SPECIFICATION
FOR
LCD MODULE

Customer   : _____

Product Model: **BI070DX1**   ___

Sample code: _____

Designed by	Checked by	Approved by

Revision History

Version	Contents	Date	Note
A	Original	2013.03.20	

Contents

2. Scope

This specification applies to the TFT LCD module which is designed and manufactured by LCM Factory.

3. Normative Reference

GB/T4619-1996 《Liquid Crystal Display Test Method》

GB/T2424 《Basic environmental Testing Procedures for Electric and Electronic Products.》
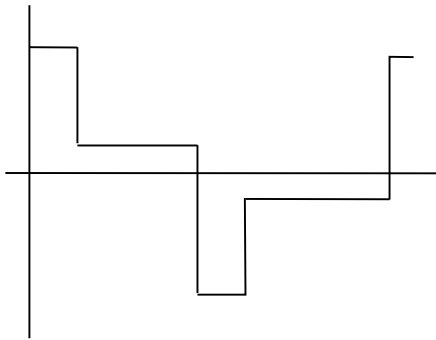
GB/T2423 《Basic Testing Procedures for Electric and Electronic Products》

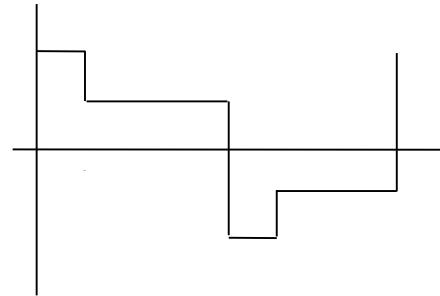IEC61747-1 《SIXTH PARTGB2828`2829-87《National Standard of PRC》

4. Definitions

4.1 Definitions of Vop

The definitions of threshold voltage Vth1, Vth2 the following typical waveforms are applied on liquid crystal by the method of equalized voltage for each duty and bias.

【 selected waveform 】   【 non-selected waveform 】

① Vth1: The voltage which the brightness of segment indicates 50% of saturated value on the conditions of selected waveform

$$(f_f=80Hz, \Phi=10° \theta=270° \text{ at } 25℃)$$

② Vth2: The voltage which the brightness of segment indicates 50% of saturated value on the conditions of non-selected waveform

$$(f_f=80Hz, \Phi=10° \theta=270° \text{ at } 25℃)$$

③ Vop: (Vth1(50%)+Vth2(50%))/2 $(f_f=80Hz, \Phi=10° \theta=270° \text{ at } 25℃)$

4.2 Definition of Response Time Tr, Td

①Tr: The time required which the brightness of segment becomes 10% from 100% when waveform is switched to selected one from non-selected one. $(f_f=80Hz, \Phi=10°\theta=270°\text{at } 25℃)$
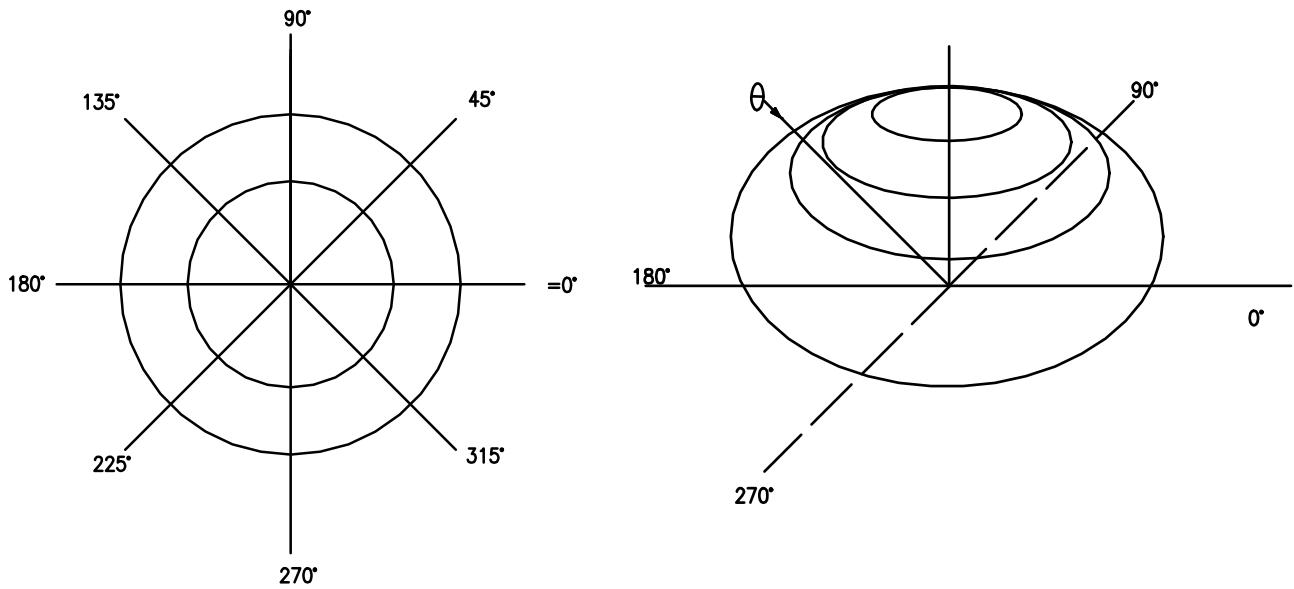
②Td: The time required which the brightness of segment becomes 90% from 10% when waveform is switched to selected one from selected one. $(f_f=80Hz, \Phi=10°\theta=270°\text{at } 25℃)$

