TO　　:

Date　:　May., 15, 2019

HannStar Product Specification
(Preliminary)

Model: HSD103JPW2 – F10
10.25" Color TFT-LCD Module

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.

Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	May. 15, 2019	F10	Preliminary Specification was first released.

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD103JPW2-F10 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 10.25 inch diagonally measured active display area with HD (1920 horizontal by 720 vertical pixel) resolution.

1.2 Features

■ 10.25 (8:3 diagonal) inch configuration

■ 16.7M LVDS (two port)

■ ROHS / Halogen Free Compliance

1.3 Applications

■ Automotive

1.4 General information

Item	Specification	Unit
Outline Dimension	258.9 (H) x 111.1 (V) x 7.55 (D) (Typ)	mm
Display area	243.648(H) x 91.368(V)	mm
Number of Pixel	1920(H) x 720(V)	pixels
Pixel pitch	0.1269(H) x 0.1269(V)	mm
Pixel arrangement	RGB Vertical Stripe	
Display mode	Normally Black	
NTSC	75 (Typ.)	%
Surface treatment	HC	
Weight	360	g
Back-light	Single LED (Side-Light type)	
Power Consumption	Logic System (White Pattern)	2.0 (Max)	W
	B/L System	8.91 (Max.)	W

1.5 Mechanical Information

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	258,5	258.9	259.3	mm
	Vertical (V)	110.7	111.1	111.5	mm
	Depth (D)	7.15	7.55	7.95	mm
Weight		—	360	—	g

2.0 ABSOLUTE MAXIMUM RATINGS

2.1 Electrical Absolute Rating

2.1.1 TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Note
Logic Supply Voltage	VDD	-0.3	+5.0	V	-

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T_{opa}	-40	85	℃	
Storage Temperature	T_{stg}	-40	95	℃	

3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR		1000	1400	—		(1)(2)
Response time	25℃	TR+TF		—	—	30	msec	(1)(3)
	-20℃			—	—	250		
	-30℃			—	—	500		
White luminance (Center)		Y_L	Θ=0 Normal viewing angle	750	1000	—	cd/m^2	(1)(4) (I_L=300mA)
Color chromaticity (CIE1931)	White	W_x		0.273	0.313	0.353		(1)(4)
		W_y		0.289	0.329	0.369		
	Red	R_x			TBD			
		R_y			TBD			
	Green	G_x			TBD			
		G_y			TBD			
	Blue	B_x			TBD			
		B_y			TBD			
Viewing angle	Hor.	Θ_L	CR>10	80	85	—		
		Θ_R		80	85	—		
	Ver.	Θ_U		80	85	—		
		Θ_D		80	85	—		
Brightness uniformity		B_{UNI}	Θ=0	75	80	—	%	(5)
Optima View Direction			Free					(6)
Reflection	%	R (%)	—	—	5.0	5.5	%	(7)

3.2 Measuring Condition

- Measuring surrounding：dark room
- LED current I_L：300mA
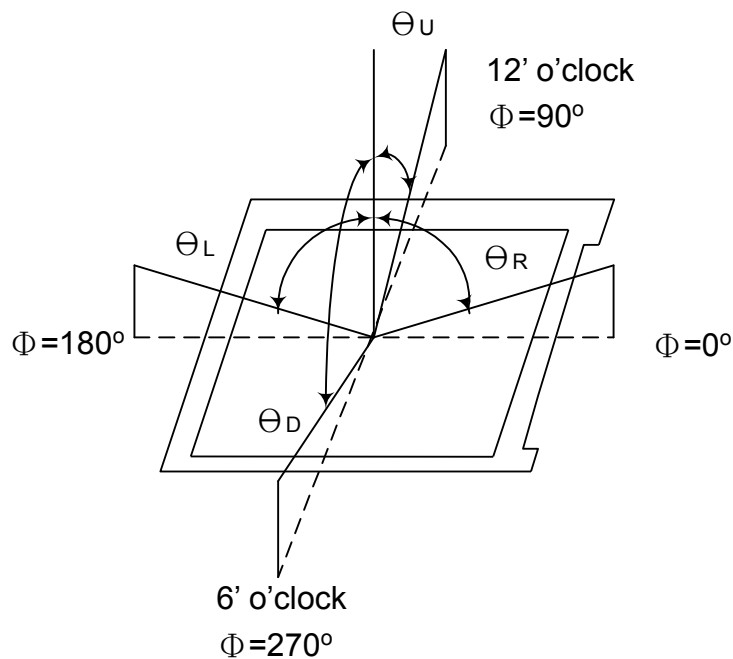- Ambient temperature：25±2℃
- 15min. warm-up time.

