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-800600C4TMQW-A1H-B
APPROVED BY	
DATE	

☑ Preliminary Specification
☐ Formal Specification

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2023/5/22	--	New Release	Simon

1. Features

8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 8” TFT-LCD panel, LED backlight, LED driver unit and power circuit unit.

(1) Construction: 8” a-Si TFT active matrix, White LED Backlight and LED driver unit.
(2) Resolution (pixel): 800(R.G.B) X600
(3) Number of the Colors : 262K colors (R , G , B 6 bit digital each)
(4) LCD type : Transmissive , normally White
(5) Interface: LVDS interface 20 pin
(6) Power Supply Voltage: 3.3V for logic voltage, 5.0V for LED driver power voltage.
(7) Viewing Direction: 6 O’clock (Gray Inversion)
(8) LCD IC: EK79713 & EK73215

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	8 inch (Diagonal)	
Resolution	800 x 3(RGB) x 600	dot
Dot pitch	0.0675(W) x 0.2025(H)	mm
Active area	162.0(W) x 121.5(H)	mm
Surface treatment	Anti-Glare	
Color arrangement	RGB-stripe	
interface	LVDS	
Weight	T.B.D.	g

3. ABSOLUTE MAX. RATINGS

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VDD	-0.3	4	V	
	VLED	-0.3	6.0		
Operation temperature	TOP	-20	70	℃	
Storage temperature	TST	-30	80	℃	
LED Reverse Voltage	VR	-	1.2	V	each LED Note 2
LED Forward Current	IF	-	25	mA	each LED

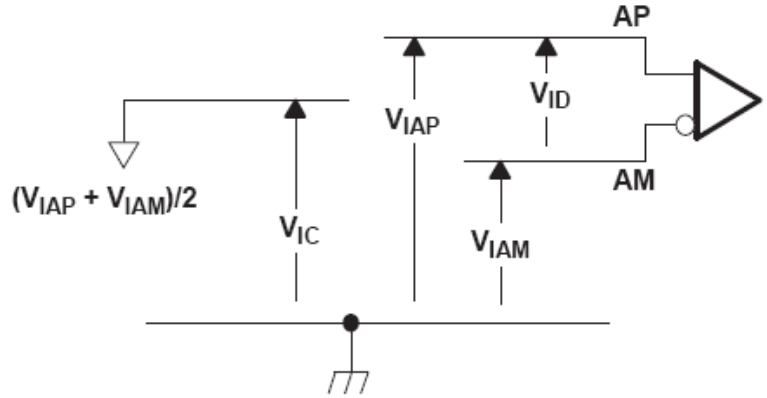
Note 1: The absolute maximum rating values of this product are not allowed to be exceededat any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 2: VR Conditions: Zener Diode 20mA

4. ELECTRICAL CHARACTERISTICS

4-1 TFT LCD Module

		MIN	NOM	MAX	UNIT
V_{DD}	Supply voltage	3	3.3	3.6	V
V_{IH}	High-level input voltage ($\overline{SHTDN}$)	2			V
V_{IL}	Low-level input voltage ($\overline{SHTDN}$)			0.8	V
$\lvert V_{ID}\rvert$	Magnitude differential input voltage	0.1		0.6	V
V_{IC}	Common-mode input voltage	$\frac{\lvert V_{ID}\rvert}{2}$		$2.4 - \frac{\lvert V_{ID}\rvert}{2}$	V



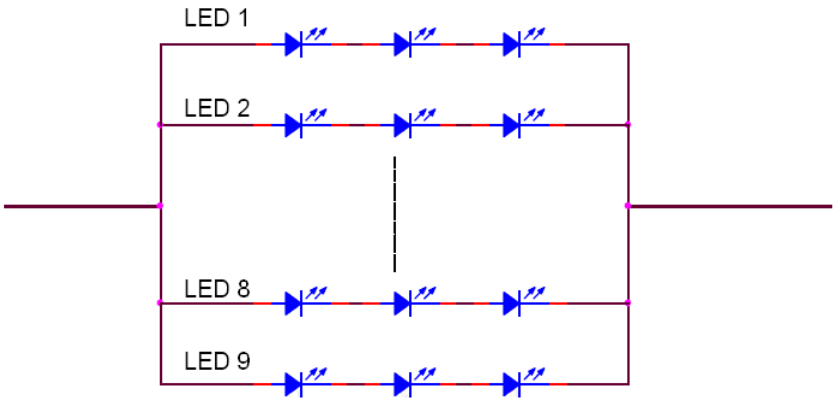
Item	Symbol	Values			Unit	Remark
		MIN	TYP	MAX		
LED Driver Power Voltage	V_{LED}	3.3	5.0	5.5	V	
LED Driver Current Consumption	I_{LED}	--	410	--	mA	VLED=5V VADJ=3.3V (duty 100%)
		--	750	--	mA	VLED=3.3V VADJ=3.3V (duty 100%)

