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**
APPROVED BY	
DATE	

☐ **Preliminary Specification**
☐ **Approved Specification**
AMPIRE CO., LTD.
4F., No.116, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City221, Taiwan (R.O.C.)
新北市汐止區新台五路一段 **116** 號 **4** 樓**(**東方科學園區 **A** 棟**)**

APPROVED BY	CHECKED BY	ORGANIZED BY

RECORD   OF   REVISION

Revision Date	Page	Contents	Editor
2014/5/13	-	New Release	Tony
2014/12/18	11	Correct LED Driver Input Voltage	Tony
	11	Correct Interface	
	3	Correct Number of the Colors	

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) Interface: 30 pin
(6) Viewing Direction: 6 O'clock (Gray Inversion)
(7) One channel LVDS interface

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
Display resolution(dot)	800RGB (W) x 480(H)	dots
Active area	176.64 (W) x 99.36 (H)	mm
Pixel pitch	0.2208 (W) x 0.207 (H)	mm
Color configuration	R.G.B Vertical stripe	
Overall dimension	192.8(W)x116.9(H)X9.2(T)	mm
Brightness	450 nit	cd/m^2
Contrast ratio	400 : 1	
Backlight unit	LED	
Display color	262,144	colors

3. ABSOLUTE MAX. RATINGS

(GND=AVDD=0V,Note 1)

Item	Symbol	Values		Unit	Remark
		Min	Max		
Operation Temperature	TOP	-30	85	$^{\circ}$C	
Storage Temperature	TST	-30	85	$^{\circ}$C	
LED Reverse Voltage	Vr		1.2	V	Each LED Note 2
LED Forward Current	If		25	mA	Each LED

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.

Note 2:Vr Conditions: Zener Diode 20mA.

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	$\dfrac{\left\|VID\right\|}{2}$	1.25	$2.4-\dfrac{\left\|VID\right\|}{2}$	V	
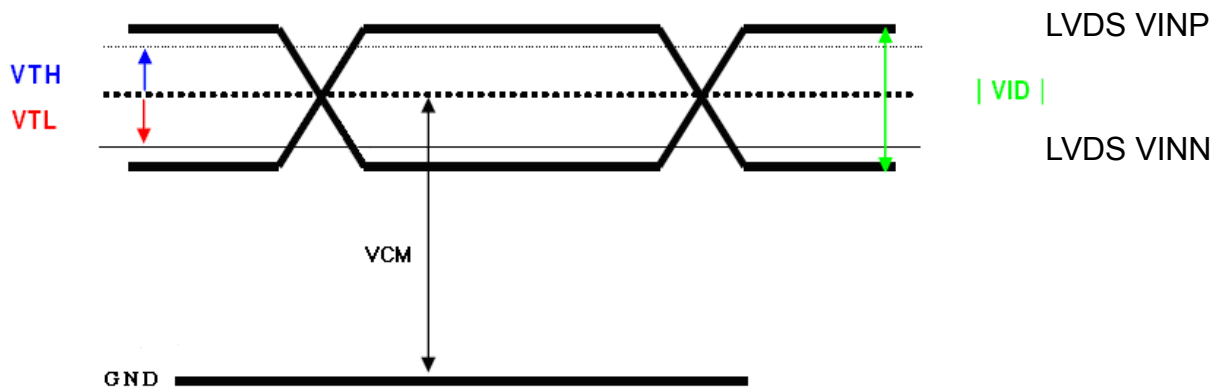
4.2 6-bit LVDS Input Data Mapping
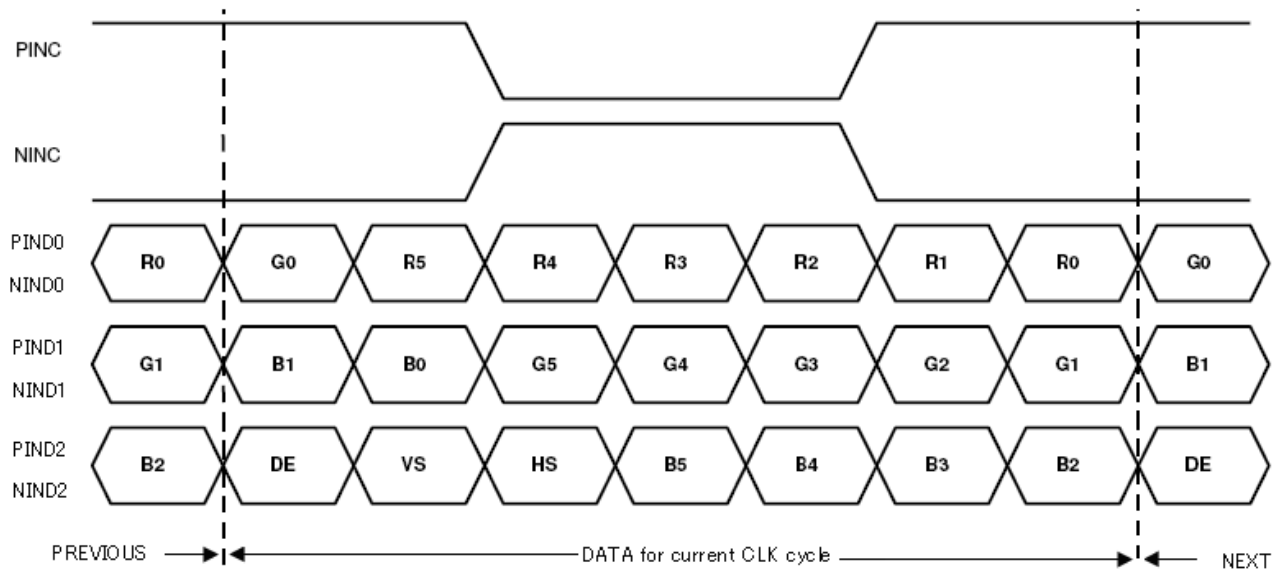
4.3 Backlight Driving Conditions

