DATA MODUL

SPECIFICATION

HannStar

HSDJHW1-D10

9" - HD - LVDS

Version: 1.0
Date: 11.01.2024

Note: This specification is subject to change without prior notice

TO : DATA MODUL

Date : Jan.11.2024

HannStar Product Information

(Formal)

9” Color TFT-LCD Module

Model: **HSD090JHW1-D10**

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.
(4) This specification contains bracketed details”(Number)”, which are tentative specifications.
If there is any change, the specifications will be updated in the next stage.

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Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Jan.11.2024	-D10	Formal Product Information was first released.

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Contents

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1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD090JHW1-D10 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 9" (16:9) inch diagonally measured active display area with HD (1280 horizontal by 720 vertical pixel) resolution.

1.2 Features

- 9 (16:9 diagonal) inch configuration
- 16.7M color by 8 bit
- ROHS / Halogen Free Compliance

1.3 Applications

- Automotive
- Multimedia applications and Others AV system

1.4 General information

Item		Specification	Unit
Outline Dimension		210.7(H) x 124.1(V) x 6.2 (Typ.)	mm
Display area		198.912(H) x 111.888V)	mm
Number of Pixel		1280 RGB (H) x 720(V)	pixels
Pixel pitch		0.1554(H) x 0.1554(V)	mm
Pixel arrangement		RGB Vertical stripe	
Display mode		Normally Black	
NTSC		70 (Typ.)	%
Surface treatment		AG, Hard-Coating (3H)	
Weight		225 (Typ.)	g
Back-light		27pcs (9S3P)	
Power Consumption	Logic System	2 (Max)	W
	B/L System	7.344 (Max.)	W

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	210.4	210.7	211.0	mm
	Vertical (V)	123.8	124.1	124.4	mm
	Depth (D)	5.9	6.2	6.5	mm
Weight		—	225	235	g

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2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Parameters	Symbol	Min.	Max.	Unit	Note
Power Supply voltage	VDD	-0.3	5	V	
	AVDD	-0.5	15	V	
	VGH	-0.3	42	V	
	VGL	-20	0.3	V	
	VGH-VGL	-0.3	40	V	

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T_{opa}	-40	85	℃	
Storage Temperature	T_{stg}	-40	90	℃	

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3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	Θ=0 Normal viewing angle	600	900	—		(1)(2)
Response time		$T_{R+}T_F$		—	30	40	msec	(1)(3)
White luminance (Center)		Y_L		650	800	—	—	(1)(4) (I_L=240mA)
Color chromaticity (CIE1931)	White	W_x		0.263	0.303	0.343		(1)(4)
		W_y		0.283	0.323	0.363		
	Red	R_x		0.619	0.649	0.679		
		R_y		0.302	0.332	0.362		
	Green	G_x		0.264	0.294	0.324		
		G_y		0.580	0.610	0.640		
	Blue	B_x		0.118	0.148	0.178		
		B_y		0.025	0.055	0.085		
Viewing angle	Hor.	$Θ_L$	CR>10	75	85	—		
		$Θ_R$		75	85	—		
	Ver.	$Θ_U$		75	85	—		
		$Θ_D$		75	85	—		
Brightness uniformity		B_{UNI}	Θ=0	70	80	—	%	(5)
Optima View Direction		Free						(6)

3.2 Measuring Condition

- Measuring surrounding：dark room
- LED current I_L：240mA
- Ambient temperature：25±2°C
- 15min. warm-up time.

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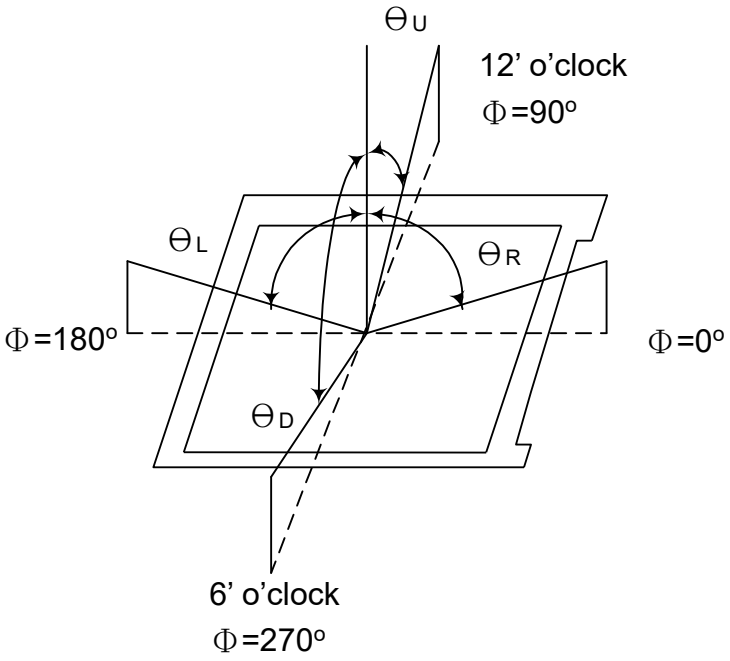
3.3 Measuring Equipment

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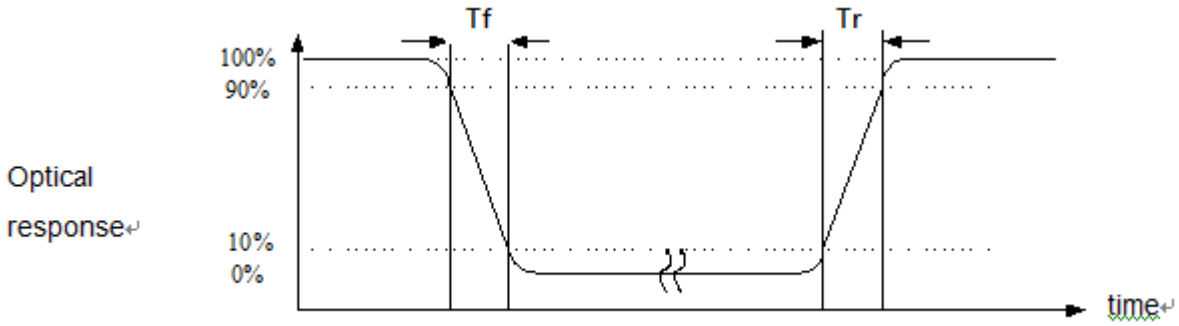
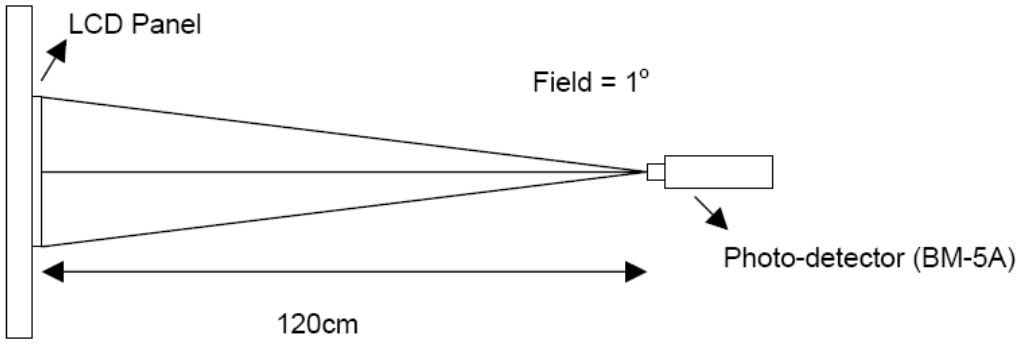
Note (3) Definition of Response Time : Sum of T_R and T_F



