倍顯(香港)有限公司
Facelcd(HongKong) Limited

PRODUCT SPECIFICATIONS

For Customer:_____ ☐ : APPROVAL FOR SPECIFICATION

Customer Model No._____ ☐ : APPROVAL FOR SAMPLE

Module No.: FB080NFP312-A Date : 2020.03.19

Version :0

For Customer's Acceptance:

Approved By	Comment

PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT

. Revision Record

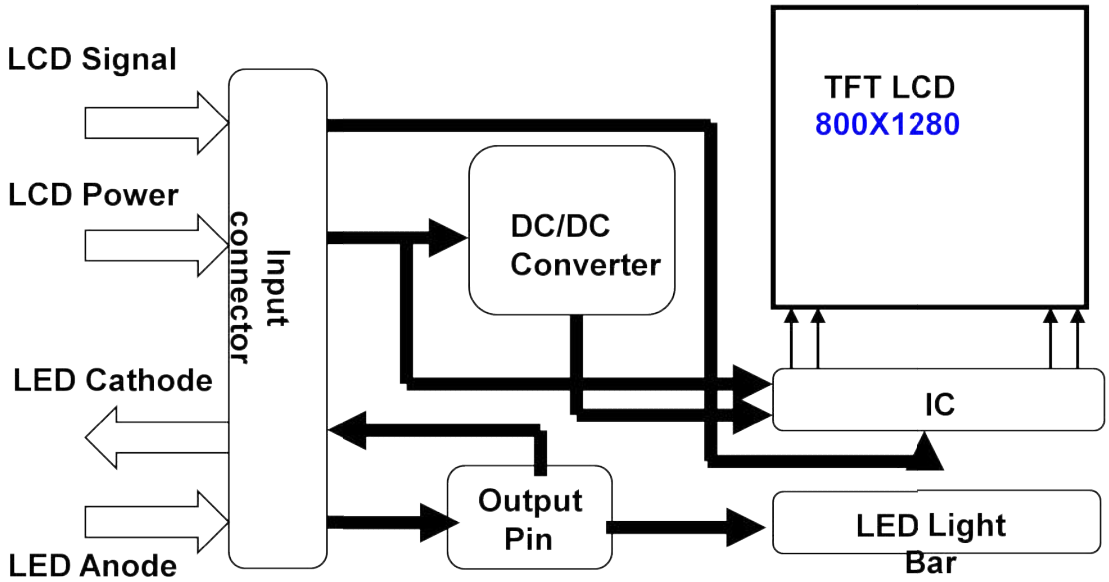
Date	Rev.No.	Page	Revision Items	Prepared
2020.03.19	**V0**		**The first release**	

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

FB080NFP312-A is a color active matrix TFT LCD FOG product using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This product has a 8.0inch diagonally measured active area with WXGA resolutions (800 horizontal by 1280 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this FOG can display 16.7M colors. The TFT-LCD panel used for this product is adapted for higher color type.



1.2 Features

- 4 lanes MIPI Interface
- Data enable signal mode
- 8-bit color depth, display 16.7M colors
- Low driving voltage and low power consumption
- RoHS Compliant

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IC:天钰 JD9365DA

1.4 General Specification

The followings are general specifications at the model TV080WXM-NL0. (listed in Table 1.)

< Table 1. General Specifications >

Parameter	Specification	Unit	Remarks
Active area	107.64(W) x 172.22(H)	mm	
Number of pixels	800(H) ×1280(V)	pixels	
Pixel pitch	44.85(H) ×RGB×134.55(V)	μm	
Pixel arrangement	Pixels RGB stripe arrangement		
Display colors	16.7M(Real 8bits)	colors	
Display mode	Normally Black		
Outline Dimension	98.7(V) × 160 (H)	mm	Tolerance:±0.15 mm
Weight	120	gram	max.
Power Consumption	1.46(max.)	Watt	
Surface Treatment	AG		

