晶采光電科技股份有限公司
AMPIRE CO., LTD.

Specifications for LCD module

Customer	
Customer part no.	
Ampire part no.	**AM-800480D1TMQW-A0H-A**
Approved by	
Date	

☐ **Preliminary Specification**
■ **Formal Specification**

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Approved by	Checked by	Organized by
Patrick	*Simon*	*Jessica*

This Specification is subject to change without notice.

RECORD OF REVISION

| Revision Date	Page	Contents	Editor
2023/04/13	-	New Release	Jessica
2023/09/19	4,22	Update drawings – add tape	Jessica

1. Features

8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 8" TFT-LCD panel and backlight unit.

(1) Construction: 8" a-Si TFT active matrix, White LED Backlight.

(2) Resolution (pixel): 800(R.G.B) X 480

(3) Number of the Colors: 262,144 colors (R, G, B, 6 bit digital each)

(4) LCD type: Transmissive, normally White

(5) Viewing Direction: 6 O'clock (Gray Inversion)

(6) One channel LVDS interface

(7) New TFT Driver IC
  ✧ Supplier: Fitipower
  ✧ Source Driver IC: EK79713
  ✧ Gate Driver IC: EK73202

2. Physical Specifications

| Item	Specifications	unit
Display Resolution(dot)	800RGB (W) x 480(H)	dots
Pixel Pitch	0.2208 (W) x 0.207 (H)	mm
Color Configuration	R.G.B Vertical stripe	
Brightness	**450**	cd/m^2
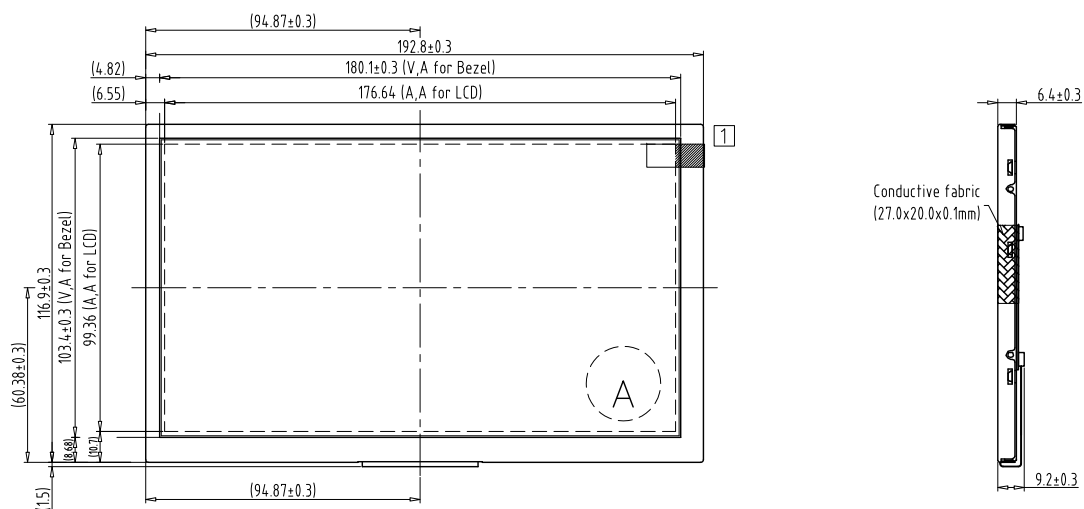
3. Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit
Operation Temperature	TOP	**-30**	**85**	℃
Storage Temperature	TSTG	**-30**	**85**	℃