4.3 Definition of Contrast Ratio Cr
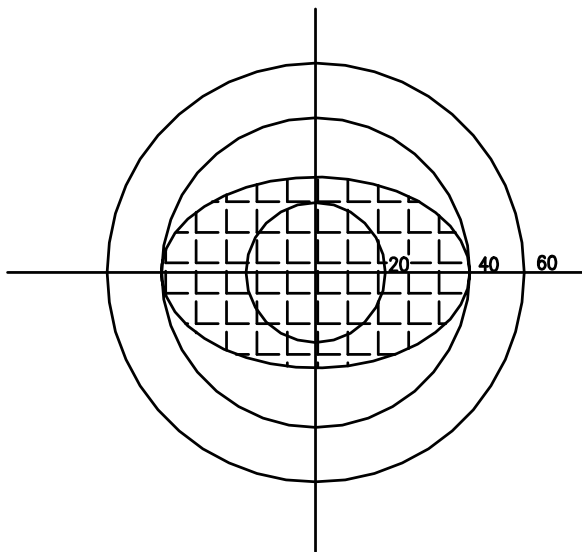
Cr=A/B

① A: Segments brightness in case of non-selected waveform
② B: Segments brightness in case of selected waveform
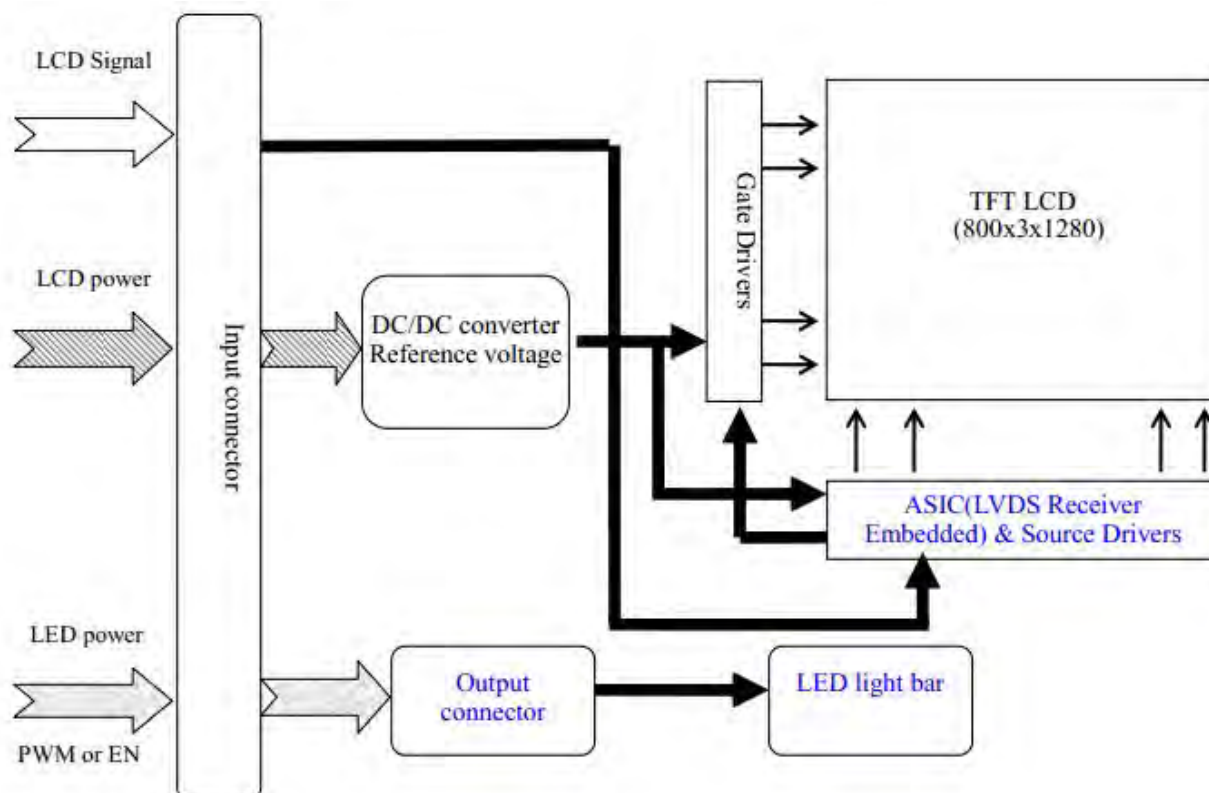
4.4 Definition of Angle and Viewing Range

Angular Graph: Constrast Ratio

Such as:
Viewing Angle Range:
        80(Cr>2) Horizontal
        70(Cr>2) Vertical

5. Block Diagram

6. Technology Specifications
6.1 Features

This single-display module is suitable for use in Net Book products.