4-2 Backlight Driving Conditions

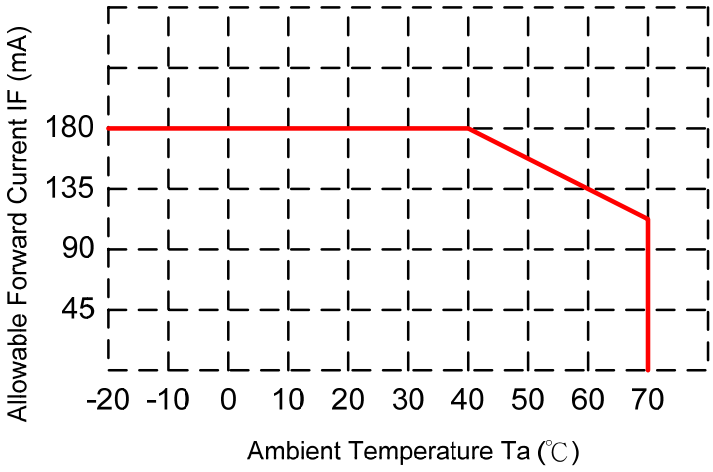
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED voltage	VL	--	9.9	10.5	V	Note 1
LED current	IL	162	180	198	mA	Note 1
LED life time	--	20,000	--	--	Hr	Note 2

Note 1 : The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL=180mA.

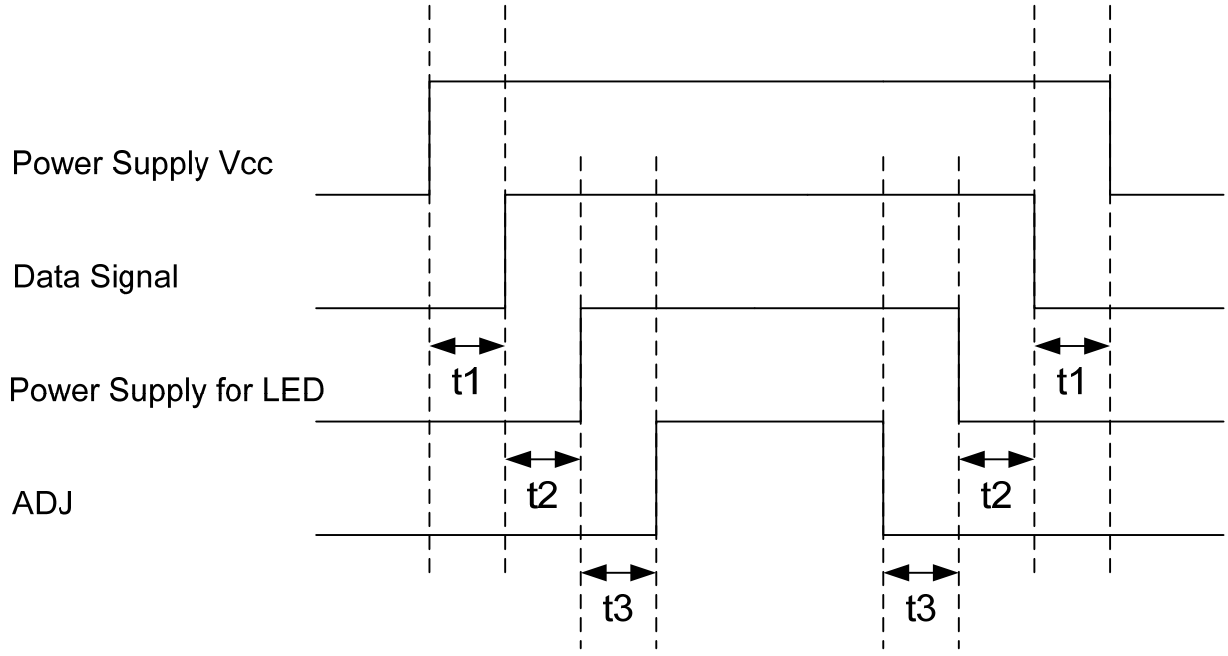
Note 2 : The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=180mA. The LED lifetime could be decreased if operating IL is larger than 180mA.



