

PRODUCT SPECIFICATION **FOR LCD MODULE**

Revision: 1.0

Model No: LS121I01-L-V1

Module Type: COG+FPC+B/L

APPROVED SIGNATURE

- Approved Product Specification only
- Approved Product Specification and Samples

<u>Prepared By</u>	<u>Checked By</u>	<u>Approved By</u>

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1. General Description

LS121I01-L-V1 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit and a backlight unit. The panel size is 12.1 inch and the resolution is 1280(RGB)*800, the panel can display up to 16.7M colors.

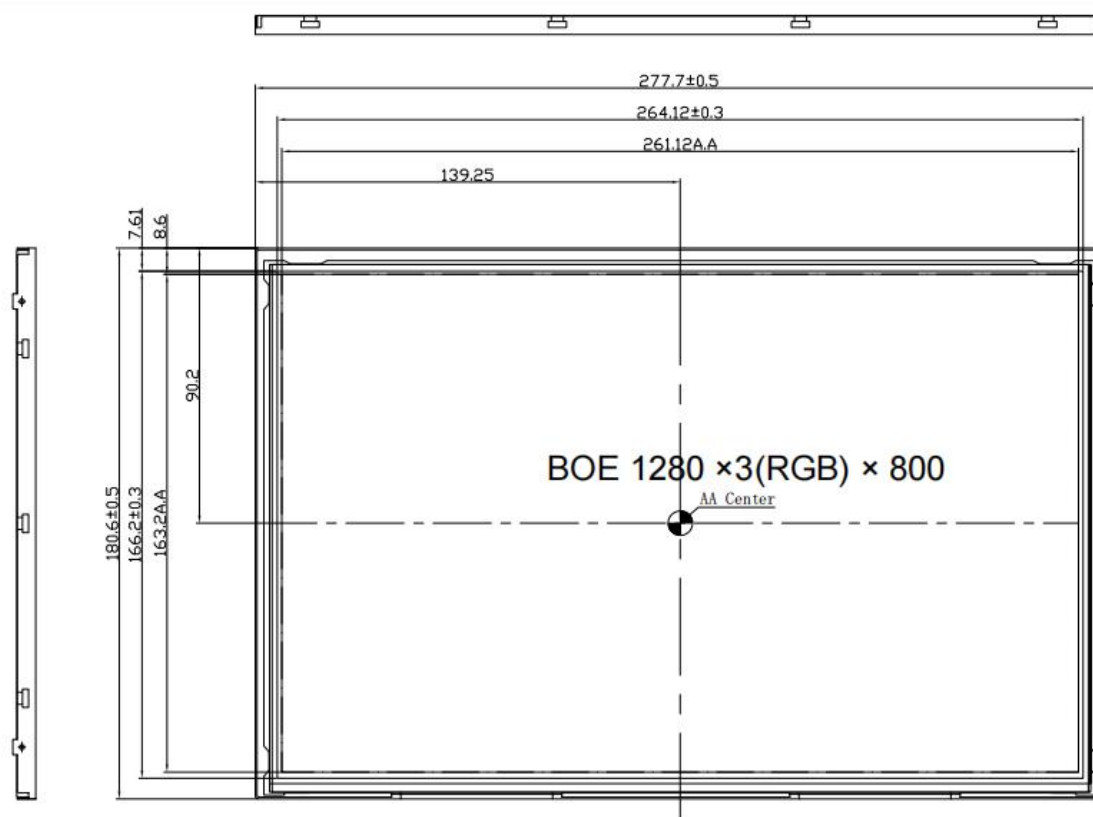
2. Physical Features

Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 1280(RGB)×800 Dot-matrix
Input Data	LVDS
Viewing Direction (Grayscale Inversion)	Free (IPS)

