



SPECIFICATION



HSD080JDW2-A20

8" - WVGA - RGB

Version: 1.0

Date: 22.02.2024

Note: This specification is subject to change without prior notice

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TO : DATA MODUL

Date : Feb.22.2024

HannStar Product Information **(Formal)**

Model: HSD080JDW2-A20
8" Color TFT-LCD Module

Note:

- (1) The information contained herein is preliminary 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	Feb.22.2024	A20	Formal Product Information was first released.

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1.0 GENERAL DESCRIPTION

1.1 Introduction

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 an 8 inch diagonally measured active display area with 800 horizontal by 480 vertical pixel resolution.

1.2 Features

- 8 (15:9 diagonal) inch configuration
- 16.7M TTL / RGB
- ROHS / Halogen Free Compliance

1.3 Applications

- Automotive

1.4 General information

Item	Specification	Unit	
Outline Dimension	188.5 (H) x 119.3 (V) x 6.8 (D) (Typ., w/o component)	mm	
Display area	174(H) x 104.4(V) (8" diagonal)	mm	
Number of Pixel	800(H) RGB x 480(V)	pixels	
Pixel pitch	0.2175(H) x 0.2175(V)	mm	
Pixel arrangement	RGB Vertical Stripe		
Display mode	Normally Black		
NTSC (CIE 1931)	70% (min.)	%	
Surface treatment	AG		
Weight	200 (typ.)	g	
Back-light	YAG LED (White LED)		
Power Consumption	Logic System (White Pattern)	1 (max.)	W
	B/L System	3.7422 (max.)	W

1.5 Mechanical Information

Item	Min.	Typ.	Max.	Unit	
Module Size	Horizontal (H)	188.2	188.5	188.8	mm
	Vertical (V)	119.0	119.3	119.6	mm
	Depth (D)	—	6.8	—	mm
Weight	187	200	213	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
Logic Supply Voltage	VDD	-0.5	+5.0	V	-
Analog Input Voltage	AVDD	-0.5	+15.0	V	
Gate Driver Voltage	VGH-VGL	0.3	+40	V	
	VGL	-20	+0.3	V	
BL Power Consumption	-	3.1752	3.7422	W	

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature (Ambient Temperature)	T _{opa}	-30	85	°C	
Storage Temperature	T _{stg}	-40	90	°C	

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3.0 OPTICAL CHARACTERISTICS

3.1 Optical specification (All specs. refer to last surface, before white calibration)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Response time	T_R+T_F		<25ms			msec	(1)(3)	
Color chromaticity (CIE1931)	White	W_x	0.260	0.300	0.340		(1)(4)	
		W_y	0.287	0.327	0.367			
	Red	R_x	0.606	0.646	0.686		(1)(4)	
		R_y	0.294	0.334	0.374			
	Green	G_x	0.258	0.298	0.338			
		G_y	0.567	0.607	0.647			
	Blue	B_x	0.108	0.148	0.184			
		B_y	0.021	0.061	0.101			
Contrast	CR	$\Theta=0$	800	—	—			(1)(2)
Viewing Angle	Top	CR > 10	70	80	—	deg		(1)(2)
	Bottom		70	80	—	deg	(1)(2)	
	Left		70	80	—	deg	(1)(2)	
	Right		70	80	—	deg	(1)(2)	
White luminance	Y_L	$\Theta=0$	730	930	1160	cd/m ²	(1)(4)	
		H:±25, V:±10	585	—	—		($I_L=189mA$)	
Brightness uniformity	B_{UNI}	$\Theta=0$	80	—	—	%	(5) 9 points	
Optima View Direction	Free						(6)	

When viewed with polarized glasses, there shall be no image, rainbows, or other defects which can detract from readability of display.

When a polarizer is used, the polarizer shall be oriented to optimize readability when viewed with polarized glasses in normal orientation.

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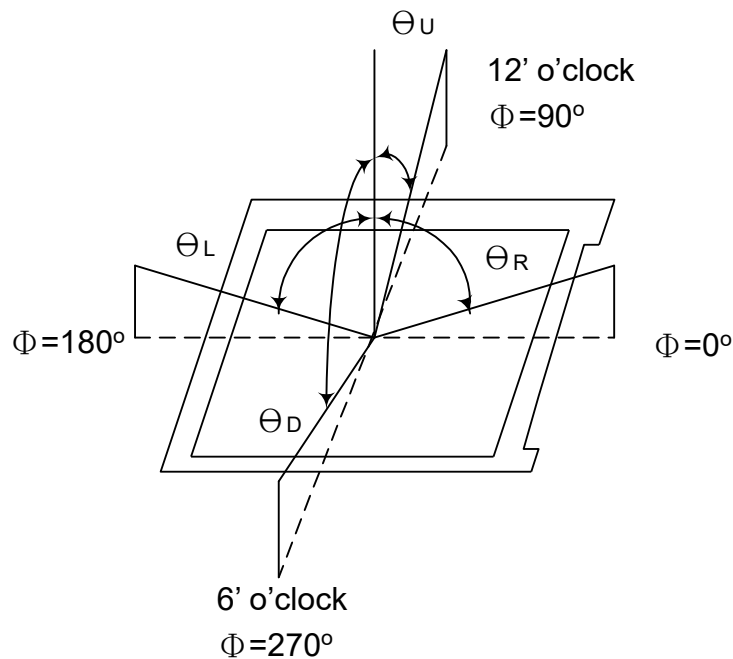
3.2 Measuring Condition

- Measuring surrounding : dark room
- LED current I_L : 189 mA (63 mA per string)
- Ambient temperature : $25 \pm 2^\circ\text{C}$
- 15 min. warm-up time.