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:

Θ_U

12' o'clock
$\Phi=90^o$

Θ_L

Θ_R

$\Phi=180^o$

$\Phi=0^o$
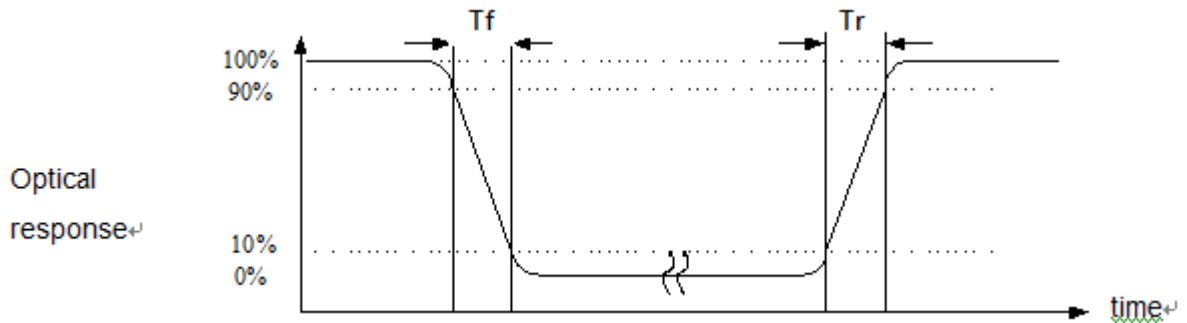
Θ_D

6' o'clock
$\Phi=270^o$

Note (2) Definition of Contrast Ratio (CR) :

measured at the center point of panel

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

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

Note (4) Definition of optical measurement setup
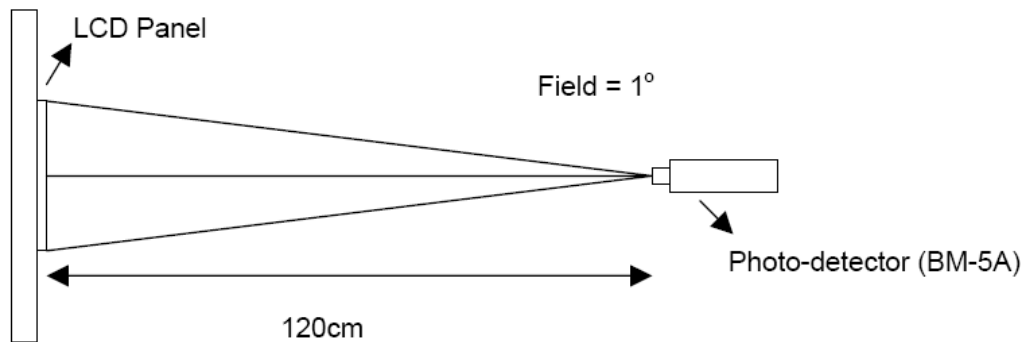
Note (5) Definition of brightness uniformity

16.67%   50.00%   83.33%

| Y2 | Y3 | Y4 | 16.67%
| Y9 | Y1 | Y5 | 50.00%
| Y8 | Y7 | Y6 | 83.33%
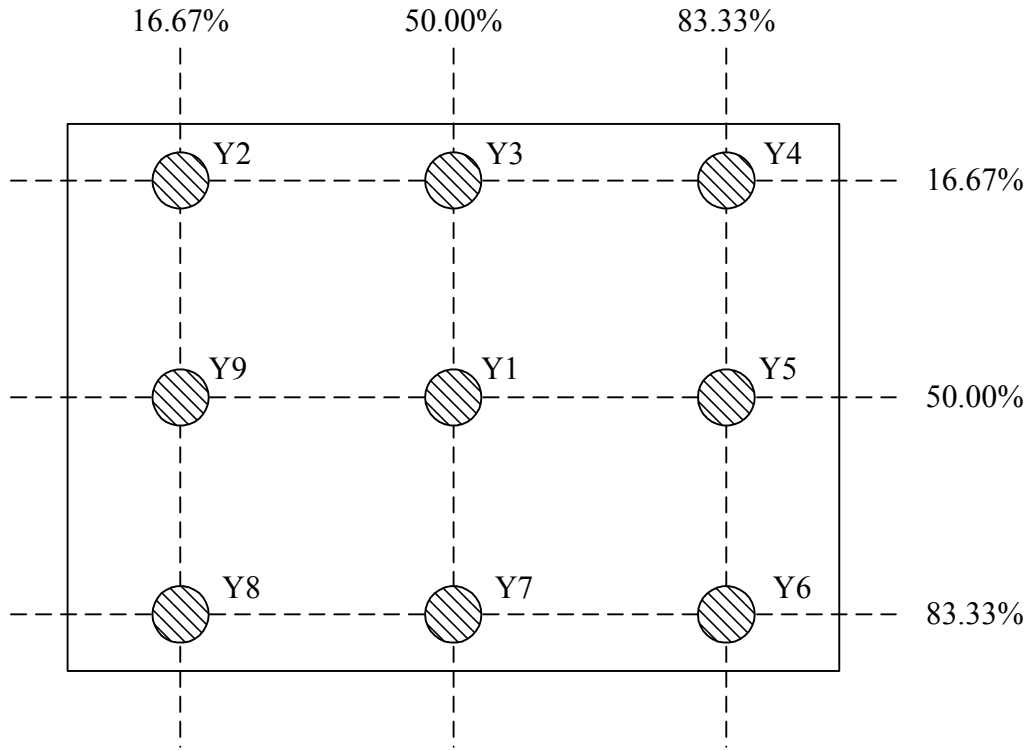
$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