DriverIC JD9365DA

2.0 ABSOLUTE MAXIMUM RATINGS

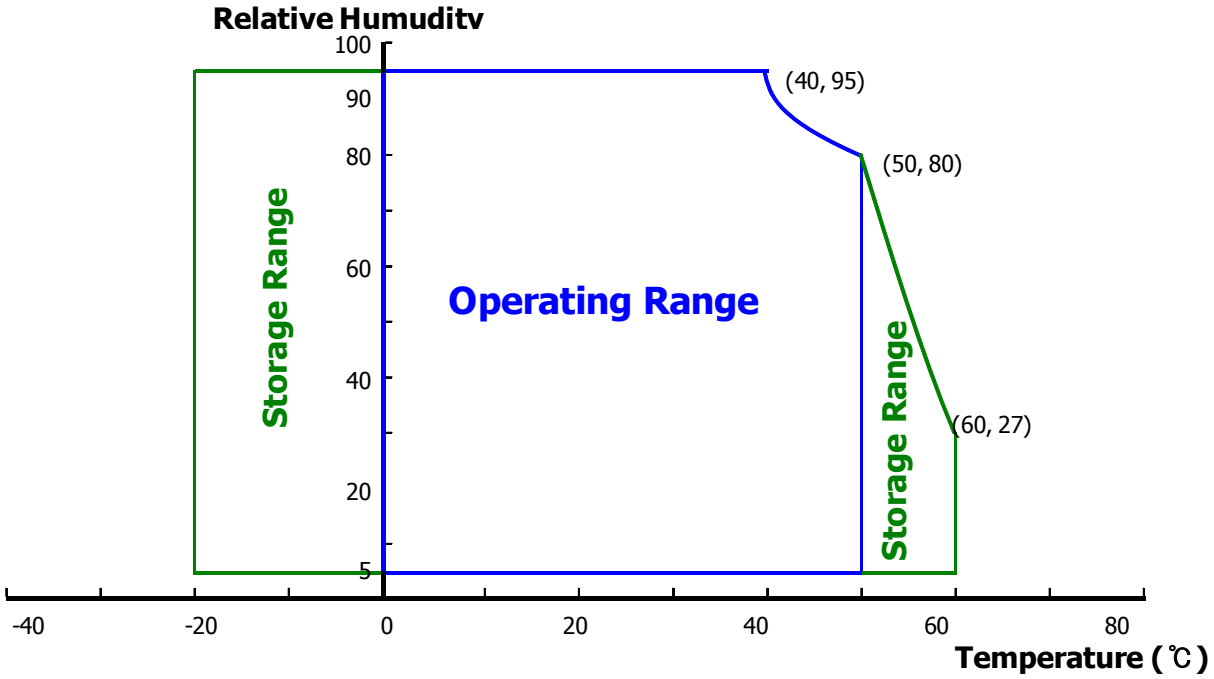
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings>

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	VDD	-0.3	5.0	V	Note 1
Operating Temperature	TOP	-20	+60	℃	Note 2
Storage Temperature	TST	-10	+50	℃	

Notes : 1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.

2. Temperature and relative humidity range are shown in the figure below.
95 % RH Max. (40 OC ≥ Ta)
Maximum wet - bulb temperature at 39 OC or less. (Ta > 40 OC) No condensation.



3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 3. Electrical specifications >

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
Power Supply Input Voltage	VDD	3.0	3.3	3.6	Vdc	
Logic Power Supply Input Voltage	VLOG	1.7	1.8	1.9	Vdc	
Power Supply Ripple Voltage	VRP		300		mV	
Power Supply Current	IDD	-	50	126	mA	1
Power Consumption	PDD		0.20	0.45	Watt	
Logic Power Supply Current	ILOG	16	18	20	mA	
Logic Power Consumption	PLOG		33		mW	
Rush current	IRUSH	-	1		A	2

Notes :

1. The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=3.3V, Frame rate f_V=60Hz and Clock frequency = 68.4MHz.Test pattern of power supply current is : typ@White, max@R/G/B

