

Shenzhen Amelin Electronic Technology Co.,Ltd	Doc.No.: AML080WXBI3103S
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PRODUCT SPECIFICATION

TFT-LCD MODULE

Model No: AML080WXBI3103S

For Customer's Acceptance	
Approved by	Comment

	Signature	Date
Prepared by		
Checked by		
Approved by		

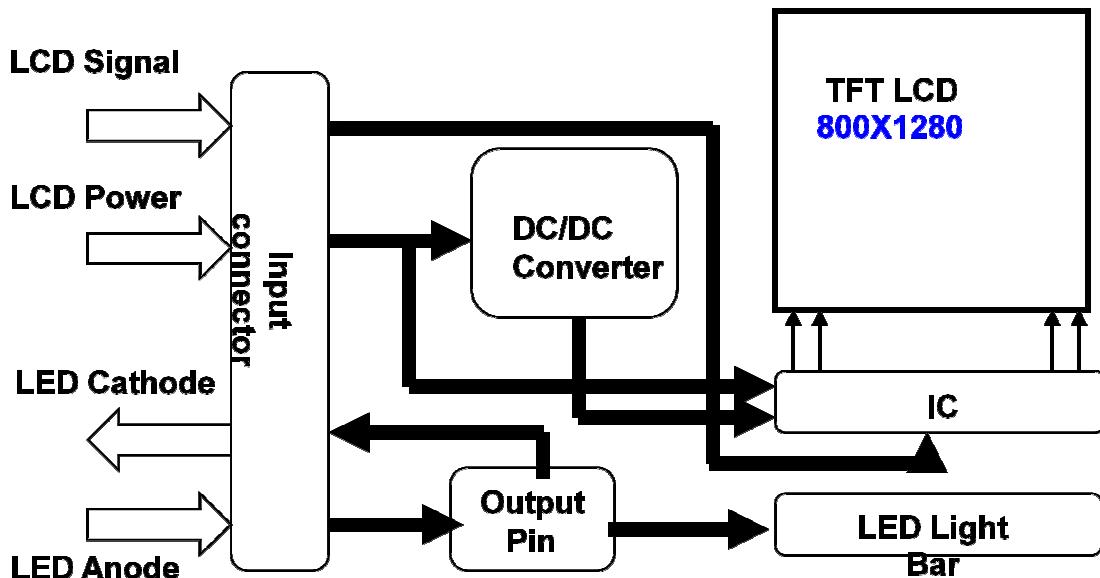
Contents

No.	Item	Page
	REVISION HISTORY	2
	CONTENTS	3
1.0	GENERAL DESCRIPTION	4
	1.1 Introduction	4
	1.2 Features	4
	1.3 Applications	4
	1.4 General Specification	5
2.0	ABSOLUTE MAXIMUM RATINGS	6
3.0	ELECTRICAL SPECIFICATIONS	7
	3.1 TFT LCD FOG	7
	3.2 Recommended Driving Condition for Backlight	7
4.0	INTERFACE CONNECTION	8
	4.1 Input Signal & power	8
5.0	SIGNAL TIMING SPECIFICATIONS	9
	5.1 MIPI Input Signal Spec	9
	5.2 Signal Timing Spec	10
	5.5 Power Sequence	11
6.0	OPTICAL SPECIFICATIONS	12
7.0	MECHANICAL CHARACTERISTICS	13
8.0	RELIABILITY TEST	14
9.0	HANDING & CAUTIONS	15
10.0	APPENDIX	16-17

1.0 GENERAL DESCRIPTION

1.1 Introduction

AML080WXBI3103S 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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1.4 General Specification

The followings are general specifications at the model AML080WXBI3103S. (listed in Table 1.)