3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-UL1R for Chromaticity and optical characteristics.
- Measuring spot size : 20 ~ 21 mm

Note (1) Definition of Viewing Angle:

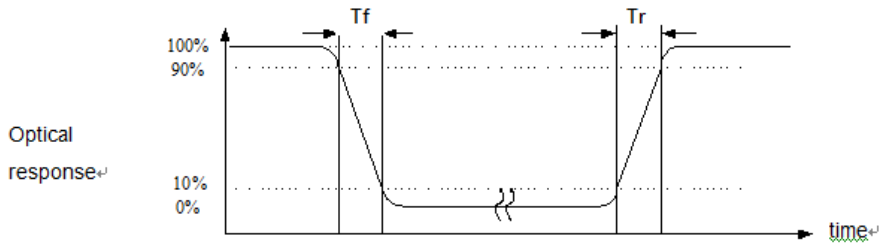


Note (2) Definition of Contrast Ratio (CR):

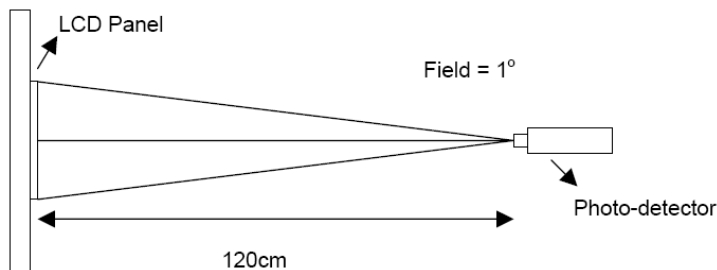
$$\text{CR} = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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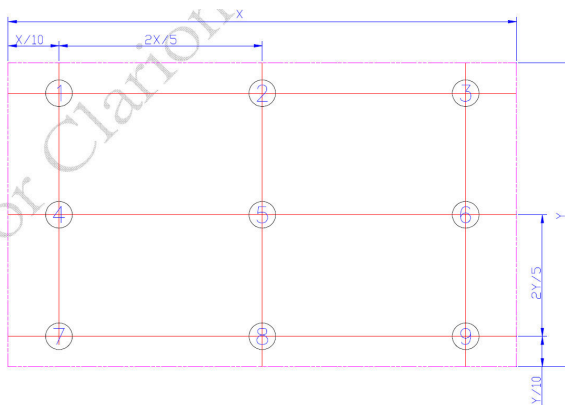
Note (3) Definition of Response Time: Sum of T_R and T_F



Note (4) Definition of optical measurement setup (SR-UL1R)



Note (5): Definition of brightness uniformity



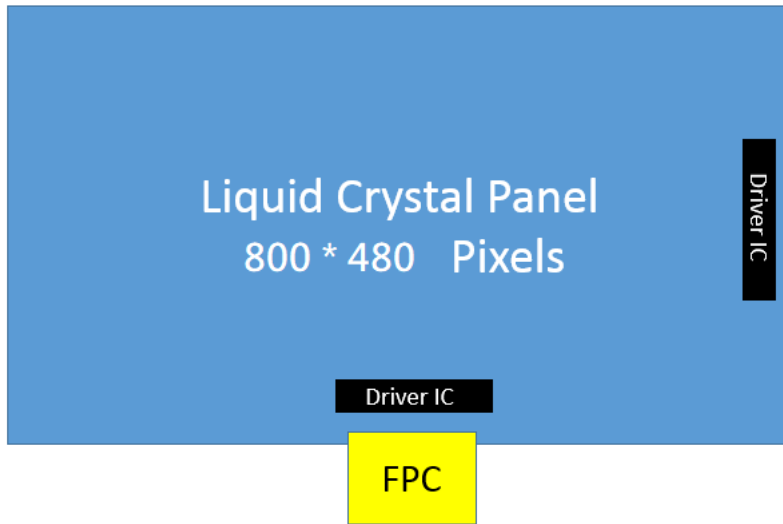
$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

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

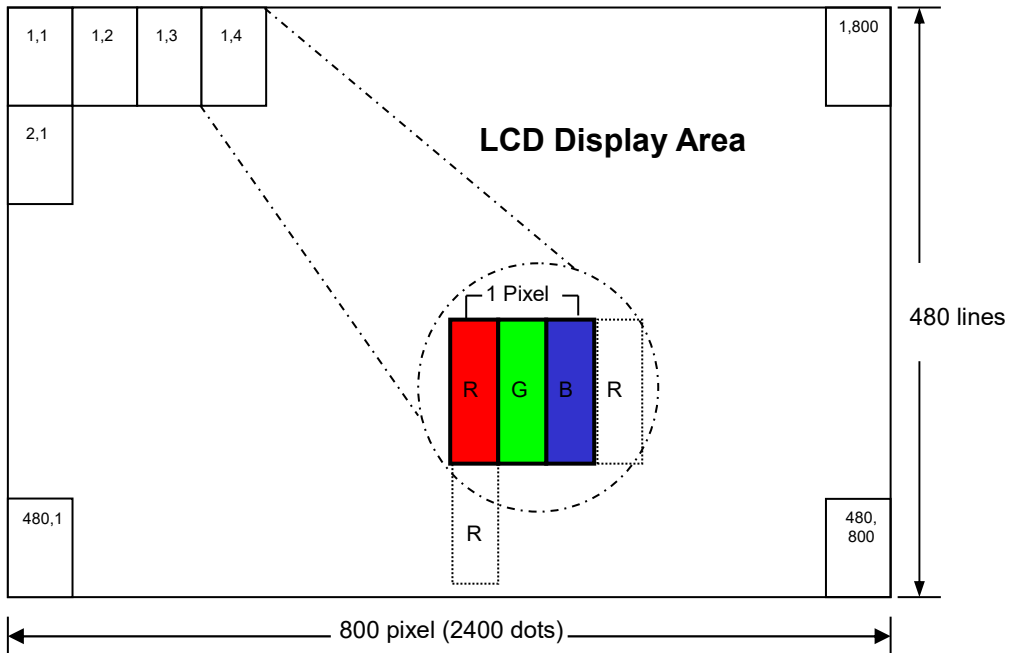
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4.0 BLOCK DIAGRAM

4.1 TFT LCD Module:



4.2 Pixel Format



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4.3 Relationship Between Displayed Color and Input