4. Electrical Characteristics

4.1 Switching Characteristics of LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential Input High Threshold	VTH	--	--	100	mV	VCM=1.2V
Differential Input Low Threshold	VTL	-100	--	--	mV	
Input current	IIN	-10	--	+10	uA	
Differential input Voltage	|VID|	0.2	--	0.6	V	
Common Mode Voltage Offset	VCM	$\dfrac{\|VID\|}{2}$	1.25	$2.4-\dfrac{\|VID\|}{2}$	V	
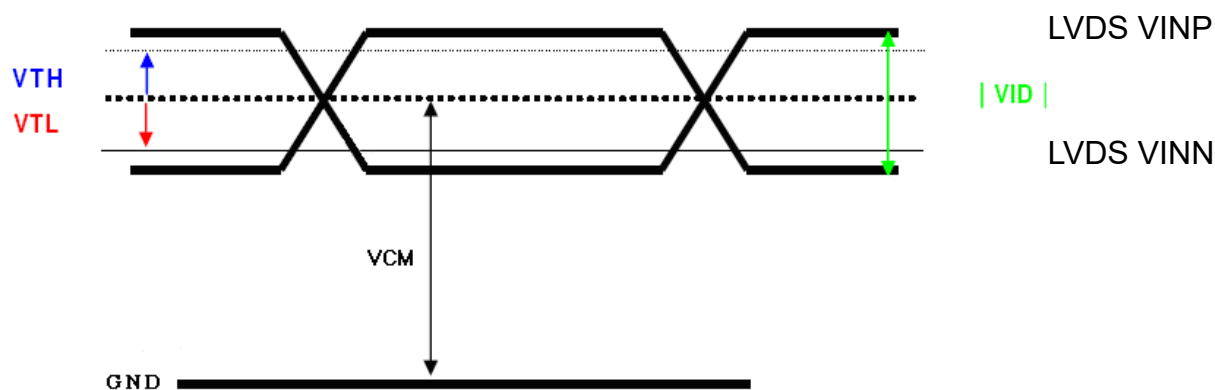
4.2 6-bit LVDS Input Data Mapping
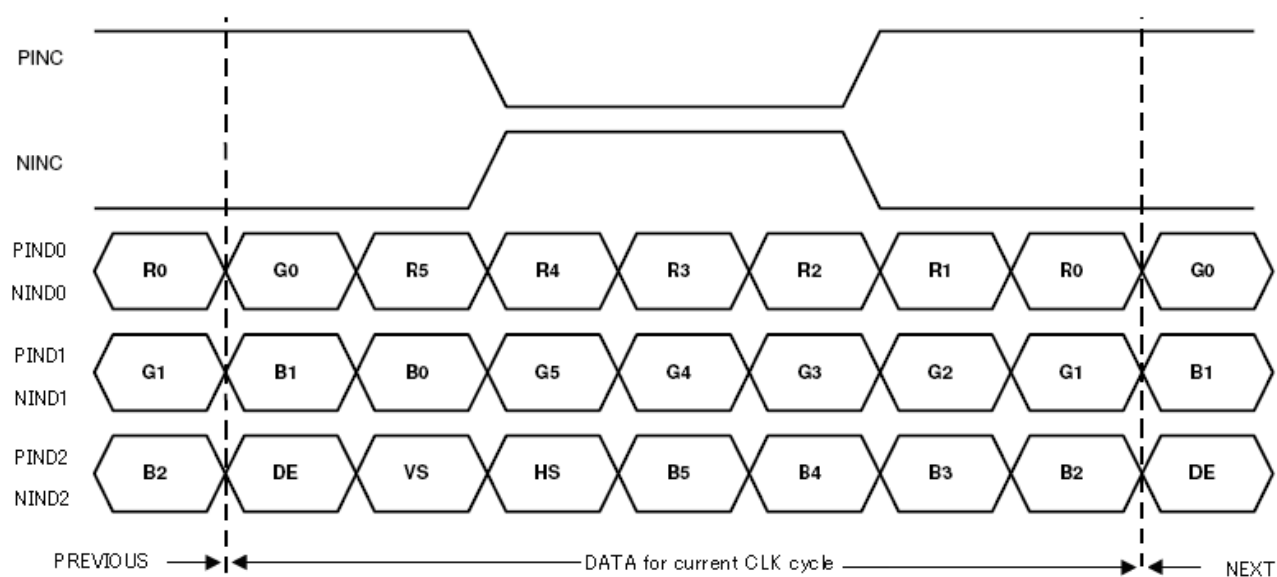
4.3 Backlight Driving Conditions

| Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	VL	8.4	9.3	10.2	V	Note 1
Current for LED backlight	I_L	216	240	264	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℃ and I_L =240mA.

Note(2)

The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =240mA. The LED lifetime could be decreased if operating I_L is lager than 240 mA.

Note(3) When LCM is operated over 40℃ ambient temperature, the IL should be follow :
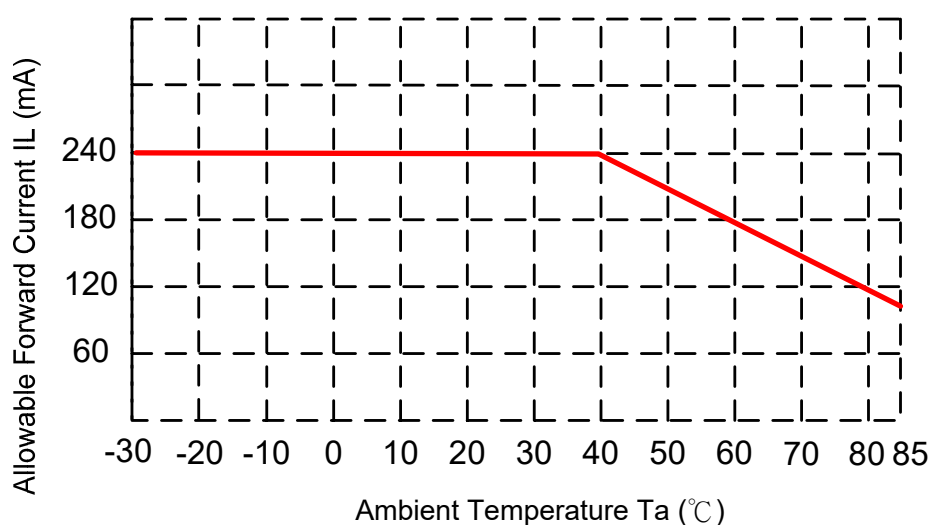
Note(4) PWM