<Table 1. General Specifications >

Parameter	Specification	Unit	Remarks
Active area	107.64(W) x 172.224(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	114.6(W) x 184.1 (H) x 2.55 (V)	mm	Tolerance:±0.15 mm
Weight	120	gram	max.
Power Consumption	1.46(max.)	Watt	
Surface Treatment	AG		

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>

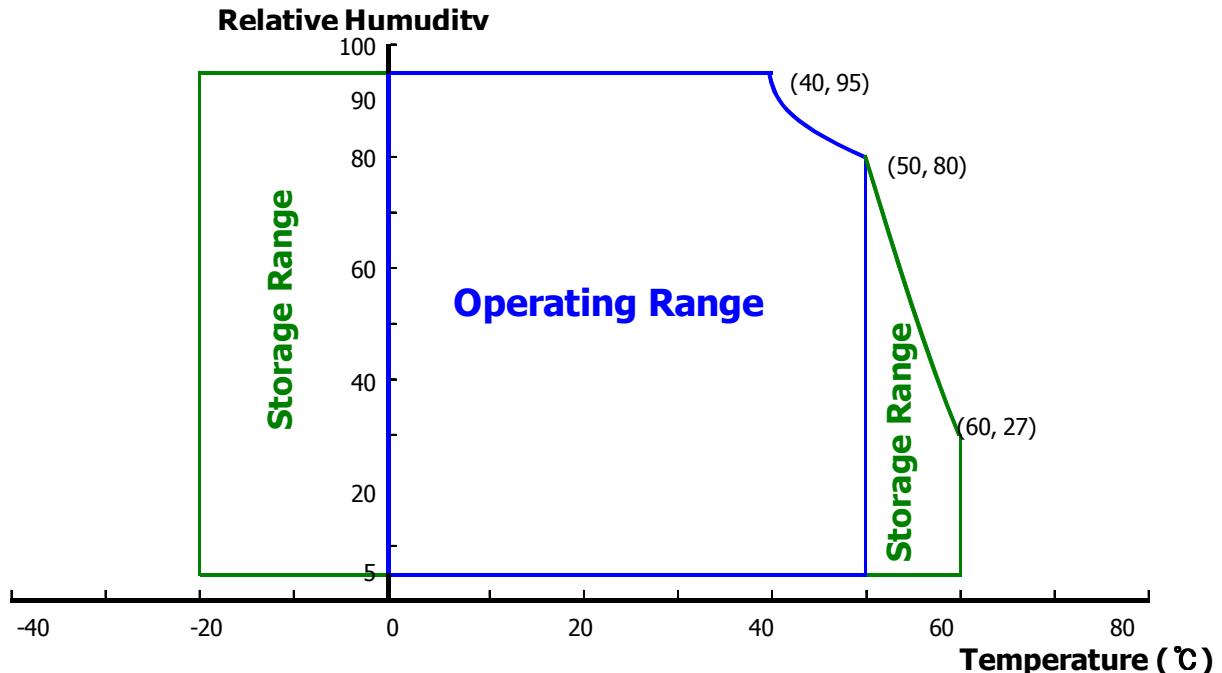
Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	VDD	-0.3	5.0	V	Note 1
Operating Temperature	TOP	-20	+60	°C	Note 2
Storage Temperature	TST	-20	+60	°C	

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. ($40^{\circ}\text{C} \geq Ta$)

Maximum wet - bulb temperature at 39°C or less. ($Ta > 40^{\circ}\text{C}$) 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	
Power Consumption	PDD		0.20	0.45	Watt	1
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 $f_v=60\text{Hz}$ 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