	Display	MSB								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	L	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	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	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	L1	
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	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	L	L	L	L	L	L	L	L	L	L	L252	
	Light ↓	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	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	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	L2	
		:	:	:											L3...L251											
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L252	
	Light ↓	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	H	L	L253		
		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	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	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	L	L	L	L	L	L	L	H	L2	
		:	:	:											L3...L251											
		H	H	H	H	H	L	L	H	H	H	H	H	L	L	H	H	H	H	H	L	L	L	L252		
	Light ↓	H	H	H	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	L	H	L	L253		
		H	H	H	H	H	H	L	H	H	H	H	H	H	L	H	H	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	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 CN1 (Input signal): MOLEX 5051105091

Pin NO.	Symbol	I/O	Description	Note
1	NC (CS)	NC	No connection HSD Reserved Function (OTP Function Use)	
2	NC (SCL)	NC	No connection HSD Reserved Function (OTP Function Use)	
3	NC (SDO)	NC	No connection HSD Reserved Function (OTP Function Use)	
4	NC (SDA)	NC	No connection HSD Reserved Function (OTP Function Use)	
5	NC (VCOM)	-	HSD Reserved Function (OTP Function Use)	
6	UPDN	I	"H" -> Up to Down; "L" -> Down to Up	
7	SHLR	I	"H" -> Left to Right; "L" -> Right to Left	
8	AVDD	P	Power for Analog	
9	GND	-	Ground	
10	VDD	P	Power for Logic; 3.3V (Typ.)	
11	VDD	P	Power for Logic; 3.3V (Typ.)	
12	RSTB	I	"H" -> Normal; "L" -> Reset State	
13	MODE	I	"H" -> HV Mode; "L" -> DE Mode	
14	DR0	I	Red Data 0	
15	DR1	I	Red Data 1	
16	DR2	I	Red Data 2	
17	DR3	I	Red Data 3	
18	DR4	I	Red Data 4	
19	DR5	I	Red Data 5	
20	DR6	I	Red Data 6	
21	DR7	I	Red Data 7	
22	DG0	I	Green Data 0	
23	DG1	I	Green Data 1	
24	DG2	I	Green Data 2	
25	DG3	I	Green Data 3	
26	DG4	I	Green Data 4	
27	DG5	I	Green Data 5	
28	DG6	I	Green Data 6	

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29	DG7	I	Green Data 7	
30	DB0	I	Blue Data 0	
31	DB1	I	Blue Data 1	
32	DB2	I	Blue Data 2	
33	DB3	I	Blue Data 3	
34	DB4	I	Blue Data 4	
35	DB5	I	Blue Data 5	
36	DB6	I	Blue Data 6	
37	DB7	I	Blue Data 7	
38	GND	-	Ground	
39	DCLK	I	Clock For Input Data	
40	GND	-	Ground	
41	DE	I	Data Input Enable	
42	HS	I	Horizontal Sync , NC if not be used	
43	VS	I	Vertical Sync , NC if not be used	
44	NC	-	No Connect	
45	VGH	P	Positive Power Supply Voltage for Gate Driver; 18V (Typ.)	
46	NC	-	No Connect	
47	VGL	P	Negative Power Supply Voltage for Gate Driver; -10V (Typ.)	
48	NC (VPP)	NC	No connection HSD Reserved Function (OTP Function Use)	
49	INV2B	I	2-Frame inversion mode; H→Enable, L→Disable (Default)	
50	GND	-	Ground	

CN2 (Input signal): MOLEX 5051101092

Pin NO.	Symbol	I/O	Description	Note
1	LEDA	I	LED power (Anode)	
2	LEDA	I	LED power (Anode)	
3	LEDA	I	LED power (Anode)	
4	NC	-	No Connect	
5	LEDK	O	Cathode	
6	LEDK	O	Cathode	
7	LEDK	O	Cathode	
8	NC	-	No Connect	
9	THER+	I	NTC Anode	
10	THER-	O	NTC Cathode	

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6.0 ELECTRICAL CHARACTERISTICS

6.1 TFT LCD Module

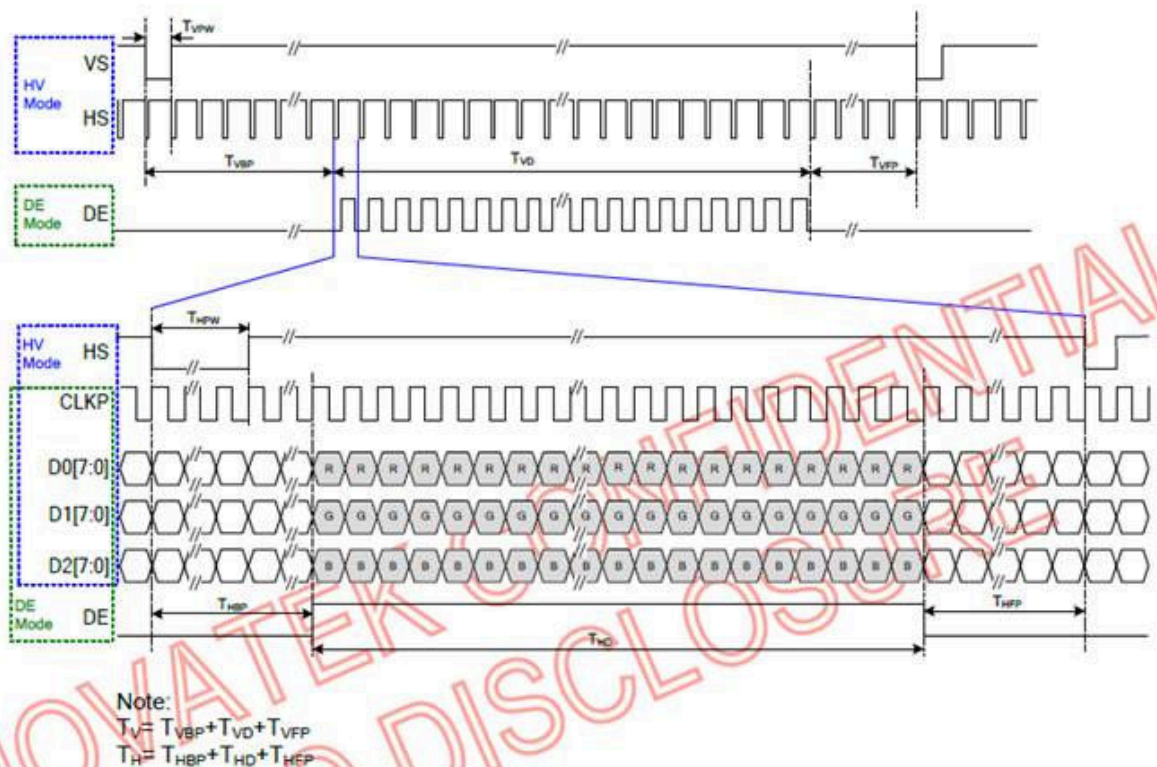
Parameter	Symbol	Min	Typ.	Max.	Unit	Notes
Power Supply	VDD	3	3.3	3.6	V	
	AVDD	12.7	13	13.4	V	
	VGH	17.5	18	18.5	V	
	VGL	-10.3	-10	-9.7	V	
Input high voltage	VIH	0.7*VDD	-	VDD	V	
Input low voltage	VIL	GND	-	0.3*VDD	V	