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	CONDITION
LED Backlight Voltage	V_{BL}	8.4	9.3	10.2	V	For reference
LED Backlight Current	I_{BL}	216	240	264	mA	Ta=25℃
LED Life Time		20,000	-		Hr	Note*

Note* : Brightness to be decreased to 50% of the initial value.(Ta=25℃, I_{BL}=240mA)
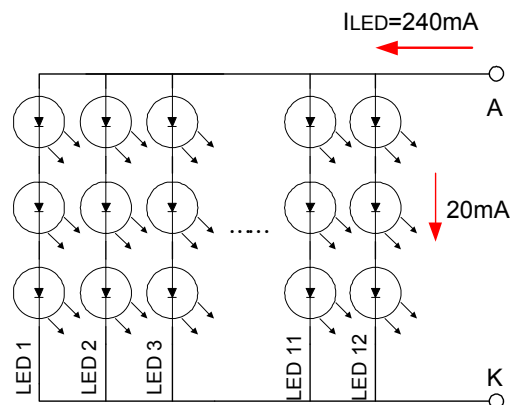

The constant current source is needed for white LED back-light driving.

When LCM is operated over 60℃ ambient temperature, the I_{BL} of the LED back-light should be adjusted to 180mA max
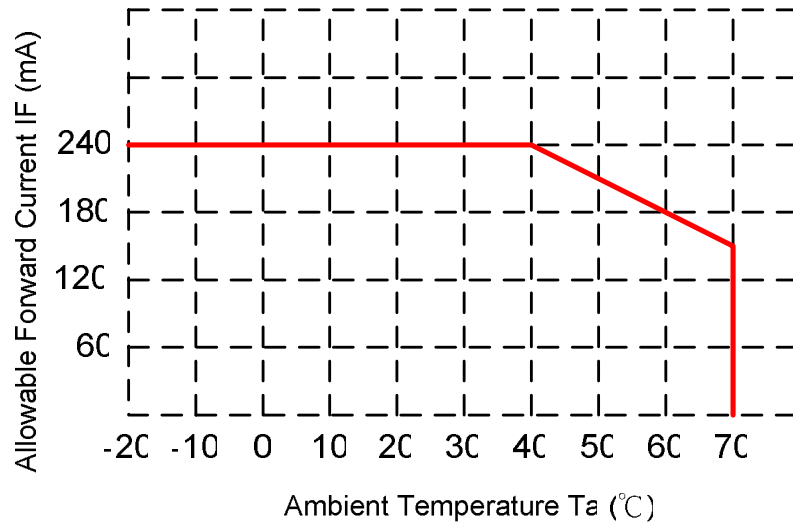
4.3.1 PWM

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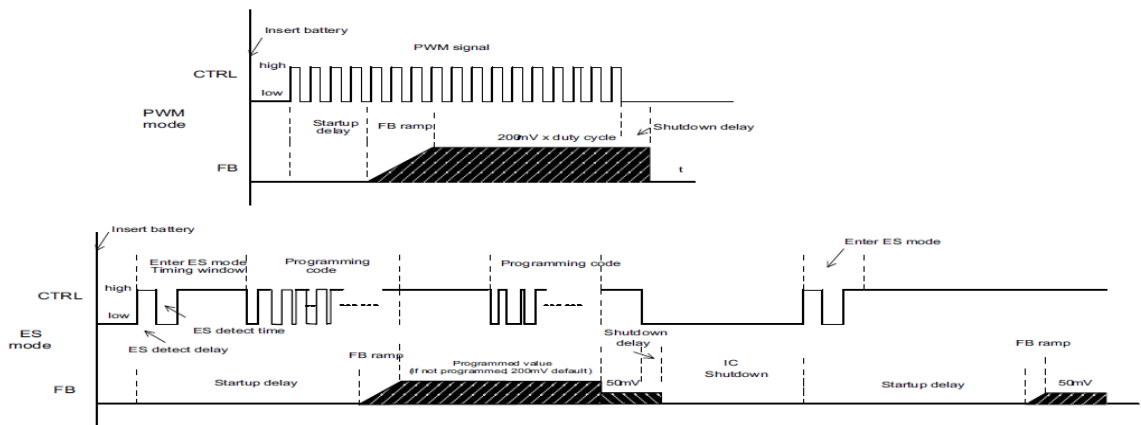
5. Optical Specifications