Once the dimming mode is programmed, it cannot be changed without another start up. This means the IC needs to be shut down by pulling the CTRL low for 2.5ms and restarts. See the Dimming Mode Detection and Soft Start for a graphical explanation.
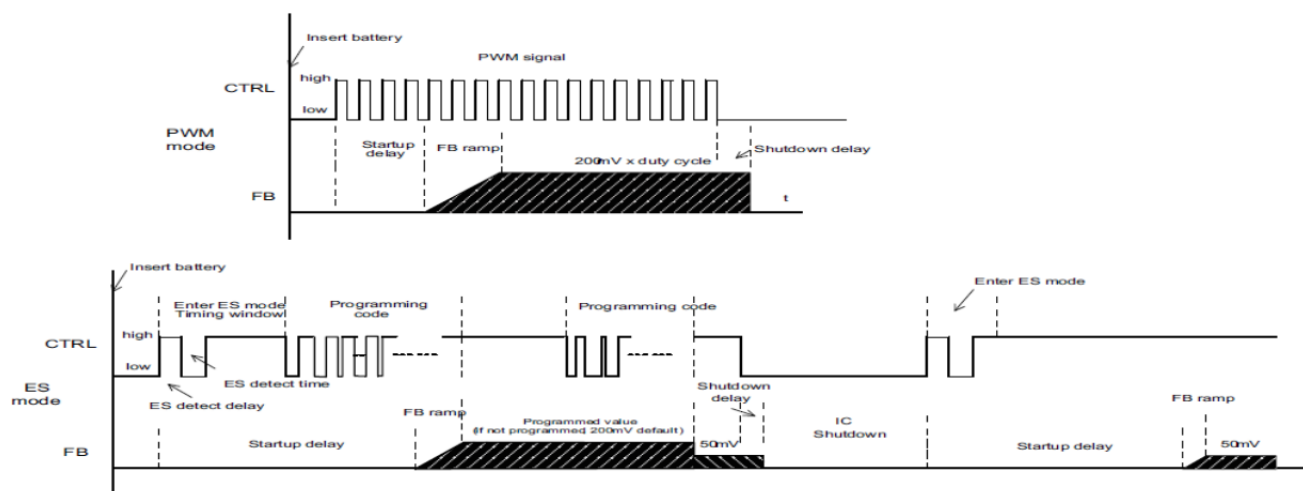
5. Optical Specifications

| Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Front	θ f	CR≧10	60	70	--	deg.	(1)(2)(3)
	Back	θ b		40	50	--		
	Left	θ l		60	70	--		
	Right	θ r		60	70	--		
Contrast ratio		CR	Θ=Φ=0°	400	500	--	--	(1)(3)
Response Time		T_r	Θ=Φ=0°	--	10	30	ms	(1)(4)
		T_f		--	15	30	ms	(1)(4)
Color chromaticity	White	Wx		0.26	0.31	0.36	--	(1)
		Wy		0.28	0.33	0.38		
Luminance		L	Θ=Φ=0°	**360**	**450**	--	cd/m^2	(1)(5)
Luminance Uniformity		ΔL	Θ=Φ=0°	70	75	--	%	(1)(5)(6)

Note(1) Definition of viewing angle range
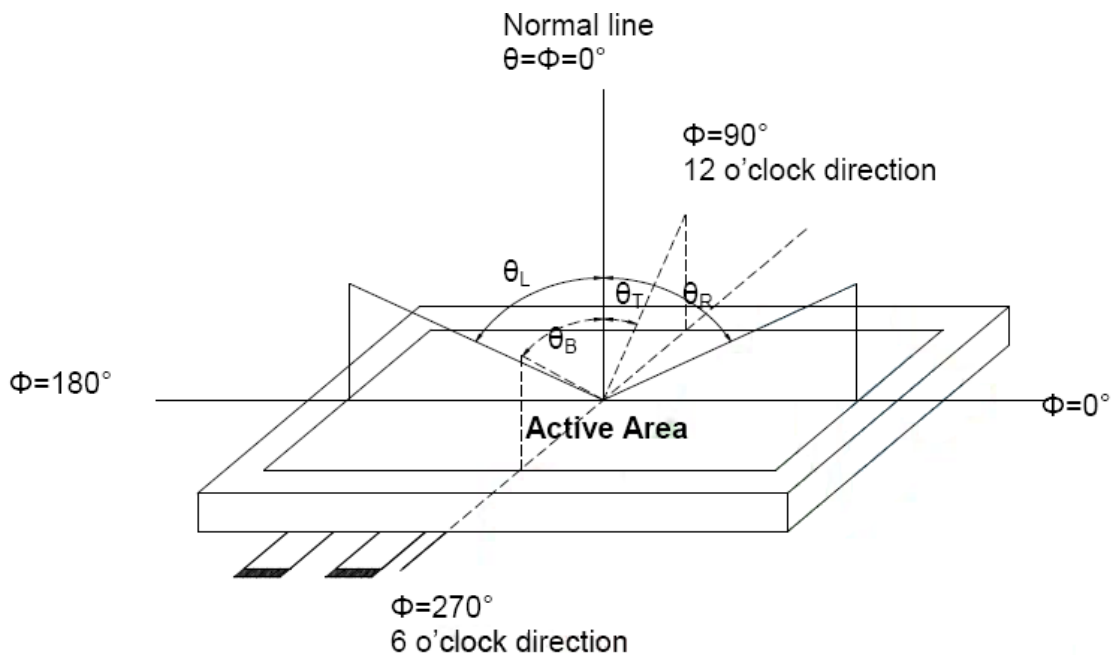
Note(2) Definition of optical measurement system.