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Panel current	IVDD	-	13	18	mA	@ White Pattern
	IAVDD	-	27	32	mA	@ White Pattern
	IVGH	-	0.23	3.5	mA	@ White Pattern
	IVGL	-	0.52	3.5	mA	@ White Pattern

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6.2 Interface Timing

Item	Symbol	Min.	Typ.	Max.	Unit
CLK frequency	F_{CLK}	25.2	28.0	28.6	MHz
Horizontal display area	T_{HD}	800			CLK
HS period time	T_H	860	924	934	CLK
HS pulse width	T_{HPW}	2			CLK
HS back porch	T_{HBP}	32			CLK
HS front porch	T_{HFP}	28	92	102	CLK
Vertical display area	T_{VD}	480			H
VS period time	T_V	488	505	511	H
VS pulse width	T_{VPW}	2			H
VS back porch	T_{VBP}	5			H
VS front porch	T_{VFP}	3	20	26	H
Data setup time	T_{DS}	10	-	-	ns
Data hold time	T_{DH}	10	-	-	ns
DE setup time	T_{ES}	10	-	-	ns

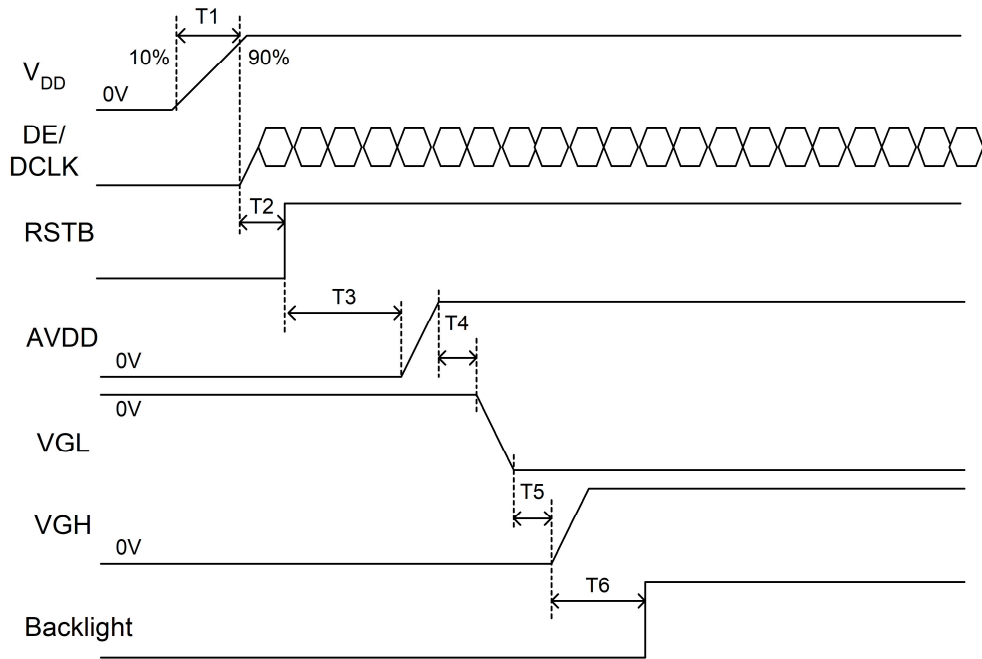


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6.3 Power On / Off Sequence

6.3.1 Power On Sequence

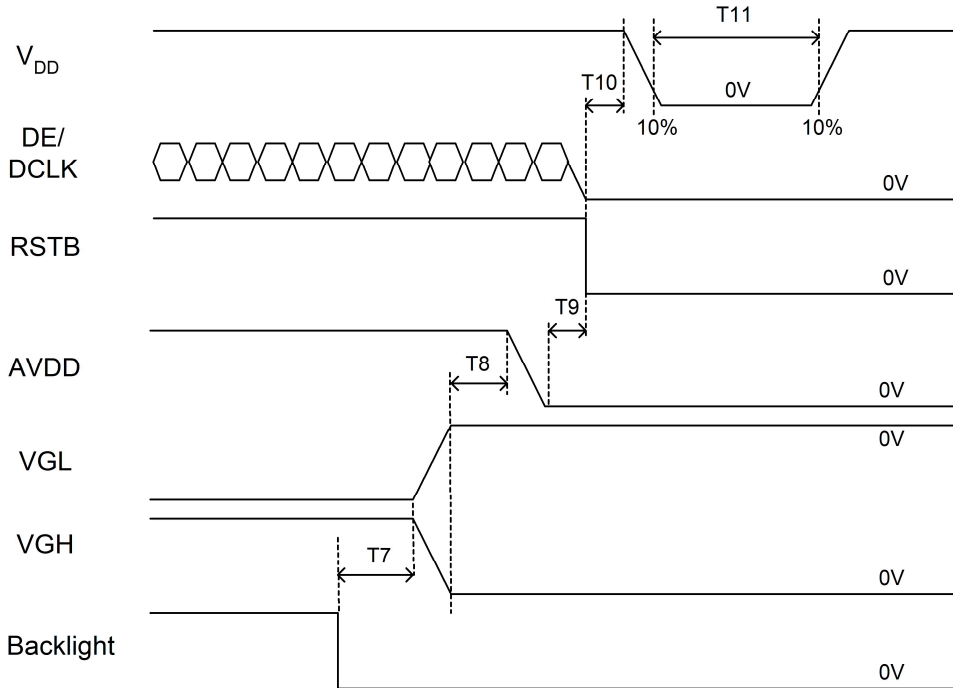


Item	Min.	Max.	Note
T1	0.25	20	
T2	1	---	
T3	50	---	
T4	15	48	
T5	0	15	
T6	150	---	

