

TFT-LCD Module SPECIFICATION

Customer: _____
Model Name: VI101IA14
SPEC NO.: _____
Date: 2022.05.20
Version: V05

- Preliminary Specification
 Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by
	张阶林	张忆红

Record of Revision

Toroson Group copyright 2022
 All right reserved, Copying forbidden.

Version	Revise Date	Page	Content
V02	2020/06/06	11,15 17 18	Add Package Drawing &weight,ST&OP temperature
V03		1 2 5 15 17	1. General Specifications 2. Pin Assignment 3. Operation Specifications 5. Reliability Test Items 7. Mechanical Drawing
V04		4 5 6	Typical Operation Conditions Current Consumption
V05	20220520		2. Pin Assignment 5 3.1 Absolute Maximum Ratings 6 3.2 Typical Operation Conditions 7 3.4 Power Sequence 9 3.5.2 Timing Table

Contents

1.General Specifications	.01
2.Pin Assignment	.02
3.Operation Specifications	.04
3.1.Absolute Maximum Ratings	.04
3.1.1.Typical Operation Conditions	.05
3.1.2.Current Consumption	.06
3.1.3.Backlight Driving Conditions	.06
3.2.Power Sequence	.07
3.3. LVDS Signal Timing Characteristics	.08
3.3.1. AC Electrical Characteristics	.08
3.3.2. Timing Table	.09
3.3.3. LVDS DData Input Format	.10
4.Optical Specifications	.11
5.Reliability Test Items	.15
6.General Precautions	.16
6. 1.Safety	.16
6. 2.Handling	.16
6.3.Static Electricity	.16
6. 4.Storage	.16
6. 5.Cleaning	.16
7.Mechanical Drawing	.17
8.Package Drawing	.18

1.General Specifications

No.	Item	Specification	Remark
1	LCD size	10.1 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1280X3(RGB)X800	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.0565(W)x0.1695(H) mm	
6	Active area	216.96(W)x135.60(H) mm	
7	Panel size	229.46(W)x149.1(H)x2.5(D)mm	Note 1
8	Surface treatment	HC	
9	Color arrangement	RGB-stripe	
11	Interface	LVDS	
12	Backlight power consumption	2.1W (Typ.)	
13	Panel power consumption	0.7W (Typ.)	Note 2
14	IC	Ek79202	
15	Weight	205g	

Note 1: Refer to Mechanical Drawing.

Note 2: Including T-con Board power consumption

2.Pin Assignment

A 40pinconnector is used for the module electronics interface. This model used 196479-40041-3 manufactured byP2 connector.

PinNo.	Symbol	I/O	Function	Remark
1	NC	---	No connection	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC	---	Only for INX test	
5	NC	---	Only for INX test	
6	NC	---	Only for INX test	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5, G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1~G5, B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6, R7, G6, G7, B6, B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	

27	NC	---	No connection	
28	NC	--	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	---	No connection	
34	NC	---	No connection	
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	NC	---	No connection	
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

3.Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	V _{DD}	2.2	3.6	V	
	A _V DD	7.9	8.5	V	
	V _{GH}	13	17	V	
	V _{GL}	-11	-15	V	
	V _{GH} -V _{GL}	24	32	V	
Operation Temperature	T _{OP}	-20	70	°C	
Storage Temperature	T _{ST}	-30	80	°C	

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.1.1. Typical Operation Conditions

Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDD	2.3	2.5	3.6	V	Note 2
	AVDD	8.0	8.2	8.4	V	
	V _{GH}	14.5	15	15.5	V	
	V _{GL}	-13.5	-13	-12.5	V	
Input signal voltage	V _{IH}	0.8DV _{DD}	-	VDD	V	Note 3
Input logic low voltage	V _{IL}	0	-	0.2DV _{DD}	V	

Note 1: Be sure to apply VDD and V_{GL} to the LCD first, and then apply V_{GH}.

Note 2: VDD setting should match the signals output voltage (refer to Note 3) of customers' system board.