The LCD adopts one backlight with High brightness 24-lamps white LED.

Construction: 7″ a-Si color TFT-LCD ,With AUO Cell,White LED backlight, FPC and

T-CON.

6.2 General Specifications

No.	Item	Specification
1	LCD size	7 inch
2	Resolution	800 (RGB)X1280
3	Display mode	Normally black
4	Pixel pitch	0.150(W)X0.150(H) mm
5	Active area	94.2 (W)X150.72 (H) mm
6	Module size	104.32(W)X161.67(H)X2.3(D)mm
7	Pixel arrangement	RGB-stripe
8	Surface Treatment	Glare
9	Interface	LVDS
10	Backlight power consumption	TBD
11	Panel power consumption	TBD
11	Weight	TBD

6.3 Interface Pin Connection

Pin No.	Symbol	Function
1	VDD	Power Supply, 3.3V typ
2	VDD	Power Supply, 3.3V typ
3	VDD	Power Supply, 3.3V typ
4	NC	NC
5	GND	Ground
6	RXIN0-	D0- (LVDS differential signal)
7	RXIN0+	D0+ (LVDS differential signal)
8	GND	Ground
9	RXIN1-	D1- (LVDS differential signal)
10	RXIN1+	D1+ (LVDS differential signal)
11	GND	Ground
12	RXIN2-	D2- (LVDS differential signal)
13	RXIN2+	D2+ (LVDS differential signal)
14	GND	Ground
15	RXCLKIN-	CLK- Negative LVDS differential clock input
16	RXCLKIN+	CLK+ Positive LVDS differential clock input
17	GND	Ground
18	NC	NC
19	NC	NC
20	GND	Ground
21	LVBIT	6 or 8bit Change
22	DITHER	Dithering function enable control
23	GND	Ground
24	LED EN(PWM)	PWM
25	LVFMT	MSB/LSB Change
26	BIST	NC
27	VLED	LED Power Supply , 3~5V
28	VLED	LED Power Supply , 3~5V
29	VLED	LED Power Supply , 3~5V
30	VLED	LED Power Supply , 3~5V
31	NC	NC

6.4 Absolute Max. Rating

Item	Symbol	Values		Unit
		Min.	Max.	
Power Voltage	VDD	-0.5	5.0	V
	VCC	-0.3	2	V
	AVDD	-0.5	15	V
	V1-V14	-0.5	15	V
	VCOMI	-0.5	15	V
	VGH	-0.3	40	V
	VGL	-20	0.3	V
	VBR	VGL	VGH	V
Backlight forward current	I_{LED}	0	25	mA(For each LED)
Input Signal Voltage	V_I	-0.3	VDD	
Operation Temperature	T_{OP}	0	50	℃
Storage Temperature	T_{ST}	-20	60	℃

6.5 Typical Operation Conditions

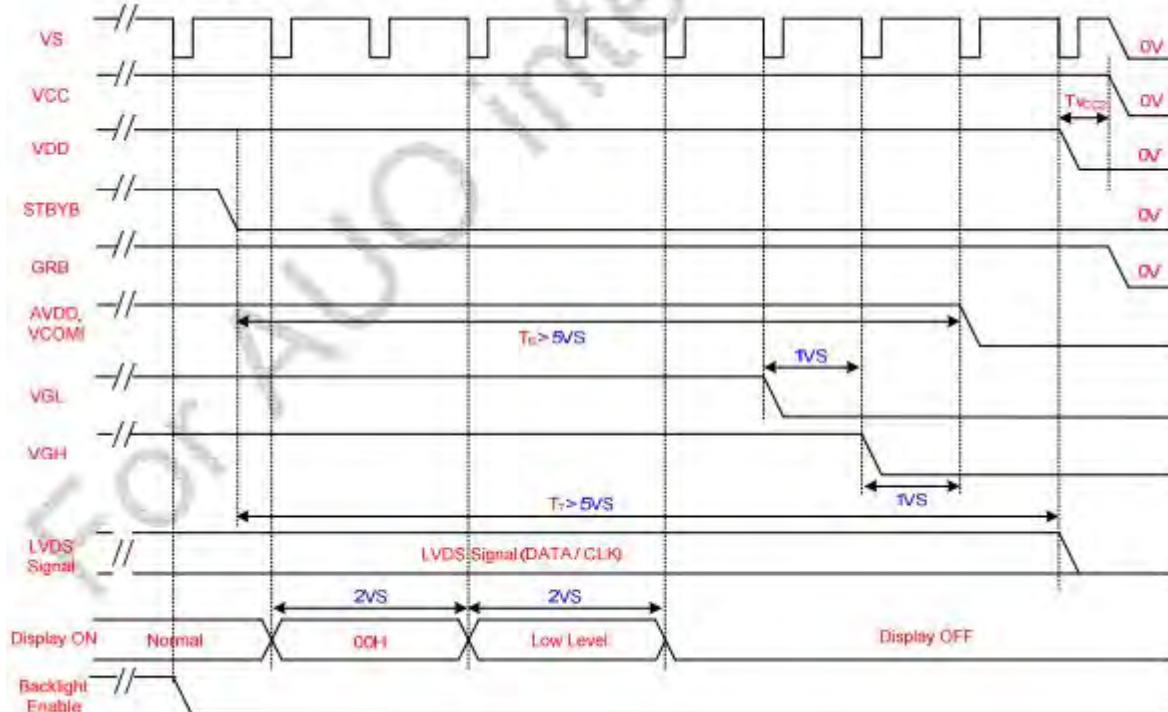| Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power Voltage	VDD	3.0	3.3	3.6	V
	VLED	3	4	5	V
Power consumption	I_{VDD}	--	TBD	--	mA
	I_{AVDD}	--	TBD	--	mA
	I_{LED}	--	TBD	TBD	mA