(ms)

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6.3.2 Power Off Sequence



Item	Min.	Max.	Note
T7	100	---	
T8	0	---	
T9	16	---	
T10	16	---	
T11	(1000)		

(ms)

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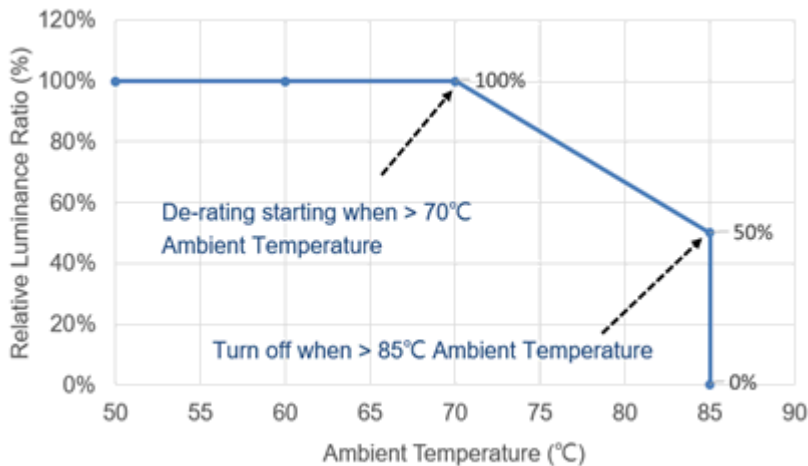
6.4 Backlight Unit

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I_L	--	189	--	mA	$T_a=25^{\circ}\text{C}$
LED Voltage	V_L	16.8	18	19.8	Volt	$T_a=25^{\circ}\text{C}$
LED Life-Time	N/A	10,000	--	--	Hour	$T_a=25^{\circ}\text{C}$ $I_L=189\text{mA}$ Note (2)

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm 3^{\circ}\text{C}$, typical I_L value indicated in the above table until the brightness becomes less than 50%.

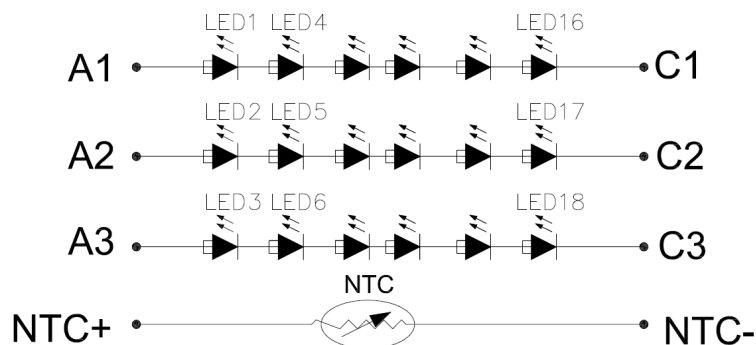
Note (2) The "LED life time" is defined as the module brightness decrease to 70% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L = 189\text{ mA}$. The LED lifetime could be decreased if operating I_L is larger than 189 mA. The constant current driving method is suggested.

Note (3) Suggestion Derating Curve



Note (4) LED Light Bar Circuit

LED P/N: Jufei 1AD4014W65T01, NTC : Murata NCU15XH103F6SRC



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7.0 RELIABILITY 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
4	Low Temperature Operation	Ta=-30°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)	-40°C(30min) → +85°C(30min) /cycle (Ramprate ≥ 20°C/min) , 100 cycles	1,2,3
7	Electrostatic Discharge	R=330Ω, C=150pF, 1sec; Contact = ± 8 kV, class B; Air = ± 15 kV, class B; 9 points, 10 time for each point.	5
8	Vibration	1.Random: 1.04G, 5~500Hz, XYZ, 30min/each direction 2.Sine: Freq. Range 8~33.3Hz, Stoke: 1.3 mm Sweep: 2.9G, 33.3~400Hz, Cycle 15mins 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, 200~500Hz XYZ 2hrs/each direction	
11	Drop (with carton)	Drop height condition, height: 60 cm 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:

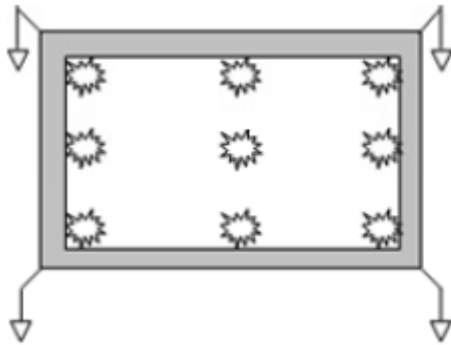
(Air bubble in the LCD 、 Seal leak 、 Non-display 、 Missing segments 、 Glass crack).

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

Note4: Follow derating curve, the luminance would be set to 50%.

Note5: Test points and pattern as below. Class B means “automatically restore”, and black screen can NOT residue for over 1 sec.

