TO :

Date : Dec., 18, 2019

HannStar Product Specification

(Preliminary)

7” Color TFT-LCD Module

Model: HSD070JDW6-G10

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.

(4) The mark “ ** ” of Model means sub-model code.

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Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Dec., 18, 2019	G10	Preliminary Product Specification was first released

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1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD070JDW6-G10 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 7” (15:9) inch diagonally measured active display area with WVGA (800 horizontal by 480 vertical pixel) resolution.

1.2 Features

- 7 (15:9 diagonal) inch configuration
- 8bit , LVDS interface
- ROHS / Halogen Free Compliance

1.3 Applications

- Automotive

1.4 General information

Item		Specification	Unit
Outline Dimension		165.00(H) x 104.07(V) x 9.15(D) (不含螺柱)	mm
Display area		152.4(H) x 91.44(V)	mm
Number of Pixel		800 RGB(H) x 480(V)	pixels
Pixel pitch		0.1905(H) x 0.1905(V)	mm
Pixel arrangement		RGB Vertical stripe	
Display mode		Normally Black	
NTSC		70(Min.)	%
Surface treatment		AG(Anti-Glare)	
Weight		TBD(Typ.)	g
Power Consumption	Logic System	1.0(Max.)	W
	B/L System	6.237(Max.)	W

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	164.70	165.00	165.30	mm
	Vertical (V)	103.77	104.07	104.37	mm
	Depth (D)	8.85	9.15	9.45	mm
Weight		TBD	TBD	TBD	g

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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	Vcc	-0.3	4.5	V	GND=0
	V_{GH}	-0.3	V_{GL}+35.0	V	GND=0
	V_{GL}	-15	0.3	V	GND=0
	AV_{DD}	-0.3	14.5	V	GND=0
	V_{COM}	4	6.5	V	
Logic Signal Input Level	V_I	-0.3	4.5	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℃

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	25℃	800	1000	—		(1)(2)
			-30~85℃	50% Value of 25℃				(1)(2)
Response time		TR,TF	Θ=0 Normal viewing angle	@+85℃, < 25ms @+25℃, < 25ms @-30℃, < 450ms			msec	(1)(3)
White luminance (Center)		Y_L		1000	1250	—	cd/m^2	(1)(4) (I_L=270mA)
Color chromaticity (CIE1931)	White	W_x		-0.03	0.291	+0.03		(1)(4)
		W_y			0.312			
	Red	R_x			0.643			
		R_y			0.330			
	Green	G_x			0.291			
		G_y			0.610			
	Blue	B_x			0.149			
		B_y			0.058			
Viewing angle	Hor.	Θ_L	CR>10	80	85	—	degree	
		Θ_R		80	85	—		
	Ver.	Θ_U		80	85	—		
		Θ_D		80	85	—		
Brightness uniformity		White	Θ=0	75	—	—	%	(5)
Brightness uniformity		Black	Θ=0	50	—	—	%	(5)
Flicker		—	—	—	—	-25	dB	50% gray Flicker pattern
Optima View Direction		Free						(6)

3.2 Measuring Condition

- Measuring surrounding：dark room
- LED current I_L：270mA
- Ambient temperature：25±2°C
- 15min. warm-up time.

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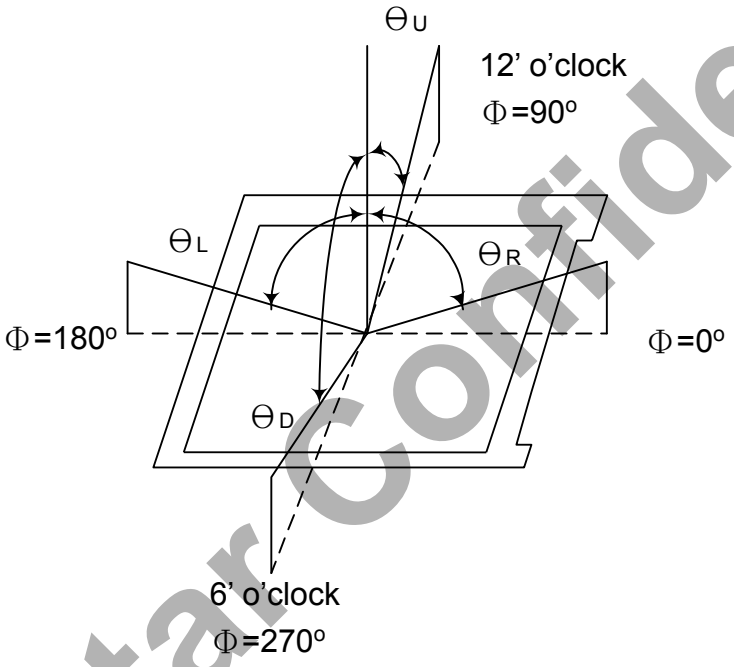
3.3 Measuring Equipment