| 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/m²	(1)(5)
Luminance Uniformity		ΔL	Θ=Φ=0°	70	75	--	%	(1)(5)(6)

Note 1: Ta=25°C. To be measured on the center area of panel after 10 minutes operation.

Note 2: Definition of Viewing Angle
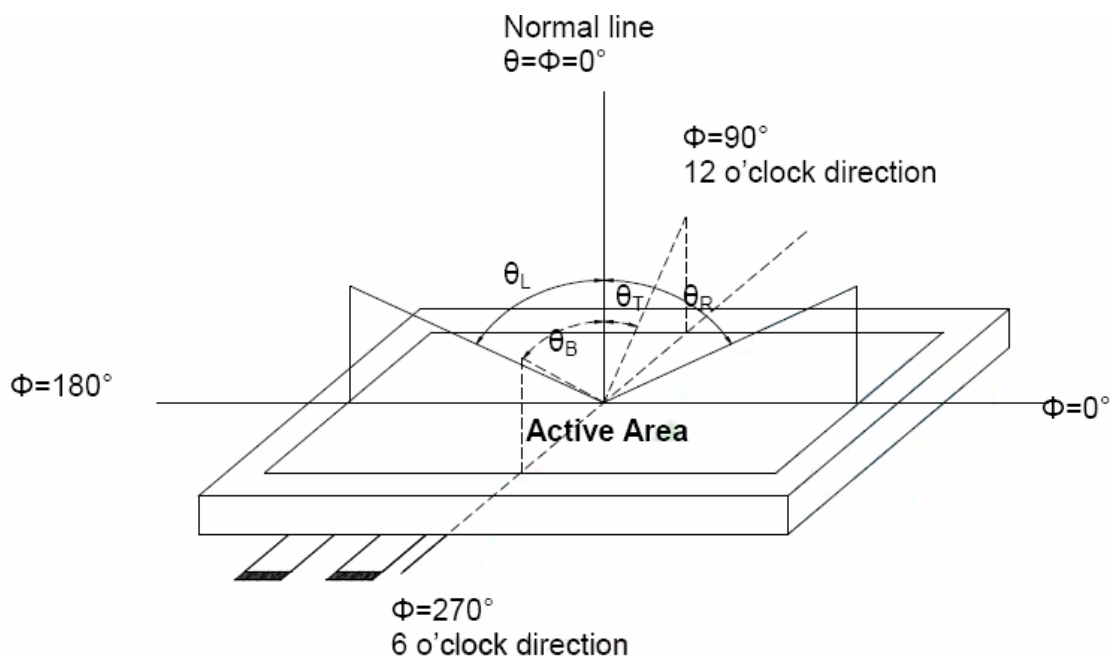
Note 2 : Definition of optical measurement system.