Note (4) Definition of optical measurement setup



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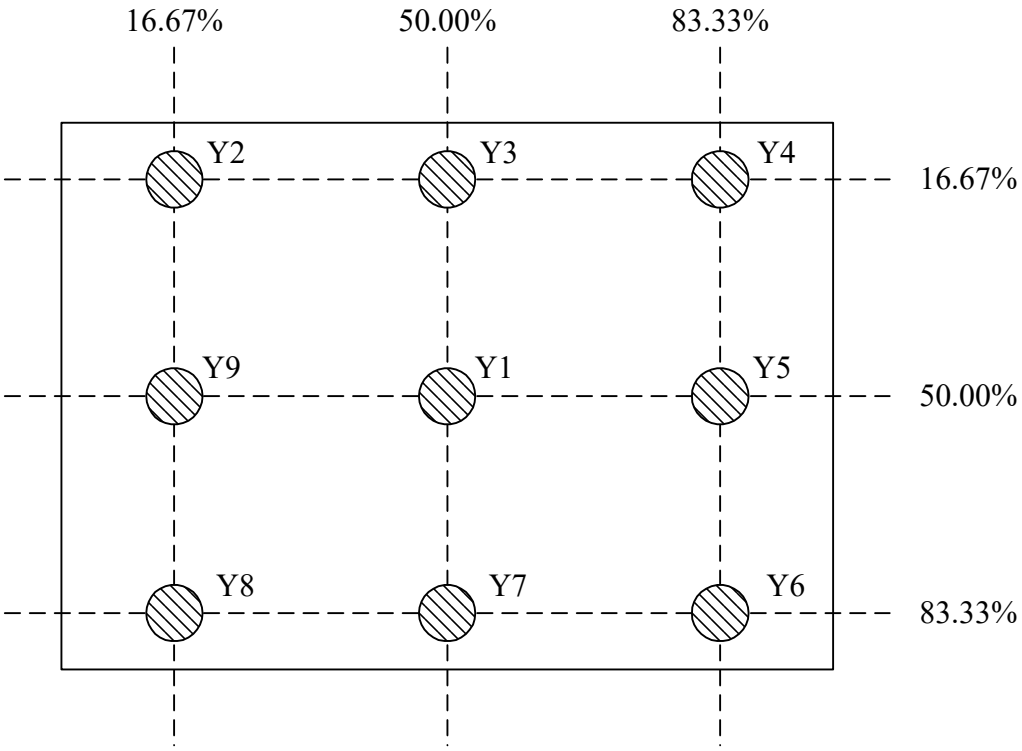
Note (5) Definition of brightness uniformity



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

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

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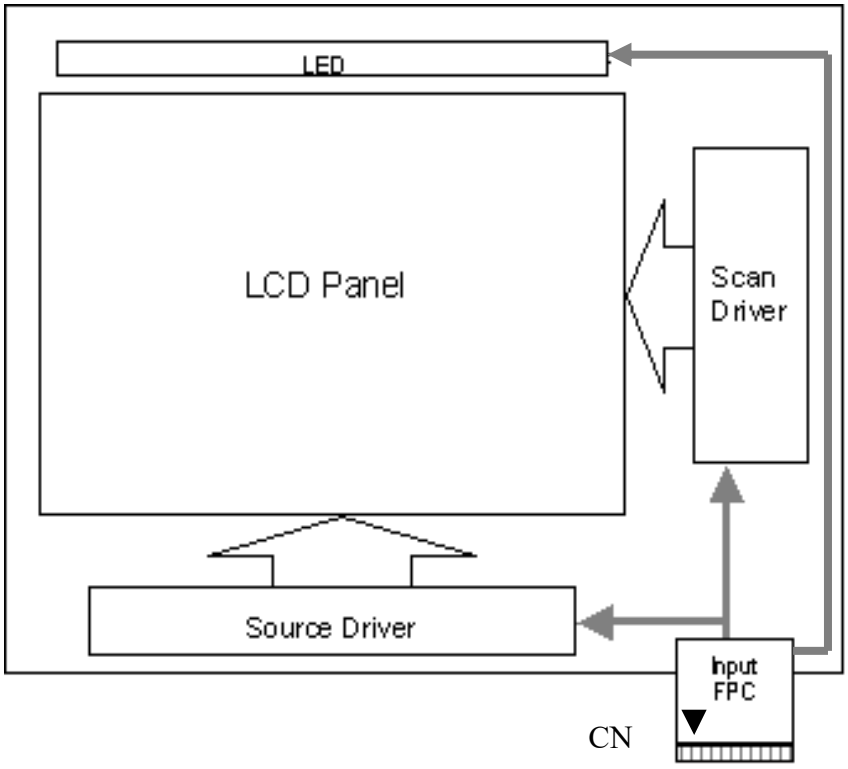
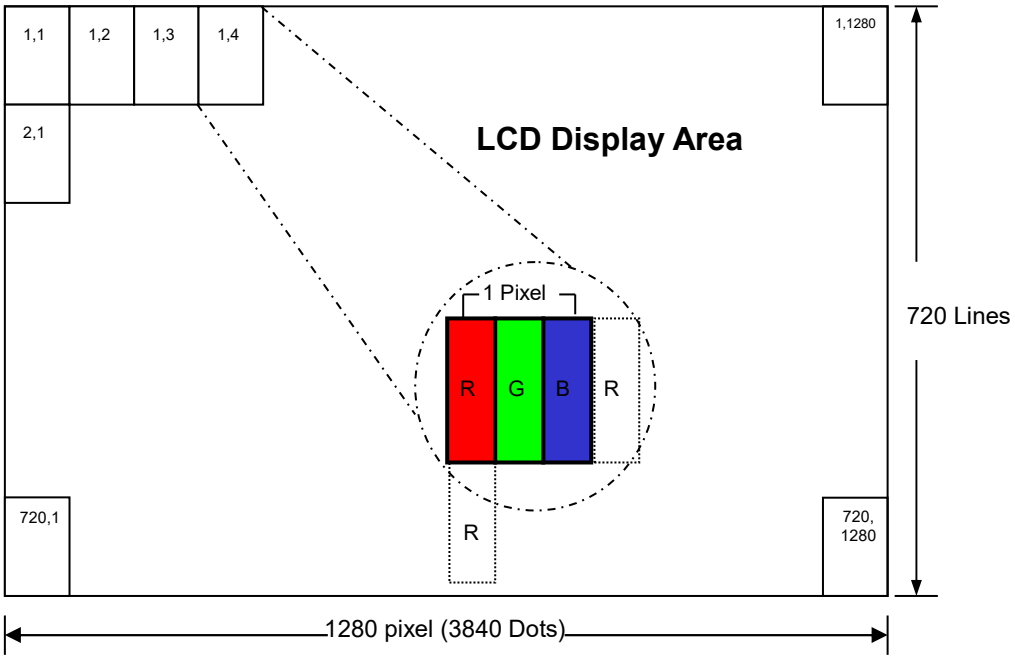
4.0 BLOCK DIAGRAM