Note 3 : When LCM is operated over 40℃ ambient temperature, the ILED should be follow :



4.-3 Power Sequence



t1 > 50 mSec
t2 ≥ 200 mSec
t3 ≥ 50 mSec

Note: Data Signal includes DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

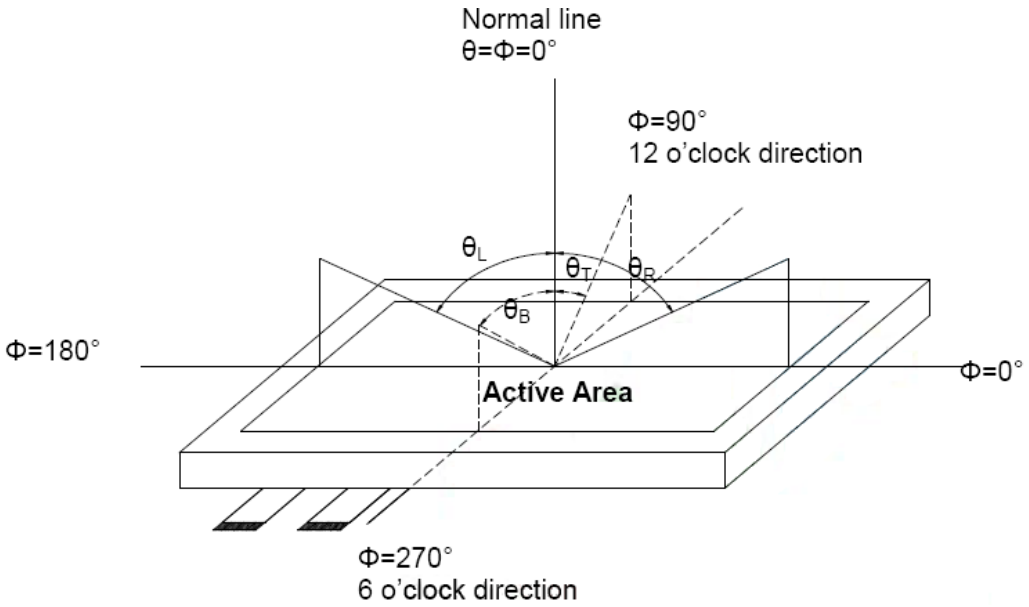
5. Optical Specifications

Item	Symbol	Condition	Values			Unit	Note
			Min.	Typ.	Max.		
Viewing angle (CR≧10)	θL	Φ = 180° (9 o'clock)	60	70	--	degree	Note1
	θR	Φ = 0° (3 o'clock)	60	70	--		
	θT	Φ = 90° (12 o'clock)	40	50	--		
	θB	Φ = 270° (6 o'clock)	60	70	--		
Response time	TON	Normal θ=Φ=0°	--	10	20	msec	Note3
	TOFF		--	15	30	msec	
Contrast ratio	CR		400	500	--	--	Note4
Color chromaticity	WX		0.26	0.31	0.36	--	Note5 Note6
	WY		0.28	0.33	0.38	--	
Luminance	L		200	250	--	cd/㎡	Note6
Luminance uniformity	YU		70	75	--	%	Note7

Test Conditions:

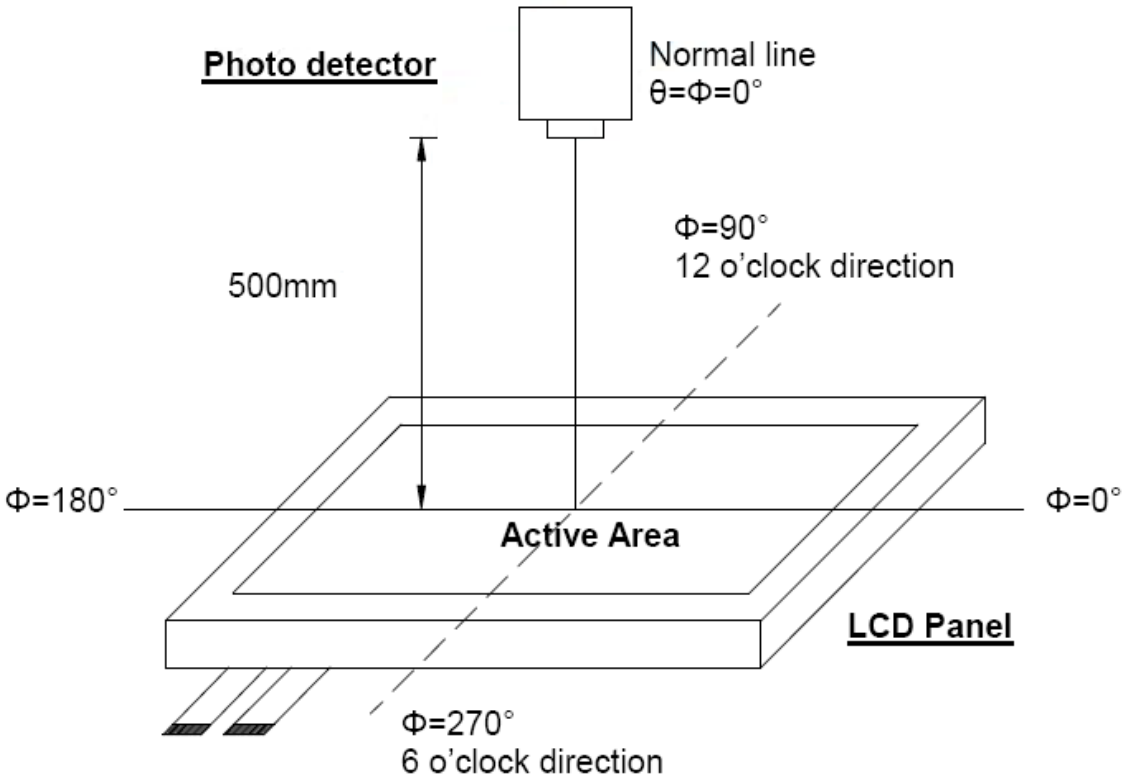
1. VCC = 3.3V, I_L = 180mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1 : Definition of viewing angle range



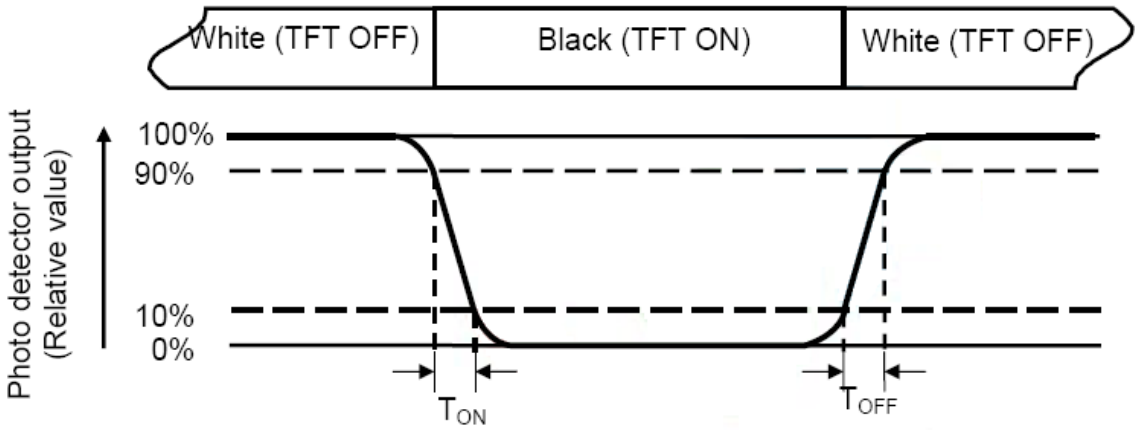
Note 2 : Definition of optical measurement system.

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.