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.)
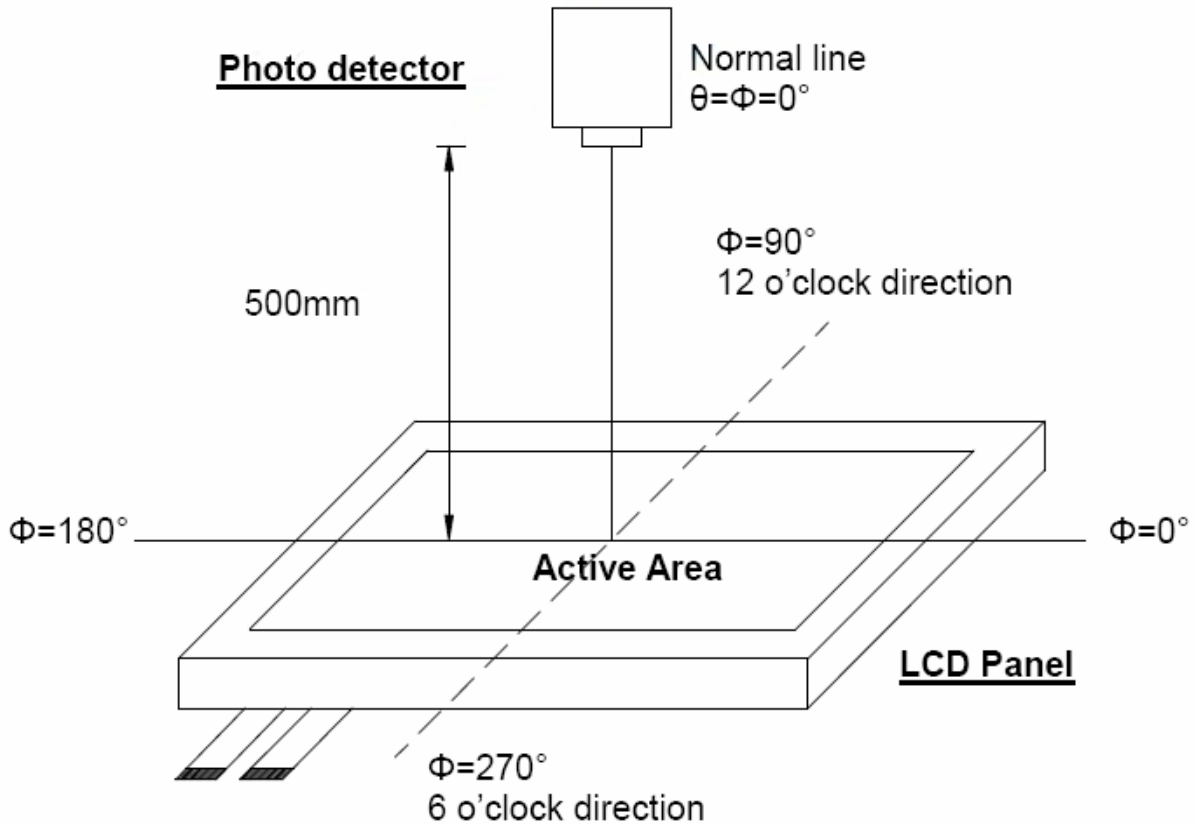
Note 3 : Definition of Response time

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%.
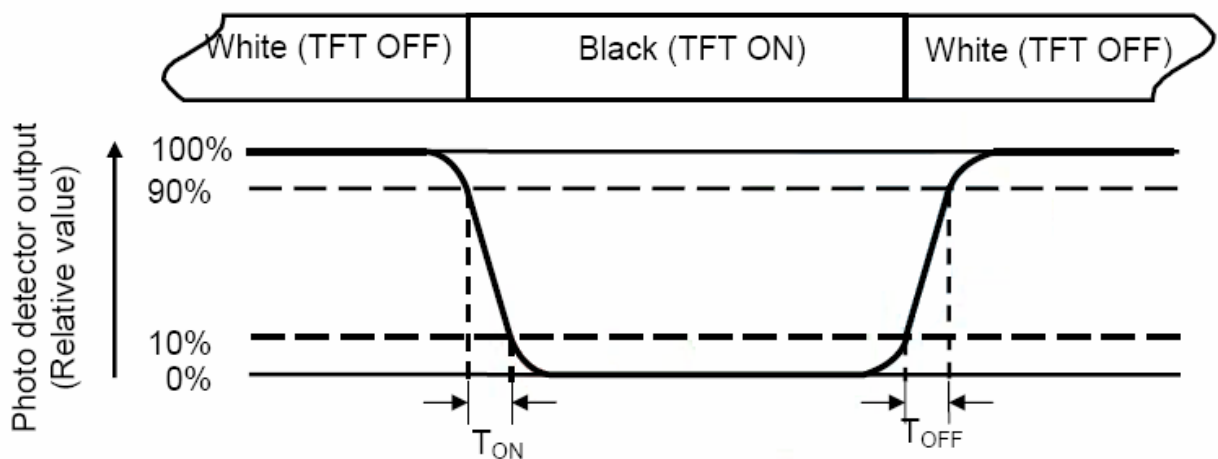
Note 4 : Definition of contrast ratio

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

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.