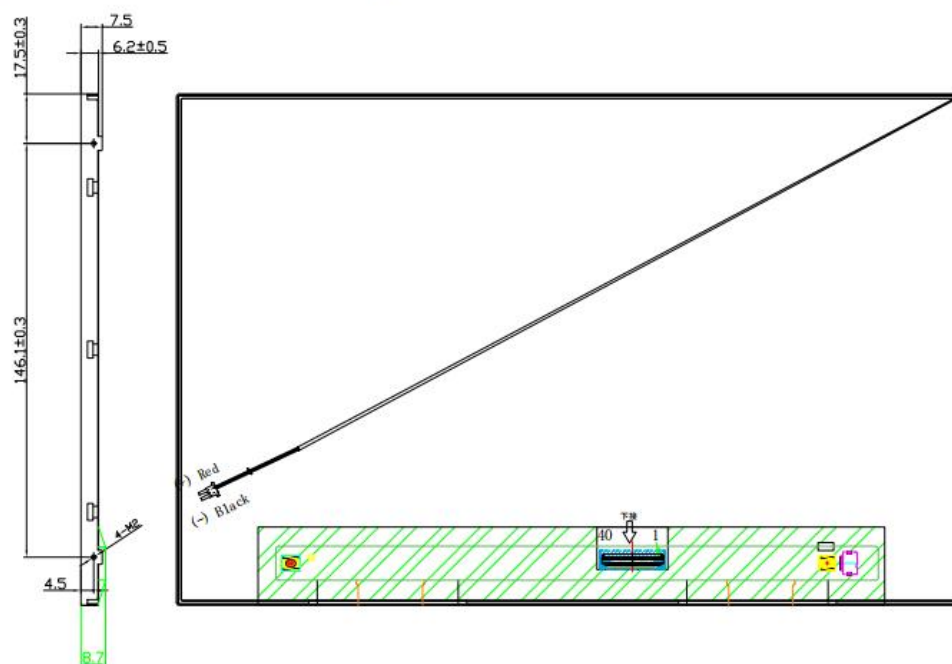
3. Mechanical Specification

Item	Specification	Unit
Module size (H×V×D)	277.7 ×180.6 ×7.5	mm
Number of dots	1280(RGB) ×800	pixel
Active area (H×V)	261.12×163.2	mm

4. Outline Dimension



Drawing Attachment: Landscape Back View



5. Absolute Maximum Ratings

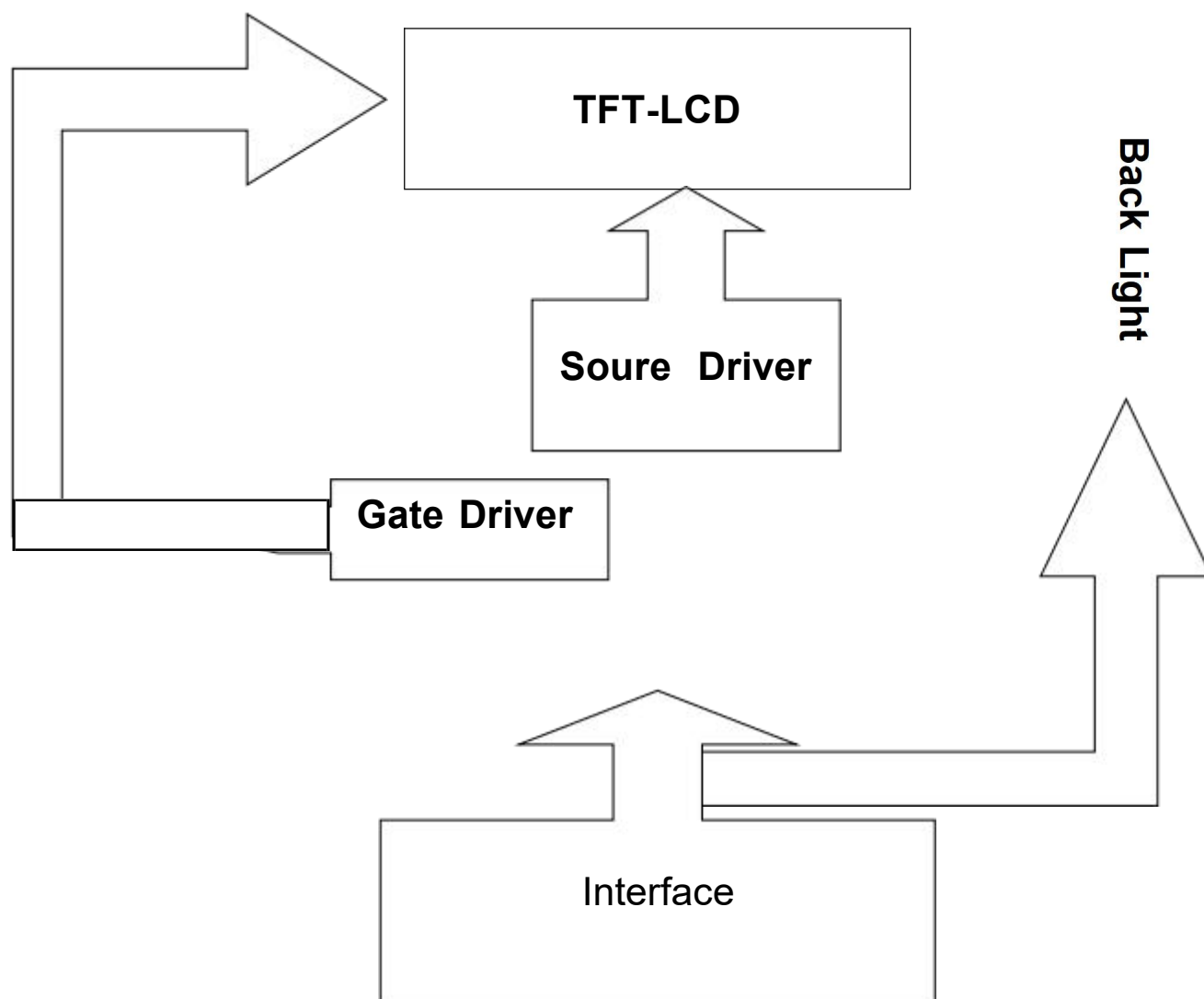
Parameter		Symbol	Min.	Max.	Unit	Remarks
Power Supply	LCD Module	VDD	0	3.6	V	Ta = 25 °C
	BLU	V _{BLU}	-	13.2	V	
		I _{BLU}	-	620	mA	
Operating Temperature		T _{OP}	-20	+70	°C	Note 1
Storage Temperature		T _{ST}	-30	+80	°C	