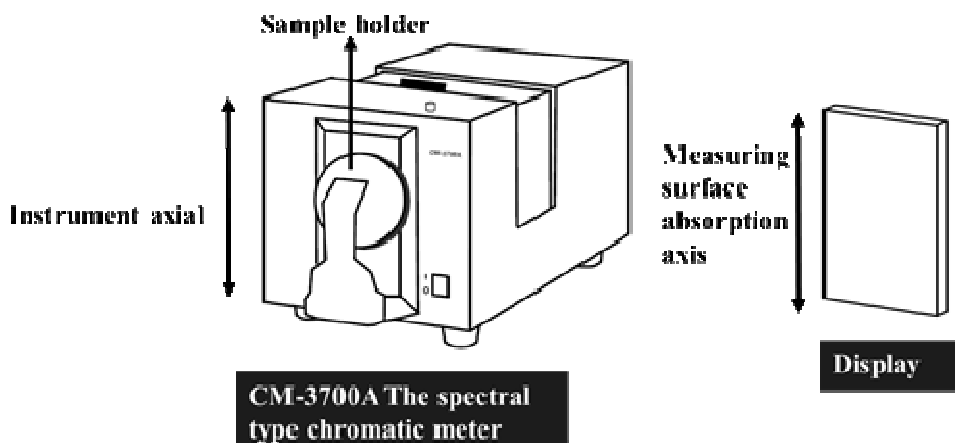**Note (6)**：Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

Note (7) Definition of CM-3700A(Konica Minolta) Measurement specification

■ The Settings of the instrument：
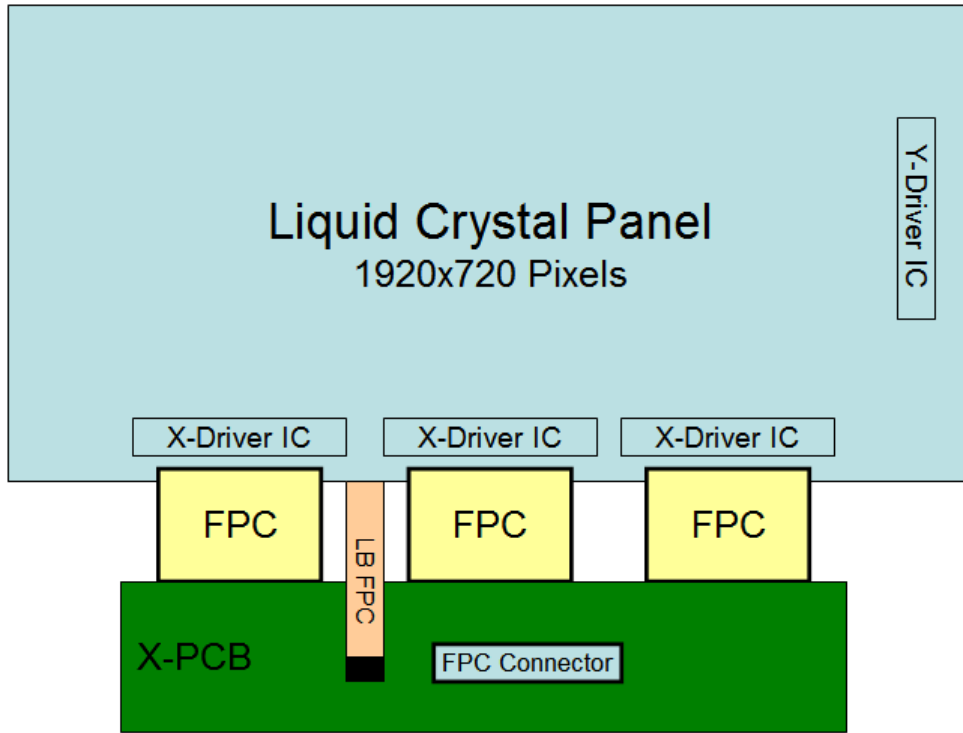　A. reflection rate;
　B. Measuring the aperture: MAV(8mm);
　C. Observer perspective: 2˚;
　D. Specular light: SCI;
　E. The light source: D65.

■ The definition of measurement way
　Chromatic meter will display the absorption of shaft and spectral type axial parallel alignment, and placed the sample frame for photometry.
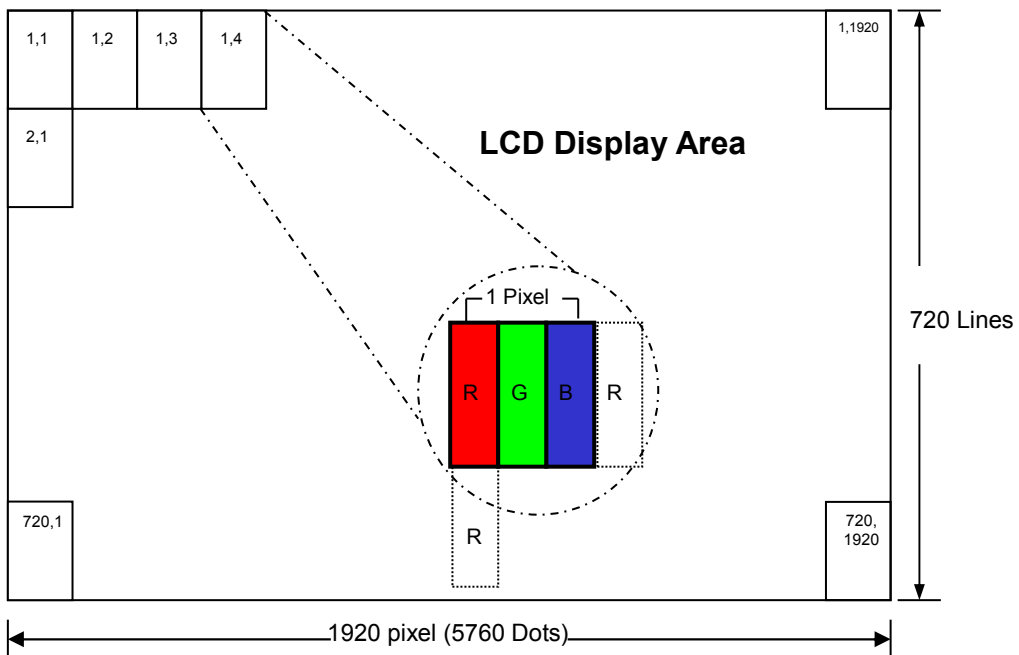
4.0 BLOCK DIAGRAM
4.1 TFT LCD Module:

4.2 Pixel Format

4.3 Relationship Between Displayed Color and Input

	Display	R7 R6 R5 R4 R3 R2 R1 R0	G7 G6 G5 G4 G3 G2 G1 G0	B7 B6 B5 B4 B3 B2 B1 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
	↓	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
	Light	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
	↓	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
	Light	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
	↓	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
	Light	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
	↓	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
	Light	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

5.0 INTERFACE PIN CONNECTION

5.1 FPC Pin Assignment:

FPC connector is used for electronics interface. The recommended model is
CN1 (Input signal): IRISO 12003S-50Y900

Pin NO.	Symbol	I/O	Description	Note
1	GND	P	Ground	
2	VDD	P	External main and I/O power supply ; +3.3V	
3	VDD	P	External main and I/O power supply ; +3.3V	
4	NC	-	Keep floating	
5	RESET	I	Global reset pin RESET="H",normal operation.(Default) RESET="L",LCM is in reset state.	
6	STBYB	I	Standby mode control. STBYB="H",normal operation. STBYB="L",LCM is in standby state.(Default)	
7	GND	P	Ground	
8	OLV0N	I	LVDS odd data 0-	
9	OLV0P	I	LVDS odd data 0+	
10	GND	P	Ground	
11	OLV1N	I	LVDS odd data 1-	
12	OLV1P	I	LVDS odd data 1+	
13	GND	P	Ground	
14	OLV2N	I	LVDS odd data 2-	
15	OLV2P	I	LVDS odd data 2+	
16	GND	P	Ground	
17	OLVCLKN	I	LVDS odd clk -	
18	OLVCLKP	I	LVDS odd clk +	
19	GND	P	Ground	
20	OLV3N	I	LVDS odd data 3-	
21	OLV3P	I	LVDS odd data 3+	
22	GND	P	Ground	
23	ELV0N	I	LVDS even data 0-	
24	ELV0P	I	LVDS even data 0+	
25	GND	P	Ground	
26	ELV1N	I	LVDS even data 1-	
27	ELV1P	I	LVDS even data 1+	
28	GND	P	Ground	

29	ELV2N	I	LVDS even data 2-	
30	ELV2P	I	LVDS even data 2+	
31	GND	P	Ground	
32	ELVCLKN	I	LVDS even clk -	
33	ELVCLKP	I	LVDS even clk +	
34	GND	P	Ground	
35	ELV3N	I	LVDS even data 3-	
36	ELV3P	I	LVDS even data 3+	
37	GND	P	Ground	
38	GND	P	Ground	
39	RL	I	Horizontal shift direction (source output) selection. RL = "H": Left -> Right(default) RL = "L": Right -> Left	
40	TB	I	Vertical shift direction (gate output) selection. TB = "H": Top ->Bottom (default) TB = "L": Bottom->Top	
41	NC	-	Keep floating	
42	NC	-	Keep floating,internal used for LCM maker.	
43	NC	-	Keep floating	
44	VDD	P	External main and I/O power supply ; +3.3V	
45	NC	-	Keep floating,internal used for LCM maker.	
46	NC	-	Keep floating,internal used for LCM maker.	
47	NC	-	Keep floating,internal used for LCM maker.	
48	NC	-	Keep floating,internal used for LCM maker.	
49	NC	-	Keep floating,internal used for LCM maker.	
50	NC	-	Keep floating,internal used for LCM maker.	

Note 1：UPDN and SHLR control function

SHLR	UPDN	Data shifting
VDD	GND	Left→Right→Down→Up
GND	GND	Right→Left；Down→Up
VDD	VDD	Left→Right；Up→Down(default)
GND	VDD	Right→Left；Up→Down
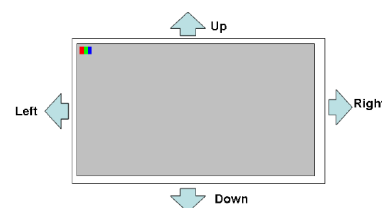
5.2 LED Board Pin Assignment:

CN2: IRISO 12001S-10Y901

Pin NO.	Symbol	Description
1	PLED	Power LED anode power supply
2	PLED	Power LED anode power supply
3	PLED	Power LED anode power supply
4	NC	
5	NTC1	heat sensor
6	NTC2(GND)	heat sensor
7	NLED	Power LED cathode power supply
8	NLED	Power LED cathode power supply
9	NLED	Power LED cathode power supply
10	NLED	Power LED cathode power supply

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		Note (1)
Input Signal Voltage	V_{IH}	0.7xVDD	-	VDD	V	Note (2)
	V_{IL}	GND	-	0.3xVDD	V	
Current of VDD	IDD	-	-	600	mA	@White Pattern