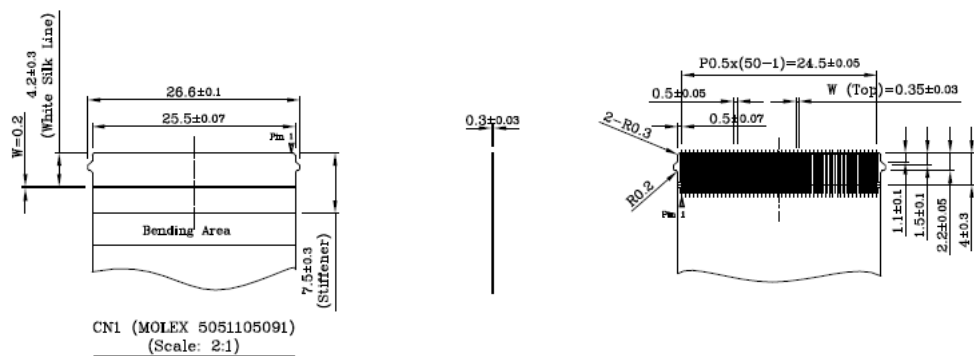
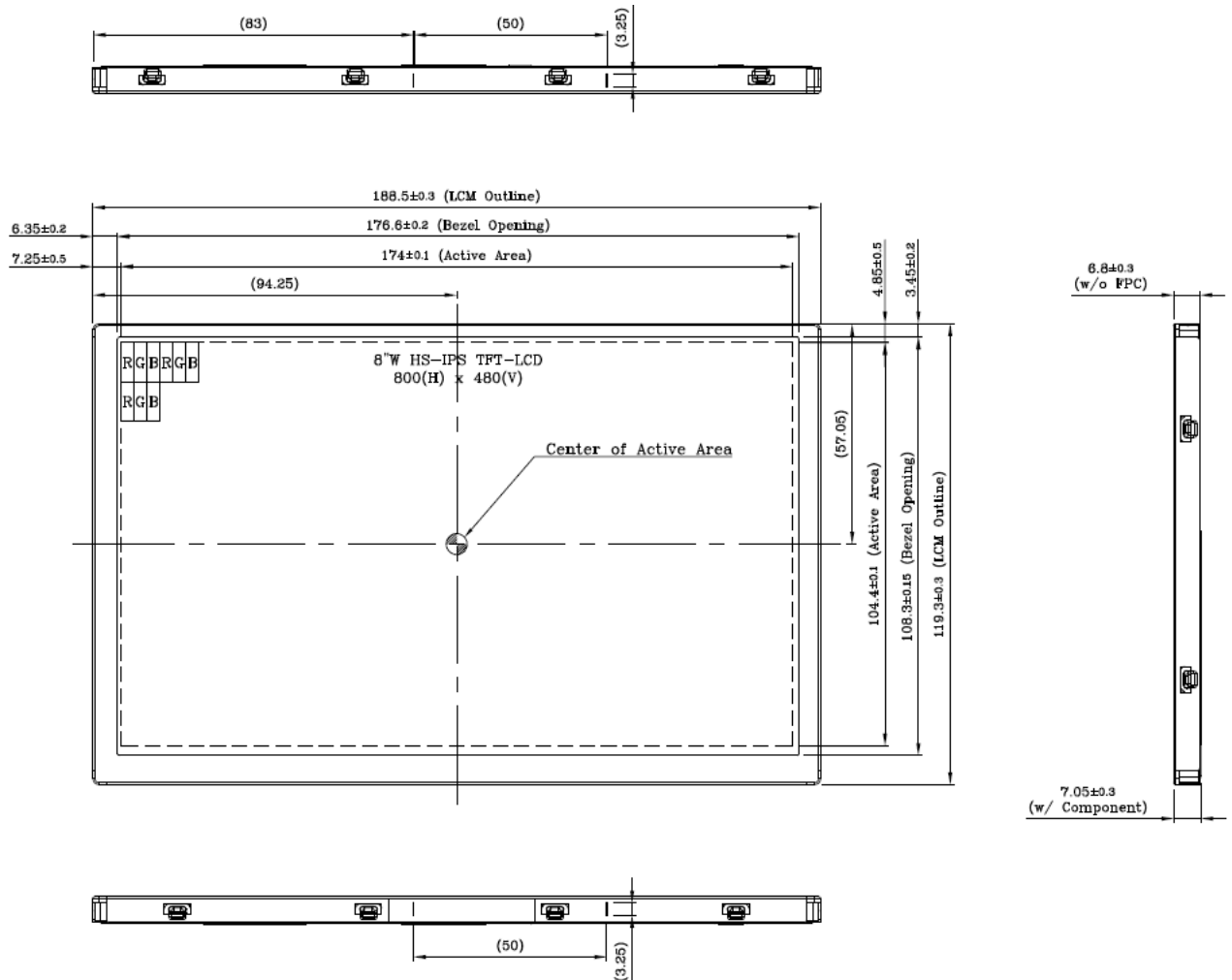


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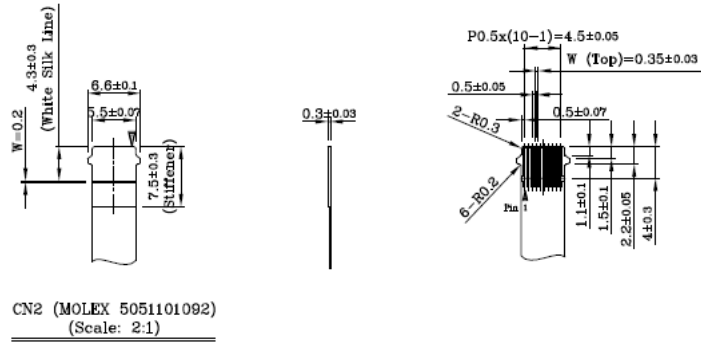
8.0 OUTLINE DIMENSION