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

L ----- Active area length　　　W ----- Active area width
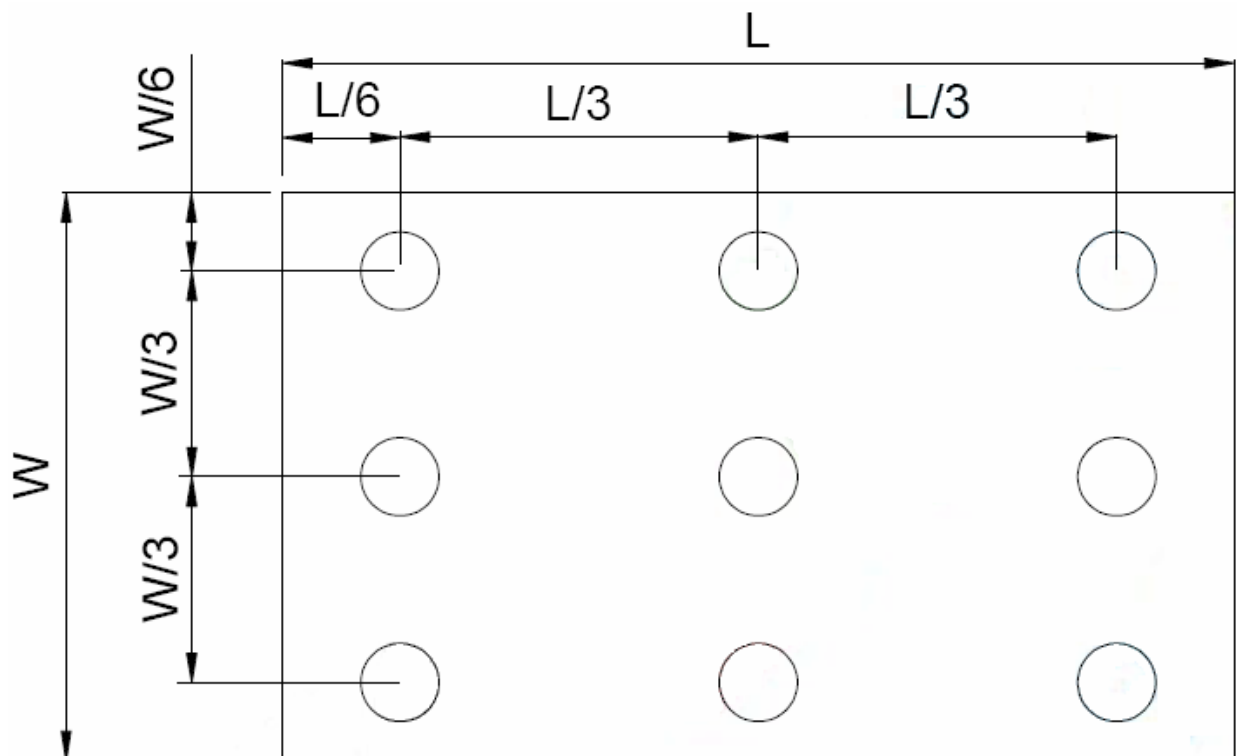
B_{max} : The measured maximum luminance of all measurement position.
B_{min} : The measured minimum luminance of all measurement position.

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	

NOTE :
(1) Pin5: ADJ is PWM signal input. It is for brightness control.

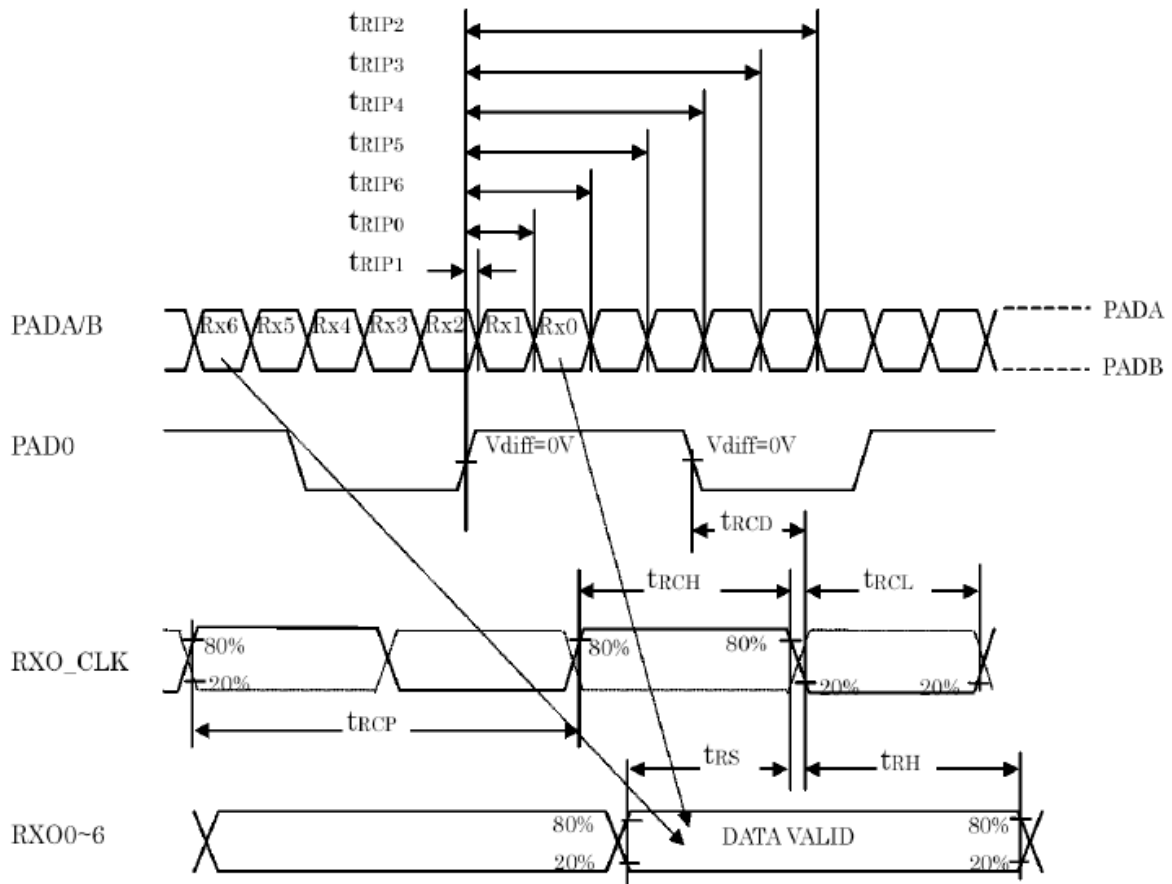| ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ signal frequency	f_{PWM}	10	--	100	KHz
ADJ signal logic level High	VIH	2	--	VLED	V
ADJ signal logic level Low	VIL	0	--	0.5	V