6.6 Power Sequence

a. Power on sequence
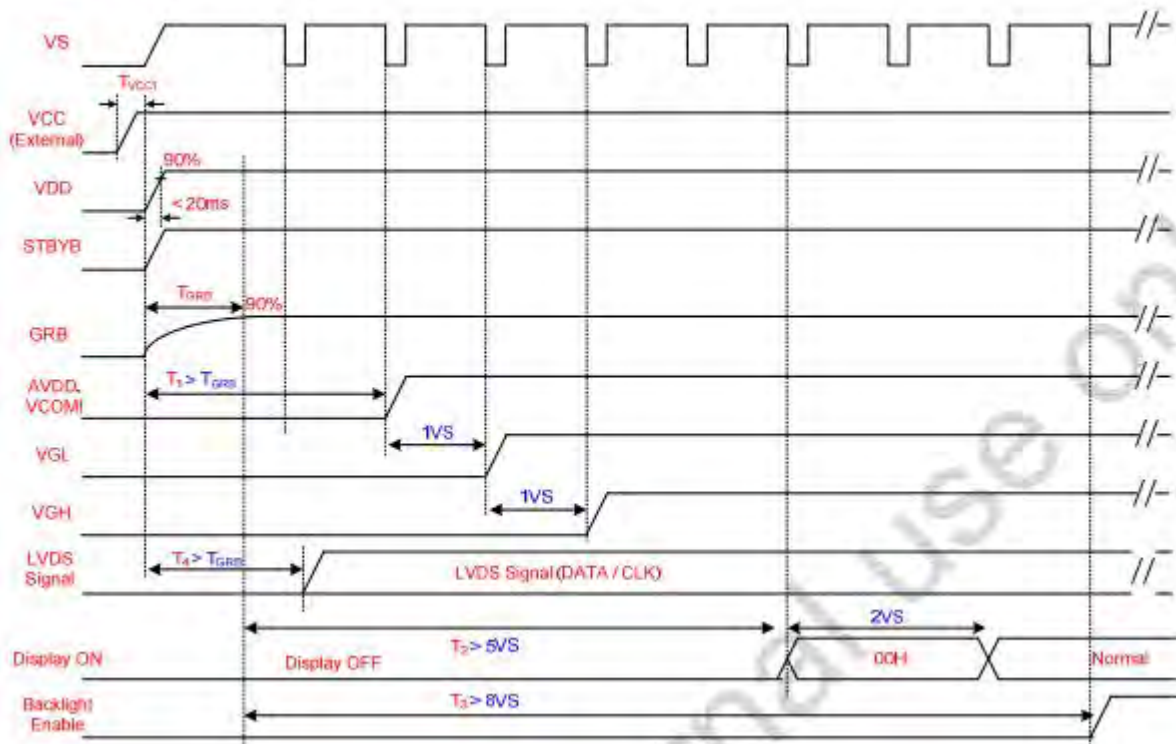

b. Power off sequence

6.7 Timing Conditions

HV mode

| Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	F_{DCLK}	60	66.8	-	MHz
Horizontal display area	T_{HD}		800		DCLK
HS period time	T_H	860	864	890	DCLK
HS pulse width	T_{HPW}	1	-	30	DCLK
HS back porch	T_{HBP}		48		DCLK
HS front porch	T_{FBP}	12	16	127	DCLK
Vertical display area	T_{VD}		1280		H
VS period time	T_V	1286	1288	1350	H
VS pulse width	T_{VPW}	1	-	10	H
VS back porch	T_{VBP}		3		H
VS front porch	T_{VFP}	3	5	127	H

DE mode

Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	F_{DCLK}	60	66.8	-	MHz
Horizontal display area	T_{HD}		800		DCLK
HS period time	T_H	860	864	890	DCLK
HS blanking	$T_{HBP} + T_{HFP}$	60	64	175	DCLK
Vertical display area	T_{VD}		1280		H
VS period time	T_V	1286	1288	1350	H
VS blanking	$T_{VBP} + T_{VFP}$	6	8	130	H