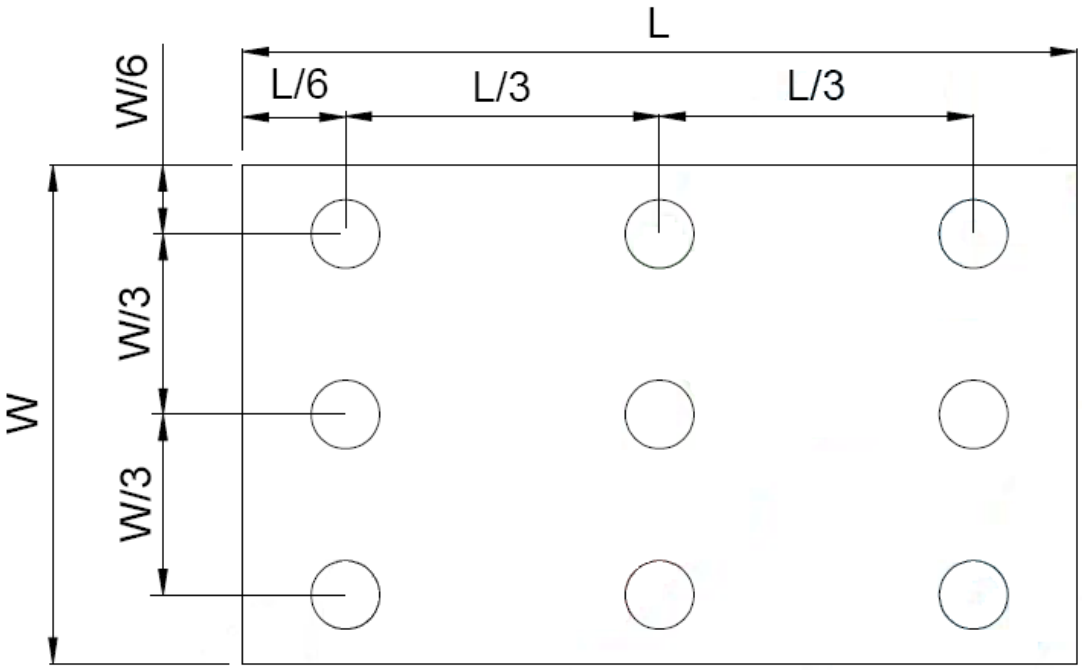
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

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.

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

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.

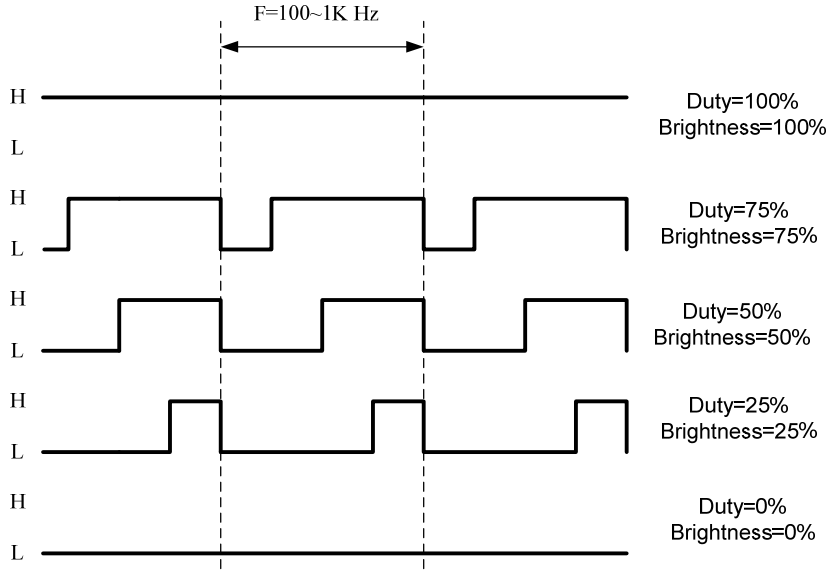
6. INTERFACE

TFT LCD Panel Driving Section

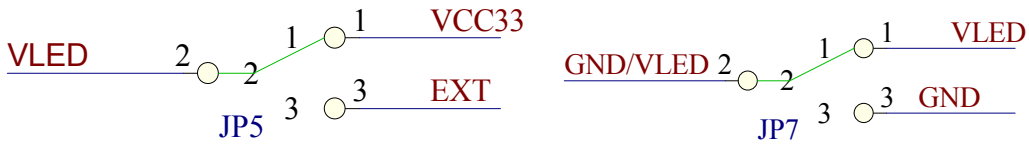
Pin No.	Symbol	Description	Note
1	VDD	POWER SUPPLY:3.3V	
2	VDD	POWER SUPPLY:3.3V	
3	GND	Power Ground	
4	GND	Power Ground	
5	IN0-	Transmission Data	
6	IN0+	Transmission Data	
7	GND	Power Ground	
8	IN1-	Transmission Data	
9	IN1+	Transmission Data	
10	GND	Power Ground	
11	IN2-	Transmission Data	
12	IN2+	Transmission Data	
13	GND	Power Ground	
14	CLK-	Sampling Clock	
15	CLK+	Sampling Clock	
16	GND	Power Ground	
17	ADJ	Adjust the LED brightness	(1)
18	NC	No connection.	
19	GND/VLED	JP7=1-2 & JP5=2-3short ➔power supply of LED driver circuit.	(2)
20	GND/VLED	**JP7=2-3 & JP5=1-2short ➔GND terminal. (default setting)**	

NOTE:
(1) Pin3: ADJ is PWM signal input. It is for brightness control.