6. Electrical Characteristics

Parameter	Symbol	Values			Unit	Notes
		Min.	Typ.	Max.		
Power Supply Voltage	VDD	3.0	3.3	3.6	V	Note 1
Power Supply Current	IDD	120	180	280	mA	
BLU Supply Voltage	V _{BLU}	10.8	12	13.2	V	Note 3
BLU Supply Current	I _{BLU}	-	-	620	mA	
Power Consumption	P _D	0.495	0.403	0.93	W	Note 2

7. Module Function Description

7-1. Block Diagram Of LCM



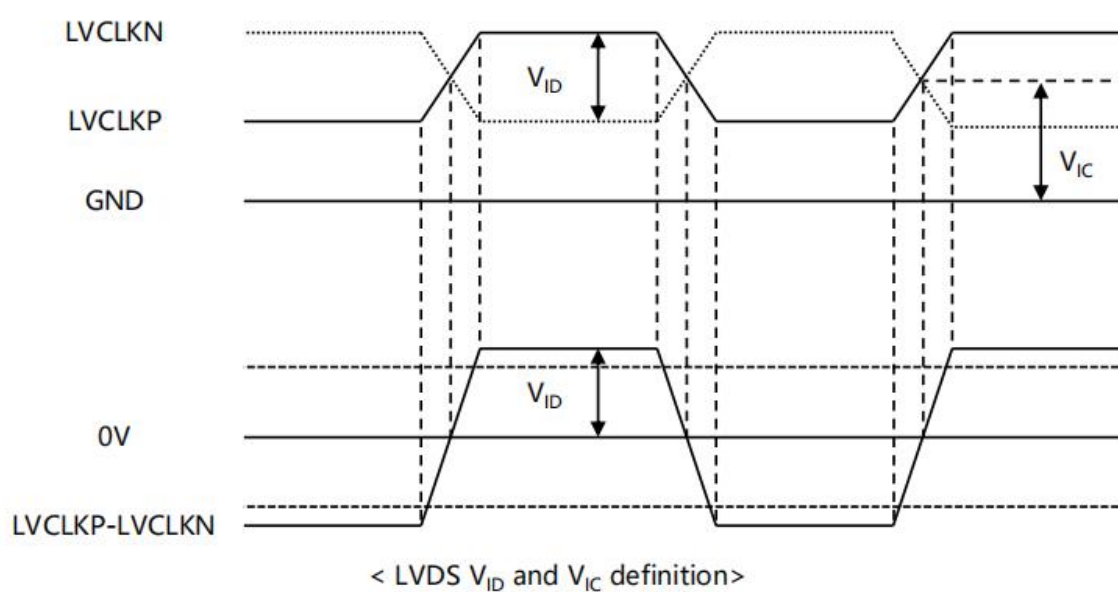
7-2. Pin Description

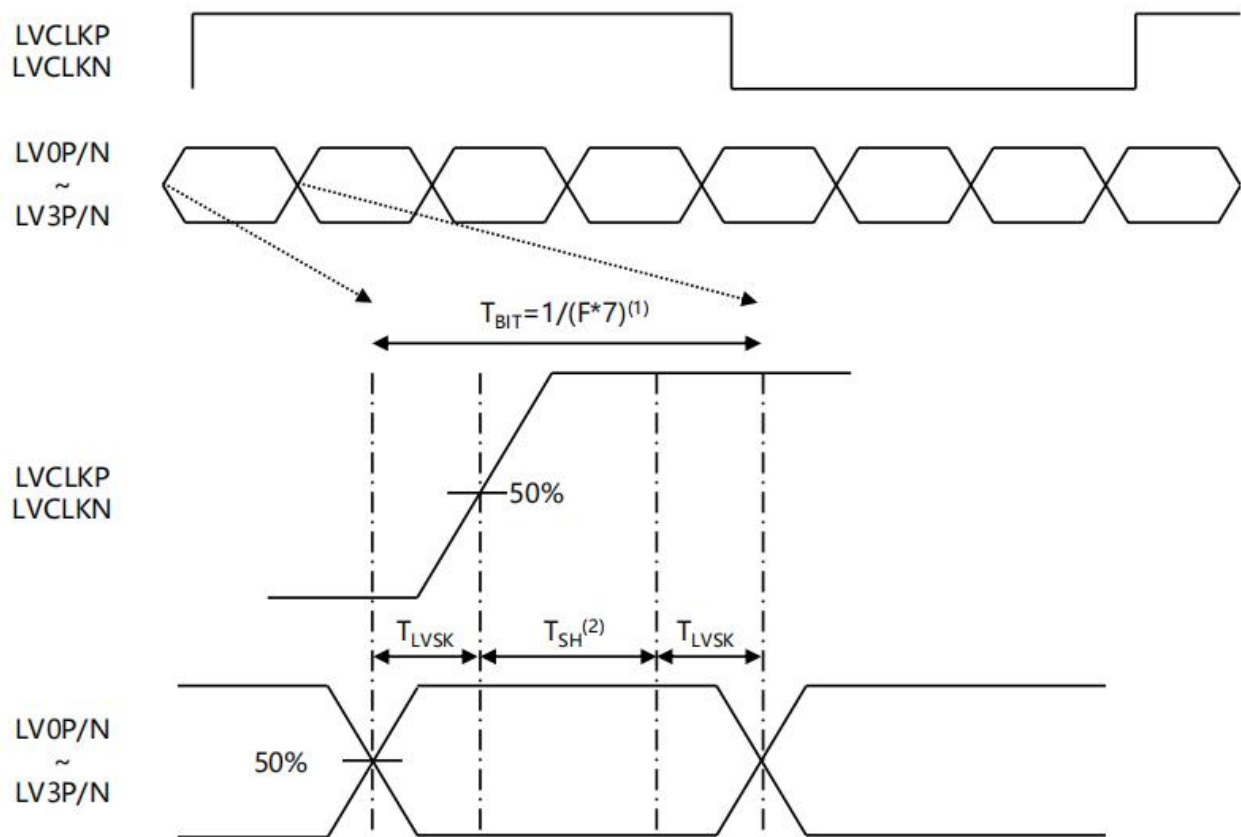
No.	Symbol		No.	Symbol	
1	NC	Non Connection	21	RIN3+	LVDS Positive data signal (+)
2	VDDIN	Power supply VDDIN=3.3V (Typ.)	22	GND	GROUND
3	VDDIN		23	NC	Non Connection
4	VDDIN		24	NC	Non Connection
5	NC	Non Connection	25	GND	GROUND
6	GND	GROUND	26	NC	Non Connection
7	GND	GROUND	27	NC	Non Connection
8	RIN0-	LVDS Negative data signal (-)	28	GND	GROUND
9	RIN0+	LVDS Positive data signal (+)	29	NC	Non Connection
10	GND	GROUND	30	NC	Non Connection
11	RIN1-	LVDS Negative data signal (-)	31	GND	GROUND
12	RIN1+	LVDS Positive data signal (+)	32	GND	
13	GND	GROUND	33	GND	
14	RIN2-	LVDS Negative data signal (-)	34	NC	Non Connection
15	RIN2+	LVDS Positive data signal (+)	35	PWM /NC	PWM dimming control input pin.
16	GND	GROUND	36	LED_EN /NC	The enable pin to LED Driver.
17	LVDS_CLK-	LVDS Negative CLK signal (-)	37	NC	Non Connection
18	LVDS_CLK+	LVDS Positive CLK signal (+)	38	VLED /NC	LED Anode
19	GND	GROUND	39	VLED /NC	
20	RIN3-	LVDS Negative data signal (-)	40	VLED /NC	