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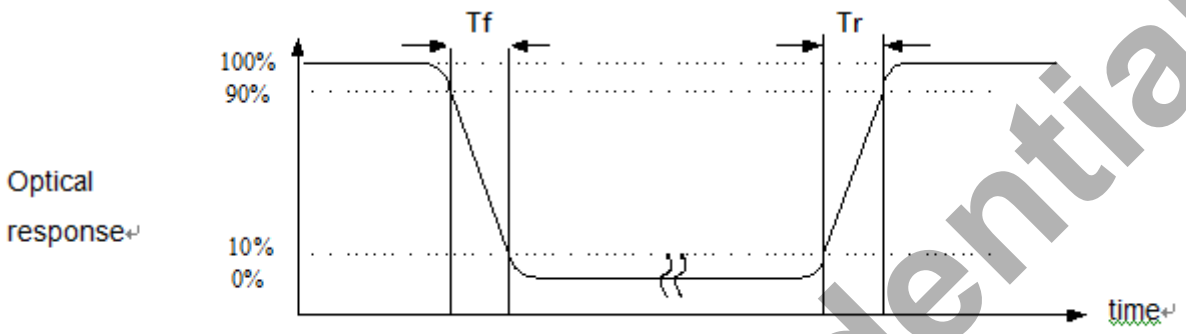
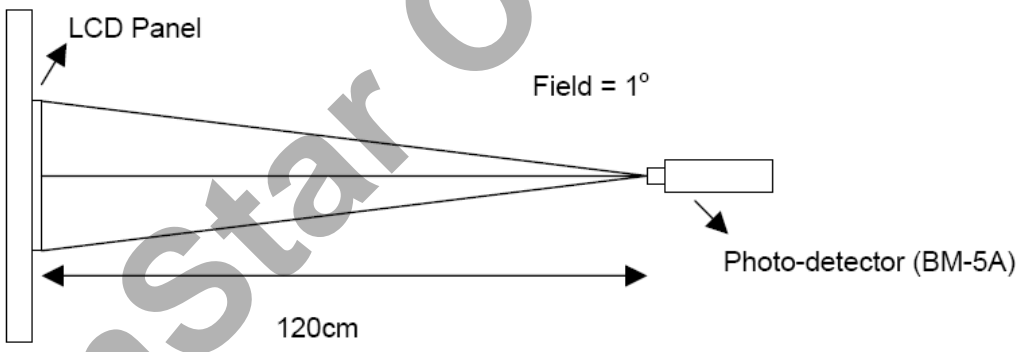
Note (3) Definition of Response Time : Sum of T_R and T_F



Note (4) Definition of optical measurement setup



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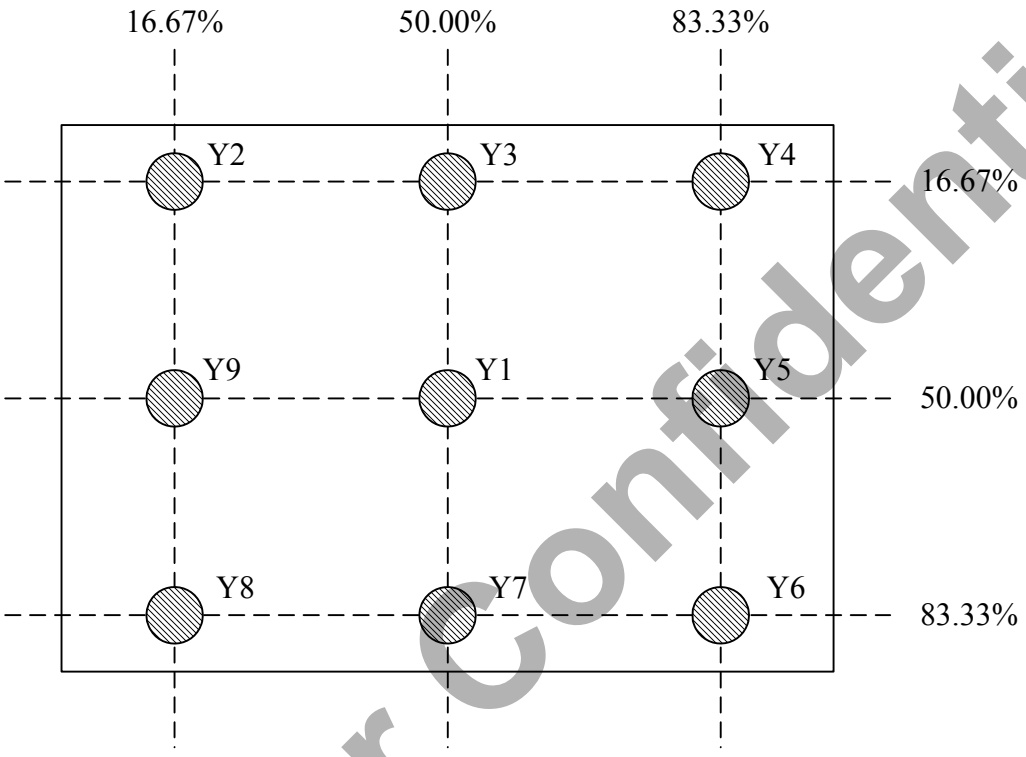
Note (5) Definition of brightness uniformity