3.1.2. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I _{GH}	1.4	1.8	2.2	uA	V _{GH} =15V
	I _{GL}	1.3	1.7	2.1	uA	V _{GL} =-13V
	I _{VDD}	26	31	36	mA	V _{DD} =2.5V
	I _{AVDD}	17	22	27	mA	A _{VDD} =8.2V

3.1.3. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V _L	8.4	9.3	10.5	V	Note 1
Current for LED backlight	I _L	258	260	265	mA	
LED life time	-	20,000	-	-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and IL=260mA

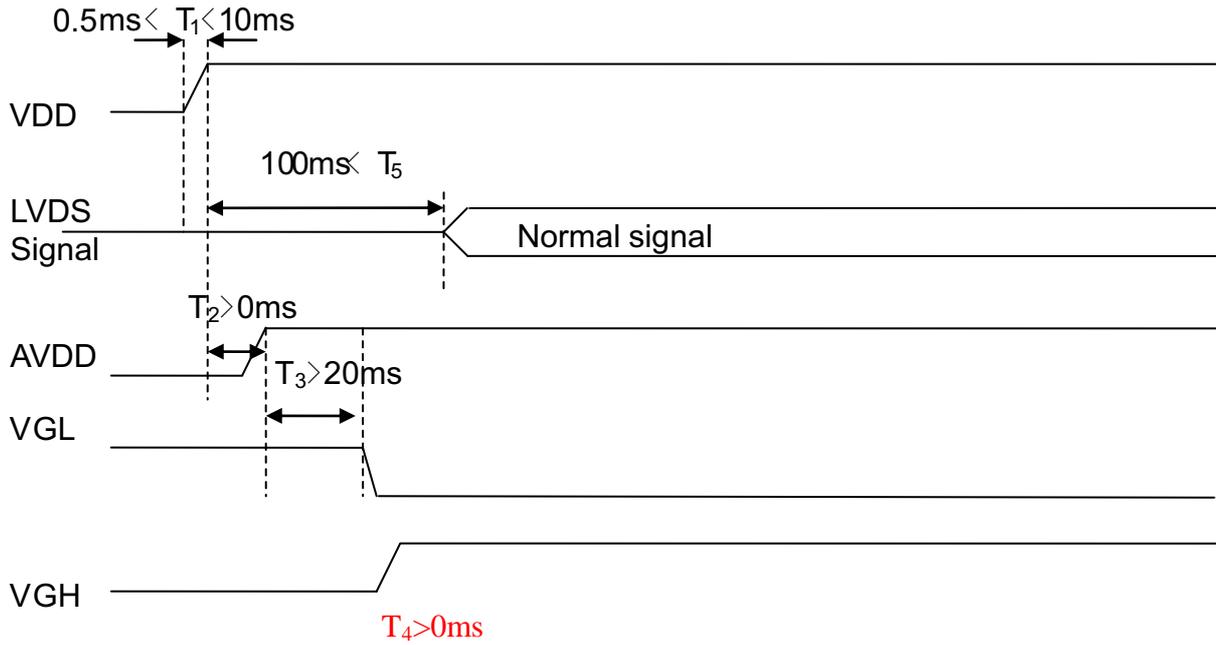
Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL=260mA.The LED lifetime could be decreased if operating IL is lager than 260mA.