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.)
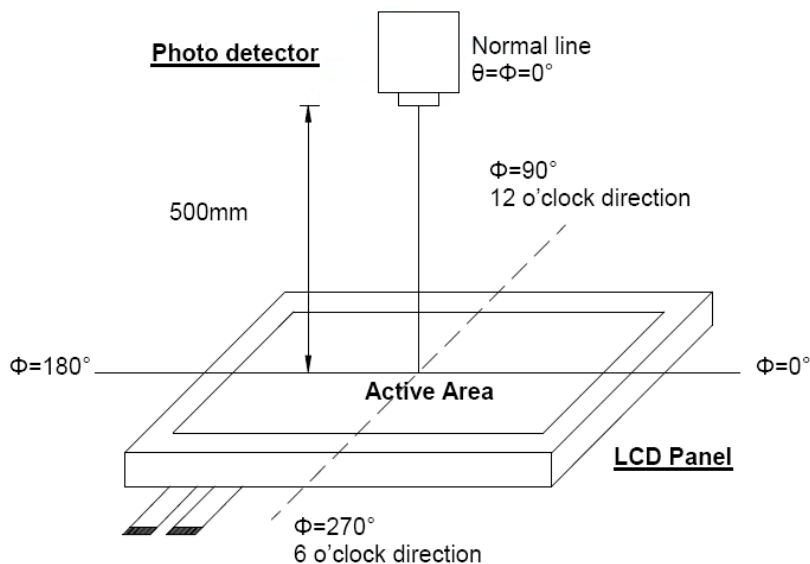
Note(3) Definition of Response time

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%.
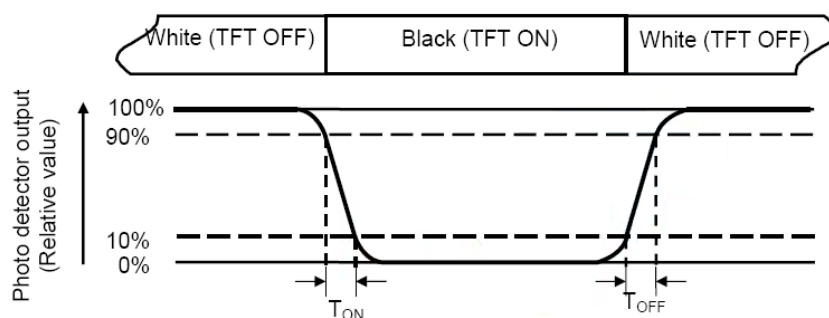
Note(4) Definition of contrast ratio

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

Note(5) Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

Note(6) All input terminals LCD panel must be ground when measuring the center area of the panel.

Note(7) Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to bellow figure). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{\text{Bmin}}{\text{Bmax}}$$

L ----- Active area length   W ----- Active area width
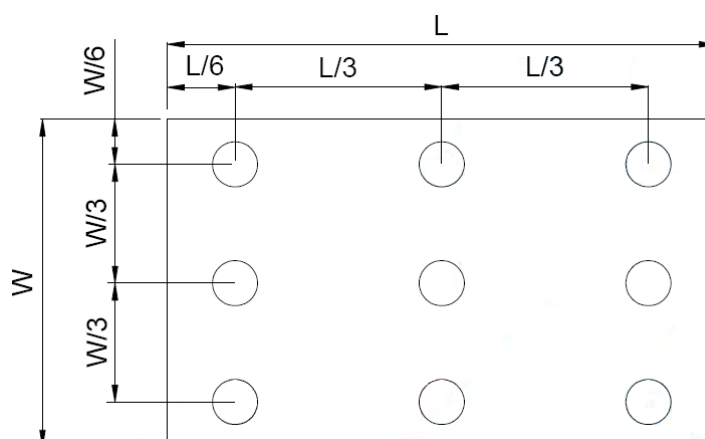
Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

6. Interface

6.1 Electrical Interface Connection

Pin No.	Symbol	Description	Note
1	GND	Ground	
2	VDD	3.3V Power	
3	VDD	3.3V Power	
4	V_EDID	No connection	
5	ADJ	Adjust the LED brightness by PWM	(1)
6	CLK_EDID	No connection	
7	DATA_EDID	No connection	
8	RXIN0-	LVDS Signal - channel0-	
9	RXIN0+	LVDS Signal+ channel0+	
10	GND	Ground	
11	RXIN1-	Data Input channel1-	
12	RXIN1+	Data Input channel1+	
13	GND	Ground	
14	RXIN2-	Data Input channel2-	
15	RXIN2+	Data Input channel2+	
16	GND	Ground	
17	RXCLKIN-	Data Input CLK-	
18	RXCLKIN+	Data Input CLK+	
19	GND	Ground	
20	NC	No connection	
21	NC	No connection	
22	GND	Ground	
23	GND	Ground	
24	VLED	LED driving voltage (5.0V)	
25	VLED	LED driving voltage (5.0V)	

26	VLED	LED driving voltage (5.0V)	
27	NC	No connection	
28	NC	No connection	
29	NC	No connection	
30	NC	No connection	

Pin5: ADJ is PWM signal input. It is for brightness control.