4.1 TFT LCD Module:



4.2 Pixel Format



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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	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	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	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	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	H	L	L	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	H	L	L	H	H	H	H	H	H	L	L	H	H	H	H	H	H	L	L	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

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5.0 INTERFACE PIN CONNECTION

5.1 FPC Pin Assignment:

FPC connector is used for electronics interface. The recommended model is FH52-60S-0.5SH manufactured by HIROSE

Pin No.	Symbol	Description	Note
1	AGND	Analog ground	
2	AVDD	Analog power	
3	DVDD	Digital power	
4	GND	Digital ground	
5	NC	No connection	
6	DVDD	Digital power	
7	GND	Digital ground	
8	NC	No connection	
9	NC	No connection	
10	NC	No connection	
11	NC	No connection	
12	NC	No connection	
13	NC	No connection	
14	NC	No connection	
15	GND	Digital ground	
16	DVDD_LVDS	LVDS power	
17	GND	Digital ground	
18	PIND3	Positive LVDS differential data input	
19	NIND3	Negative LVDS differential data input	
20	GND	Digital ground	
21	PINC	Positive LVDS differential clock input	
22	NINC	Negative LVDS differential clock input	
23	GND	Digital ground	
24	PIND2	Positive LVDS differential data input	
25	NIND2	Negative LVDS differential data input	
26	GND	Digital ground	
27	PIND1	Positive LVDS differential data input	

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Pin No.	Symbol	Description	Note
28	NIND1	Negative LVDS differential data input	
29	GND	Digital ground	
30	PIND0	Positive LVDS differential data input	
31	NIND0	Negative LVDS differential data input	
32	GND	Digital ground	
33	GND_LVDS	Digital ground	
34	GRB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ，C=0.1μF)	
35	STBYB	Standby mode, normally pull high STBYB=”1”, normal operation STBYB=”0”,timing control, source driver will turn off, all output are high-Z	
36	SHLR	Left or right display control	1
37	DVDD	Digital power	
38	UPDN	Up / down display control	1
39	AGND	Analog ground	
40	AVDD	Analog power	
41	NC	No connection	
42	NC	No connection	
43	GND	Digital ground	
44	DVDD	Digital power	
45	GND	Digital ground	
46	NC	No connection	
47	NC	Let it open. HSD used for SPI function	
48	NC	Let it open. HSD used for SPI function	
49	NC	Let it open. HSD used for SPI function	
50	NC	Let it open. HSD used for SPI function	
51	GND	Please connect to ground. (HSD used for EEPROM function)	
52	NC	No connection	
53	GND	Digital ground	
54	DVDD	Digital power	

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Pin No.	Symbol	Description	Note
55	SELB	6bit/8bit mode select, SELB = “1”, LVDS input data is 8bits SELB = “0”, LVDS input data is 6bits	2
56	VGH	Positive power for TFT	
57	DVDD	Digital power for Gate IC	
58	VGL	Negative power for TFT	
59	GND	Digital ground	
60	BIST	Normal operation/BIST pattern select. BIST="1": BIST mode. BIST="0": Normal operation.	

Note1:

When L/R="0",set right to left scan direction

When L/R="1",set left to right scan direction

When U/D="0",set buttom to top scan direction

When U/D="1",set top to buttom scan direction

Note2:

If LVDS input data is 8 bits,SELB must be set to High

If LVDS input data is 6 bits,SELB must be set to Low

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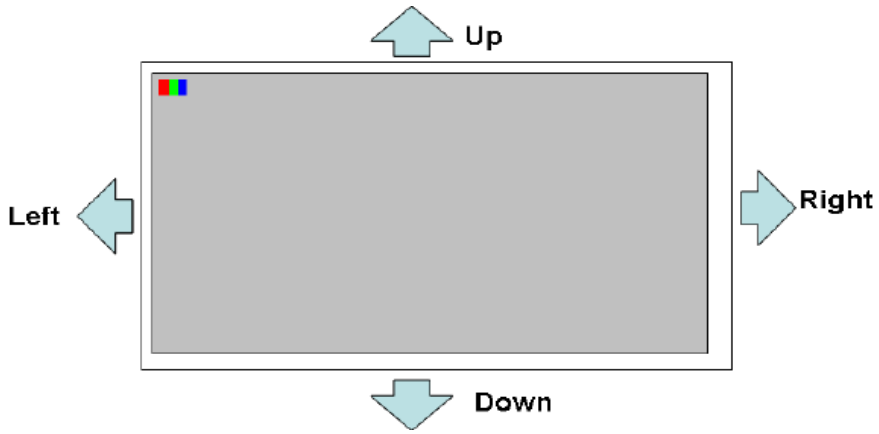
SHLR	UPDN	Data shifting
DVDD	GND	Left→Right→Down→Up
GND	GND	Right→Left；Down→Up
DVDD	DVDD	Left→Right；Up→Down(default)
GND	DVDD	Right→Left；Up→Down



5.2 LED Board Pin Assignment:

FPC connector is used for LED FPC. The recommended model is FH52-10S-0.5SH manufactured by HIROSE

Pin NO.	Function	Remark
1	ANODE	A (+)
2	ANODE	A (+)
3	ANODE	A (+)
4	NC	NC
5	NC	NC
6	NC	NC
7	CATHODE1	K1 (-)
8	CATHODE2	K2 (-)
9	CATHODE3	K3 (-)
10	NC	NC

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6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	VDD	3.0	3.3	3.6	V	
	VGH	19	20	21	V	Note (1)
	VGL	-11	-10	-9	V	Note (2)
	AVDD	12.3	12.4	12.5	V	
Input signal voltage	ViH	0.7 VDD	-	VDD	V	
	ViL	GND	-	0.3 VDD	V	
Current of power supply	IDD	-	30	39	mA	VDD =3.3V / Note (3)
	IADD	-	50	65	mA	AVDD=12.4V / Note (3)
	IGH	-	1	1.3	mA	VGH=20V / Note (3)
	IGL	-	1	1.3	mA	VGL=-10V / Note (3)

Note：

(1)：VGH is TFT Gate operating Voltage.

(2)：VGL is TFT Gate operating Voltage.