8.1 Front View:

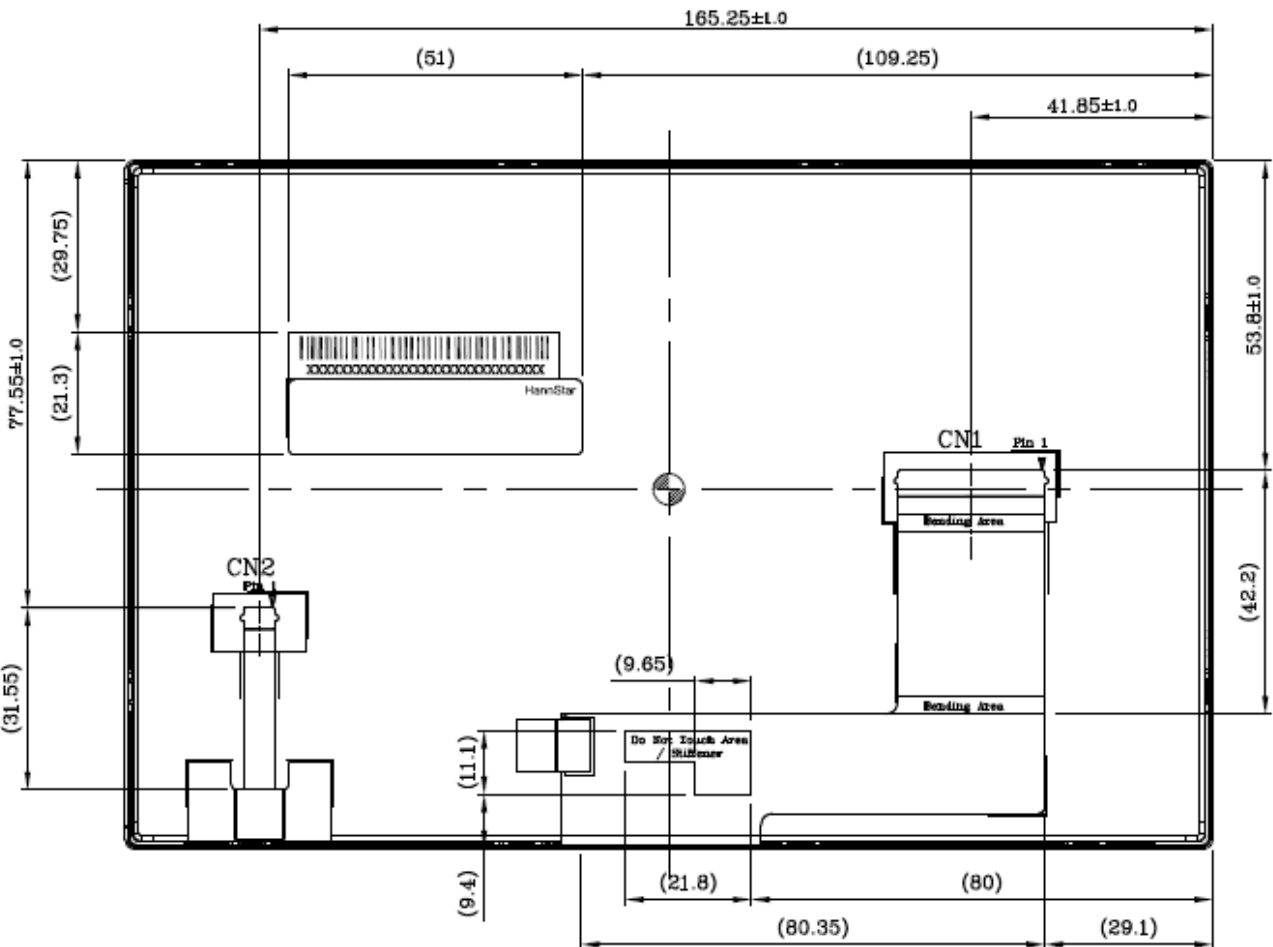
Unit: mm; General tolerance: ± 0.3 mm



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8.2 Rear View:



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9.0 LCM LABEL

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

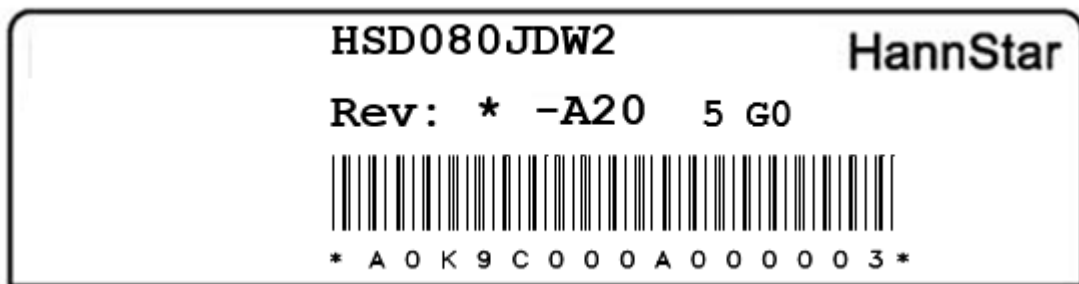
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mark	0	1	2	3	4	5	6	7	8	9

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.



