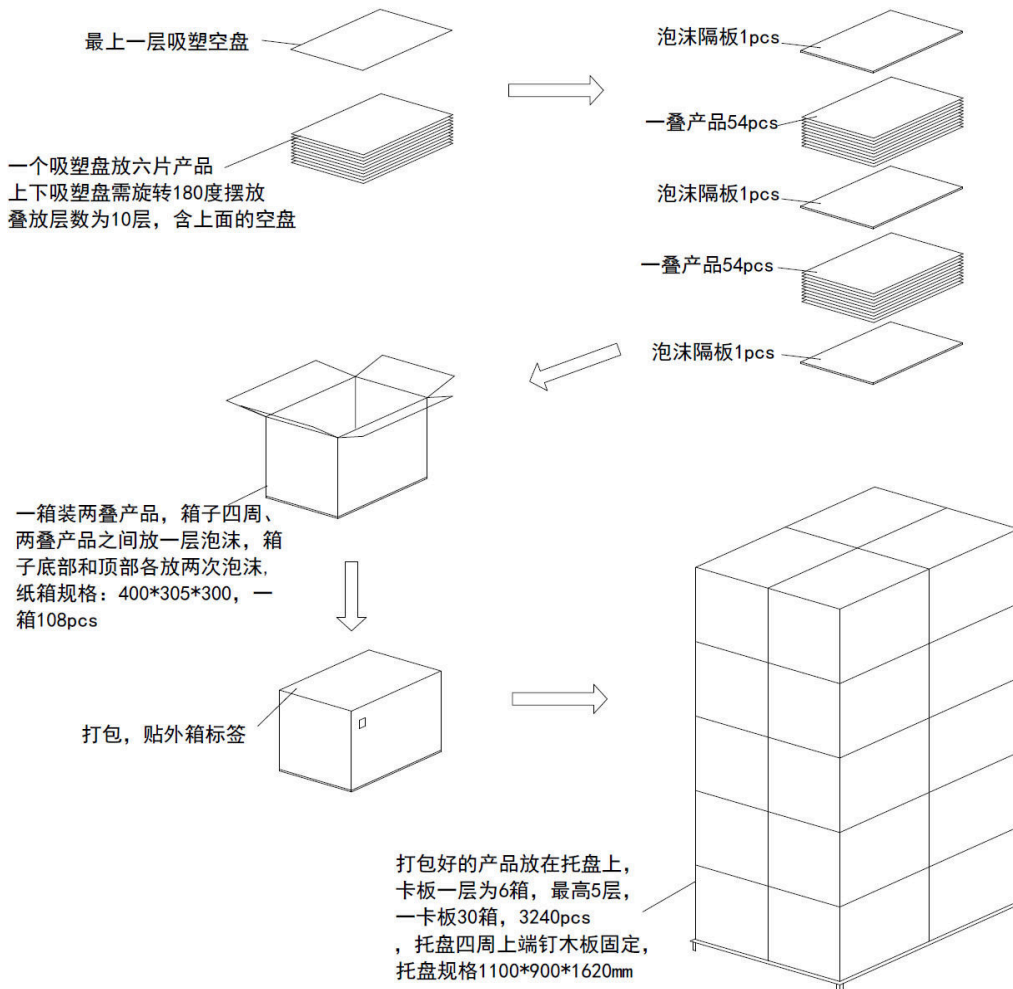
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10.0 PACKAGE SPECIFICATION

10.1 Packing form

Packaging material	Standard	Boxful
BOX	400*305*300mm	1pcs
Blister tray	360*280*0.8mm	18pcs
Foam1	360*280*10mm	3pcs
Foam2	285*285*10mm	2pcs
Foam3	360*285*10mm	2pcs
pallet	1100*900*1620mm	30 boxes of a pallet

10.2 Packing Drawing



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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.



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