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

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

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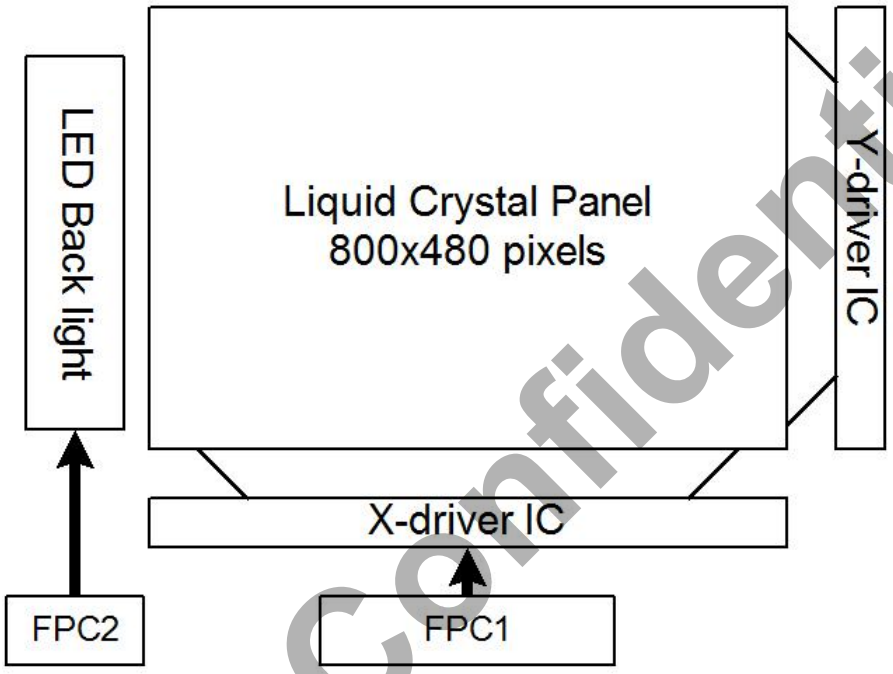
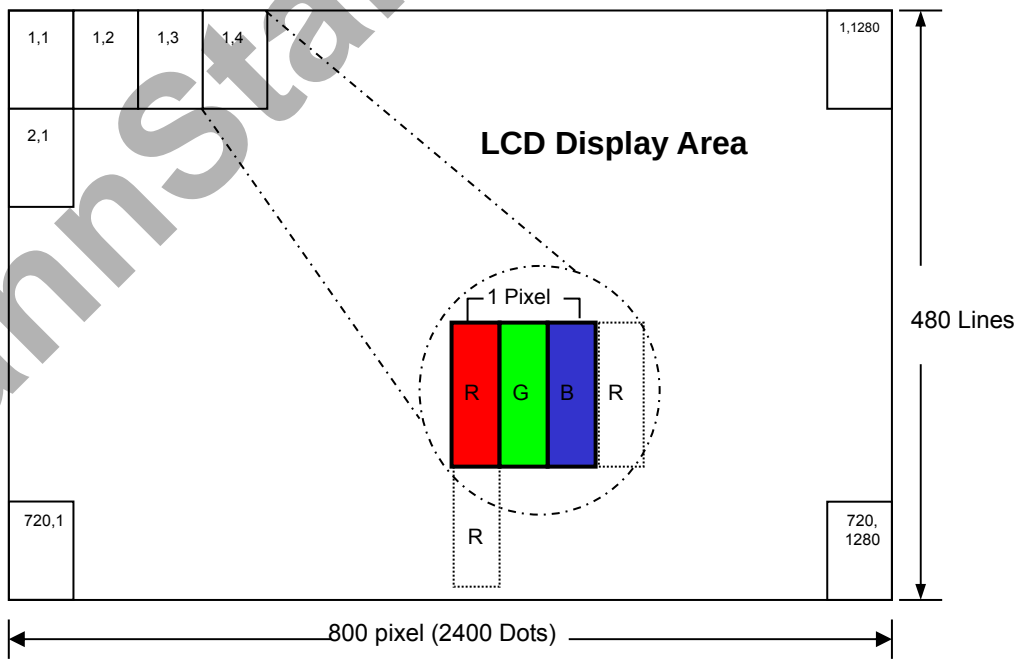
4.0 BLOCK DIAGRAM

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:

FPC1: signal and power input. (Connector: HIROSE FH52E-40S-0.5SH)

PIN	SYMBOL (Customer)	I/O/P	FUNCTION
1	A	P	LED Anode
2	A	P	LED Anode
3	A	P	LED Anode
4	NC	--	Not Connected
5	K1	P	LED Catode 1
6	K2	P	LED Catode 2
7	K3	P	LED Catode 3
8	NTC+	O	Themistor
9	NTC-	O	Themistor
10	VCOM	P	For external VCOM DC input
11	AVDD	P	Analog Power Supply
12	VCC	P	Digital Power Supply
13	VCC	P	Digital Power Supply
14	GND	P	Ground
15	GND	P	Ground
16	VGH	P	Positive power for TFT.
17	VGL	P	Negative power for TFT.
18	STBYB	I	Standby mode. H: normal operation. L: the controller and source driver will turn off. Suggest to connecting with a RC (10KΩ, 0.47uF) circuit for stability.
19	SHLR	I	Left or Right display control. Note1.
20	UPDN	I	UP or Down display control. Note1.
21	GND	P	Ground
22	LVDS_RX_IN3+	I	LVDS Data Input 3+
23	LVDS_RX_IN3-	I	LVDS Data Input 3-
24	GND	P	Ground
25	LVDS_CLK_IN+	I	LVDS Clock Input+
26	LVDS_CLK_IN-	I	LVDS Clock Input-
27	GND	P	Ground
28	LVDS_RX_IN2+	I	LVDS Data Input 2+
29	LVDS_RX_IN2-	I	LVDS Data Input 2-
30	GND	P	Ground
31	LVDS_RX_IN1+	I	LVDS Data Input 1+
32	LVDS_RX_IN1-	I	LVDS Data Input 1-
33	GND	P	Ground
34	LVDS_RX_IN0+	I	LVDS Data Input 0+
35	LVDS_RX_IN0-	I	LVDS Data Input 0-
36	GND	P	Ground

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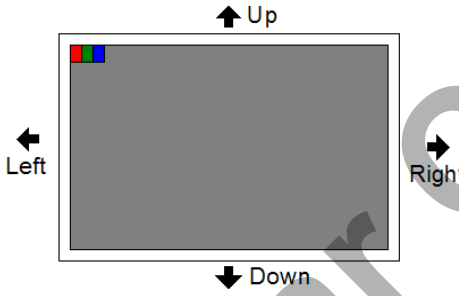
37	RST	I	Reset Pin. H:normal operation. L:the controller is in reset state. Suggest to connecting with a RC (10KΩ, 0.1uF) circuit for stability.
38	GND	P	Ground
39	BRS	O	BRS signal output for external detecting. BRS will keep high when inputted CLK/DE/HV signals fail.
40	GND	P	Ground

Note1：SHLR and UPDN control function

SHLR	UPDN	Data shifting
H	H	Left→Right, Up→Down
L	H	Right→Left, Up→Down
L	L	Right→Left, Down→Up
H	L	Left→Right, Down→Up



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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	
	VGH	-	19	-	V	
	VGL	-	-10	-	V	
	AVDD	-	12.5	-	V	
VCOM	VCOM		5.5		V	Note (4)
Input signal voltage	ViH	0.7*Vcc	-	1.0*Vcc	V	Note (1)
	ViL	0	-	0.3*Vcc	V	
Current of power supply	I_{Vcc}	-	15	-	mA	Vcc =3.3V, white pattern
	I_{AVDD}	-	20	-	mA	AVDD=12.5V, white pattern
	I_{VGH}	-	0.25	-	mA	VGH=19V, white pattern
	I_{VGL}	-	0.50	-	mA	VGL=-10V, white pattern

Note (1): HSYNC, VSYNC, DE, Digital Data
Note (2): Be sure to apply the power voltage as the power sequence spec.
Note (3): GND=AGND=0V
Note (4): 5.5V is for reference, strongly suggest to do Vcom calibration in customer side.