7-3 Timing Characteristics

< Table7. DC Specification >

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Supply current	I_{DD}	150	180	200	mA	
LVDS DC specifications						
Differential input high threshold	V_{TH}	-	-	+100	mV	$V_{IC}=1.2V$
Differential input low threshold	V_{TL}	-100	-	-	mV	
LVDS common mode voltage	V_{IC}	0.7	-	1.6	V	
LVDS swing voltage	V_{ID}	± 100	-	± 600	mV	





Note:

- (1) T_{BIT} : Data period
- (2) Internal CLK sampling data window

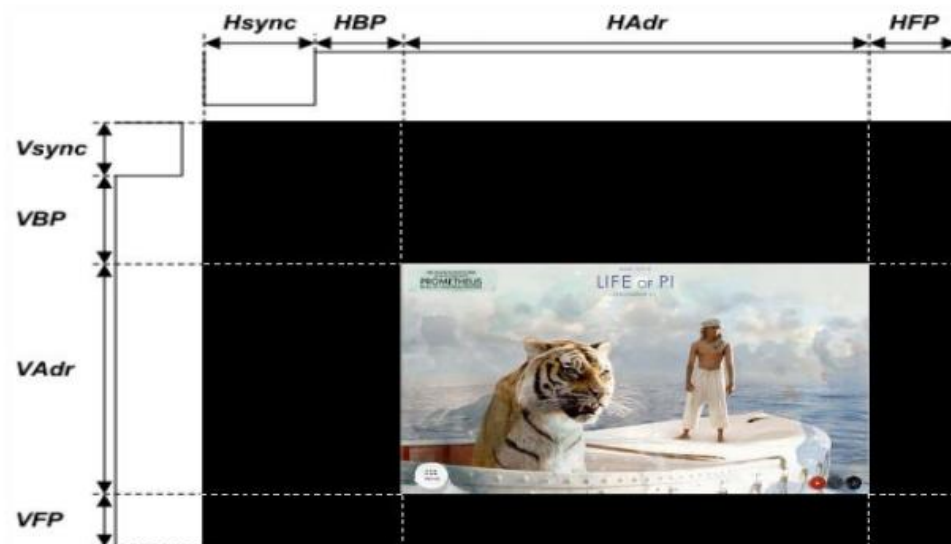
< LVDS channel to channel skew >

< Table8. AC Specification >

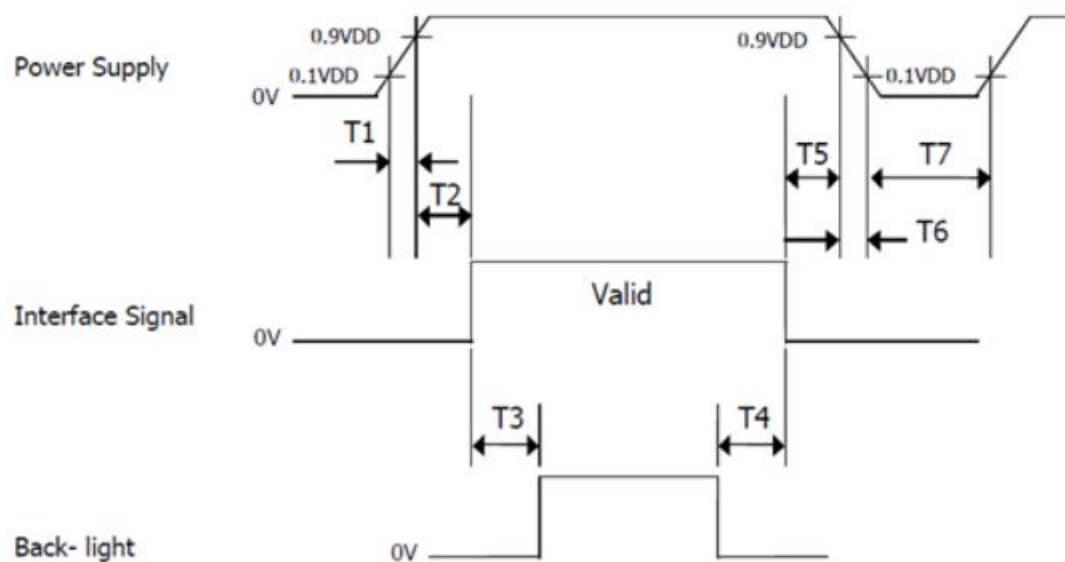
Description	Symbol	Condition	Min	Typ	Max	Unit
LVDS Input frequency	F	-	20	-	85	MHz
LVDS channel to channel skew	T_{LVSK}	F=65MHz $V_{IC}=1.2V$ $V_{ID}=\pm 200mV$	-600	-	+600	ps