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ signal frequency	f_{PWM}	100	--	1K	Hz
ADJ signal logic level High	VIH	2V	--	VLED (5.0V)	V
ADJ signal logic level Low	VIL	0	--	0.5	V

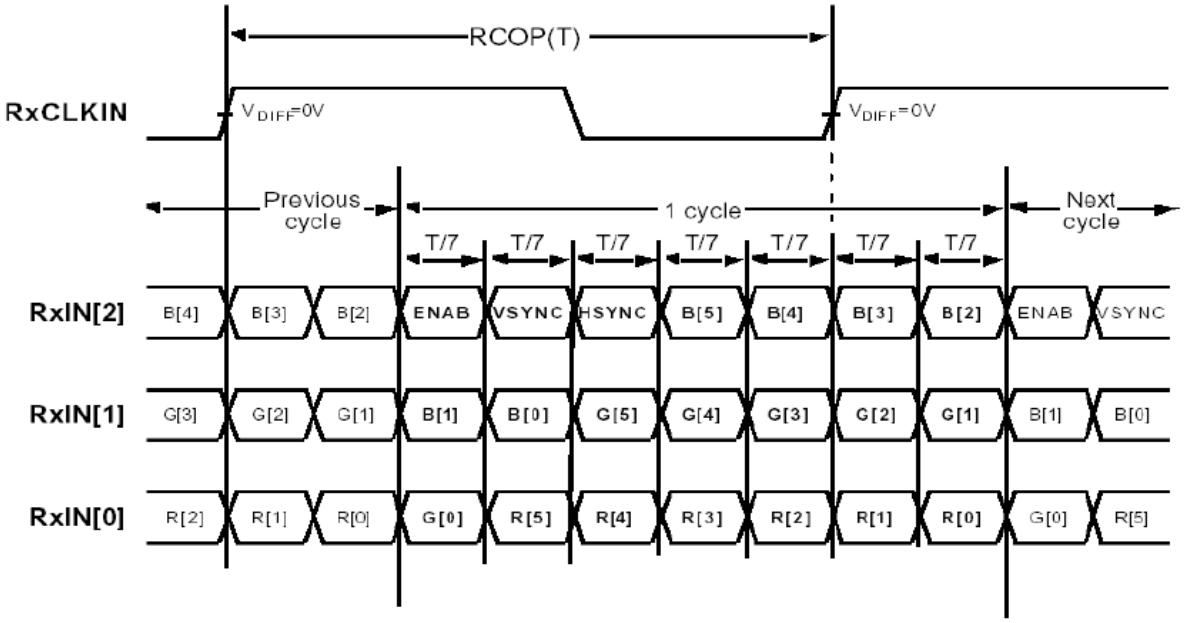


(2)