Note：

(1)：VDD setting should match the signals output voltage of customer's system board.
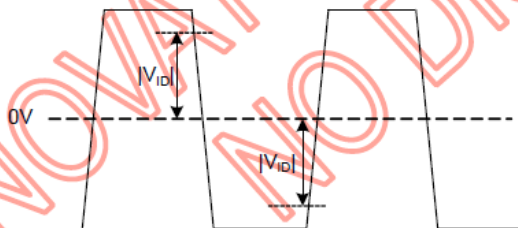
(2) : RESET,STBYB,R/L,T/B

6.2 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	R_{xVTH}	+100		+300	mV	
Differential Input Low Threshold	R_{xVTL}	-300		-100	mV	
Differential input common mode voltage	R_{xVCM}	1.0	1.2	1.7-$|V_{ID}|/2$	V	
Input leakage Current	I_{IN}	-10		10	uA	RX+/-, RXC+/-
Differential input Voltage	$|V_{ID}|$	200		600	mV	
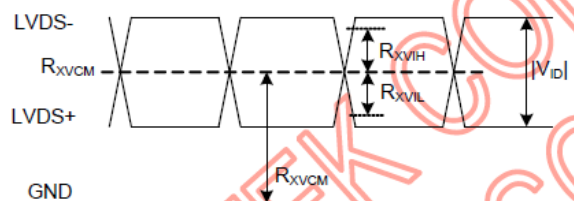
6.3 8Bit LVDS input
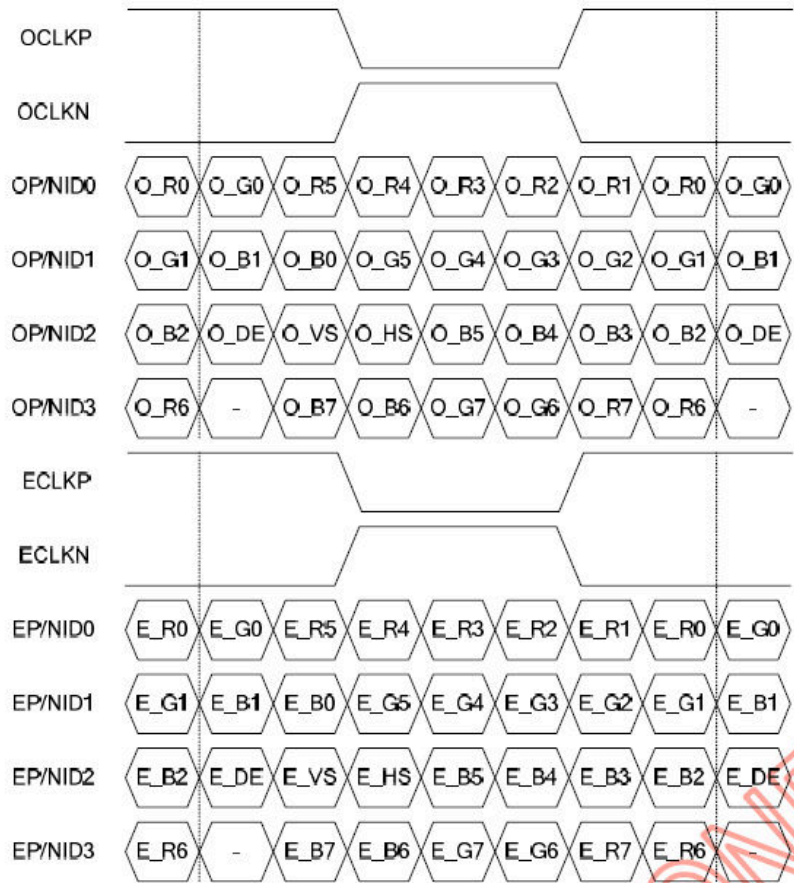
6.4 Interface Timing (DE mode)

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Rate	--	55	60	65	Hz
Vertical Total Time	T_V	730	732	764	line
Vertical Display Time	T_{VD}		720		
Vertical Blanking Time	T_{VB}	10	12	44	line
Horizontal Total Time	T_H	1022	1045	1080	clock
Horizontal Display Time	T_{HD}		960		
Horizontal Blanking Time	T_{HB}	62	85	120	clock
Clock Rate	$1/T_{Clock}$	45.4	45.9	48.5	MHz

6.5 Power On / Off Sequence
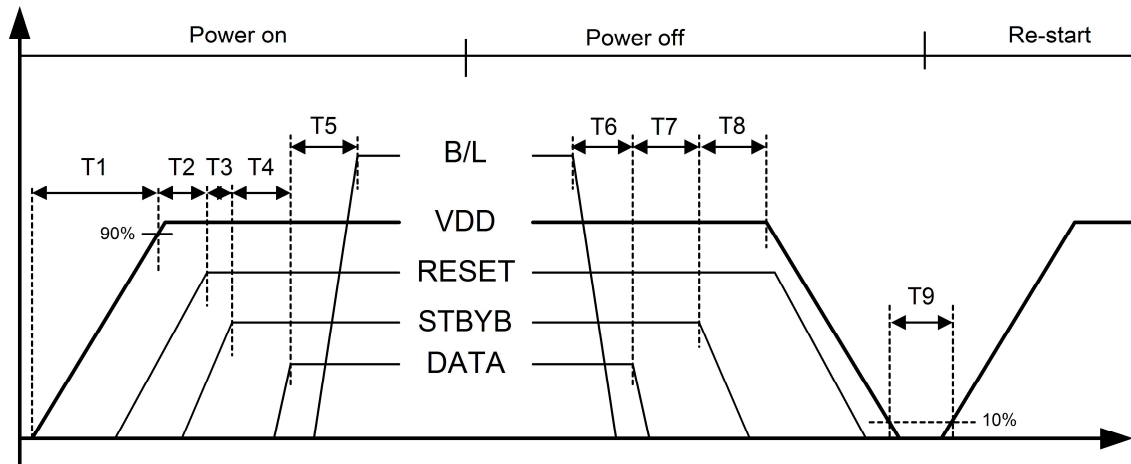
Item	Min.	Typ.	Max.	Unit
T1	0.5	--	20	ms
T2	1	--	--	ms
T3	1	--	--	ms
T4	200	--	--	ms
T5	50	--	--	ms
T6	50	--	--	ms
T7	16	--	--	ms
T8	16	--	--	ms
T9	1000	--	--	ms