(3)：@ White Pattern & 60Hz。

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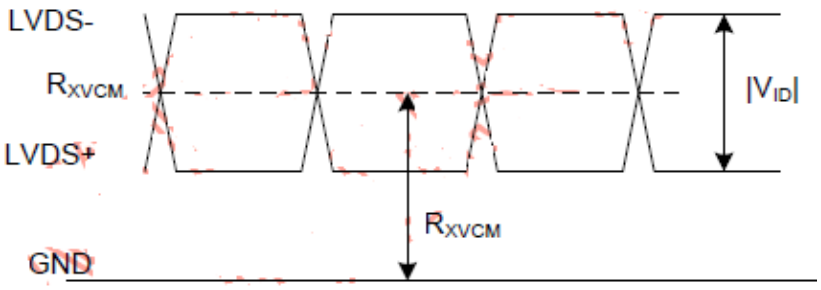
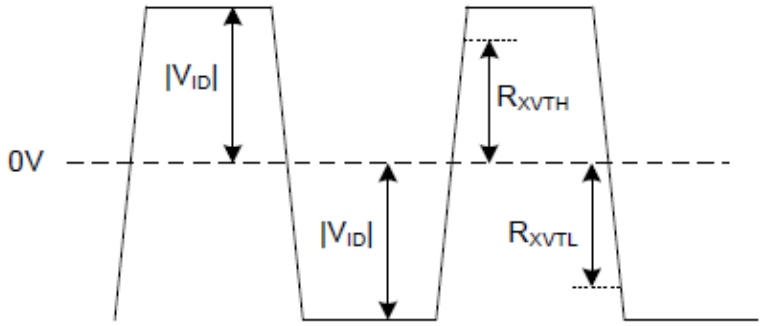
6.2 LVDS Interface DC Characteristic

Item	Symbol	Min.	Typ.	Max.	Unit
Differential Input High Threshold Voltage	R_{XVTH}	-	-	200	mV
Differential Input Low Threshold Voltage	R_{XVTL}	-200	-	-	mV
Differential Input Common Mode Voltage	R_{XVCM}	1.0	1.2	1.7-$\|V_{ID}\|$/2	V
Differential input Voltage	$\|V_{ID}\|$	200	-	600	mV

Single-end Signal



Differential Signal



LVDS DC Diagram

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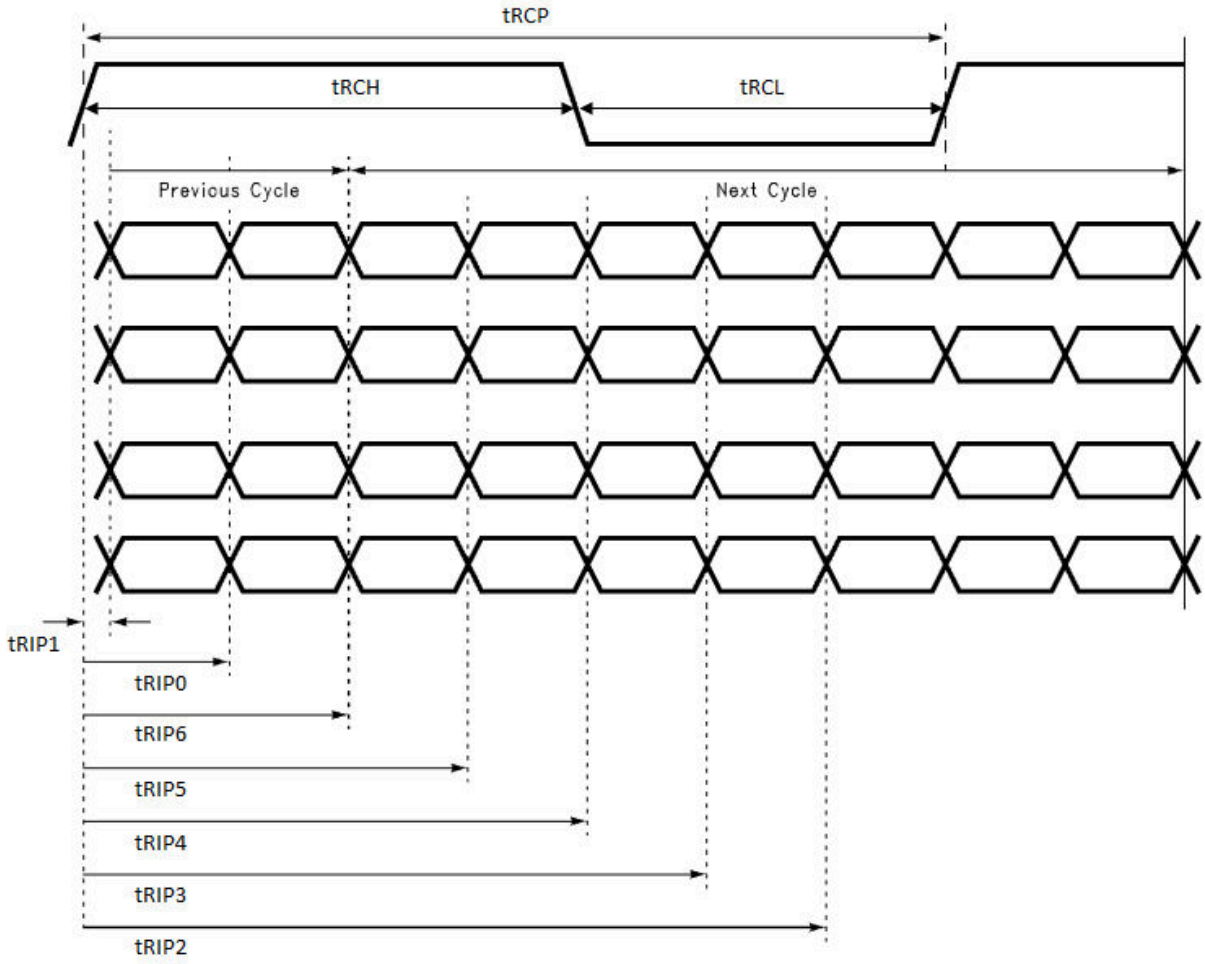
6.3 LVDS Input Timing

Item	Symbol	Min.	Typ.	Max.	Unit
Clock Period	tRCP	Refer to input timing table			
1 data bit time	UI	-	1/7	-	tRCP
Clock high time	tRCH	-	4	-	UI
Clock low time	tRCL	-	3	-	UI
Input Position 1	tRIP1	-0.25	0	0.25	UI
Input Position 0	tRIP0	0.75	1	1.25	UI
Input Position 6	tRIP6	1.75	2	2.25	UI
Input Position 5	tRIP5	2.75	3	3.25	UI
Input Position 4	tRIP4	3.75	4	4.25	UI
Input Position 3	tRIP3	4.75	5	5.25	UI
Input Position 2	tRIP2	5.75	6	6.25	UI