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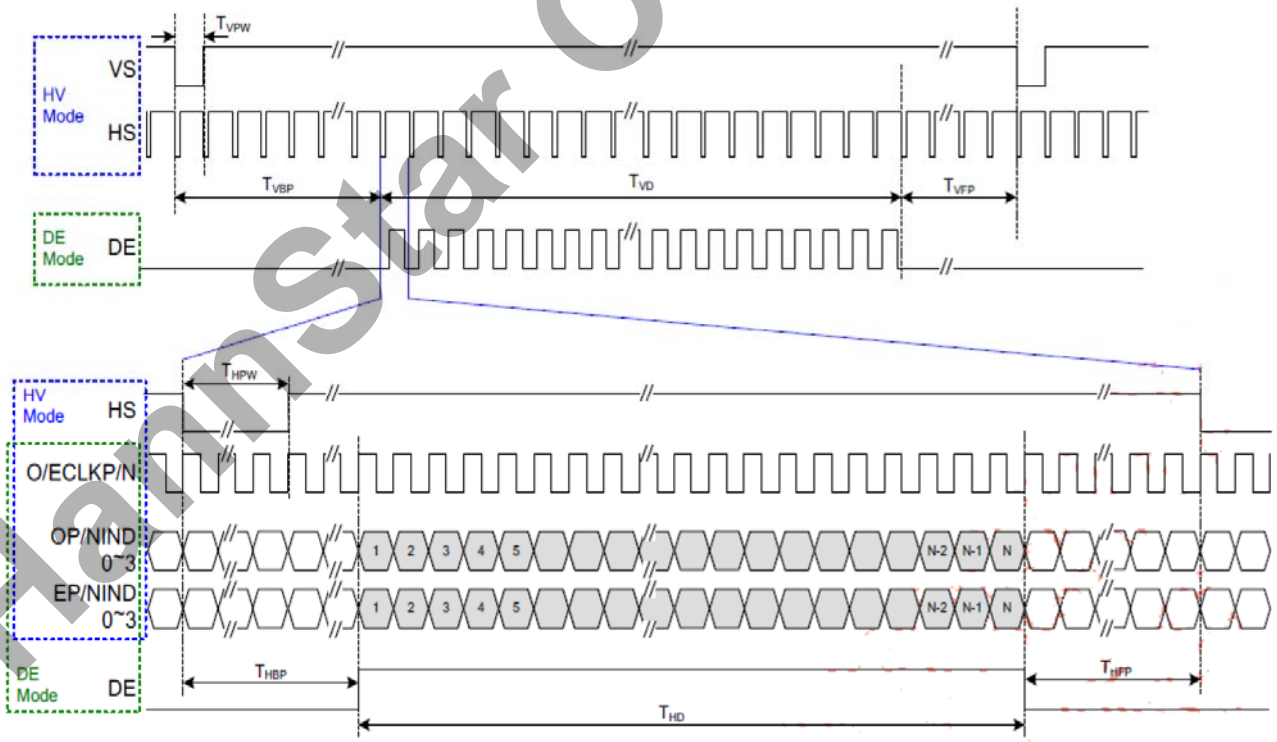
6.2 Interface Timing

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK frequency	fclk	28	30	32	MHz	
Horizontal Display Time	T_{HD}		800		Clock	
Horizontal Total Time	T_{H}	899	902	915	Clock	
Horizontal Blanking Time	T_{HB}	89	102	115	Clock	$T_{HB} = T_{HBP}+T_{HFP}$
Vertical Display Time	T_{VD}		480		Line	
Vertical Total Time	T_{V}	546	555	564	Line	
Vertical Blanking Time	T_{VB}	66	75	84	Line	$T_{VB} = T_{VBP}+T_{VFP}$
Frame rate	--	54	60	66	Hz	