< Table9. Timing Parameter >

Item			Symbol	min	typ	max	UNIT
LCD	Frame Rate		-	58	60	62	Hz
	Pixels Rate		-	66.3	72.4	78.9	MHz
Timing	Horizontal	Horizontal total time	tHP	1380	1440	1500	t _{CLK}
		Horizontal Active time	tHadr	1280			t _{CLK}
		Horizontal Back Porch	tHBP	-	78	-	t _{CLK}
		Horizontal Front Porch	tHFP	-	72	-	t _{CLK}
	Vertical	Vertical total time	tvp	824	838	872	t _H
		Vertical Active time	tVadr	800			t _H
		Vertical Back Porch	tVBP	-	18	-	t _H
		Vertical Front Porch	tVFP	-	15	-	t _H
Lane			-	1	-	Lane	



7-3 Power Sequence



< Table10. Sequence Table >

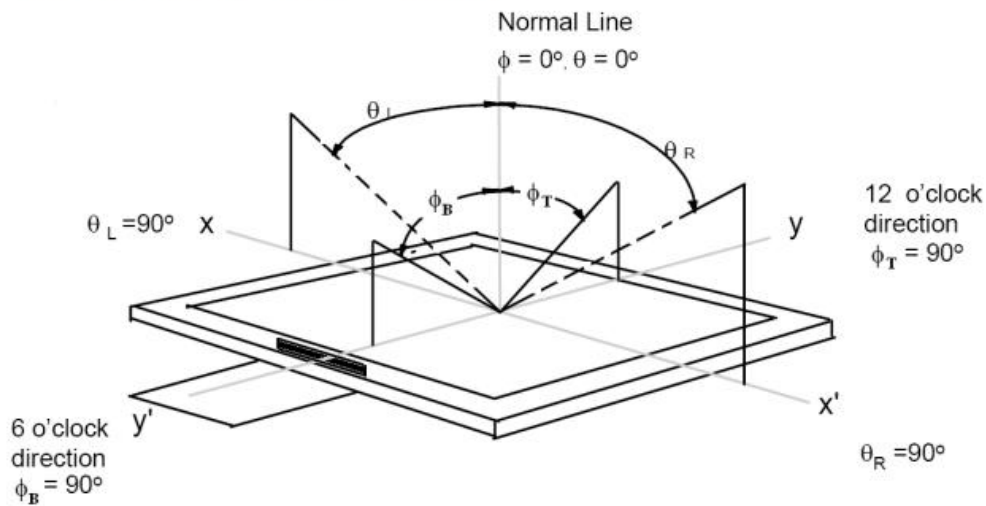
Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0	-	10	(ms)
T2	0	-	50	(ms)
T3	200	-	-	(ms)
T4	200	-	-	(ms)
T5	0	-	50	(ms)
T6	0	-	10	(ms)
T7	500	-	-	(ms)