7. INTERFACE TIMING   (The information as below is to be defined.)
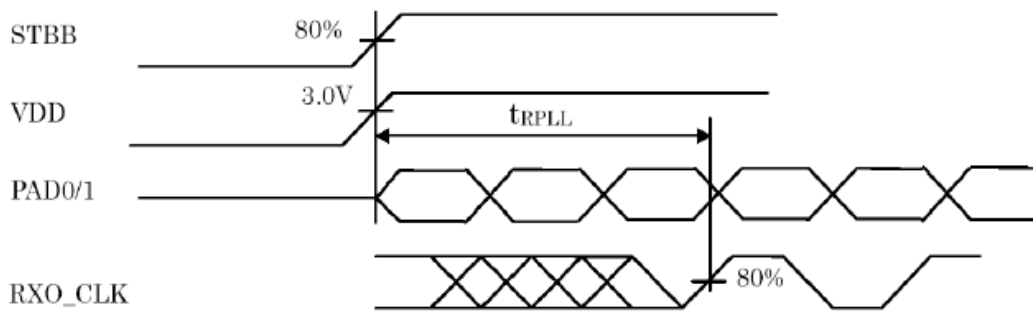
7-1 LVDS SIGNAL :
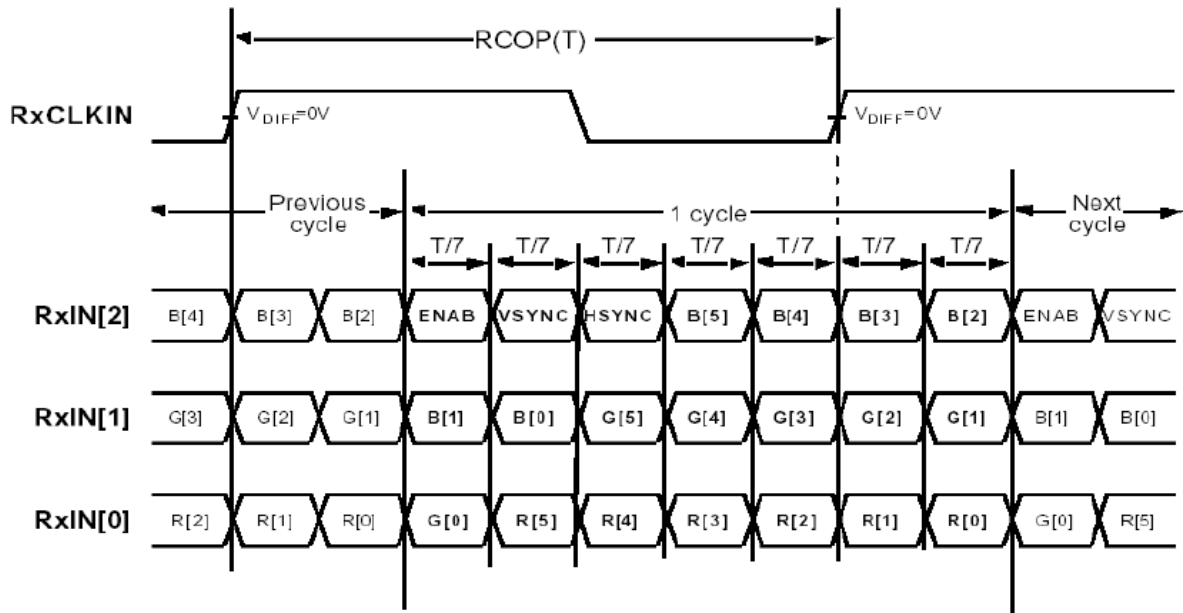
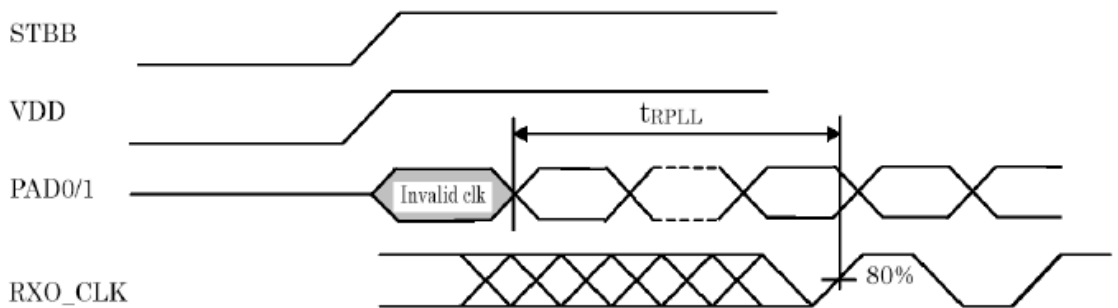Note : R/G/B[5]s are MSBs and R/G/B[0]s are LSBs