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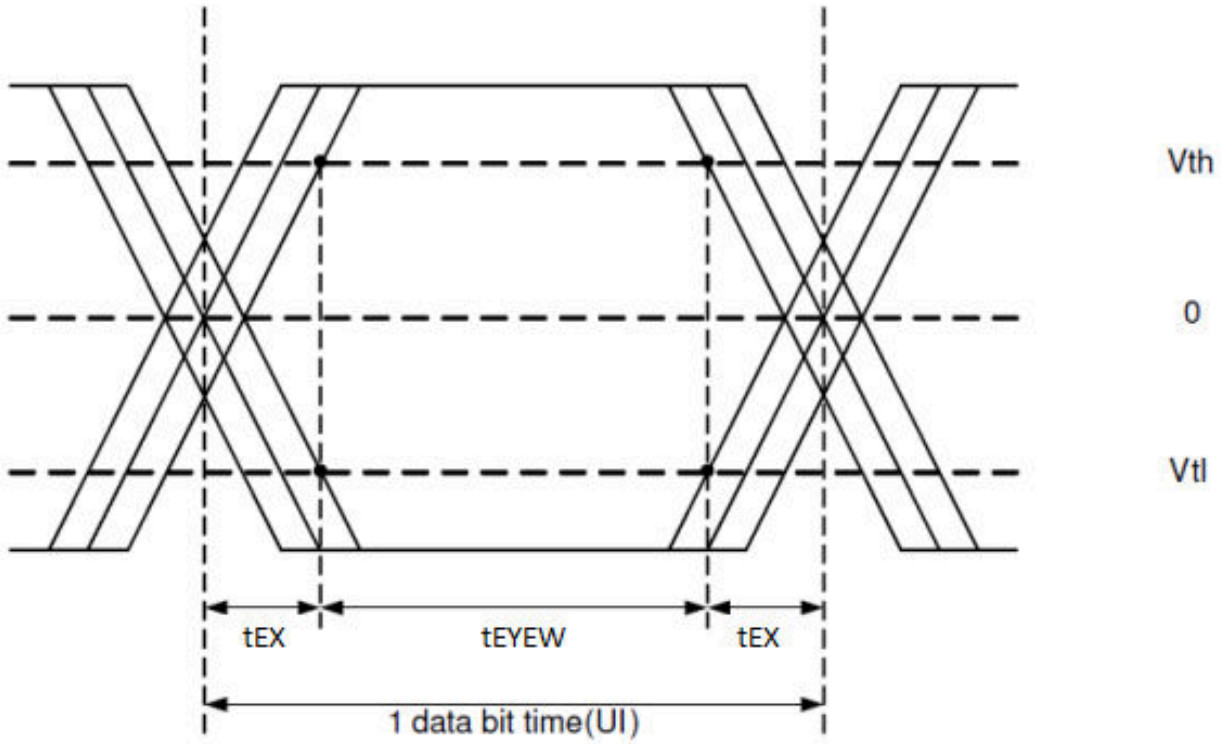
6.4 LVDS Data Skew

Item	Symbol	Min.	Typ.	Max.	Unit
Strobe width	tEYEW	0.5		-	UI
Input data skew margin	tEX	-		0.25	UI



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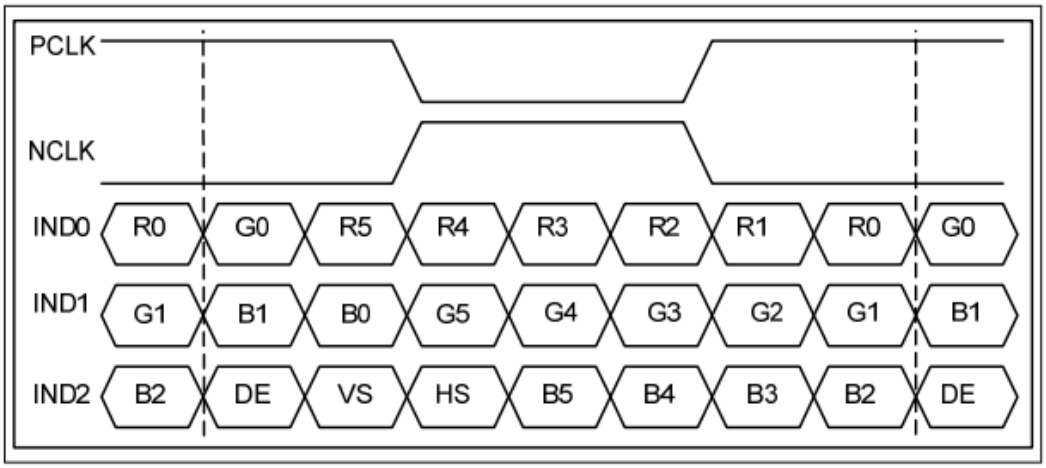
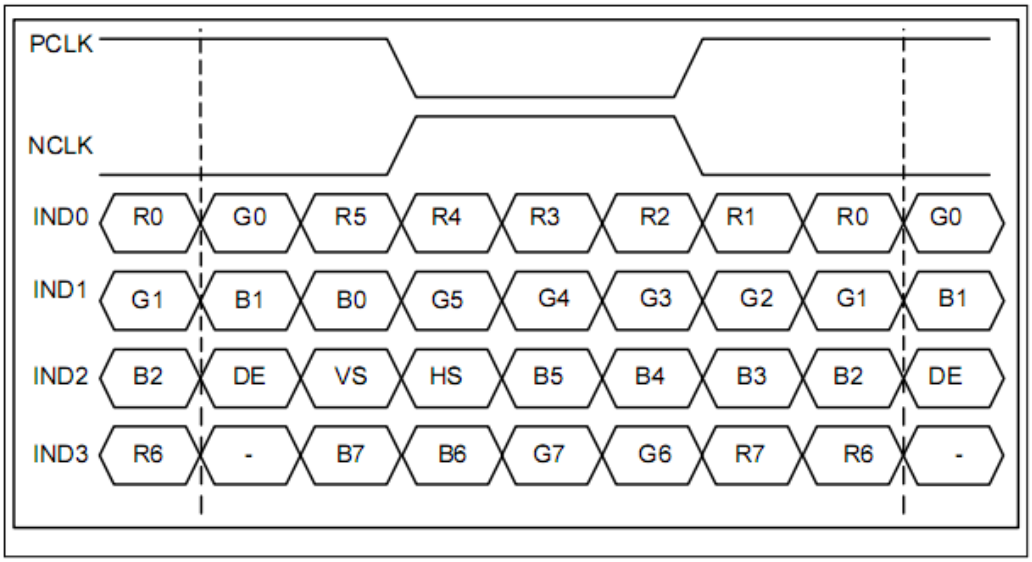
6.5 Bit LVDS input