6.3 Timing Diagram of Interface Signal



LVDS input timing format

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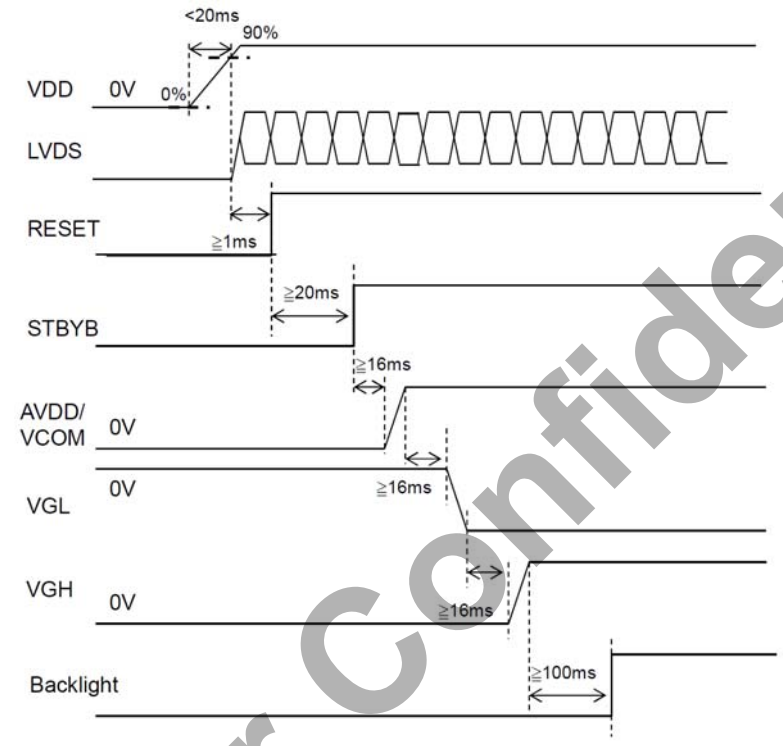
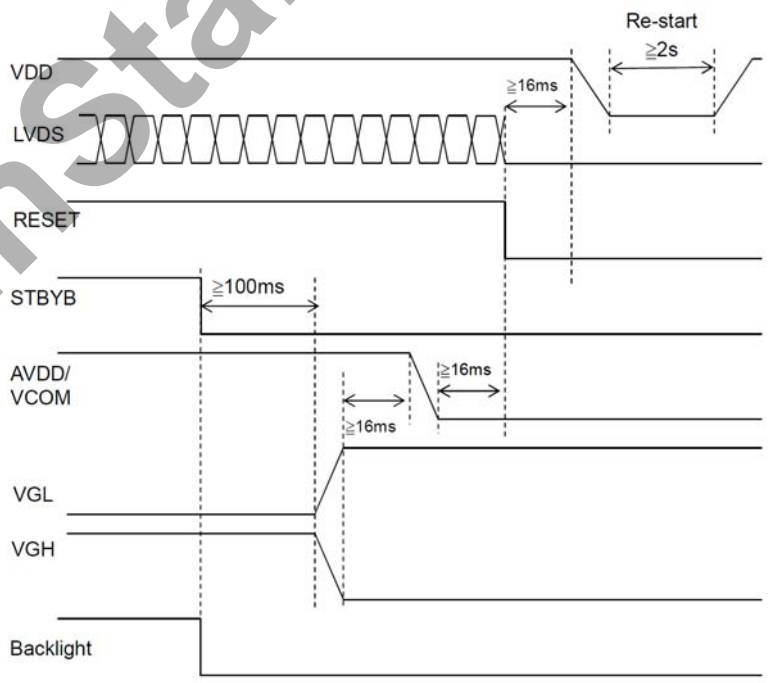
6.4 Power Sequence

Power on Sequence



Power off Sequence



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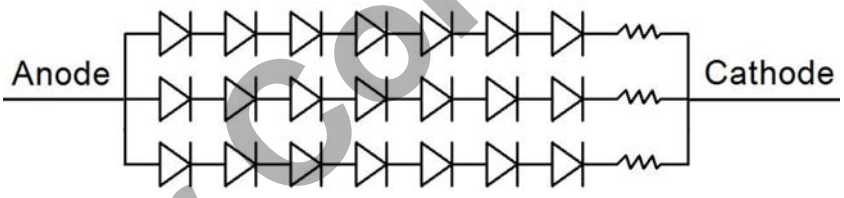
6.5 Backlight Unit

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I_L	--	270	--	mA	Ta=25℃
LED Voltage	V_F	--	--	23.1	Volt	Ta=25℃
LED Life-Time	N/A	20,000	--	--	Hour	Ta=25℃ Note (2)

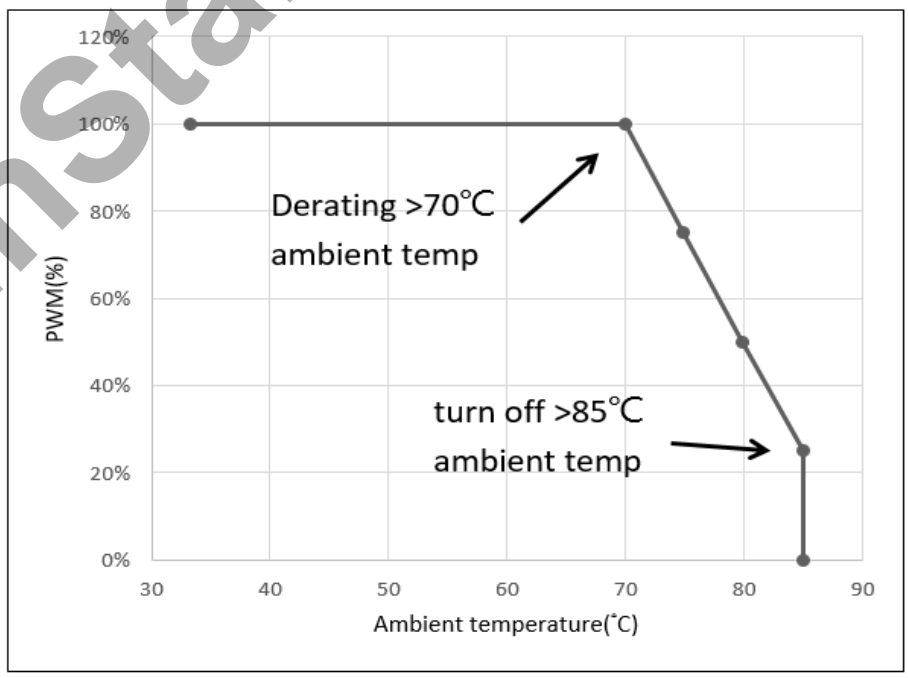
Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃. and IL=270mA. The LED lifetime could be decreased if operating IL is larger than 270mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit



Note (4) LED temperature current curve, The temperature at 70 degrees before the output 100% / CH, 70 degrees to 85 degrees when the linear drop to 25%.