7-2 LVDS AC Timing Diagram :

7-3 Phase Lock Loop Set Time :

(Case1)

(Case2)


7-4 Recommended Input Timing of LVDS transmitter :

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

Horizontal input timing
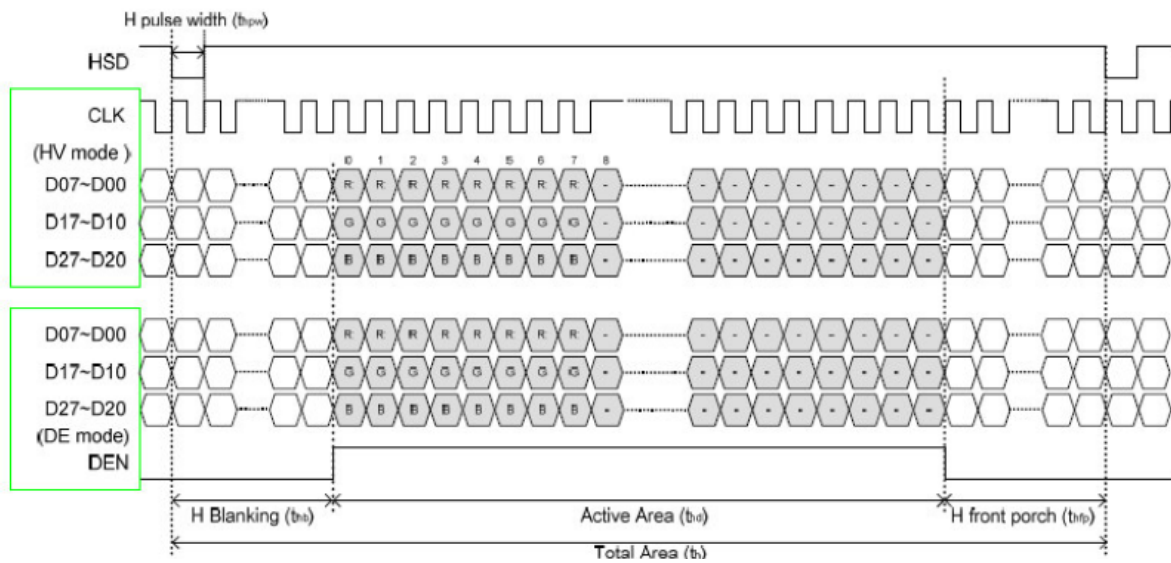
7-5. Power On/Off Sequence
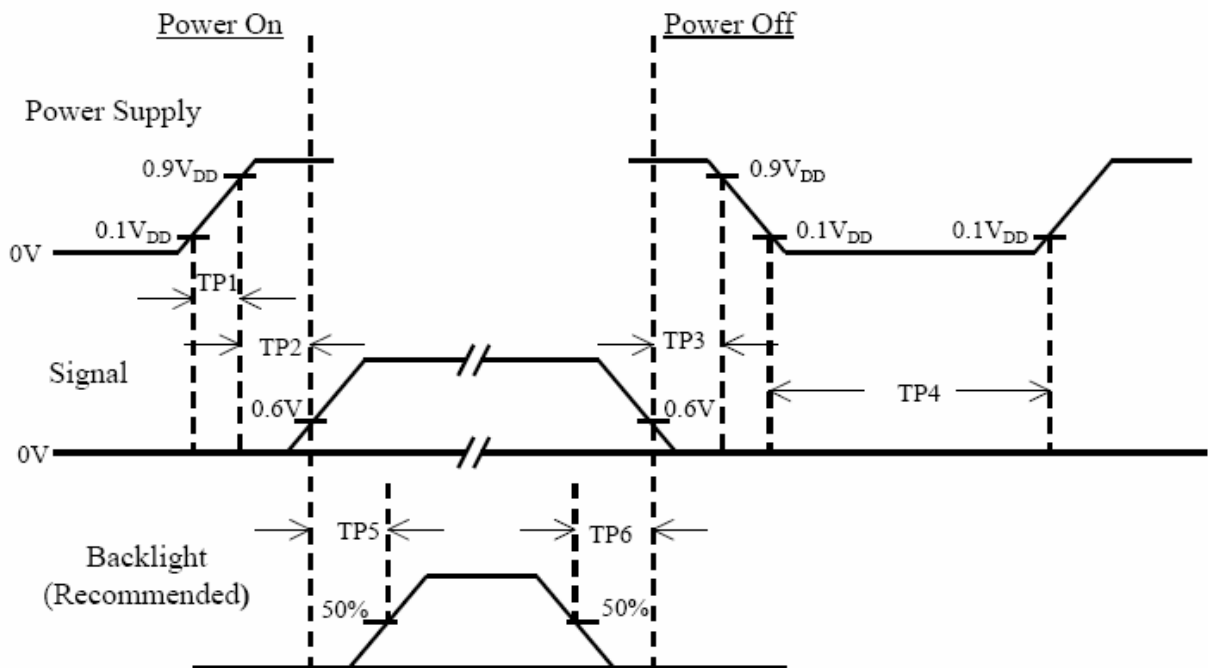
Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	200	--	--	msec	
TP6	200	--	--	msec	