6.5.1 6bit LVDS input



6.5.2 8Bit LVDS input



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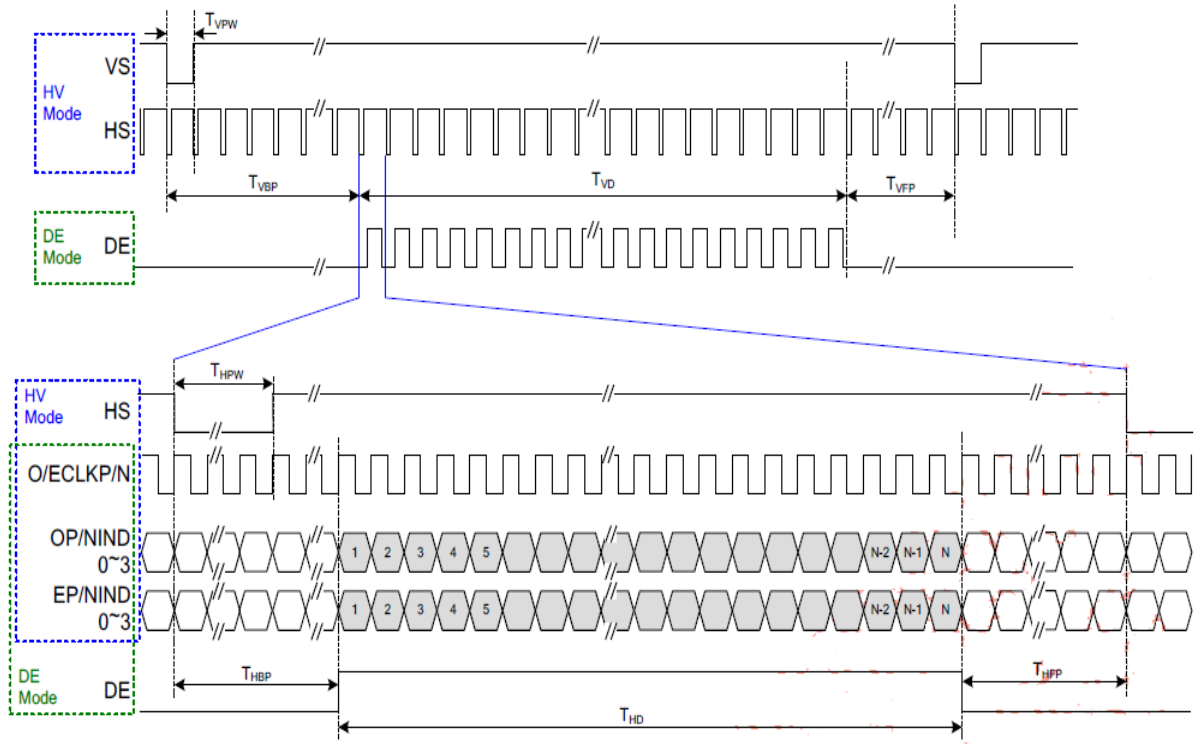
6.6 Interface Timing (DE mode)

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	58	60	62	Hz
Vertical Total Time	T_V		738		line
Vertical Display Time	T_{VD}		720		line
Vertical Blanking Time	$T_{VBP}+ T_{VFP}$		18		line
Horizontal Total Time	T_H		1344		clock
Horizontal Display Time	T_{HD}		1280		clock
Horizontal Blanking Time	$T_{HBP}+ T_{HFP}$		64		clock
Clock Rate	1/ T_{Clock}	57.5	59.5	61.5	MHz

Timing Diagram of Interface Signal (DE mode)



LVDS input timing format

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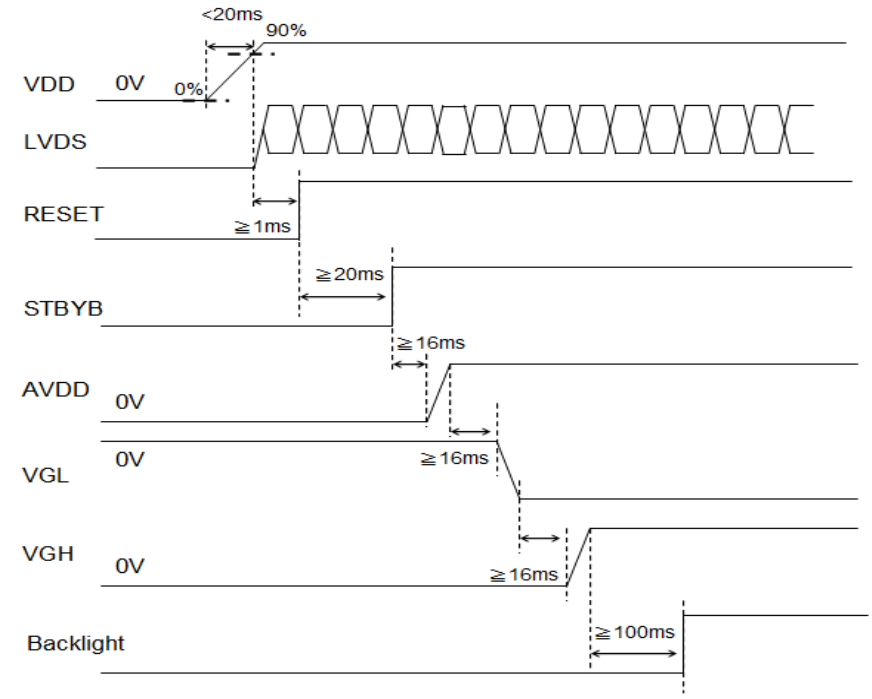
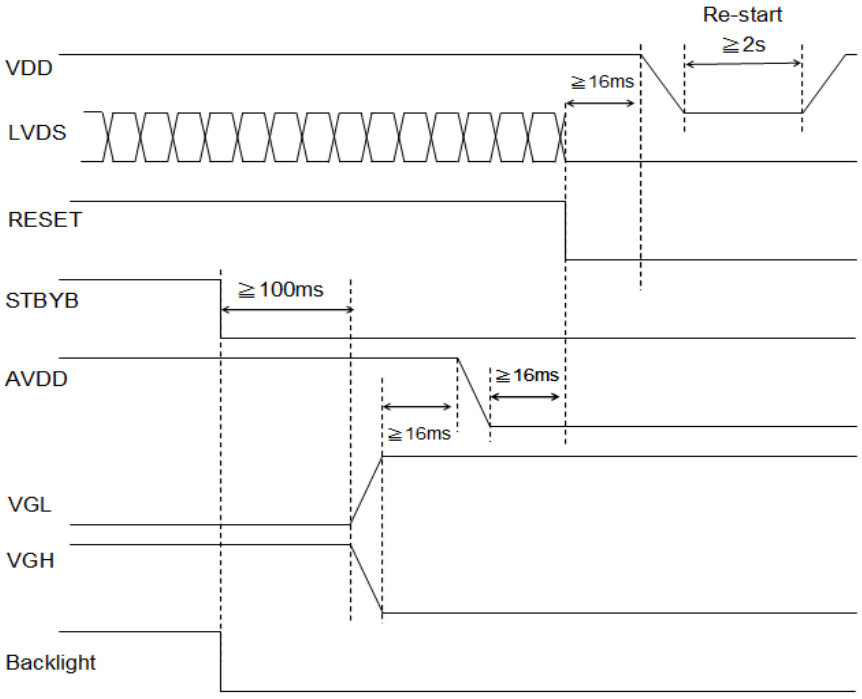
6.7 Power On / Off Sequence