6.6 Backlight Unit

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I_L	--	300	--	mA	Ta=25℃
LED Voltage	V_L	--	27.9	29.7	Volt	Ta=25℃
LED Life-Time	N/A	20,000	--	--	Hour	Ta=25℃ I_F=75mA 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
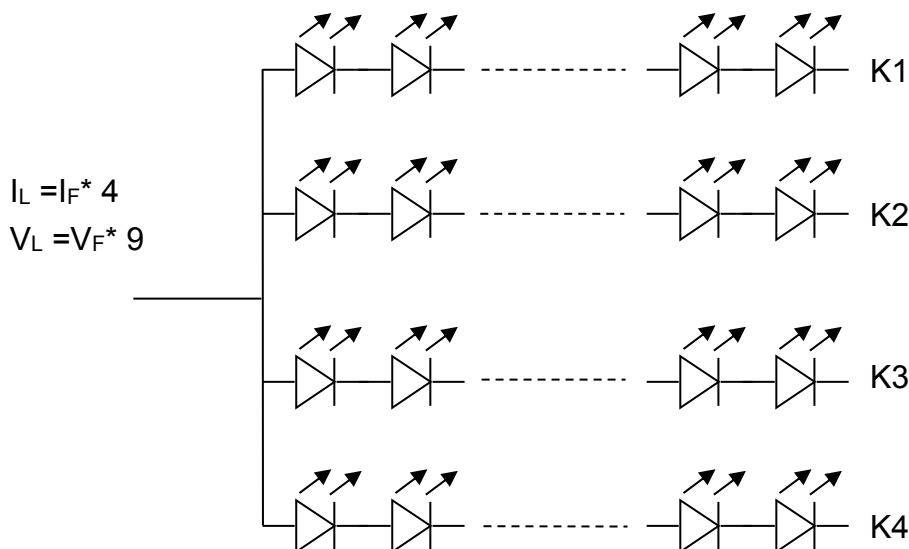
$I_L = I_F * 4$
$V_L = V_F * 9$

7.0 RELIABILIRY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+95°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, 240hrs	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, 10~500Hz, XYZ,
		  30min/each direction
		2.Sine:
		  Freq.1.5G, 8~33.3Hz,
		  Stoke: 1.3mmhz
		  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 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:

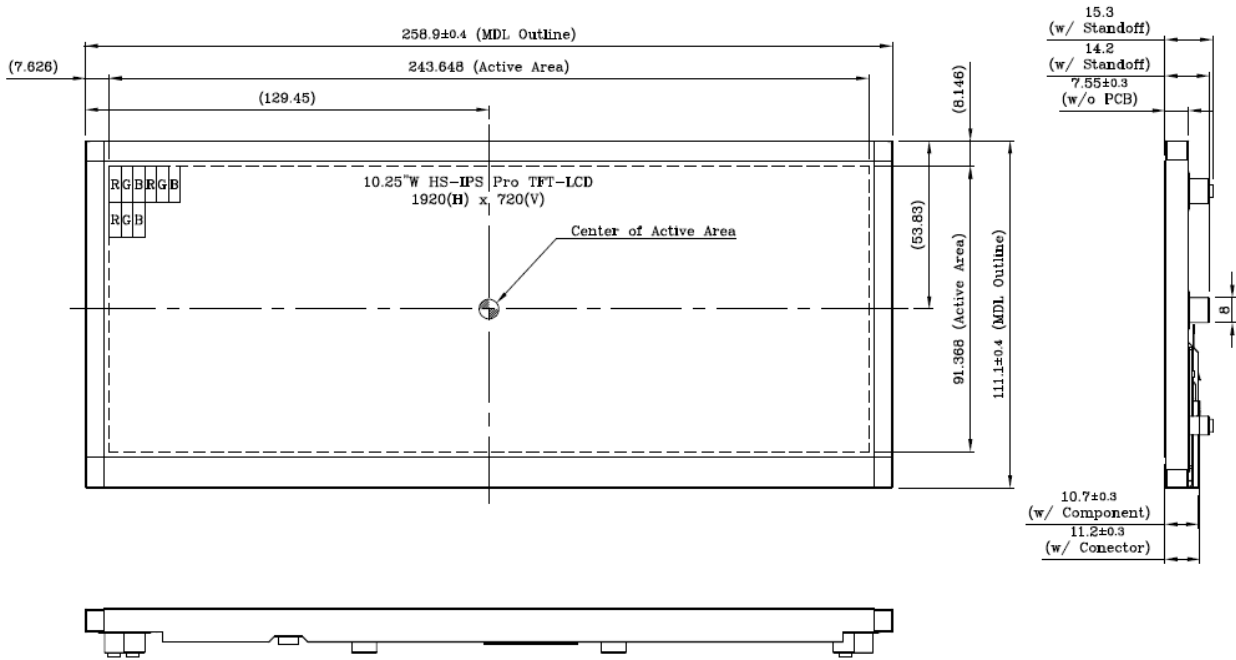(Air bubble in the LCD、Seal leak、Non-display、Missing segments、Glass crack).