3.1.4. Backlight Absolute Maximun Ratings

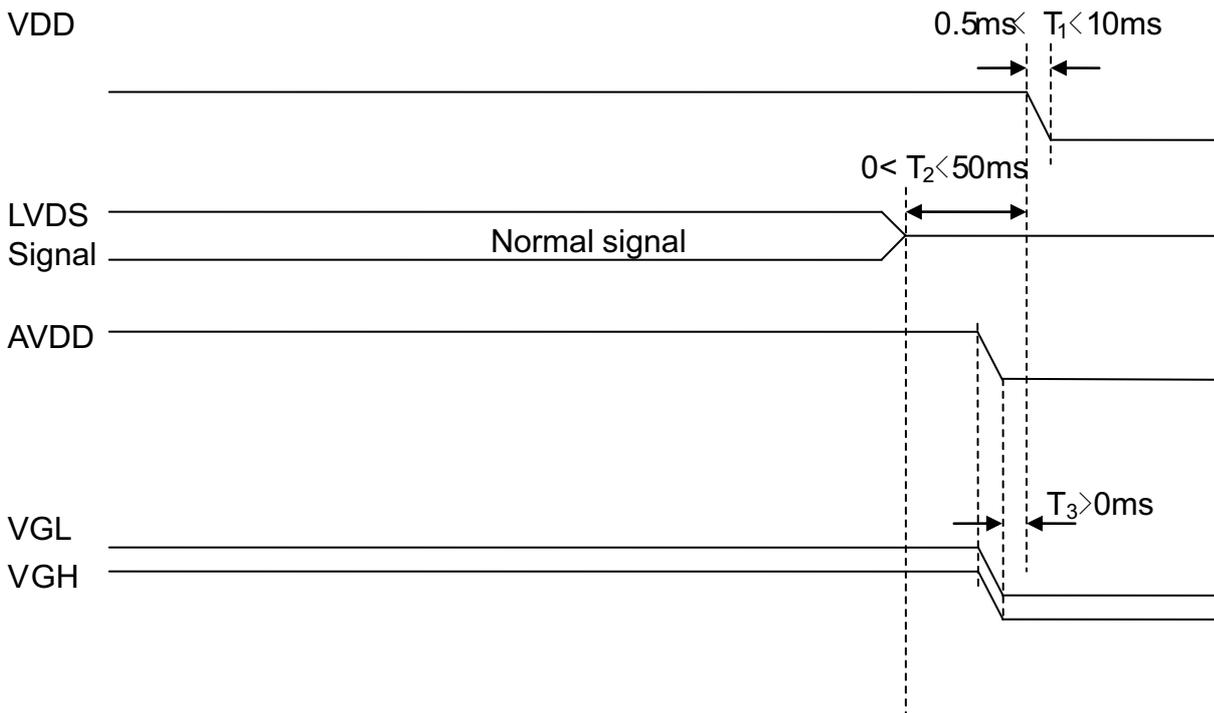
Item	Symbol	Condition	Value	Unit
Forward Current	IFM		300	mA
Peak Forward Current	IFP	Duty:1/10 pulse Width 0.1ms	600	mA
Power Description	Pd		3150	mW

3.2. Power Sequence

a. Power on:



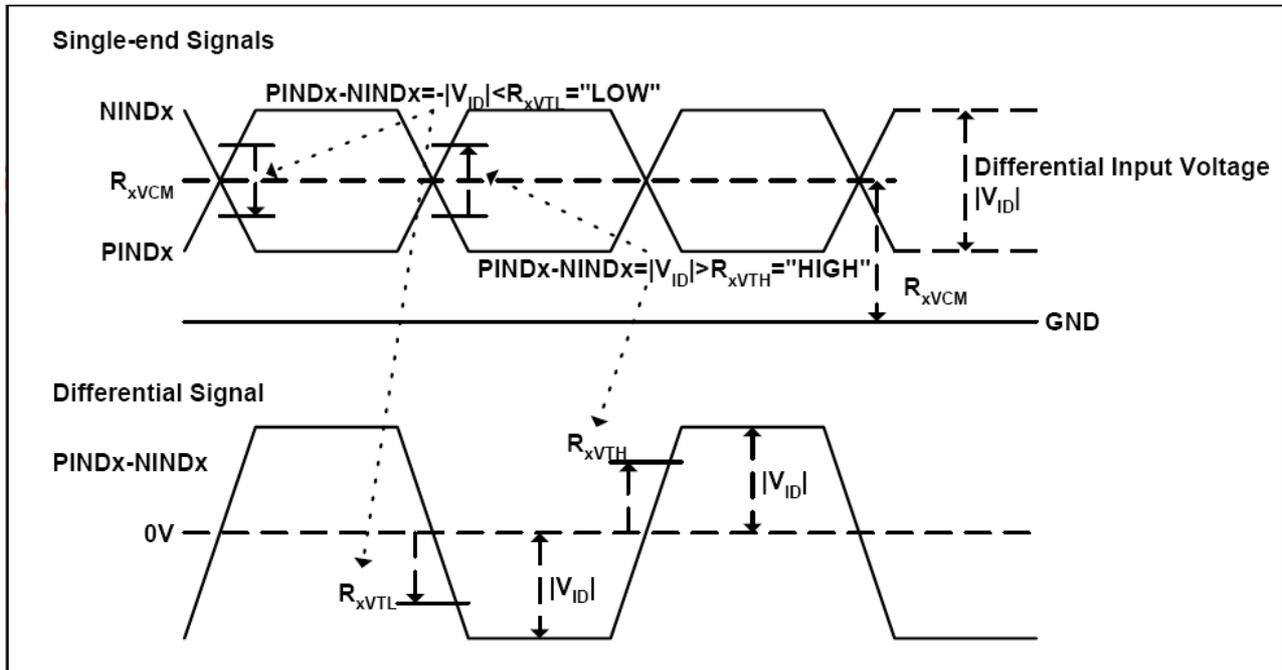
b. Power off:



3.3. LVDS Signal Timing Characteristics

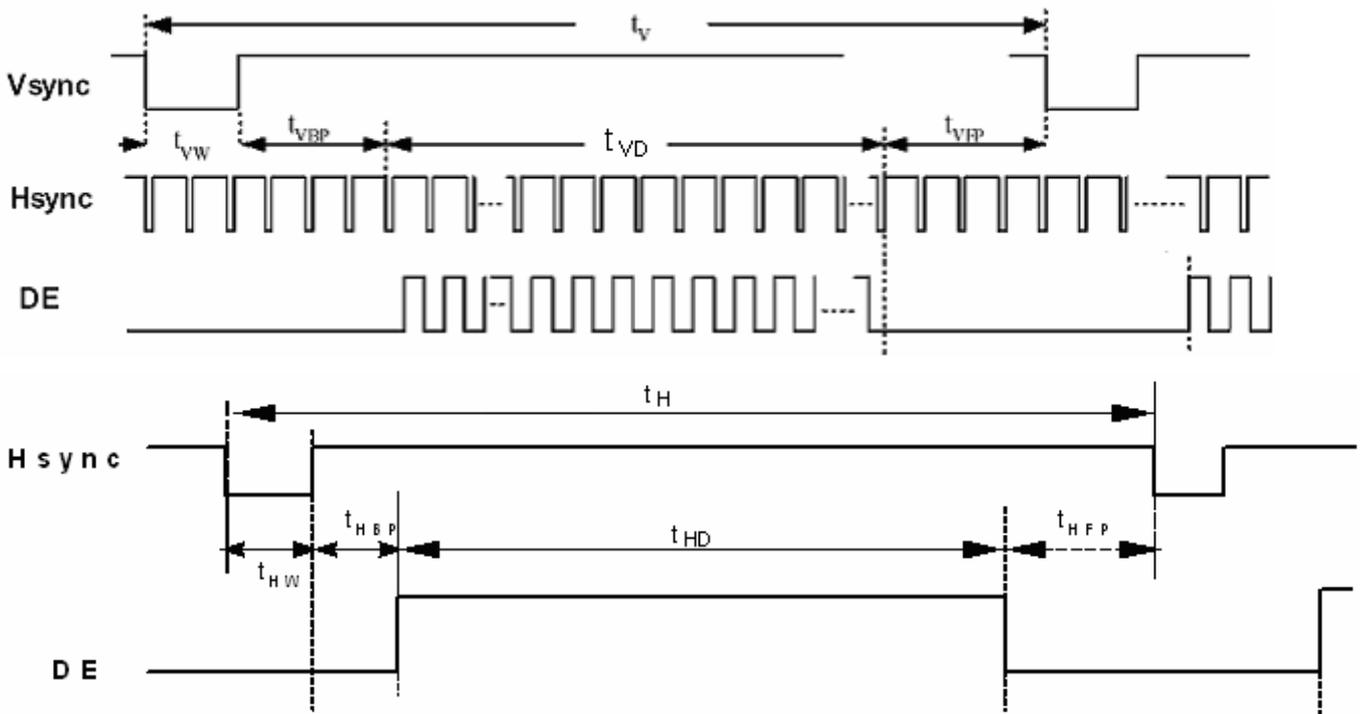
3.3.1. AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LVDS Differential input high Threshold voltage	R_{xVTH}	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS Differential input low Threshold voltage	R_{xVTL}	-100	-	-	mV	
LVDS Differential input common mode voltage	R_{xVCM}	0.7	-	1.6	V	
LVDS Differential voltage	$ V_{ID} $	200	-	600	mV	