Note：

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

(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.

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

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

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

8. Reliability Test Items

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
Thermal Shock Test	-30°C (30min) ~ 85°C (30min) 100 cycles	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 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

9. General Precautions

9-1 Safety

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.

9-2 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 ICs.

9-3 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.

9-4 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.

9-5 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. OUTLINE DIMENSION

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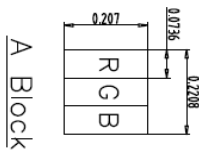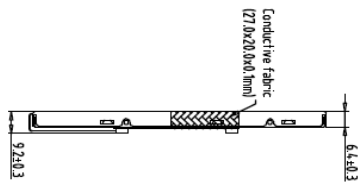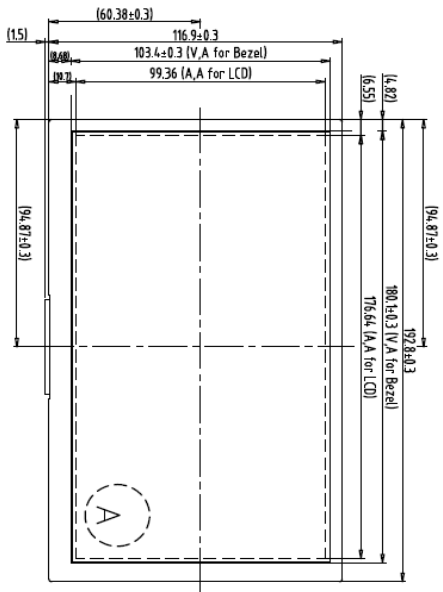
Note:
1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN1:P0.5 50PIN/CSF-2082-501R or equivalent
4. CN2:P1.0 30PIN H2.3/DS100-230-H23 or equivalent.

Viewing Direction

	1	7		
	2	8		
	3	9		
	4	10		
	5	11		
	6	12		

TOLERANCE GRADE(±)	A	B	DIM.	
			IE NO.	MM

PARTS NO. LCM
800480D1-A0

Conductive fabric
(27.0x20.0x0.1mm)

A Block
R G B

REV	REVISION RECORD	DATE NAME
0	NEW RELEASE	05-05-14 LEO

TITLE 800480D1-A0
AMPIRE 晶采光電科技
DWG. NO. *140509MA SHEET 1 OF 1

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

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

A Block

0.207
0.0736
0.2208

R G B

145.0±0.3 (PCB)
(72.5±0.3)
(46.8)
(32.0)
50.0±0.3 (PCB)

Kapton (60.0x15.0)
2-Conductive Fabric
(27.0x20.0x0.1mm)

CN2
PIN30
PIN1
50
CN1
1

DIM.		A	B	TOLERANCE GRADE(±)
MM				

1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

PART'S NO.LCM-1 800480D1-A0