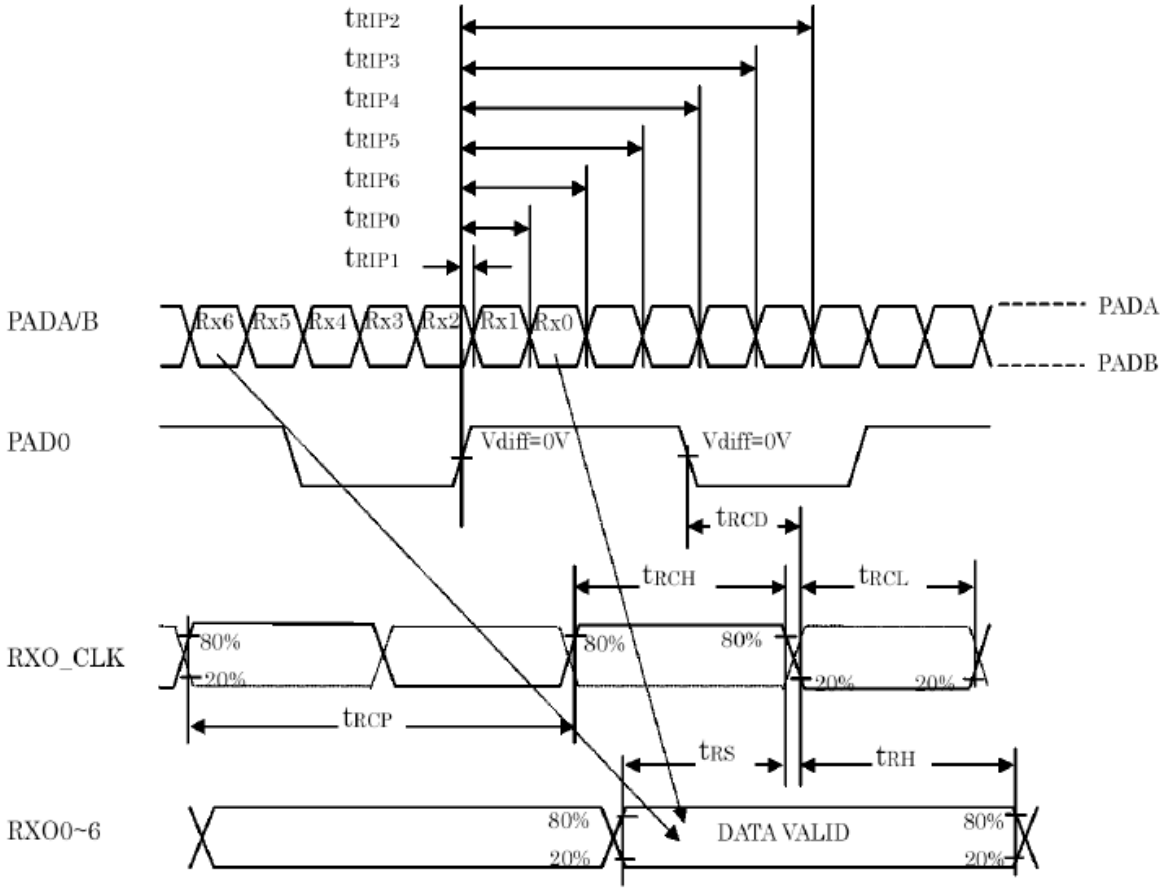
7. INPUT SIGNAL:

7-1 LVDS SIGNAL:



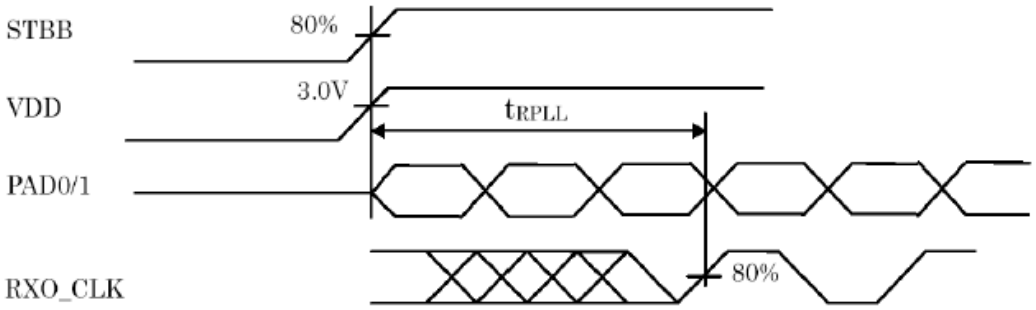
Note : R/G/B[5]s are MSBs and R/G/B[0]s are LSBs

7-2 LVDS AC Timing Diagram :

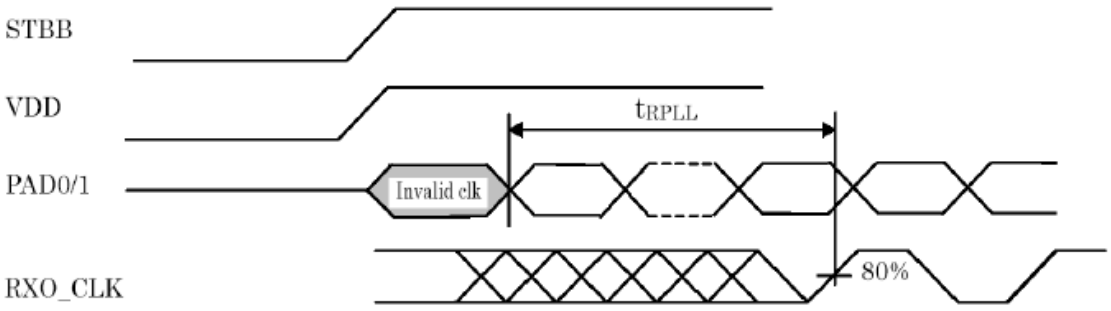


7-3 Phase Lock Loop Set Time:

(Case1)



(Case2)