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

8.0 OUTLINE DIMENSION

Unit : mm

8.1 Front View:

8.1 Rear View:

General tolerance:+/-0.3mm
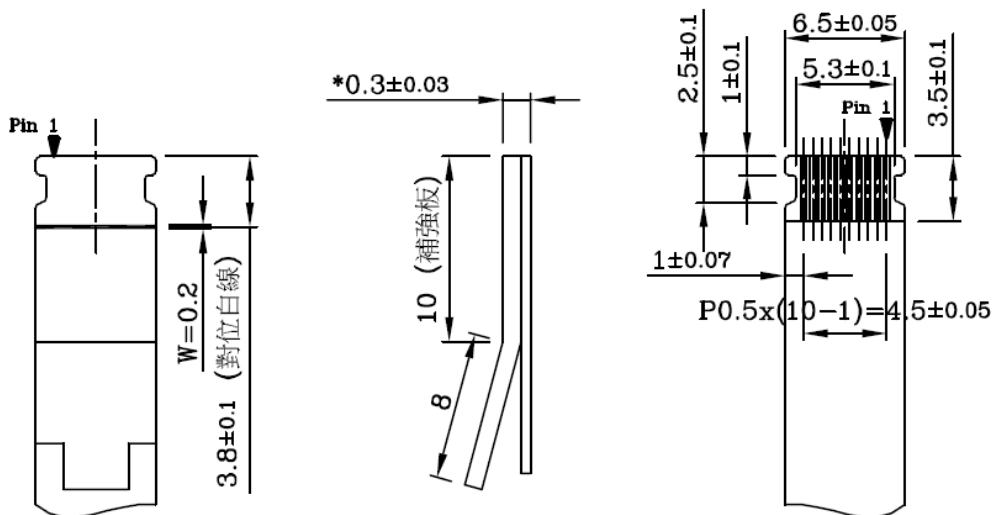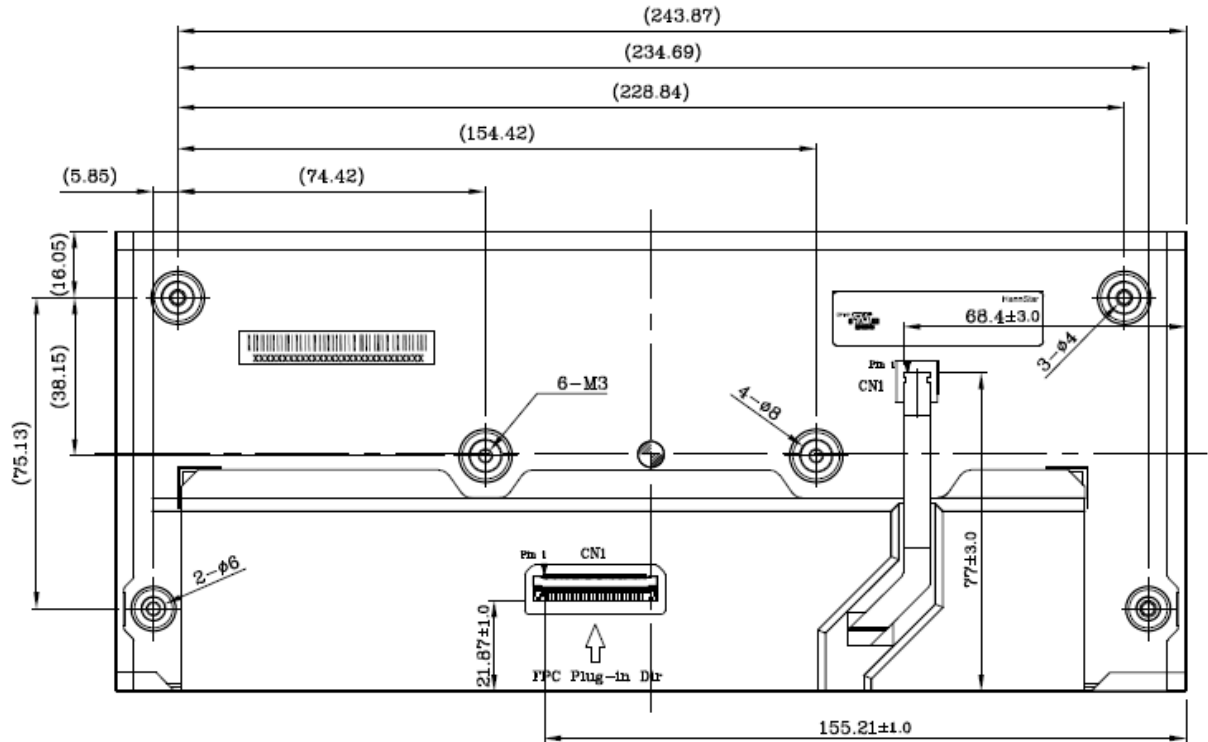
CN2(Scale: 2:1)

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.