Power on Sequence



Power off Sequence



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6.8 Backlight Unit

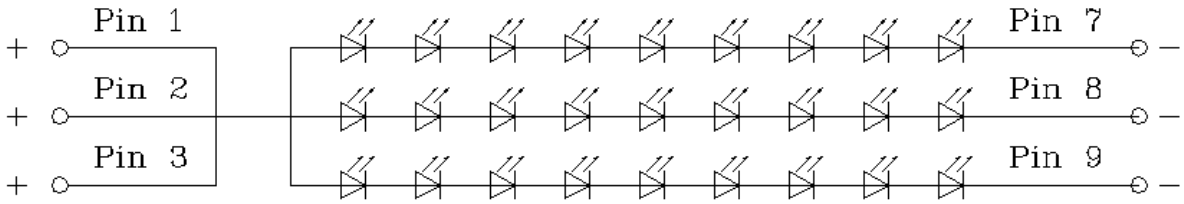
Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I_L	--	240	--	mA	Ta=25℃
LED Voltage	V_F	--		30.6	Volt	Ta=25℃
LED Life-Time	N/A	30,000	--	--	Hour	Ta=25℃ I_L=240mA Note (2)

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 IL 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℃ and IL=240mA. The LED lifetime could be decreased if operating IL is larger than 240mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit

LB LED (9S3P)



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7.0 RELIABILTY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta = +90°C, 500hrs	1, 2, 3
2	Low Temperature Storage	Ta = -40°C, 500hrs	1, 2, 3
3	High Temperature Operation	Ta = +85°C, 500hrs	1, 2, 3
4	Low Temperature Operation	Ta = -40°C, 500hrs	1, 2, 3
5	High Temperature and High Humidity (operation)	Ta = +60°C, 90%RH, 500hrs	1, 2, 3
6	Thermal Cycling Test (non operation)	-30°C(30min) → +85°C(30min), 100 cycles	1, 2, 3
7	Electrostatic Discharge	R=330Ω,C=150pF Contact = ± 8 kV, class B; Air = ± 15 kV, class B; 1 time for each point.	
8	Vibration	1.Random: 1.04G, 5~500Hz, XYZ, 30min/each direction 2.Sine: Freq. Range: 8~33.3Hz, Stoke: 1.3mm Sweep: 2.9G, 33.3~400 X/Z: 2hrs, Y:4hrs	
9	Shock	Half-Sine, 100G, 6ms, ±XYZ, 1time	
10	Vibration (with carton)	Random: 0.015G^2/Hz, 5~200Hz -6dB/Octave, 200~400Hz XYZ 2hrs/each direction	
11	Drop (with carton)	Drop height condition, basis on the product weight and Follow QB200-0015 1 corner, 3 edges, 6 surfaces	

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

Note2: The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample shall be free from defects:
(Air bubble in the LCD、Seal leak、Non-display、Missing segments、Glass crack).

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

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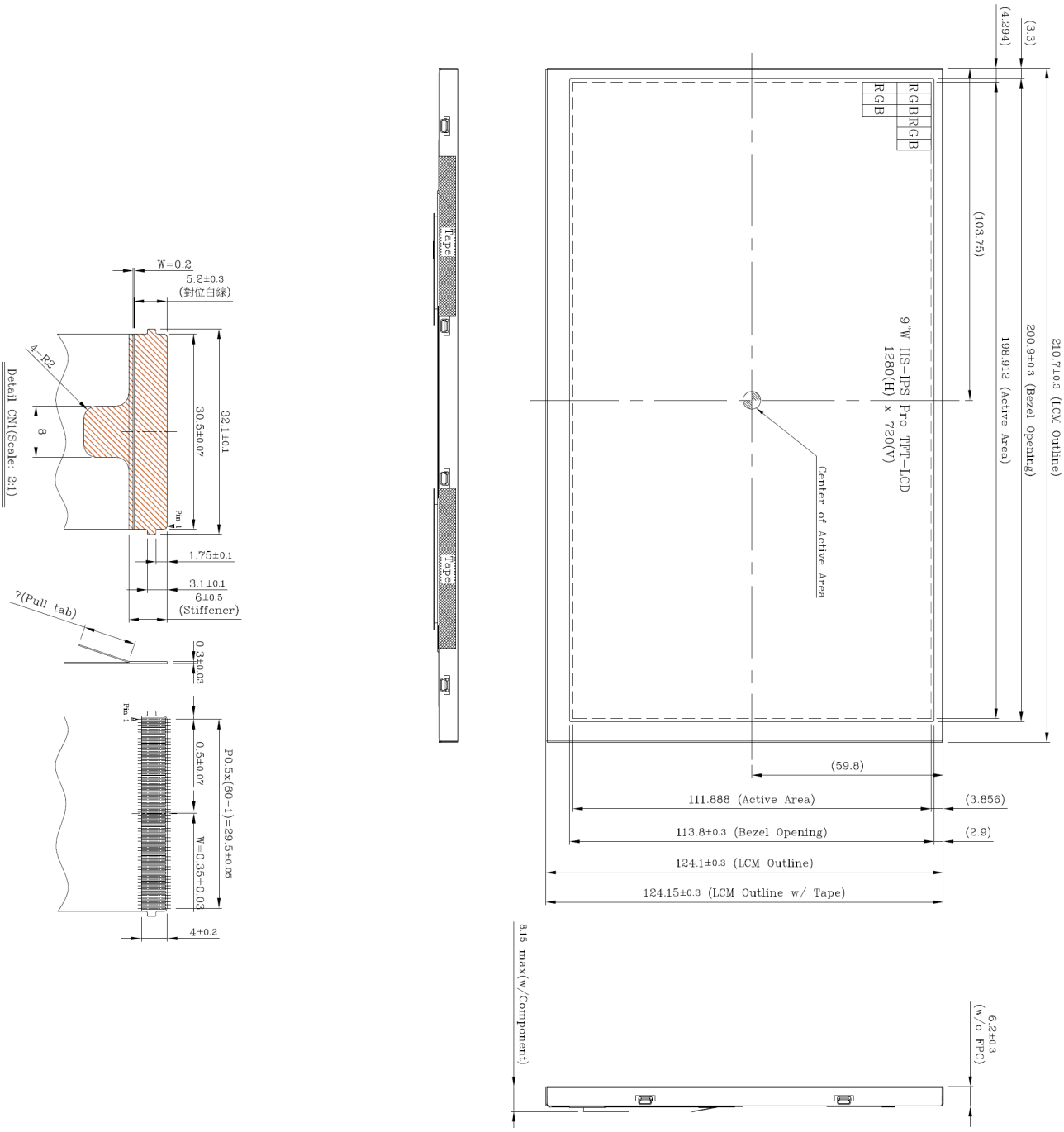
8.0 OUTLINE DIMENSION