Timing Diagram

Vertical input format
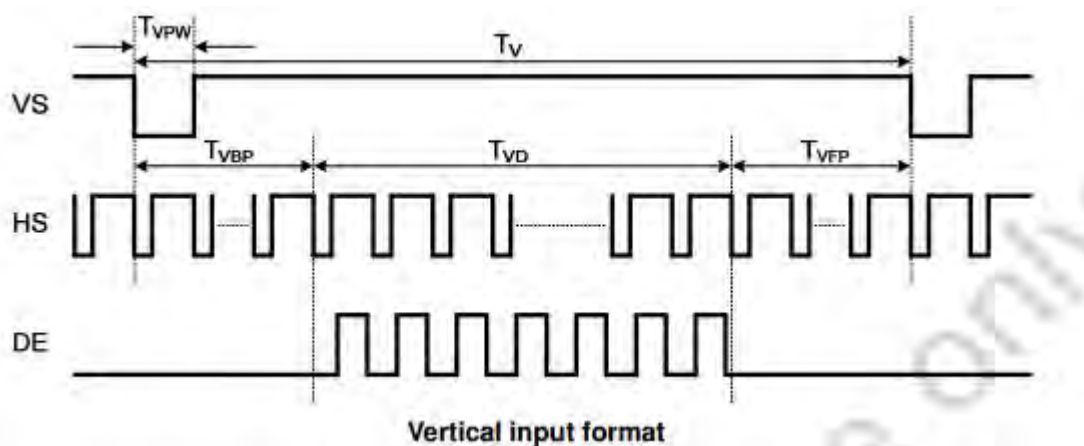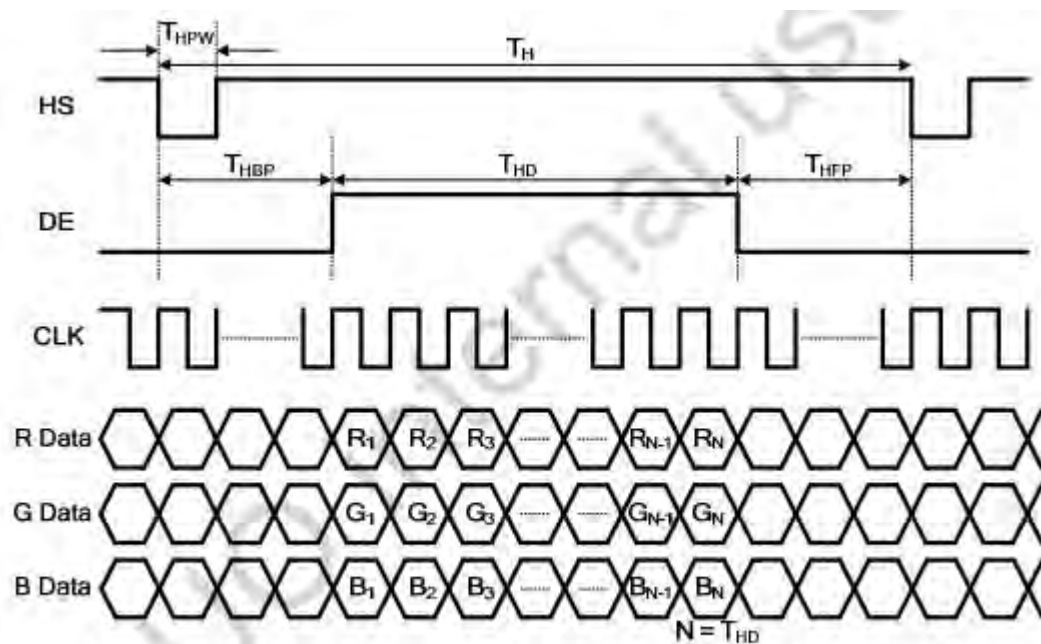
Horizontal input format

6.8 Optical specifications

| Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	85	-	-	degree	Note 1
	θ_R	Φ=0°(3 o'clock)	85	-	-		
	θ_T	Φ=90°(12 o'clock)	85	-	-		
	θ_B	Φ=270°(6 o'clock)	85	-	-		
Response time Rise+Fall	T_{RT}	Normal θ=Φ=0°	-	30	-	msec	Note 3
Contrast ratio	CR		-	800	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2
	W_Y		0.28	0.33	0.38	-	Note 5 Note 6
Luminance	L		TBD	TBD	-	-	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 6,7