Item	Symbol	Min.	Typ.	Max.	Unit
ADJ signal frequency	fPWM	10	--	100	KHz
ADJ signal logic level High	VIH	2	--	VLED	V
ADJ signal logic level Low	VIL	0	--	0.5	V

7. Interface Timing (The information as below is to be defined.)

7.1 LVDS Signal
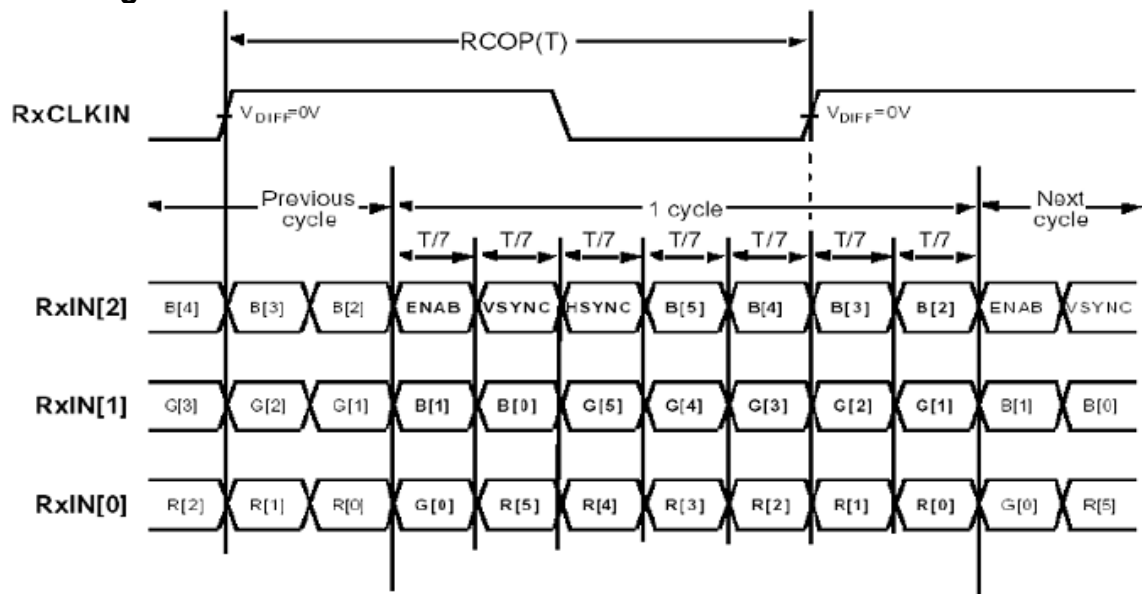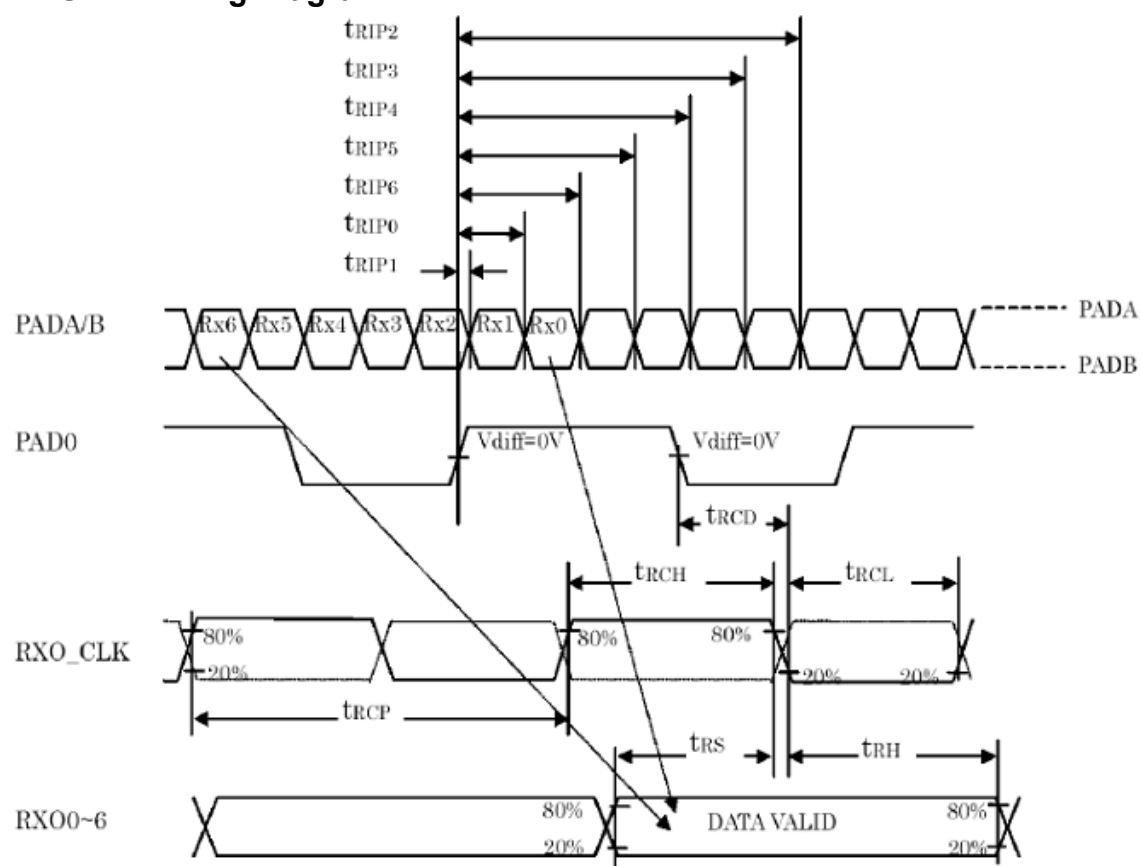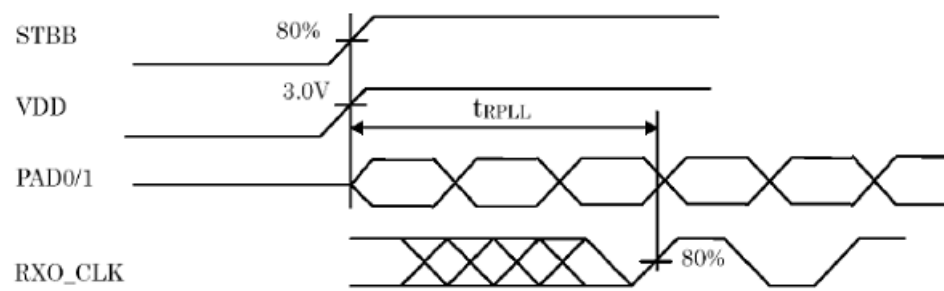