2. The duration of rush current is about 2ms and rising time of Power input is 1ms(min)

4.0 INTERFACE CONNECTION

Input Signal & Power

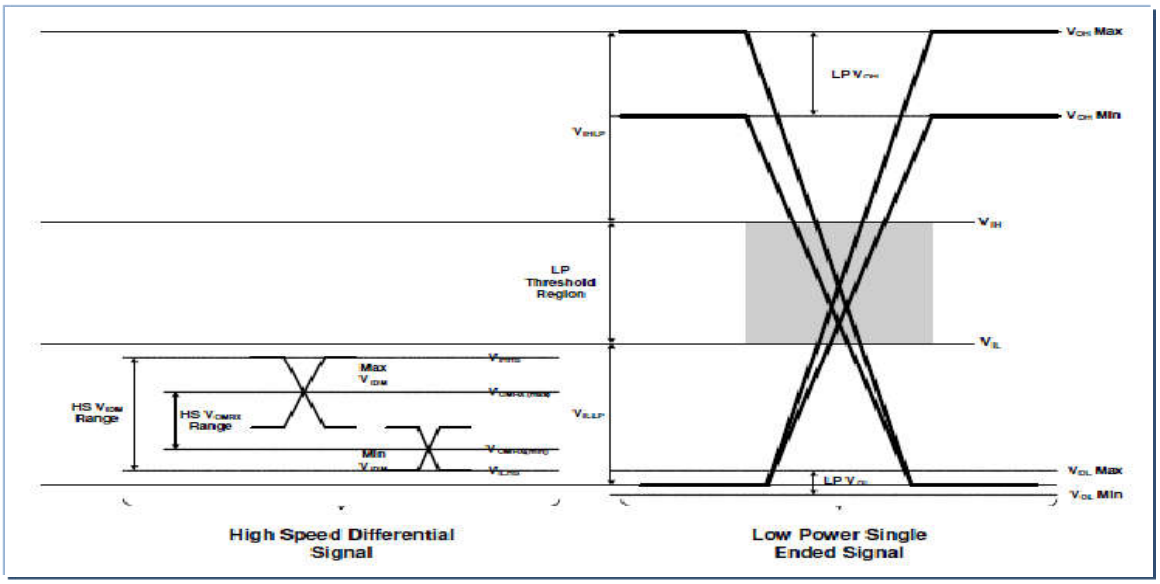
Pin No.	Symbol	Description	Remarks
1	LEDA	LED ANODE	
2	LEDA	LED ANODE	
3	LEDA	LED ANODE	
4	NC		
5	LEDK	LED CATHODE	
6	LEDK	LED CATHODE	
7	LEDK	LED CATHODE	
8	LEDK	LED CATHODE	
9	GND	Ground	
10	GND	Ground	
11	D2P	MIPI differential data input	
12	D2N	MIPI differential data input	
13	GND	Ground	
14	D1P	MIPI differential data input	
15	D1N	MIPI differential data input	
16	GND	Ground	
17	DCLKP	MIPI differential clock input	
18	DCLKN	MIPI differential clock input	
19	GND	Ground	
20	D0P	MIPI differential data input	
21	D0N	MIPI differential data input	
22	GND	Ground	
23	D3P	MIPI differential data input	
24	D3N	MIPI differential data input	
25	GND	Ground	
26	TE	NC	
27	RESET	Global reset pin, Active low	
28	GND	Ground	
29	VDDIO	Power supply 1.8V	
30	VDD	Power supply 3.3V	
31	VDD	Power supply 3.3V	