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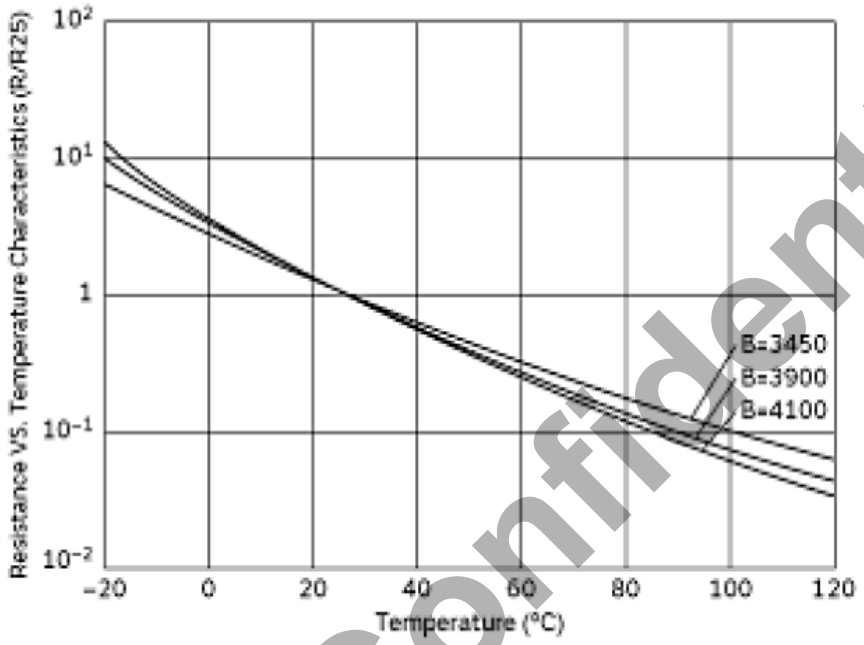
Note (5) Thermistor R-T Table.



Resistance-Temperature Characteristics

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7.0 RELIABILTY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+90℃, 500hrs	1, 2, 3
2	Low Temperature Storage	Ta=-40℃, 500hrs	1, 2, 3
3	High Temperature Operation	Ta=+85℃, 500hrs	1, 2, 3
4	Low Temperature Operation	Ta=-40℃, 500hrs	1, 2, 3,
5	High Temperature and High Humidity (operation)	Ta=+65℃, 90%RH, 500hrs	1, 2, 3
6	Thermal Cycling Test (non operation)	-40°C(30min) → +85°C(30min), 100 cycles	1, 2, 3
7	Electrostatic Discharge	±200V,200pF(0Ω) 1 time/each connector	
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, 33.3~400Hz 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 QB100-0027 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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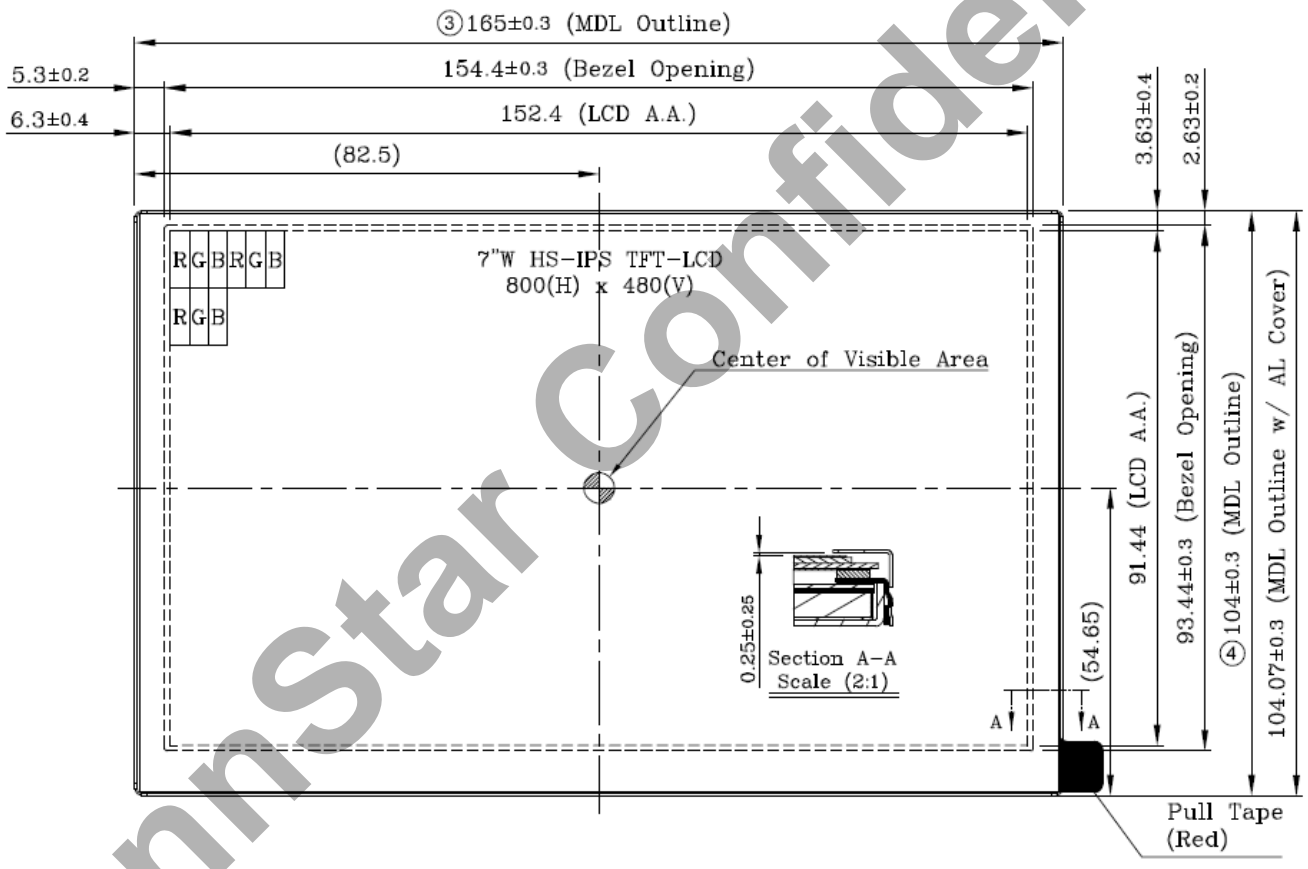
8.0 OUTLINE DIMENSION