Note 1: Definition of viewing angle range
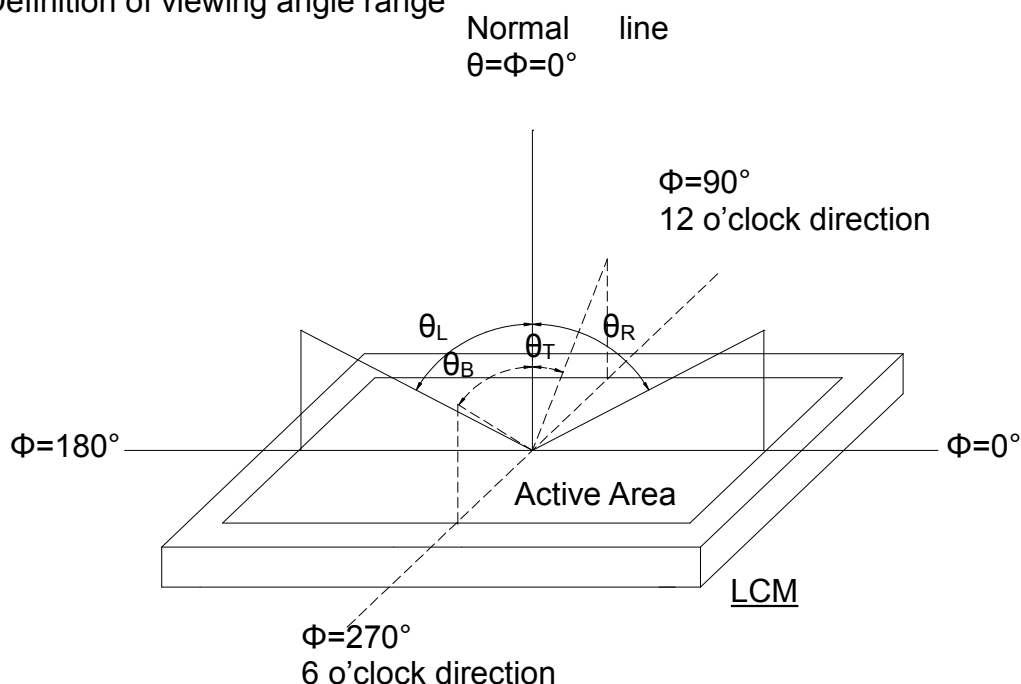
Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm ,Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)
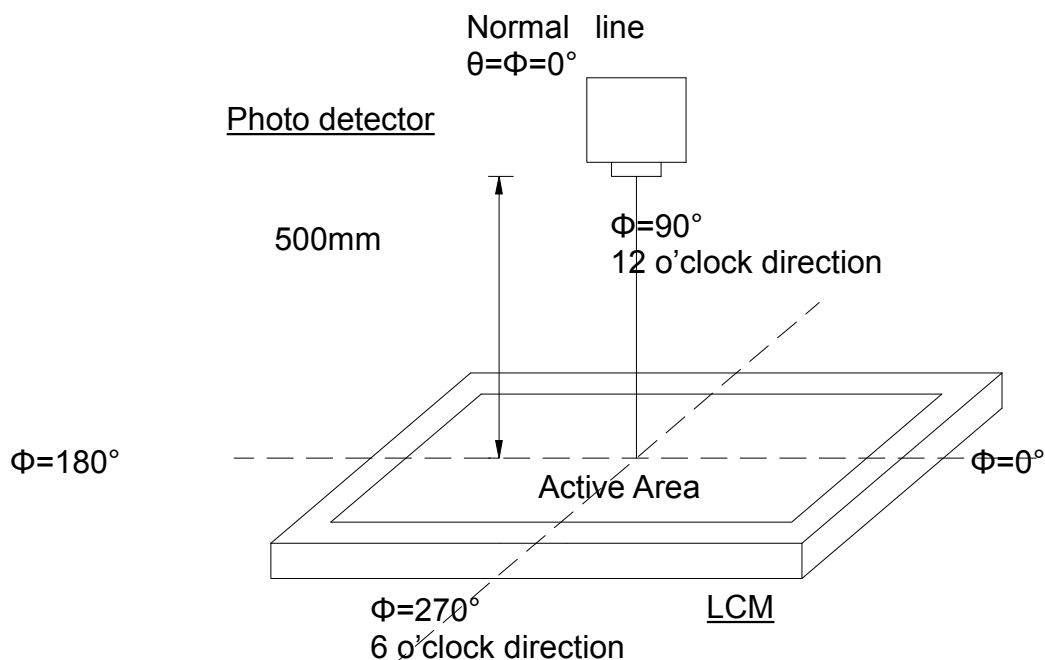

Fig. 4-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo

detector output intensity changed from 10% to 90%.
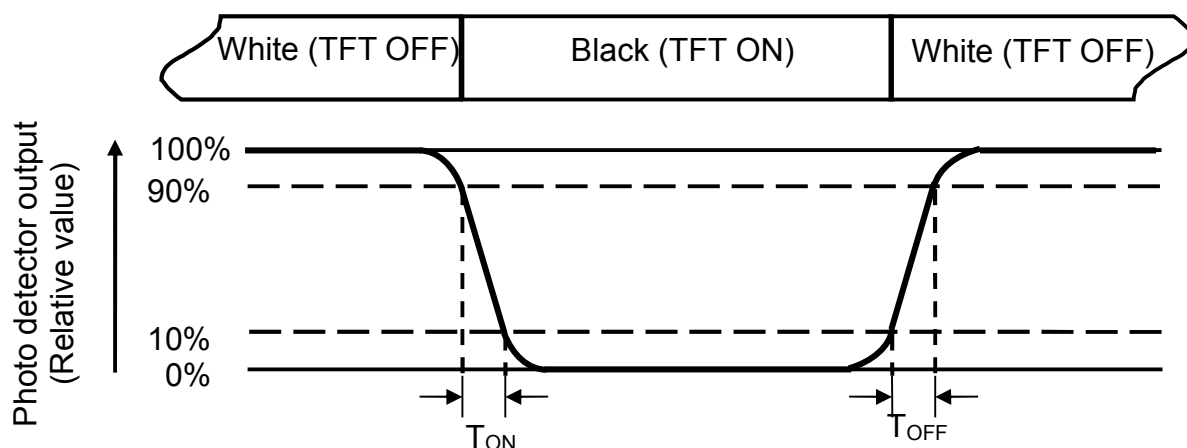
White (TFT OFF) | Black (TFT ON) | White (TFT OFF)