8. Electro-Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr +Tf	$\theta_x = \theta_y = 0$	---	30	35	ms	Note 1
Contrast Ratio		CR		1000	1200	---	---	Note 2
Transmittance		T%		--	4.8	---	%	
Color Chromaticity (CIE1931)	White	W x	$\theta_x = \theta_y = 0$	---	0.27	---	---	
		W y		---	0.29	---	---	
Viewing angle	θ_T		CR > 10	---	85	---	Deg.	Note 3
	θ_B			---	85	---		
	θ_L			---	85	---		
	θ_R			---	85	---		
Luminance ($I_F = 20mA$)		L		--	1000	---	cd/m2	Note4

Note 1: The definition of Viewing Angle

Refer to the graph below marked by θ and ϕ .



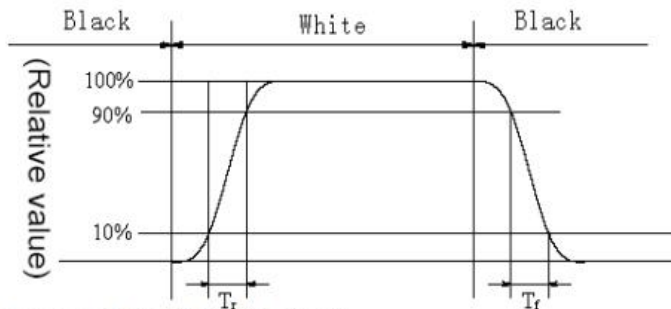
Note2:The definition of Contrast Ratio (Test LCM using CS2000 or similar equipments):

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance When LCD is at "White" state}}{\text{Luminance When LCD is at "Black" state}}$$

(Contrast Ratio is measured in optimum common electrode voltage)

Note3:Definition of Response time.(Test LCD using DMS501 or similar equipments):

The output sign also photo detector are measured when the input sign also are changed from "black" to "white" (Voltage falling time) and from "white" to "black" (Voltage rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figures below.



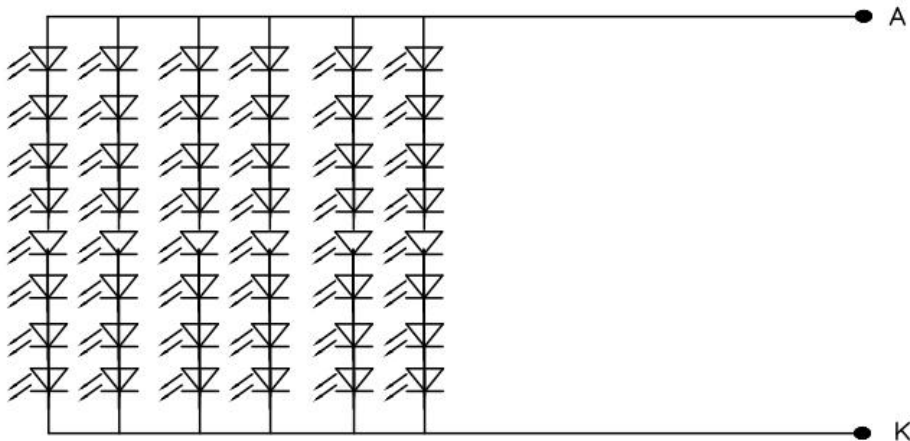
	L0	L1	L2	L3	L4	L5	L6	L7
L0	Black							
L1		Black						
L2			Black					
L3				Black				
L4					Black			
L5						Black		
L6							Black	
L7								Black

Response time of gray to gray:

Measurement equipment: DMS501 or similar equipments.

Test method: we define 8 grays L0-L7, the grays of L0-L7 were defined as: 0, 36, 73, 109, 146, 182, 219, 255. The output signals of photo detector are measured when the input signals are changed from "Lx" to "Ly", x, y = [0, 7]. The response time is defined as the time interval between the 10% and 90% of amplitudes. The result of the test can be noted as below:

Note(4) Backlight circuit



$$I_f = 360\text{mA}; V_f = 24 - 26.4\text{V}$$

9.Records Of Version

Version	Revise Date	Page	Content
00	2024.3.25	ALL	New released