5. Electrical Specification

5.1 MIPI Input Signal SPEC

< Table 5 MIPI Input Signal Spec>

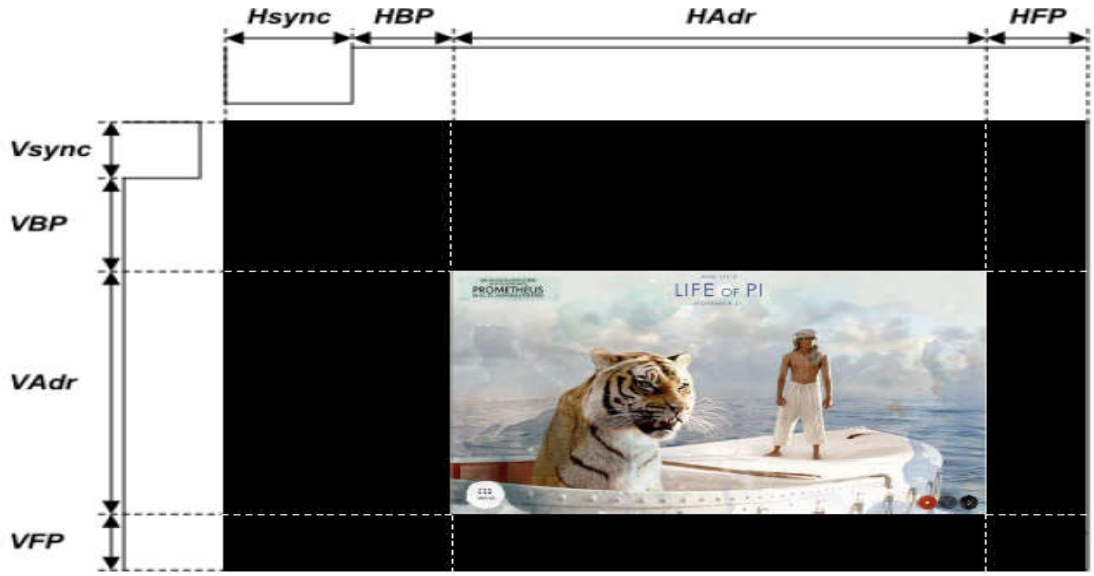
Parameter	Symbol	Min	Typ	Max	Unit	Condition
MIPI digital operation current	I_{VCCIF}	16	18	20	mA	-
MIPI digital stand-by current	$I_{VCCIFST}$	-	200	-	uA	-
MIPI Characteristics for High Speed Receiver						
Single-ended input low voltage	V_{ILHS}	-40	-	-		
Single-ended input high voltage	V_{IHHS}	-	-	460	mV	
Common-mode voltage	V_{CMRXDC}	155	-	330	mV	
Differential input impedance	Z_{ID}	80	100	125	Ω	
HS transmit differential voltage(V_{OD}=V_{DP}-V_{DN})	$\|V_{OD}\|$	140	200	250	mV	
MIPI Characteristics for Low Power Receiver						
Pad signal voltage range	V_I	-50	-	1350	mV	
Ground shift	V_{GNDSH}	-50	-	50	mV	
Output low level	V_{OL}	-50	-	50	mV	
Output high level	V_{OH}	1.1	1.2	1.3	V	



5.2 Signal Timing Spec

< Table 6 Signal Timing Spec>

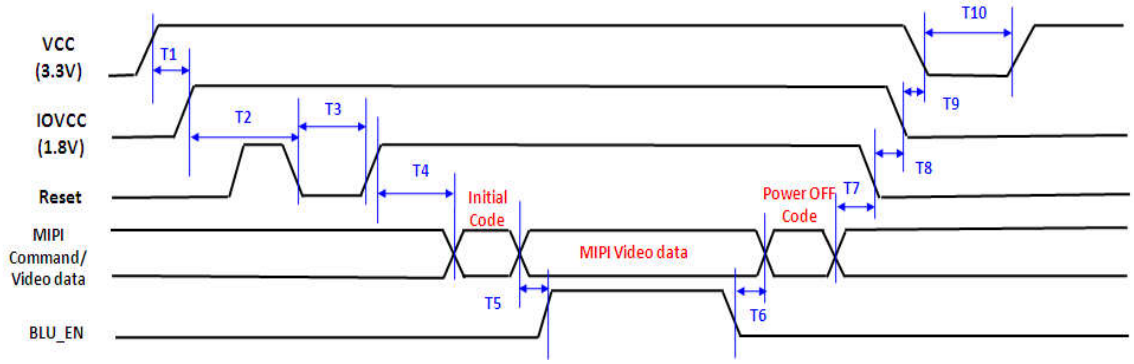
Item	Symbol	Min	Typ	Max	Unit
Pixel CLK	Tpixclk		68.43		MHz
MIPI CLK	Period	-	2.22	-	ns
	Frequency	-	450	-	MHz
Hsync	Period	--	16	-	t_{pCLK}
	Frequency	-	77.76	-	KHz
Vsync	Period	-	4	-	Line
	Frequency	-	60	-	Hz
Horizontal Active Display Term rgb vporch 8 4 4 rgb hporch 16 48 16	HAdr	-	800	-	t_{pCLK}
	HBP	-	48	-	t_{pCLK}
	HFP	-	16	-	t_{pCLK}
	Total	-	880	-	t_{pCLK}
Vertical Active Display Term	Vadr	-	1280	-	Line
	VBP	-	4	-	Line
	VFP	-	8	-	Line
	Total	-	1296	-	Line