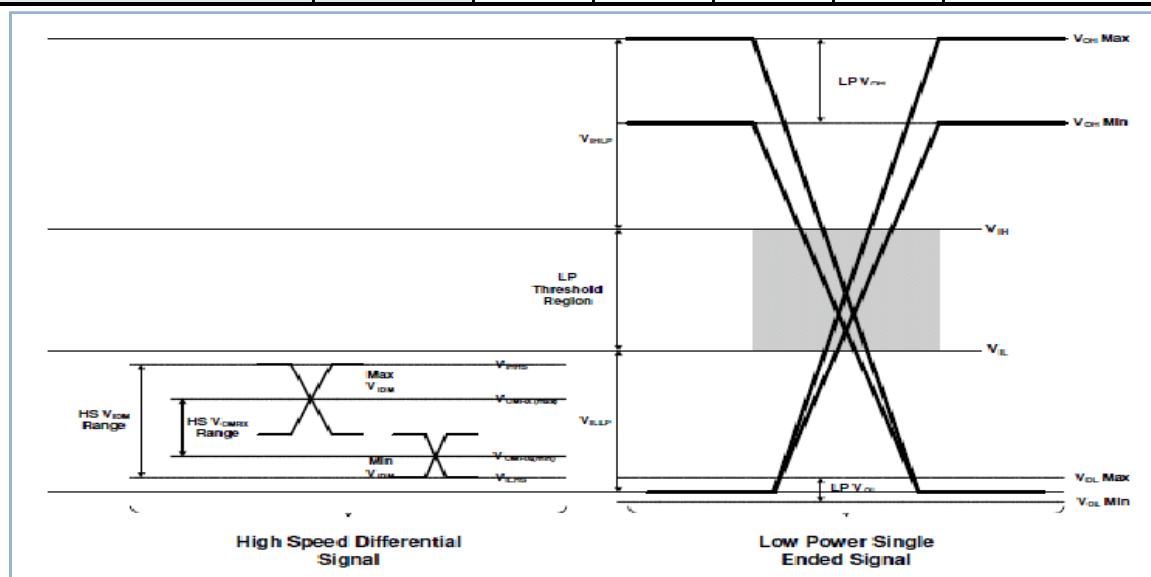
Pin No.	Symbol	Description	Remarks
1	LEDA	LED ANODE	
2	LEDA	LED ANODE	
3	LEDA	LED ANODE	
4	NC		
5	LEDK	LED CATHODE	
6	LEDK	LED CATHODE	
7	LEDK	LED CATHODE	
8	LEDK	LED CATHODE	
9	GND	Ground	
10	GND	Ground	
11	D2P	MIPI differential data input	
12	D2N	MIPI differential data input	
13	GND	Ground	
14	D1P	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>

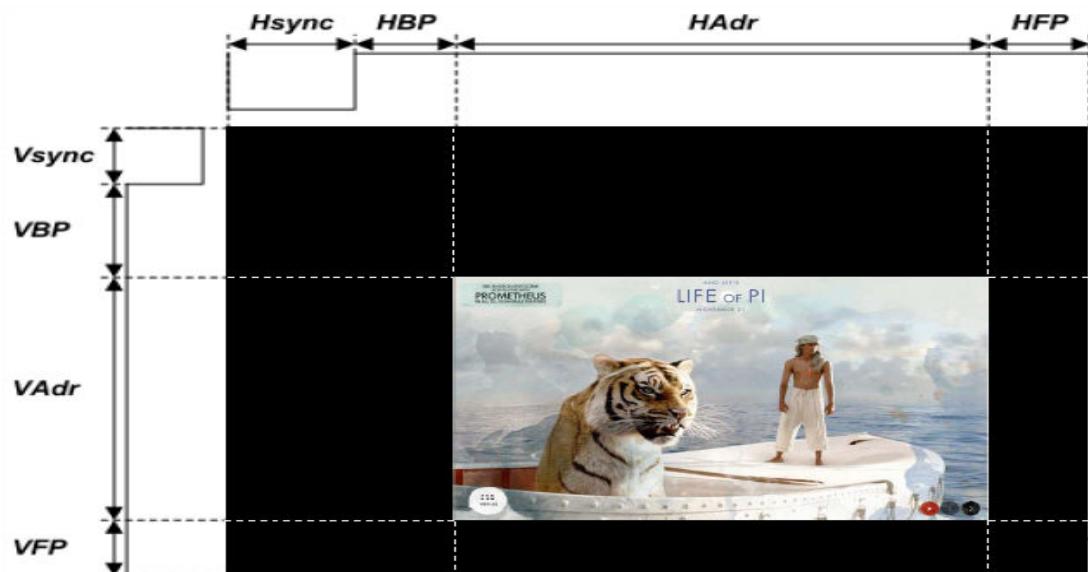
Parameter	Symbol	Min	Typ	Max	Unit	Condition
MIPI digital operation current	I _{VCCIF}	16	18	20	mA	-
MIPI digital stand-by current	I _{VCCIFST}	-	200	-	uA	-
MIPI Characteristics for High Speed Receiver						
Single-ended input low voltage	V _{ILHS}	-40	-	-		
Single-ended input high voltage	V _{IHHS}	-	-	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 >