Unit : mm



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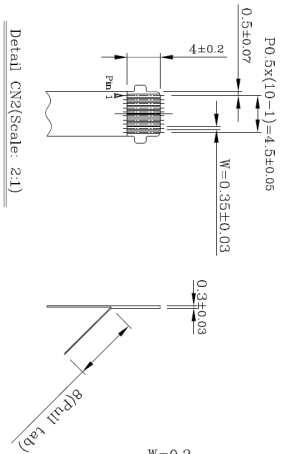
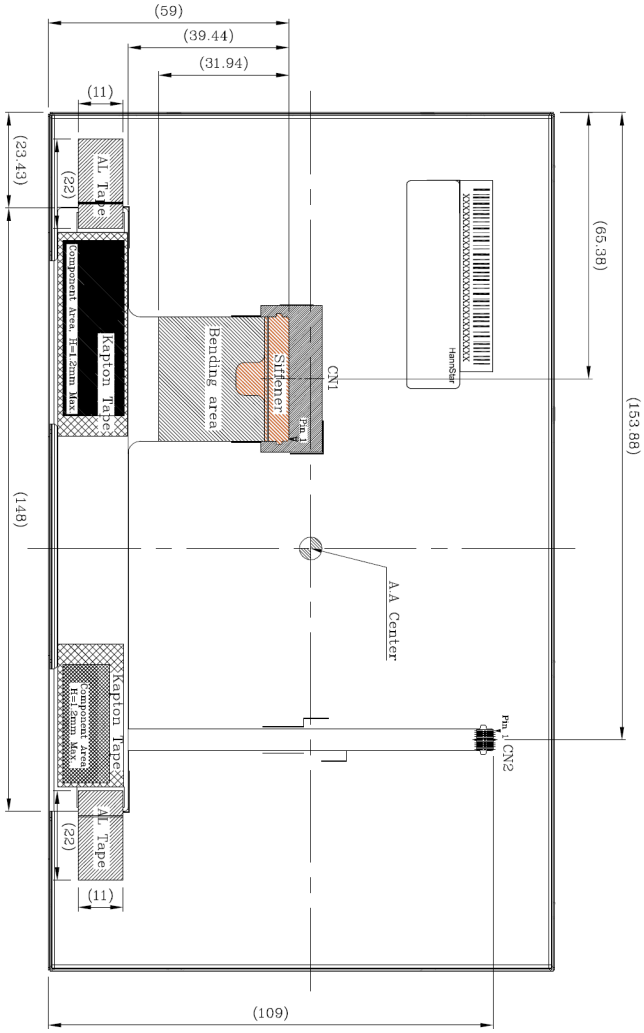


CN2

Pin No	Symbol
1	A
2	A
3	A
4	NC
5	NC
6	NC
7	K1
8	K2
9	K3
10	NC



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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

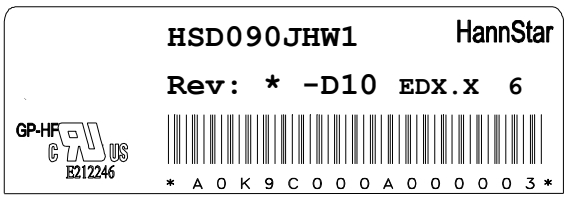
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Mark	7	8	9	0	1	2	3	4	5	6

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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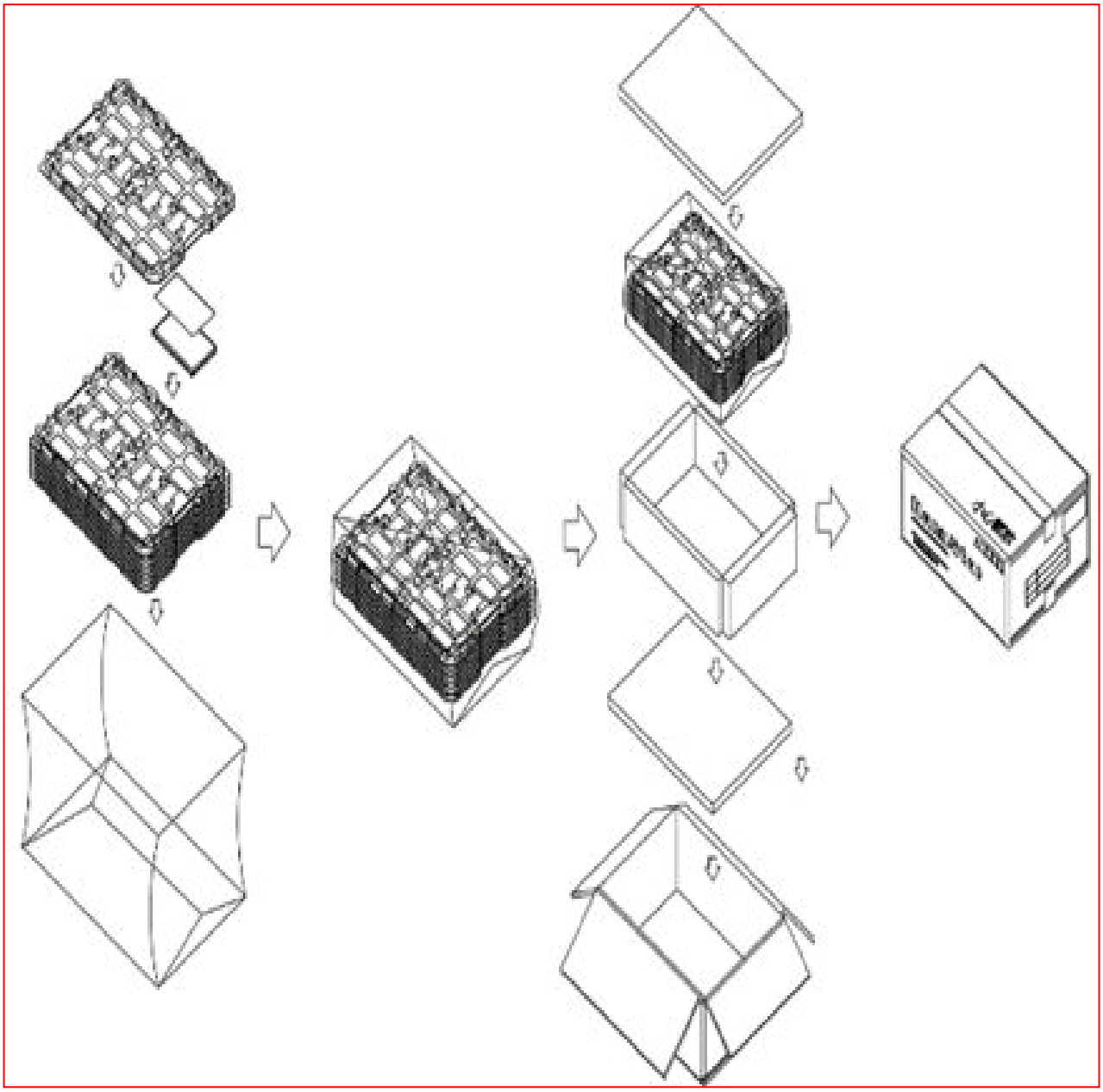
10.0 PACKAGE SPECIFICATION

10.1 Packing form

(1) Package quantity in one carton: 40 pieces.

(2) Carton size: 575 mm × 400 mm × 221 mm.

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.

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