Fig. 4- 3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)
    Color coordinates measured at center point of LCD.
Note 6: All input terminals LCD panel must be ground while measuring the center area of
    the panel. The LED driving condition is V_{LED}=5.0V.
Note 7: Definition of Luminance Uniformity
    Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring
point is placed at the center of each measuring area.

$$\textit{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

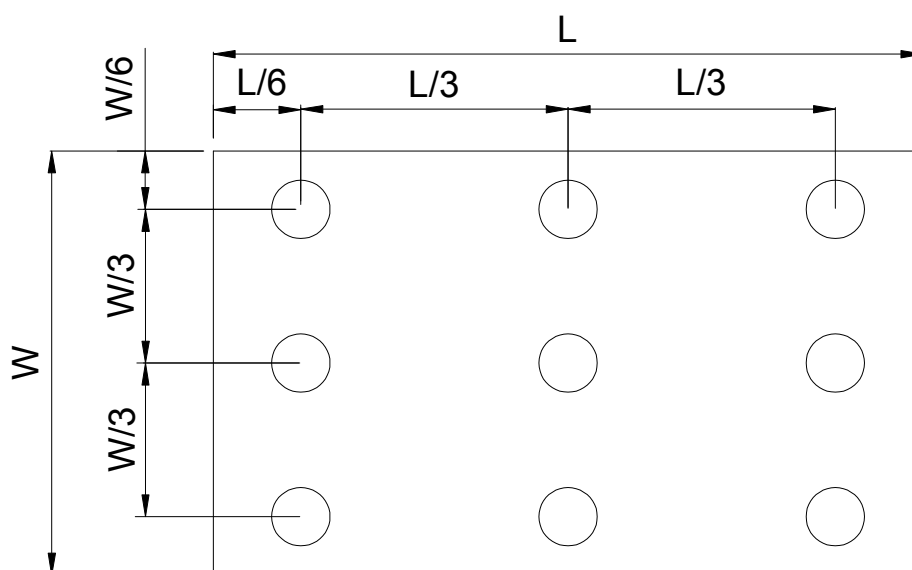L-------Active area length   W----- Active area width

Fig. 4- 4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.
B_{min}: The measured minimum luminance of all measurement position.

7. Reliability Test Conditions And Methods

Item	Test Conditions		Remark
High Temperature Storage	Ta = 80℃	240 hrs	
Low Temperature Storage	Ta =-30℃	240hrs	
High Temperature Operation	Ts = 70℃	240hrs	
Low Temperature Operation	Ta = -20℃	240hrs	
Operate at High Temperature and Humidity	+60℃, 90%RH max.	240 hrs	Operation
Thermal Shock	-20℃～ +70℃ 100 cycles 2Hrs/cycle		Non-operation
Electrostatic Discharge	Contact=±4KV, class B Air=±8KV, class B		

8. Handling Precautions

8.1 Mounting method

The LCD panel of   Daxian LCD module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.
Extreme care should be needed when handling the LCD modules.

8.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent
[recommended below] and wipe lightly
● Isopropyl alcohol
● Ethyl alcohol
Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.
Do not use the following solvent:
● Water
● Aromatics
Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns
Do not use the following solvent on the pad or prevent it from being contaminated:
● Soldering flux
● Chlorine (Cl) , Salfur (S)
If goods were sent without being sili8con coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.
If ITO corrosion happen by miss-handling or using some materials such as Chlorine (Cl), Salfur (S) from customer, Responsibility is on customer.

8.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:
Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

8.4 packing

● Module employ LCD elements and must be treated as such.
● Avoid intense shock and falls from a height.
● To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

8.5 Caution for operation

● It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
● An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
● Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
● If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
● A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.
   Usage under the maximum operating temperature, 50%Rh or less is required.