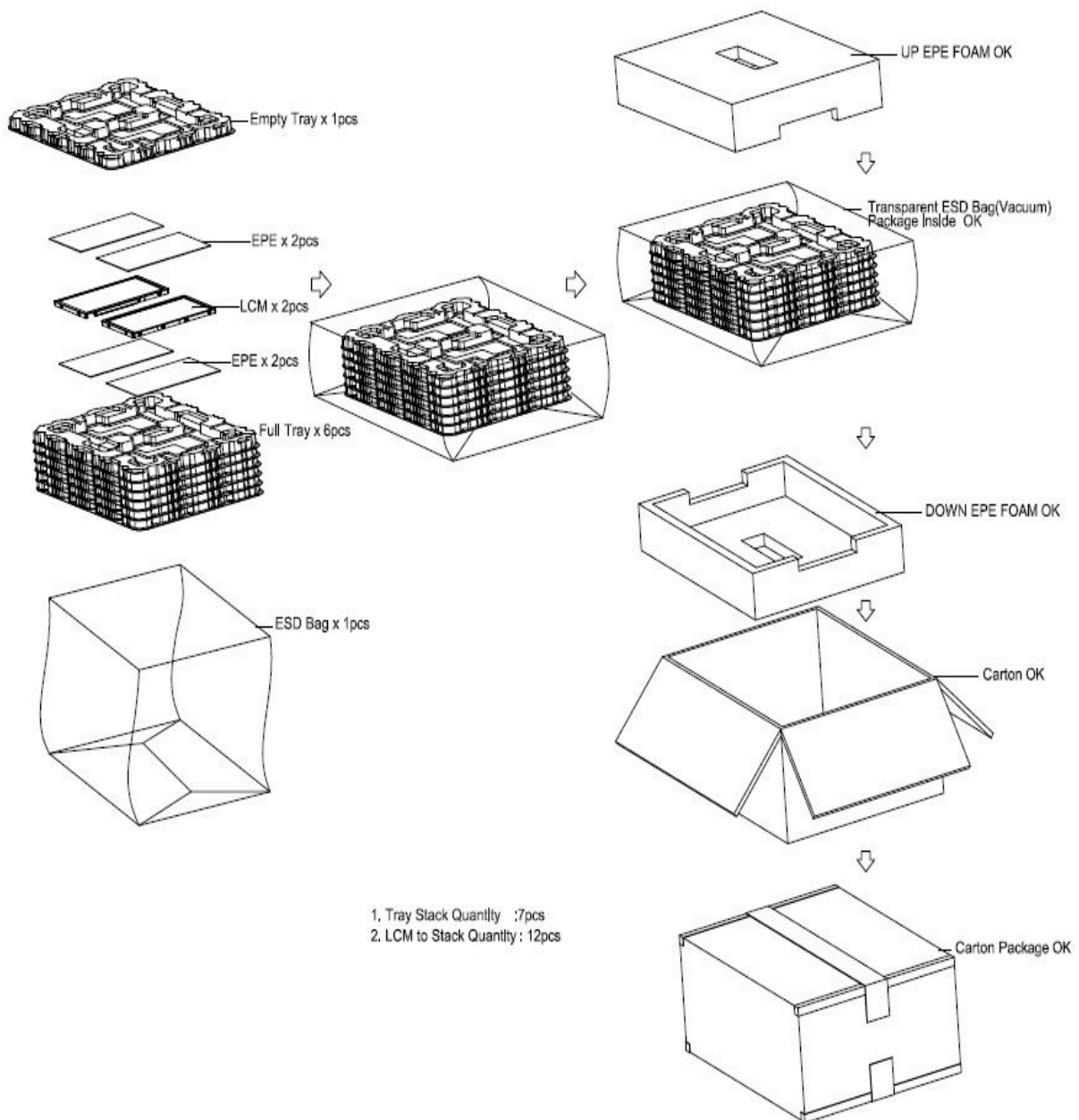
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10.0 PACKAGE SPECIFICATION

10.1 Packing form

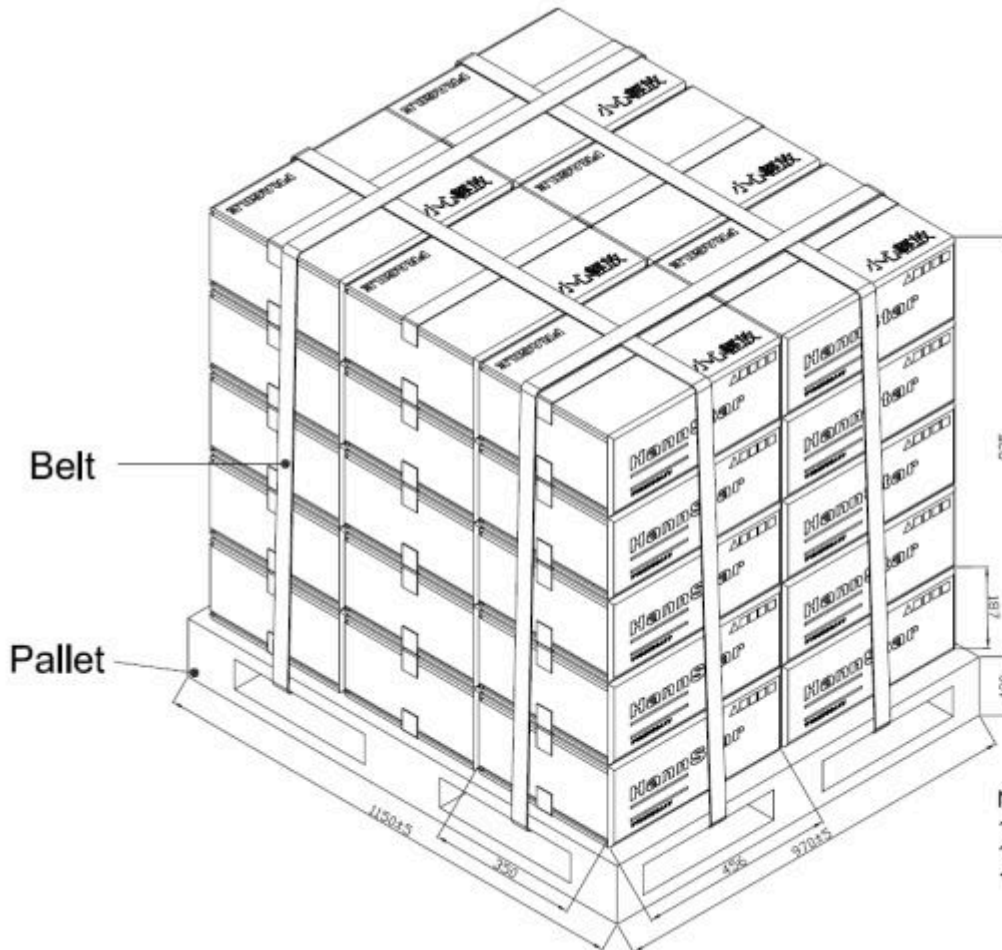
TPM Model	Qty. in the Box	Inner Box Size (mm)	Notice
HSD080JDW2-A20	12pcs/Box	456x350x187 ^H	--

10.2 Packing assembly drawings



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10.3 Pallet Drawings



- Notes :
- 1 Pallet : 30pcs Cartons
 - 1 Carton : 12 pcs LCM
 - 1 Pallet : 360 pcs LCM

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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 touch panel module, and may cause scratches or dust on the display. HannStar does not warrant the touch panel 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 touch panel module.

11.4.2. Do not pull or fold the LED cable.

11.4.3. Do not touch the parts inside touch panel 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 touch panel module may be damaged.

11.5.2. Please do not leave touch panel 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 touch panel 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.

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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 touch panel 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 touch panel module to prevent from electrostatic occurrence.

11.8.2 Because touch panel 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 touch panel module, obey the local environmental regulations.

11.11 Optical Bonding

Before CL/TP bonding, LCM must pre baking by 80°C/8hr.



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