5.5 Power Sequence

To prevent a latch-up or DC operation of the LCD FOG, the power on/off sequence shall be as shown in below

Power on/off sequence



Power ON/OFF Timing			
Parameters	Value		
	min.	max.	Unit
T1	0.5	-	ms
T2	1	-	
T3	0.02	-	
T4	5	-	
T5	200	-	
T6	40	-	
T7	0	-	
T8	1	-	
T9	No Limit	-	
T10	500	-	

6.0 OPTICAL SPECIFICATIONS

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to $\theta_{Ø=0}$ (=θ_3) as the 3 o'clock direction (the "right"), $\theta_{Ø=90}$ (= θ_{12}) as the 12 o'clock direction ("upward"), $\theta_{Ø=180}$ (= θ_9) as the 9 o'clock direction ("left") and $\theta_{Ø=270}$(= θ_6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 3.3V +/-10% at 25°C. Optimum viewing angle direction is 6 'clock.

< Table 7 Optical Spec>

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Θ_3	CR > 10		85	-	Deg.	Note 1、6
		Θ_9			85	-	Deg.	
	Vertical	Θ_{12}			85	-	Deg.	
		Θ_6			85	-	Deg.	
Color Gamut			-	50	60	-	%	NTSC
Contrast ratio		CR	Θ = 0° (Center) Normal Viewing Angle	600:1	800:1	-		Note 2、6
Trans.		-		-	6.6	-	%	Note 3、6
Reproduction of color	White	Wx		TYP. - 0.03	0.30	TYP. + 0.03		Note 4、6
		Wy			0.32			
	Red	R_x			0.615			
		R_y			0.355			
	Green	G_x			0.34			
		G_y			0.6			
	Blue	B_x			0.15			
		B_y			0.095			
Response Time		T_g		-	-	35	ms	Note 5、6
Gamma Scale				2.0	2.2	2.4		Note 6

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.

2. Contrast measurements shall be made at viewing angle of θ= 0° and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as luminance values of center point of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. When the LED current is set at 20mA .

4. The color chromaticity coordinates specified in Table 7. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

5. The electro-optical response time measurements shall be made as FIGURE 2 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Td, and 90% to 10% is Tr.

6. The listed optical specifications refer to the initial value of manufacture, but the condition of the specifications after long-term operation will not be warranted

7.0 MECHANICAL CHARACTERISTICS

7.1 Dimensional Requirements

FIGURE 3 (located in Appendix) shows mechanical outlines for the model TV080WXM-NL0. Other parameters are shown in Table 8.

<Table 8. Dimensional Parameters>

Parameter	Specification	Unit
Dimensional outline	98.7(V) × 160 (H)	mm
Weight	120g (Max.)	gram
Active area	94(H) x 151(V)	mm
Pixel pitch	0.13455(H) ×0.13455(V)	mm
Number of pixels	800(H) ×1280(V) (1 pixel = R + G + B dots)	pixels

7.2 Mounting

See FIGURE 4. (shown in Appendix)

7.3 Surface Treatment of Polarizer.

The surface treatment of the CF POL is HC.