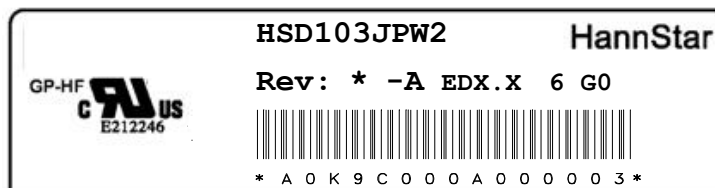Note (1) Production Year: Code 8 is defined by the last number of the year, for example

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
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 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.
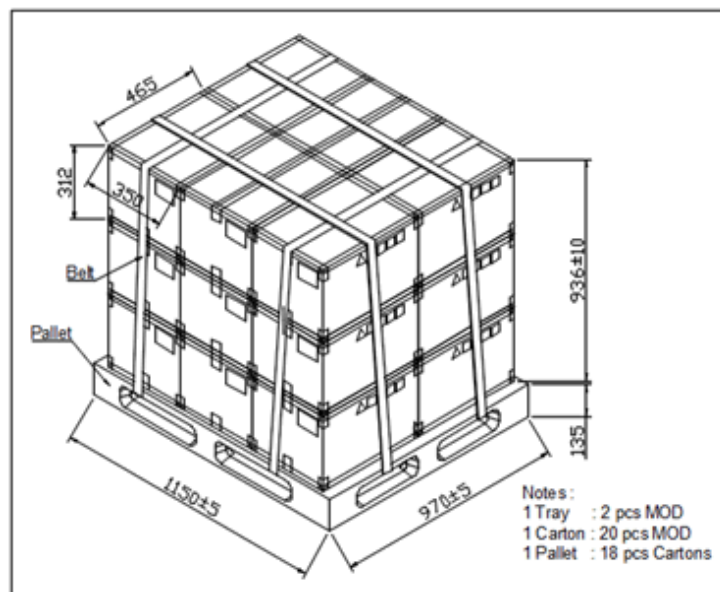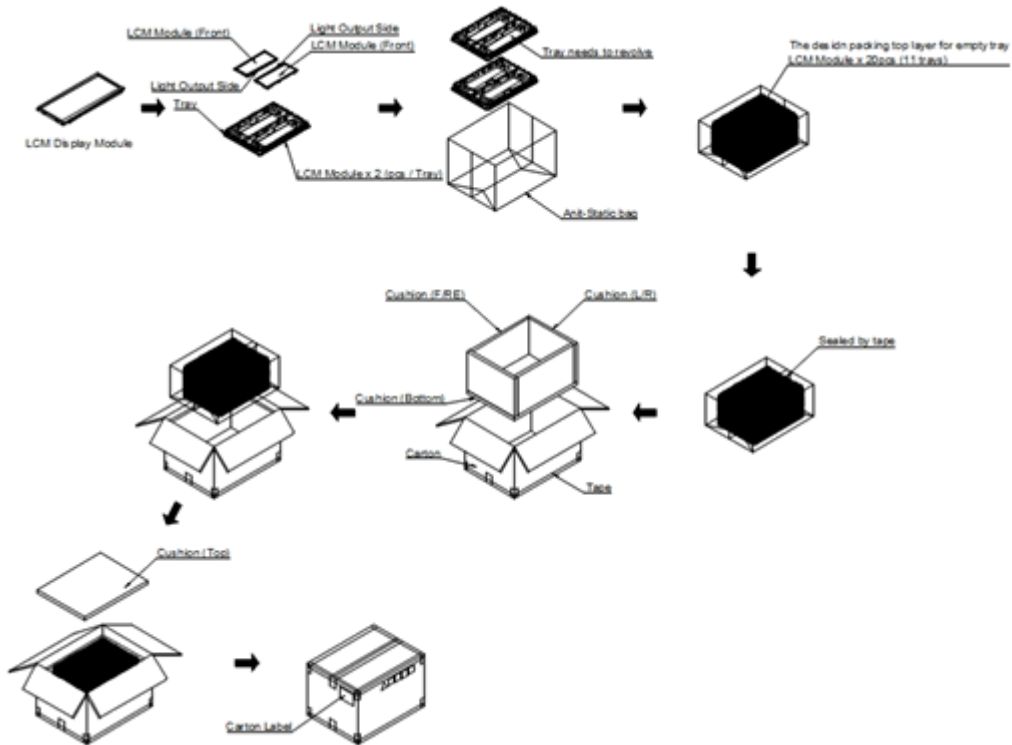(3) This is subject to change without prior notice.

```
                HSD103JPW2          HannStar
GP-HF  cRUus    Rev: * -A EDX.X  6 G0
       E212246
                ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖
                * A 0 K 9 C 0 0 0 A 0 0 0 0 0 3 *
```

10.0 PACKAGE SPECIFICATION

10.1 Packing form

LCM Model	Qty. in the Box	Inner Box Size(mm)	Notice
HSD103JPW2-F10	20 pcs/Box	Ref. 456 x 350 x 312^H	--

10.2 Packing assembly drawings

Notes:
1 Tray : 2 pcs MOD
1 Carton : 20 pcs MOD
1 Pallet : 18 pcs Cartons

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.

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.