8.6 storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.
● Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it . And with no desiccant.
● Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
● Storing with no touch on polarizer surface by the anything else.
   [It is recommended to store them as they have been contained in the inner container at the time of delivery from us

8.7 Safety

● It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
● When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water
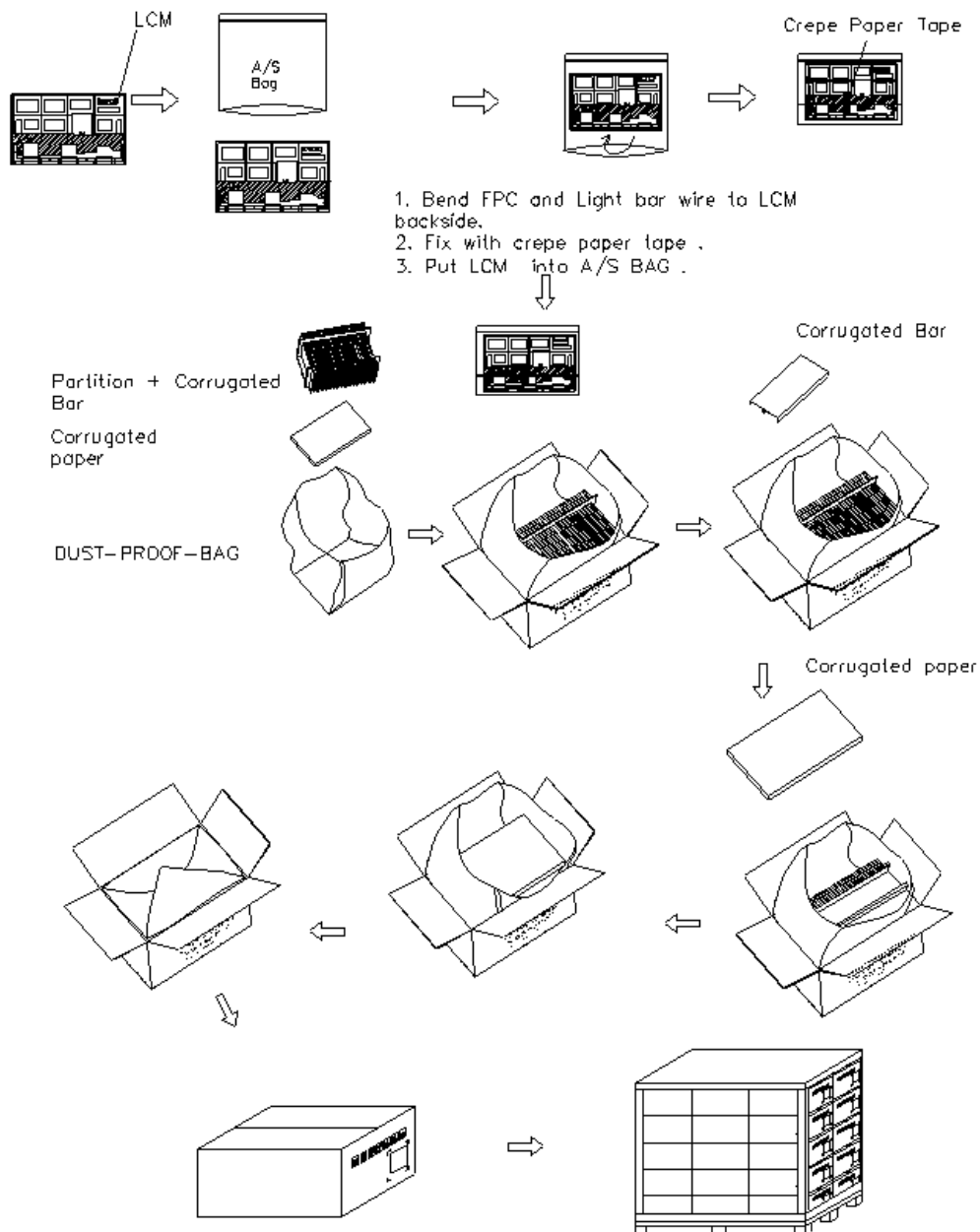
9. Precaution for use

9.1
A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.
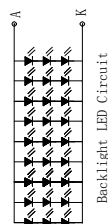
9.2
On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to Daxian , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

10. Package Drawing

11. Outline Dimension

Specification:
1). Luminance(cd/m2): 390(MIN) 450(TYP)
2). Display mode: a_Si TFT/Transmissive/Normal Black
3). Operating temp.: -20°C~+70°C
    Storage temp.: -30°C~+80°C
4). All the raw material are Rohs compliant

Backlight LED Circuit

7.0" TFT
800X1280 DOTS

*104.32±0.20(OUTLINE)
102.10±0.20(TFT)
99.90(CF)
97.35(POL_U)
94.20(ACTIVE AREA)
50.25
0.95
1.70
3.15
78.51
150.72(ACTIVE AREA)
153.82(POL_U)
155.42(CF)
158.92±0.20(TFT)
*161.67±0.20(OUTLINE)
1.70
0.95
12.08
79.79

Release film
Remove tape
19.50
10.00
10.00
10.00
10.00
Release film
*2.30±0.20
1.20MAX(COMPONENT)
3.70±0.30(W/out insulation Max4.00)
W/in insulation Max4.05)
Removal tape
CONPONENT AREA

SCALE:	**FIT**		MODEL NO:
SHEET:	**1**	OF **1**	PART NO:
GENERAL TOL: ± **0.3**			TITTLE:
APP:	DATE:		
CHK:	DATE:		
DWN:	DATE:		