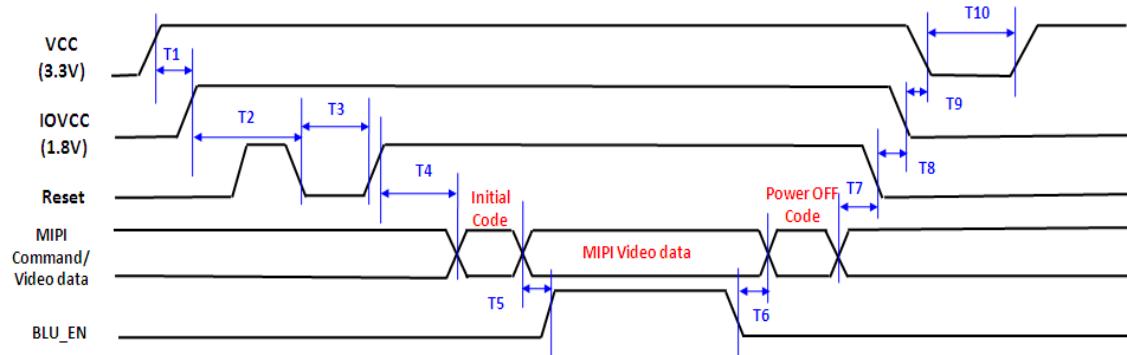
Item	Symbol	Min	Typ	Max	Unit
Pixel CLK	Tpixclk		68.43		MHz
MIPI CLK	Period	-	2.22	-	ns
	Frequency	-	450	-	MHz
Hsync	Period	--	16	-	t_{pCLK}
	Frequency	-	77.76	-	KHz
Vsync	Period	-	4	-	Line
	Frequency	-	60	-	Hz
Horizontal Active Display Term rgb vporch 8 4 4 rgb hporch 16 48 16	HAdr	-	800	-	t_{pCLK}
	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		Unit
	min.	max.	
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 = $25\pm 2^\circ\text{C}$) 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 $\theta_{\theta=0} (= \theta_3)$ as the 3 o'clock direction (the "right"), $\theta_{\theta=90} (= \theta_{12})$ as the 12 o'clock direction ("upward"), $\theta_{\theta=180} (= \theta_9)$ as the 9 o'clock direction ("left") and $\theta_{\theta=270} (= \theta_6)$ as the 6 o'clock direction ("bottom"). While scanning θ and/or Φ , 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 $3.3\text{V} +/- 10\%$ 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	$\Theta = 0^\circ$ (Center) Normal Viewing Angle	600:1	800:1	-		Note 2、 6	
Trans.		-		-	6.6	-	%	Note 3、 6	
Reproduction of color	White	W_x			0.30			Note 4、 6	
		W_y			0.32				
	Red	R_x			0.615				
		R_y		TYP. - 0.03	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 $\theta = 0^\circ$ 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 AML080WXB13103S. Other parameters are shown in Table 8.

<Table 8. Dimensional Parameters>

Parameter	Specification	Unit
Dimensional outline	112.64(V) × 181.824 (H)	mm
Weight	120g (Max.)	gram
Active area	107.64(H) x 172.224(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 RELIABILITY TEST

The Reliability test items and its conditions are shown in below.

<Table 9. Reliability Test Parameters >

Test item	Test condition	No. of failures / No. of examinations
Low temperature storage test	Ta= -20°C, 240h	0/5
High temperature storage test	Ta= 70°C, 240h	0/5
Low temperature operation test	Ta= -10°C, 240h	0/5
High temperature operation test	Ta= 60°C, 240h	0/5
High temperature & High humidity operation test	Ta= 50°C, 90%RH, 240h	0/5
Thermal Shock	[(-20°C 30min) → (70°C 30min)]/cycle, 100cycles	0/5
Electrostatic discharge test	330ohm,150pf Air: +/-5KV, (Note 23,24)	0/5
Packing vibration-proof test	1.47G,5-200Hz,Random,+Z	0/1box
Packing drop test	1Angle,3Edge,6Face Height: 依据 JIS-Z-0200 Level 1	0/1box