Note: R/G/B [5]s are MSBs and R/G/B[0]s are LSBs
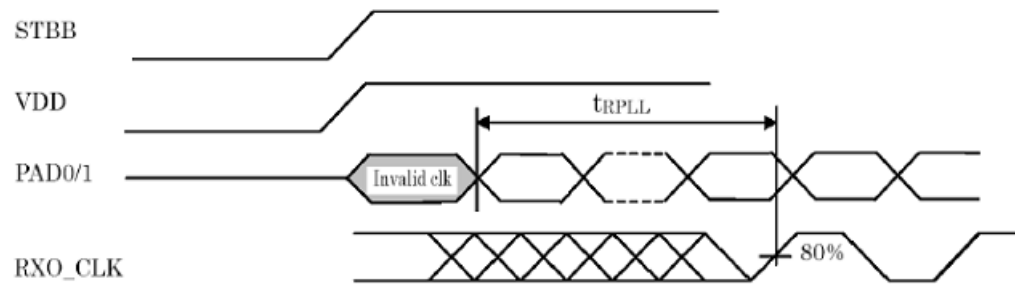
7.2 LVDS AC Timing Diagram:

7.3 Phase Lock Loop Set Time:

(Case1)

(Case2)

7.4 Recommended Input Timing of LVDS transmitter:

Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd	800			DCLK
DCLK frequency		fclk	Min.	Typ.	Max	
			/	33.3	50	MHz
1 Horizontal Line		th	862	1056	1200	DCLK
HSD pulse width	Min.	thpw	1			DCLK
	Typ.		/			
	Max.		40			
HSD Back Porch (Blanking)		thb	46	46	46	
HSD Front Porch		thfp	16	210	354	

Vertical input timing

Parameter	Symbol	Min.	Typ.	Max.	Unit
Vertical display area	tvd		480		H
VSD period time	tv	510	525	650	H
VSD pulse width	tvpw	1	/	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H
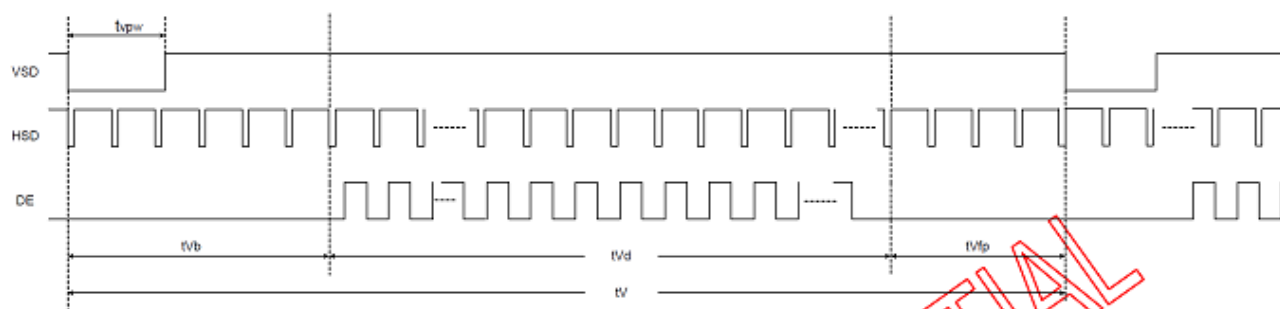
Vertical input timing