Unit : mm



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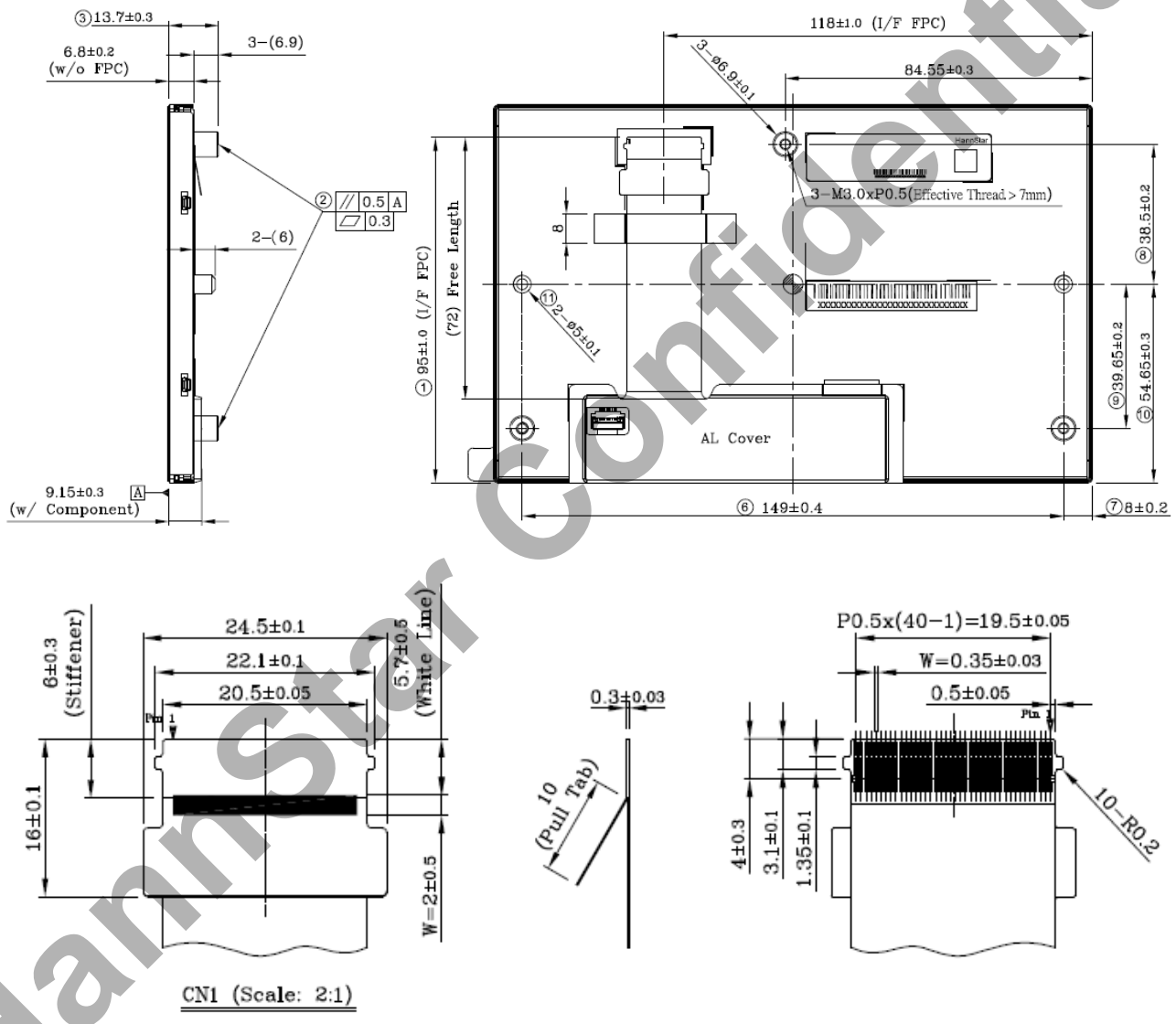

CN1 (Scale: 2:1)