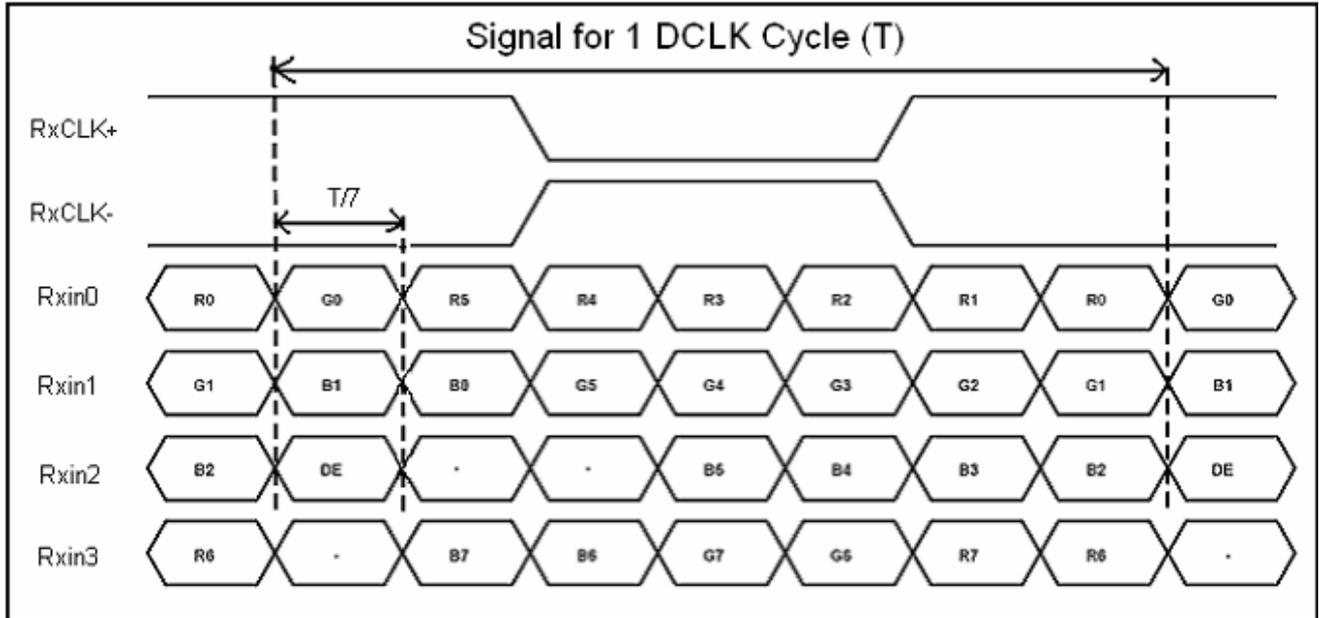


3.3.2. Timing Table

Clock Frequency	1/Tc	66.3	72.4	78.9	MHz	Frame rate =60Hz
Horizontal display area	tHD	1280			Tc	
HSYNC pulse width	tHPW	2	-	40	Tc	
HSYNC back porch(with pulse width)	tHBP	88	88	88	Tc	
HSYNC front porch	tHFP	12	72	132	Tc	
Vertical display area	tVD	800			tH	
VSYNC pulse width	tVPW	2	-	20	tH	
VSYNC back porch(with pulse width)	tVBP	23	23	23	tH	
VSYNC front porch	tVFP	1	15	49	tH	



3.3.3. LVDS DData Input Format



4.Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (Cr≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	75	85	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	75	85	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	75	85	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	75	85	-		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	C_R		600	800	-	-	Note 4
Color chromaticity	W_X		0.24	0.29	0.33	-	Note 2 Note 5
	W_Y		0.28	0.30	0.37	-	Note 6
Luminance	L		350	400	-	cd/m2	Note 6
Luminance uniformity	Y_U		75	-	-	%	Note 7

Test Conditions:

1. VDD=2.5V, the ambient temperature is 25°C.
- 2.The test systems refer to Note 2.

Note 1: Definition of viewing angle

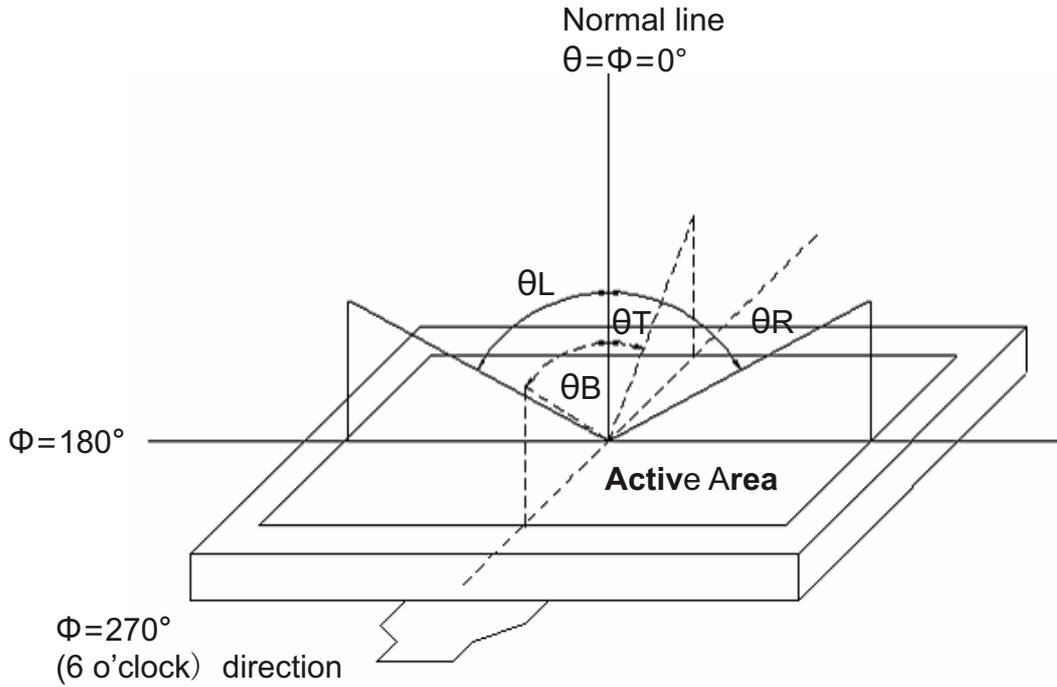


Fig. 4-1 Definition of viewing angle

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. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

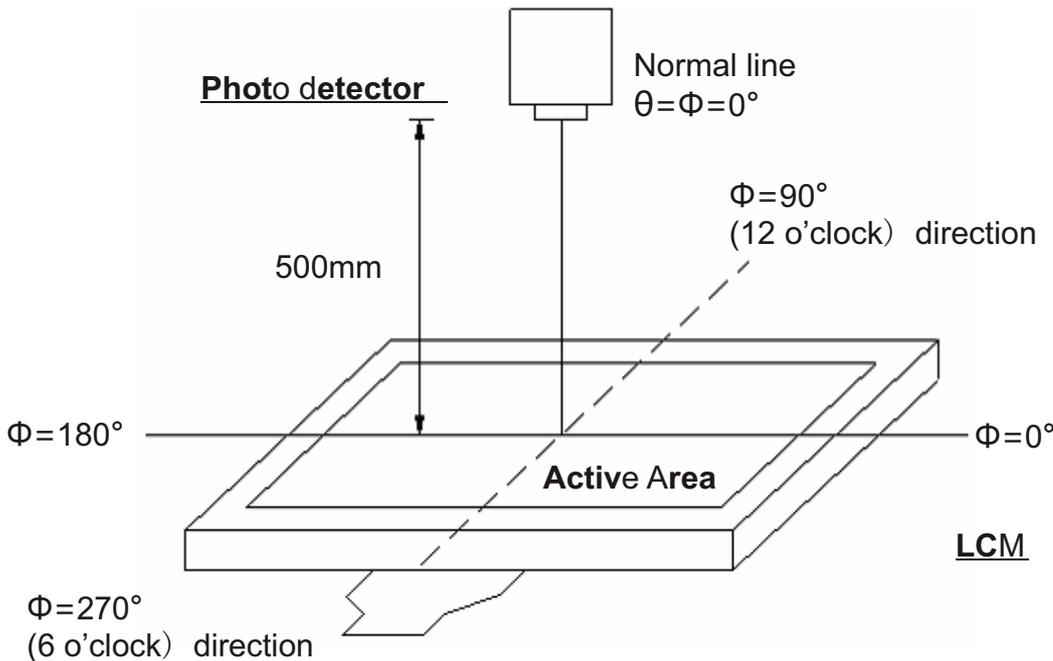


Fig. 4-2 Optical measurement system setup

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 (Ton) is the time between photo detector output intensity changed from 90% to 10%. And fall time(toff) is the time between photo detector output intensity changed from 10% to 90%.