8. Power On/Off Sequence
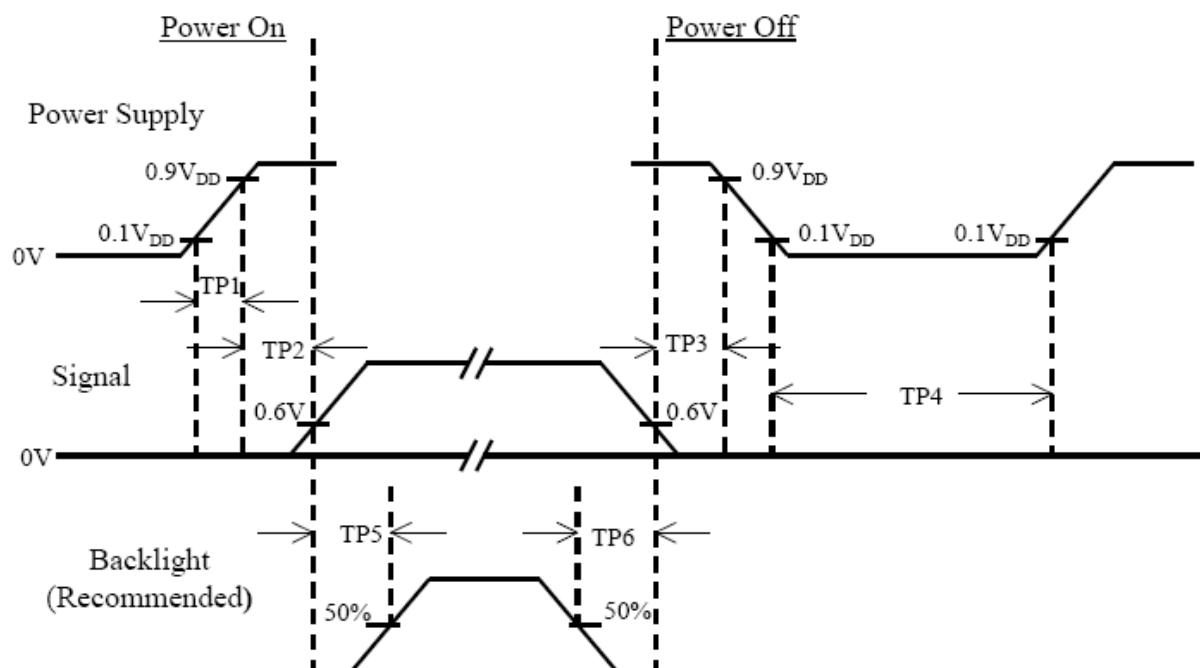
Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	200	--	--	msec	
TP6	200	--	--	msec	

Note(1)   The supply voltage of the external system for the module input should be the same as the definition of VDD.

Note(2)   Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.

Note(3)   In case of VDD = off level, please keep the level of input signal on the low or keep a high impedance.

Note(4)   TP4 should be measured after the module has been fully discharged between power off and on period.

Note(5)   Interface signal shall not be kept at high impedance when the power is on.

9. Reliability Test Conditions

Test Item	Test Conditions	Note
High Temperature Operation	85±3°C , t=240 hrs	
Low Temperature Operation	-30±3°C , t=240 hrs	
High Temperature Storage	85±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	60°C, 90% RH , 240 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note(1) Ta is the ambient temperature of samples.

Note(2) Ts is the temperature of panel's surface.

Note(3) In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

Note(4) Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note(5) Condensation of water is not permitted on the module.

Note(6) The module should be inspired after 1 hour storage in normal conditions (15~35℃, 45~65%RH).

Note(7) The module shouldn't be tested over one condition, and all the tests are independent.

Note(8) All reliability tests should be done without the protective film.

Definitions of life end point:

● Current drain should be smaller than the specific value.
● Function of the module should be maintained.
● Appearance and display quality should not have degraded noticeably.
● Contrast ratio should be greater than 50% of initial value.

10. General Precautions

10.1 Safety

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

10.2 Handling

(2) The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.

(3) The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.

(4) To avoid contamination on the display surface, do not touch the module surface with bare hands.

(5) Keep a space so that the LCD panels do not touch other components.

(6) Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.

(7) Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.

(8) Do not leave module in direct sunlight to avoid malfunction of the ICs.

10.3 Static Electricity

(1) Be sure to ground module before turning on power or operation module.

(2) Do not apply voltage which exceeds the absolute maximum rating value.

10.4 Storage

(1) Store the module in a dark room where must keep at +25±10℃ 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.

10.5 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.