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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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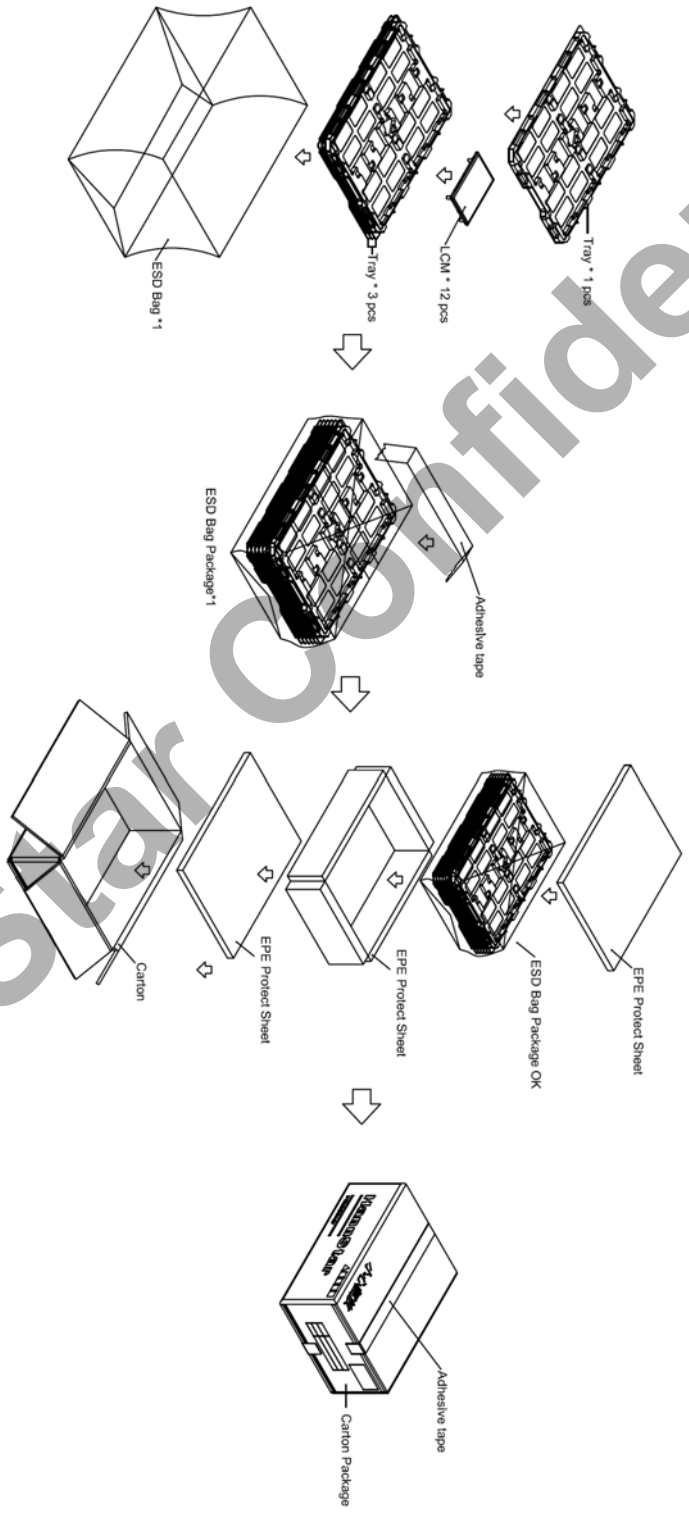
10.0 PACKAGE SPECIFICATION

10.1 Packing form



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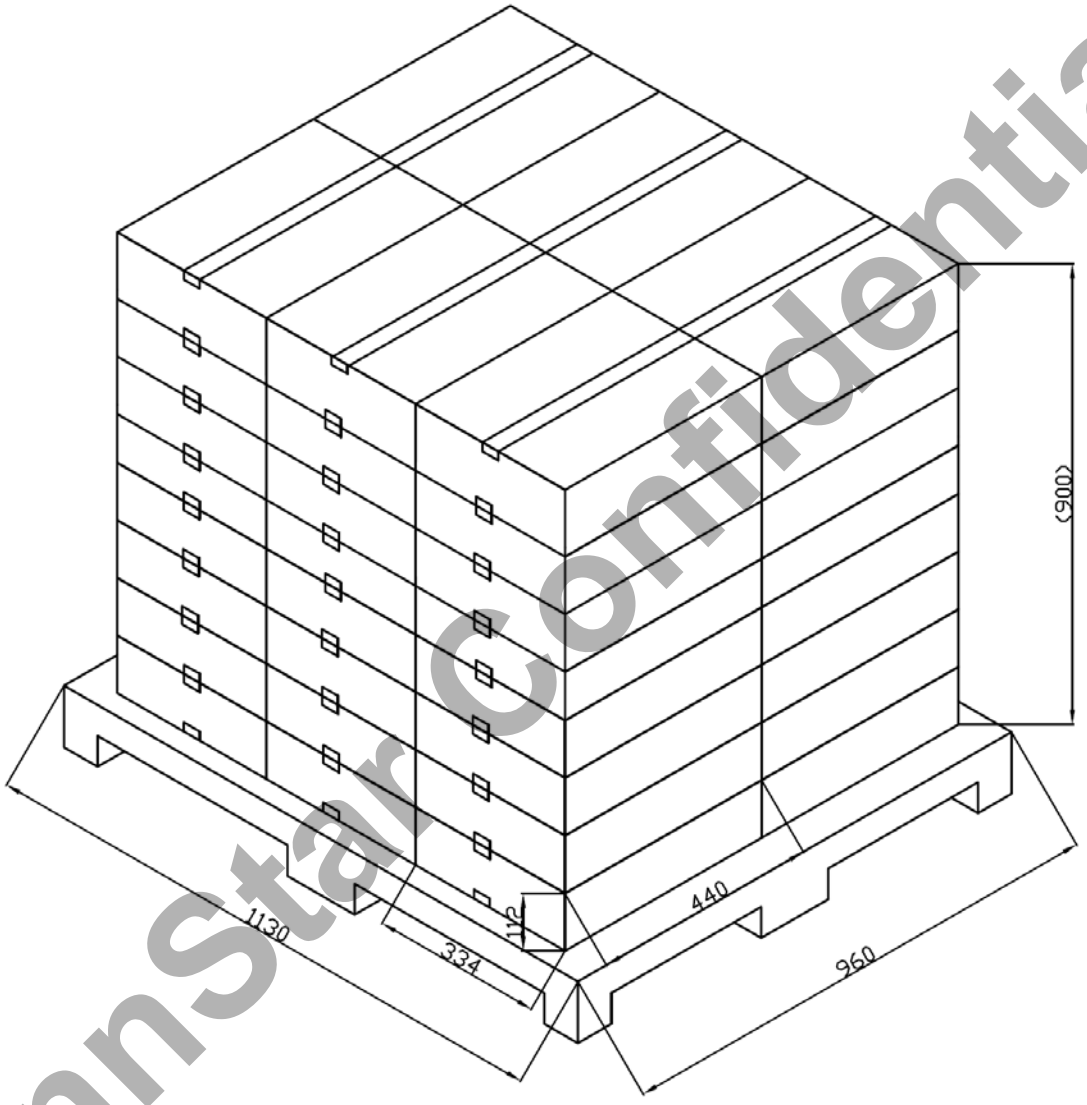
10.2 Pallet Drawing



Notes :
1 Pallet : 48 Cartons
1 Cartons : 12pcs MDL
1 Pallet : 576pcs MDL

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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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