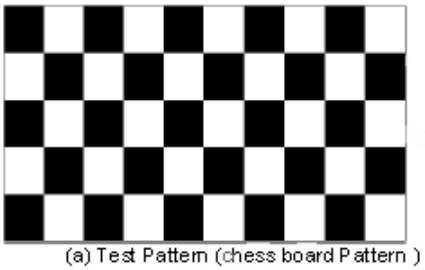
8.0 RELIABLITY TEST

8.0.1TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=60℃; 72hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Storage	Ta=-20℃; 72hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature Operation	Ta=50℃; 72hrs	IEC60068-2-1：2007 GB2423.2-2008
Low Temperature Operation	Ta=-10℃; 72hrs	IEC60068-2-1：2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50℃，90%RH， 72Hrs(no condensation)	IEC60068-2-78：2001 GB/T2423.3-2006
Thermal Shock	-20℃(0.5h) ~ 60℃(0.5h) / 10cycles	Start with cold temperature， End with high temperature， IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃ ; 2hrs	Note1

Note1:Condition of image sticking test :25℃±2℃

Operation with test pattern sustained for 2hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (chess board Pattern)

(b) Gray Pattern

8.0.1ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF，330Ω， Contact:±3KV,Air:±8KV	1	IEC61000-4-2：2001 GB/T17626.2-2006
	200pF，0Ω，±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

9.0 HANDLING & CAUTIONS

(1) Cautions when taking out the FOG

- Pick the pouch only, when taking out FOG from a shipping package.

(2) Cautions for handling the FOG

- As the electrostatic discharges may break the LCD FOG, handle the LCD FOG with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD FOG should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD FOG is operating.
- Put the FOG display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation

- When the FOG is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the FOG would be damaged.

(4) Cautions for the atmosphere

- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD FOG in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the FOG characteristics

- Do not apply fixed pattern data signal to the LCD FOG at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions

- Do not disassemble and/or re-assemble LCD FOG.
- Do not re-adjust variable resistor or switch etc.
- When returning the FOG for repair or etc., Please pack the FOG not to be broken. We recommend to use the original shipping packages.