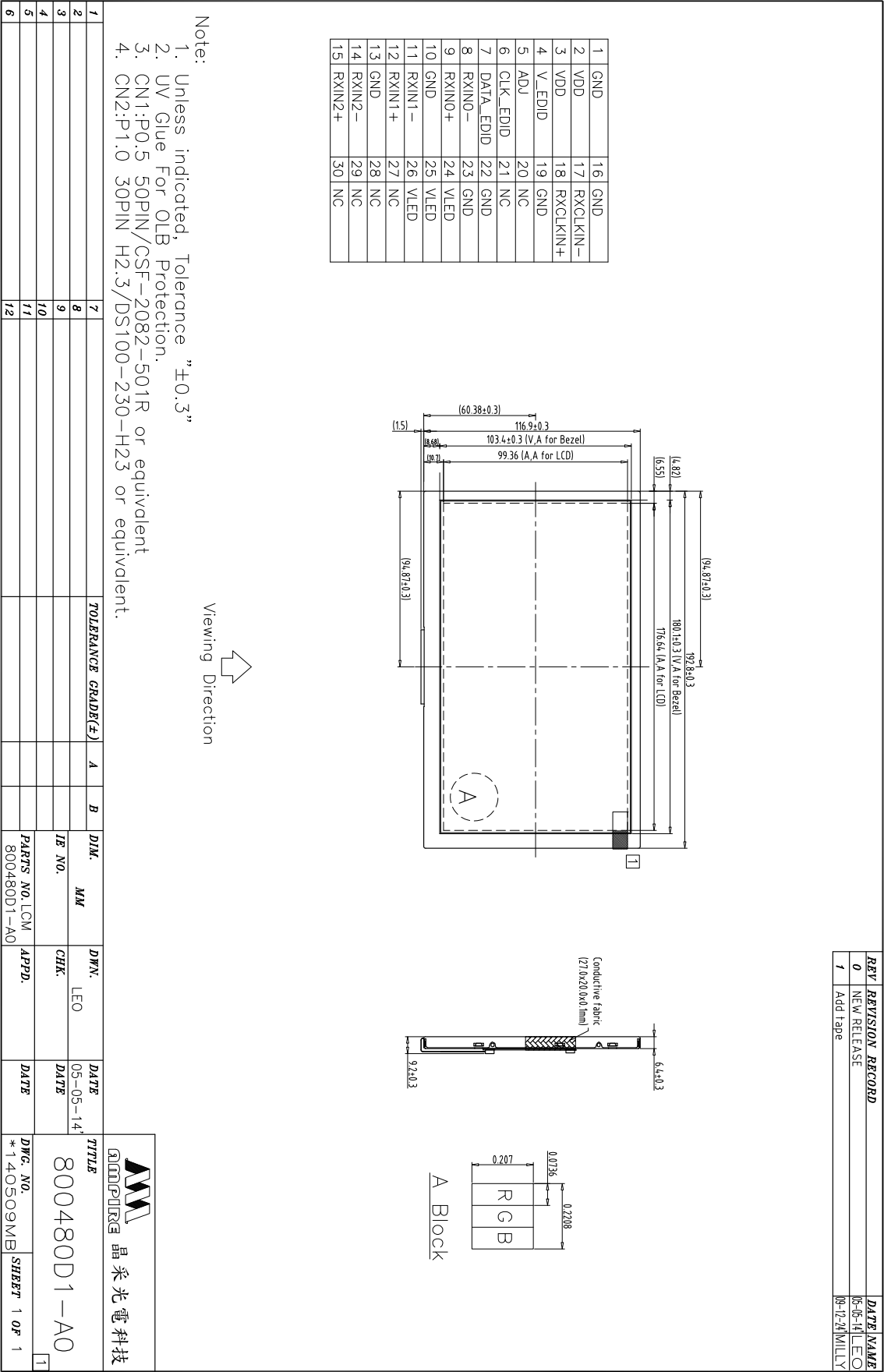## 10.6 Mechanism

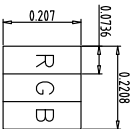(1) Please mount LCD module by using mounting holes arranged in four corners tightly.

10.7 Others

(1) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.

(2) Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver

11. Outline Dimension

	GND	16	GND
2	VDD	17	RXCLKIN-
3	VDD	18	RXCLKIN+
4	V_EDID	19	GND
5	ADJ	20	NC
6	CLK_EDID	21	NC
7	DATA_EDID	22	GND
8	RXIN0-	23	GND
9	RXIN0+	24	VLED
10	GND	25	VLED
11	RXIN1-	26	VLED
12	RXIN1+	27	NC
13	GND	28	NC
14	RXIN2-	29	NC
15	RXIN2+	30	NC

Note:
1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN1:P0.5 50PIN/CSF-2082-501R or equivalent
4. CN2:P1.0 30PIN H2.3/DS100-230-H23 or equivalent.

Viewing Direction

A Block

	R	G	B

TOLERANCE GRADE(±)		
DIM.	A	B
MM		

IE NO.

PARTS NO.LCM
800480D1-A0

DWN. LEO
CHK.
APPD.
DATE 05-05-14'
DATE
DATE

REV	REVISION RECORD	DATE	NAME
			05-05-14 LEO
0	NEW RELEASE		
1	Add tape	09-12-24 MILLY	

1	GND	16	GND
2	VDD	17	RXCLKIN−
3	VDD	18	RXCLKIN+
4	V_EDID	19	GND
5	ADJ	20	NC
6	CLK_EDID	21	NC
7	DATA_EDID	22	GND
8	RXIN0−	23	GND
9	RXIN0+	24	VLED
10	GND	25	VLED
11	RXIN1−	26	VLED
12	RXIN1+	27	NC
13	GND	28	NC
14	RXIN2−	29	NC
15	RXIN2+	30	NC

Note:
1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN1:P0.5 50PIN/CSF-2082-501R or equivalent
4. CN2:P1.0 30PIN H2.3/DS100-230-H23 or equivalent.

Back View

Kapton (60.0x15.0)
2-Conductive fabric (27.0x20.0x0.1mm)
CN2 PN30
CN1 PN1
145.0±0.3 (PCB)
(72.5±0.3)
(46.8)
(32.0)
50.0±0.3 (PCB)

A Block
R
G
B
0.207
0.0736
0.2208

		TOLERANCE GRADE(±)	A	B	DIM.	MM	DWN.	DATE
1	7							
2	8							
3	9							
4	10							
5	11							
6	12							

IE NO.
PARTS NO. LCM-1
800480D1-A0
APPD.
CHK.
DWN. LEO
DATE 05-05-14

REV | REVISION RECORD
0 | NEW RELEASE

DATE NAME
05-05-14 LEO

AMPIRE 晶采光電科技

TITLE
800480D1-A0

DWG. NO.
*140510MA
SHEET 1 OF 1

12. Package
TBD