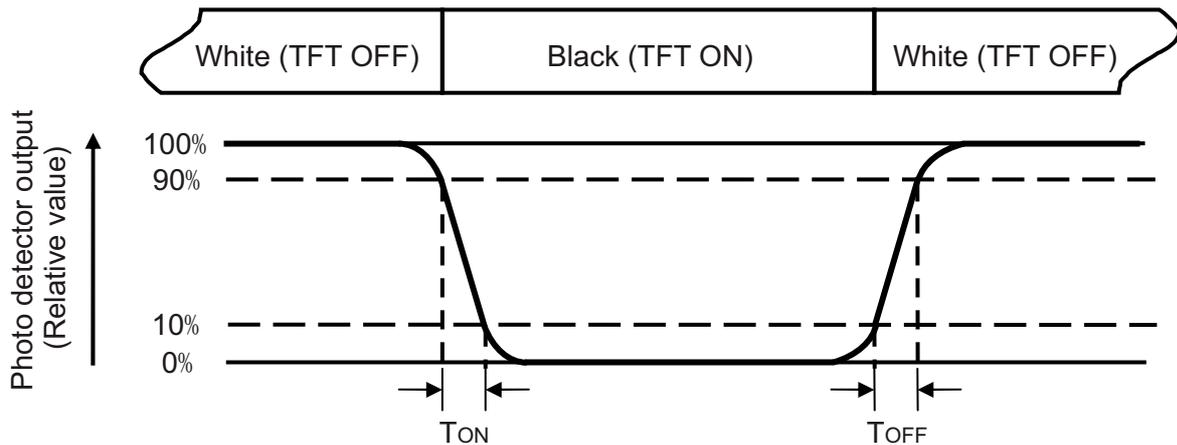


Fig. 4-3 Definition of response time

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 L.CD

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.The LED driving condition is IL=260mA.

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.

$$\text{Luminance Uniformity} = \frac{B_{\min}}{B_{\max}}$$

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

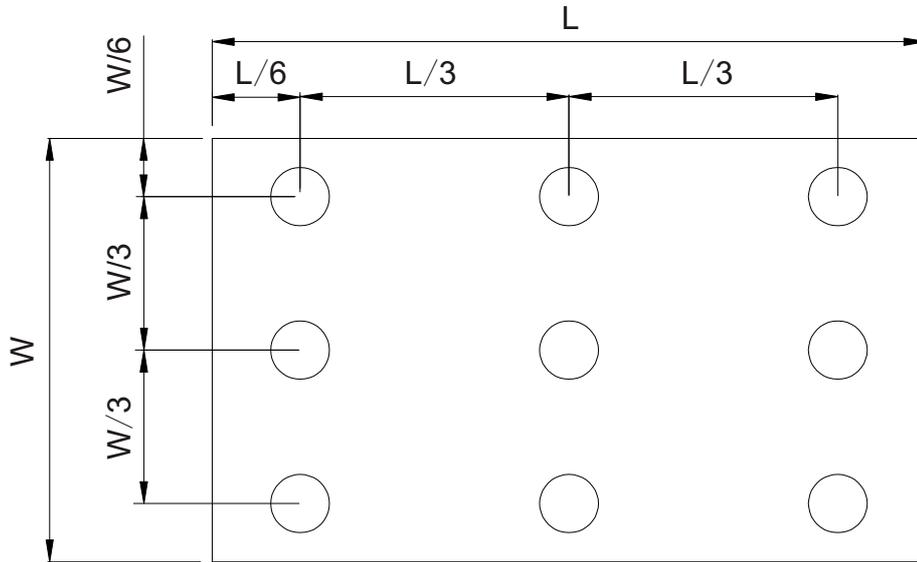


Fig. 4-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement poition.

B_{min}: The measured minimum luminance of all measurement poition.

6.General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2. Handling

- 1.The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
- 2.The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
- 3.To avoid contamination on the display surface, do not touch the module surface with bare hands.
- 4.Keep a space so that the LCD panels do not touch other components.
- 5.Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
- 6.Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
- 7.Do not leave module in direct sunlight to avoid malfunction of the lcs.

6.3. Static Electricity

- 1.Be sure to ground module before turning on power or operating module.
- 2.Do not apply voltage which exceeds the absolute maximum rating value.

6.4. Storage

- 1.Store the module in a dark room where must keep at $25 \pm 10^{\circ}\text{C}$ and 65%RH or less.
- 2.Do not store the module in surroundings containing organic solvent or corrosive gas
- 3.Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

- 1.Do not wipe the polarizer with dry cloth. It might cause scratch.
- 2.Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

8.Package Drawing