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

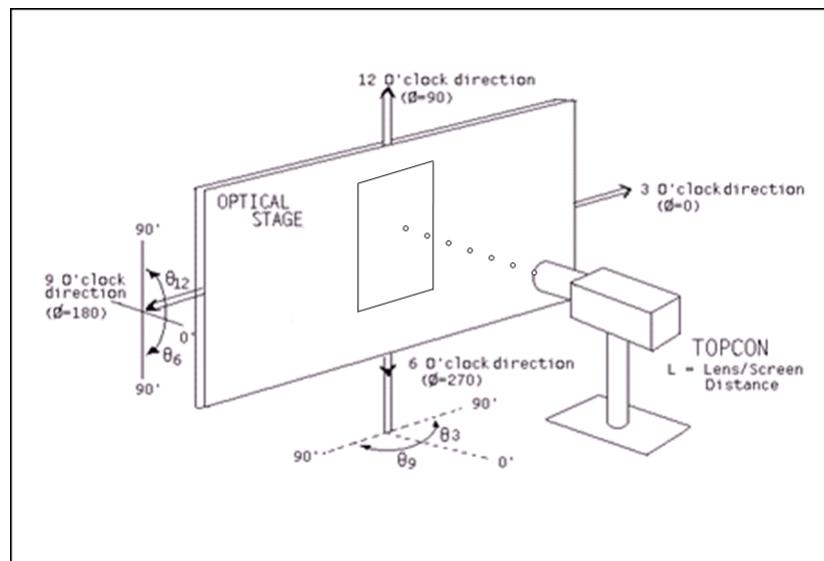


Figure 2. Response Time Testing

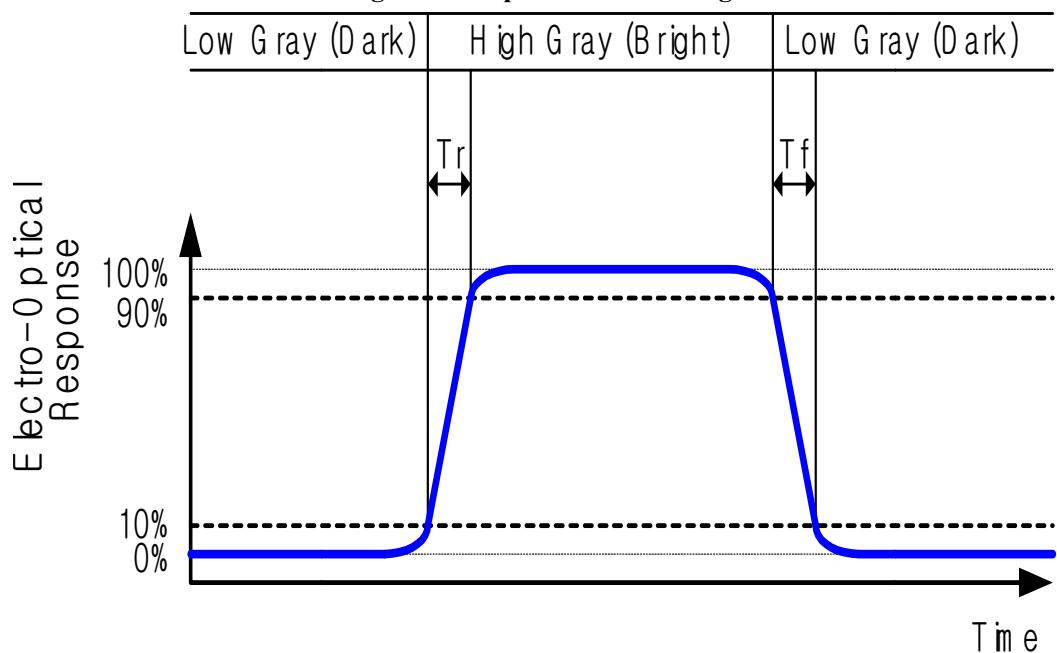


Figure 3. TFT-LCD FOG Outline Dimensions (Front view)