10.0 APPENDIX

Figure 1. Measurement Set Up

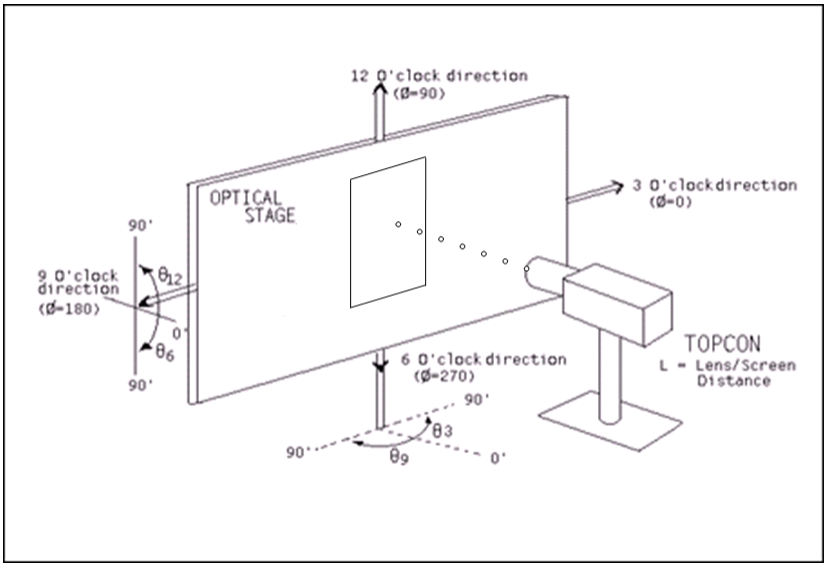


Figure 2. Response Time Testing

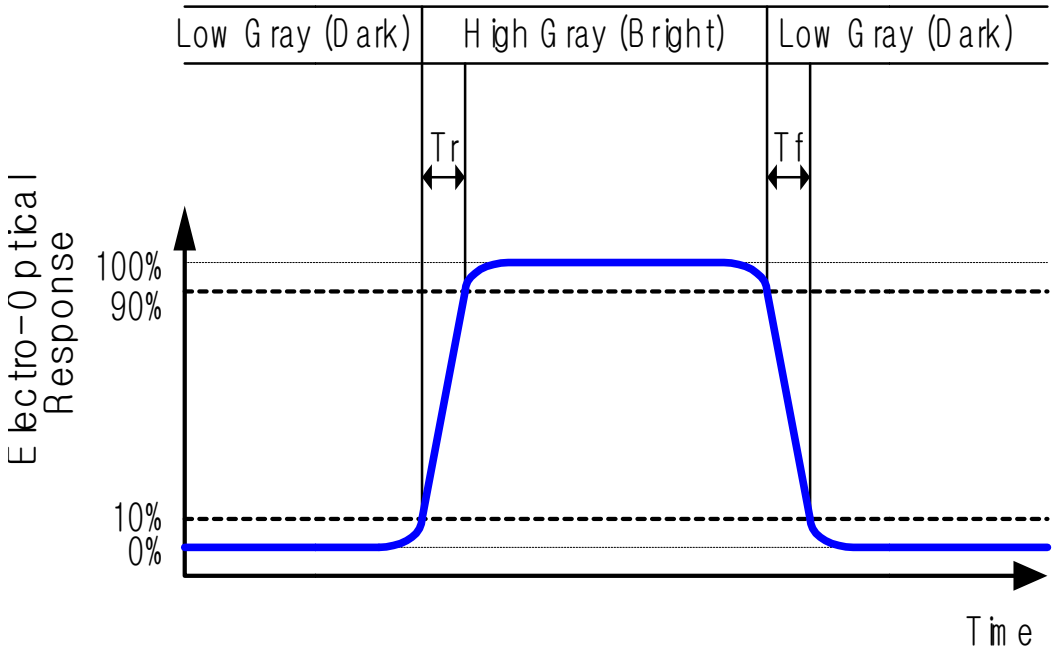
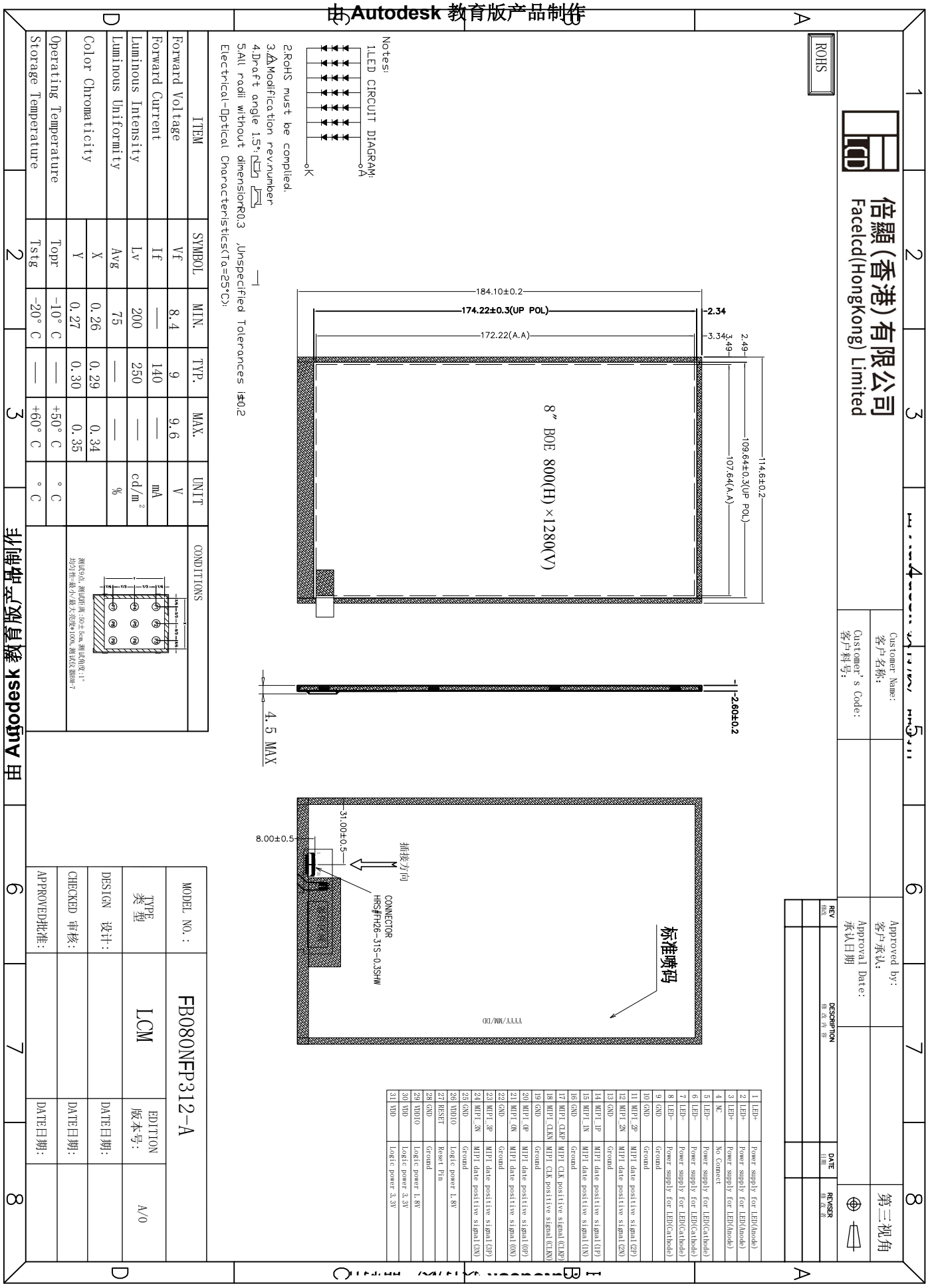