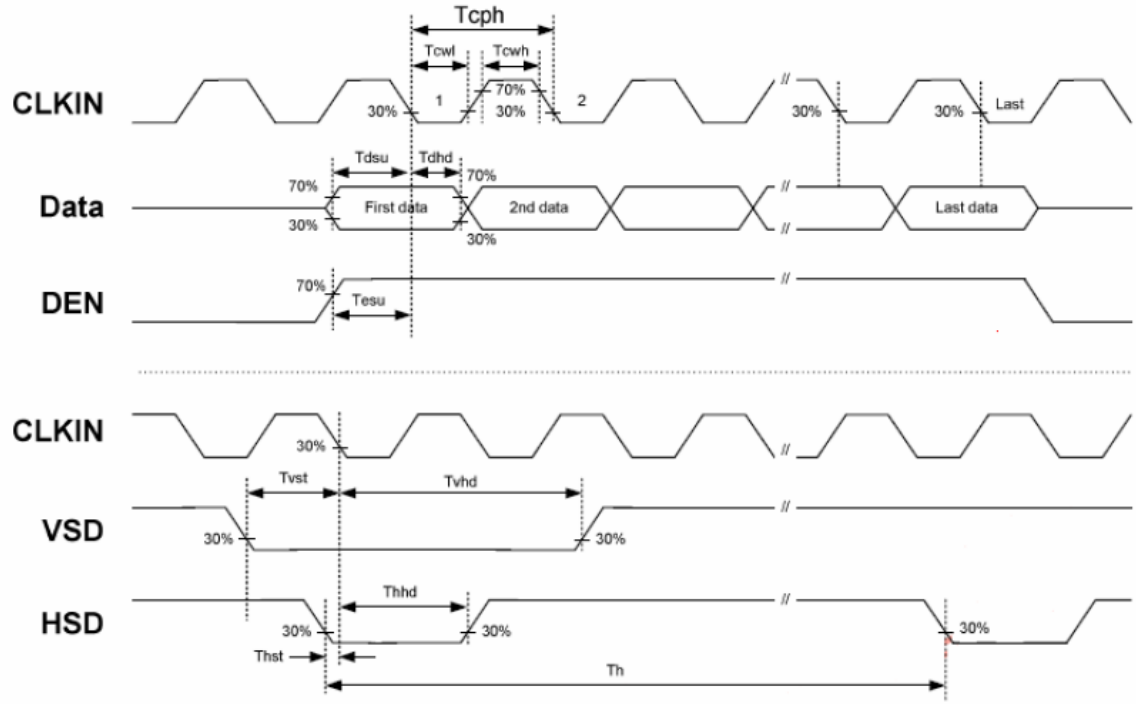
7-3 AC Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	Ns	
HS hold time	T_{hhd}	8	-	-	Ns	
VS setup time	T_{vst}	8	-	-	Ns	
VS hold time	T_{vhd}	8	-	-	Ns	
Data setup time	T_{dsu}	8	-	-	Ns	
Data hole time	T_{dhd}	8	-	-	Ns	
DE setup time	T_{esu}	8	-	-	Ns	
DE hole time	T_{ehd}	8	-	-	Ns	
VDD Power On Slew rate	T_{POR}	-	-	20	ms	
RSTB pulse width	T_{Rst}	10	-	-	us	
CLKIN cycle time	T_{coh}	20	-	-	Ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
Output stable time	T_{sst}	-	-	6	us	

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	-	600	-	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	



8. RELIABILITY TEST CONDITIONS

(Note 3)

Item	Test Conditions	Note
High Temperature Storage	Ta = 80℃ 240 hrs	Note 1,4
Low Temperature Storage	Ta = -30℃ 240 hrs	Note 1,4
High Temperature Operation	Ts = 70℃ 240 hrs	Note 2,4
Low Temperature Operation	Ta = -20℃ 240 hrs	Note1,4
Operate at High Temperature and Humidity	+40℃, 90%RH 240 hrs	
Thermal Shock	-30℃ /30 min ~ +80℃ /30 min for a total 100 cycles, Start with cold temperature and end with high temperature	
Vibration Test	Frequency range : 10 ~ 55Hz Stroke : 1.5mm Sweep : 10Hz ~ 55Hz ~ 10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms, ±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height : 60 cm 1 comer, 3 edges, 6 surfaces	
Electro Static Discharge	±2KV, Human Body Mode, 100pF/150Ω	

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 don't guarantee all of the cosmetic specification.

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

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.

9-5 Others

1. AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
2. The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.

10. OUTLINE DIMENSION