Figure 3. TFT-LCD FOG Outline Dimensions (Front view)



ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Forward Voltage	Vf	8.4	9	9.6	V	
Forward Current	If	—	140	—	mA	
Luminous Intensity	Lv	200	250	—	cd/m²	
Luminous Uniformity	Avg	75	—	—	%	
Color Chromaticity	X	0.26	0.29	0.34		
	Y	0.27	0.30	0.35		
Operating Temperature	Topr	-10° C	—	+50° C	° C	
Storage Temperature	Tstg	-20° C	—	+60° C	° C	

1	LED+	Power supply for LED(Anode)	
2	LED+	Power supply for LED(Anode)	
3	LED+	Power supply for LED(Anode)	
4	NC	No Connect	
5	LED-	Power supply for LED(Cathode)	
6	LED-	Power supply for LED(Cathode)	
7	LED-	Power supply for LED(Cathode)	
8	LED-	Power supply for LED(Cathode)	
9	GND	Ground	
10	GND	Ground	
11	MIPI_2P	MIPI date positive signal(2P)	
12	MIPI_2N	MIPI date positive signal(2N)	
13	GND	Ground	
14	MIPI_1P	MIPI date positive signal(1P)	
15	MIPI_1N	MIPI date positive signal(1N)	
16	GND	Ground	
17	MIPI_CLKP	MIPI CLK positive signal(CLKP)	
18	MIPI_CLKN	MIPI CLK positive signal(CLKN)	
19	GND	Ground	
20	MIPI_0P	MIPI date positive signal(0P)	
21	MIPI_0N	MIPI date positive signal(0N)	
22	GND	Ground	
23	MIPI_3P	MIPI date positive signal(3P)	
24	MIPI_3N	MIPI date positive signal(3N)	
25	GND	Ground	
26	VDDIO	Logic power 1.8V	
27	RESET	Reset Pin	
28	GND	Ground	
29	VDDIO	Logic power 1.8V	
30	VDD	Logic power 3.3V	
31	VDD	Logic power 3.3V	