

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	AM-1024768JTZQW-A0H
APPROVED BY	
DATE	

- Preliminary Specification
 Formal Specification

Approved by	Checked by	Organized by
<i>Patrick</i>	<i>Kokai</i>	<i>Mark</i>

This Specification is subject to change without notice.

Date: 2020/08/04

AMPIRE CO., LTD.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2020/08/04	--	New Release	Mark

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 LED backlight and LED driving board.

- (1) Construction: 8" a-Si TFT active matrix, White LED Backlight.
- (2) Resolution (pixel): 1024(R.G.B) X 768
- (3) Number of the Colors : 16.7M colors (R , G , B 8 bit digital each)
- (4) LCD type :SFT with Normally Black

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	8 inch (Diagonal)	
Resolution	1024 x (RGB) x 768	dot
Pixel pitch	0.158(H) x 0.158(V)	mm
Active area	162.05(W) x 121.54(H)	mm
Surface treatment(Up Polarizer)	HC	
Color arrangement	RGB-stripe	
Contrast Ratio	1200:1	
Brightness	460	cd/m ²
Driver IC	RM51150+HX8684B	

3. ABSOLUTE MAX. RATINGS

3.1 TFT Absolute Maximum Ratings

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VCC	-0.3	5.0	V	Note1
Operation temperature	TOP	-20	70	°C	
Storage temperature	TST	-30	80	°C	
Relative Humidity Note 2	RH	--	≤95	%	Ta≤40°C
		--	≤85	%	40°C<Ta≤50°C
		--	≤55	%	50°C<Ta≤60°C
		--	≤36	%	60°C<Ta≤70°C
		--	≤24	%	70°C<Ta≤80°C
Absolute Humidity	AH	--	≤70	g/m ³	Ta>70°C

Note1: Input voltage include RxIN0±, RxIN1±, RxIN2± and RxCLKI±.

Note2: Ta means the ambient temperature.

It is necessary to limit the relative humidity to the specified temperature range.

Condensation on the module is not allowed.

4. ELECTRICAL CHARACTERISTICS

4-1 Typical Operation Conditions

AGND=GND=0V, Ta=25°C

Item	Symbol	Min	Typ.	Max	Unit	Remark
Digital Supply Voltage	DVDD	3	3.3	3.6	V	-

4-2 Power Consumption

AGND=GND=0V, Ta=25°C

Item	Symbol	Condition	Min	Typ.	Max	Unit	Remark
Digital Supply Current	IVCC	DVDD=3.3V	-	TBD	-	mA	-
Power Consumption	Pane I& Gamma		-	TBD	-	mW	-

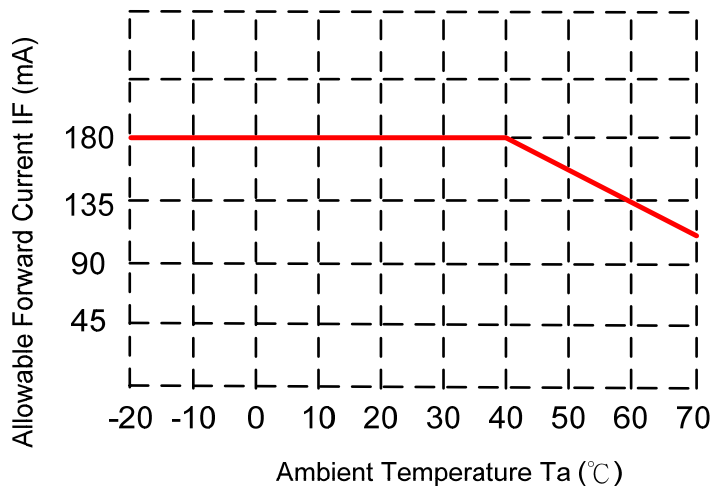
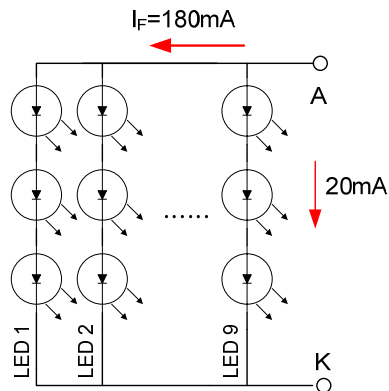
Note1: Checkered Black pattern for Typ.

4-3 LED Driving Conditions

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED Driving Voltage	VL		5.0		V	
LED Driving Current	IL		TBD		mA	
ADJ Input Voltage			3.3			
LED voltage	V_F	8.4	9.3	10.2	V	Note(1)
LED forward Current	I_F	--	180	225	mA	Ta=25°C
Power Consumption	W_{BL}	--	1.674	2.295	W	
LED life time	--	20	30	--	kHr	$I_F=20mA$

Note (1) The constant current source is needed for white LED back-light driving.

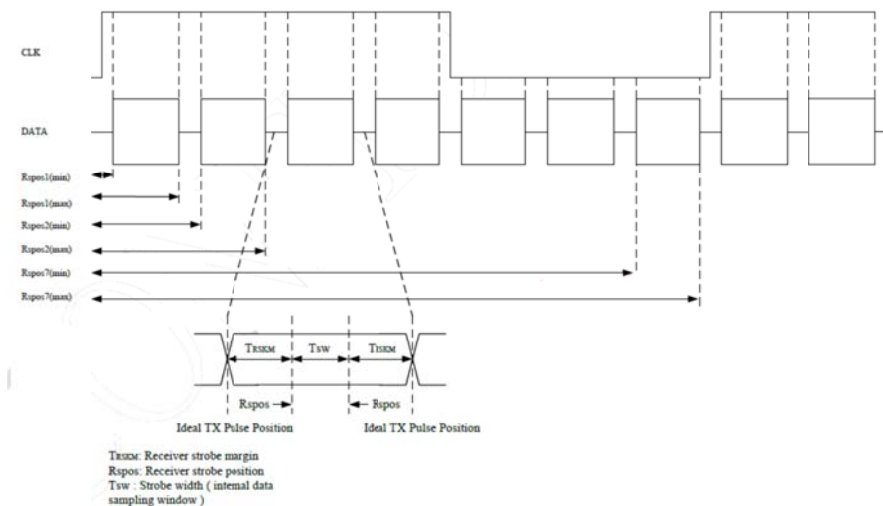
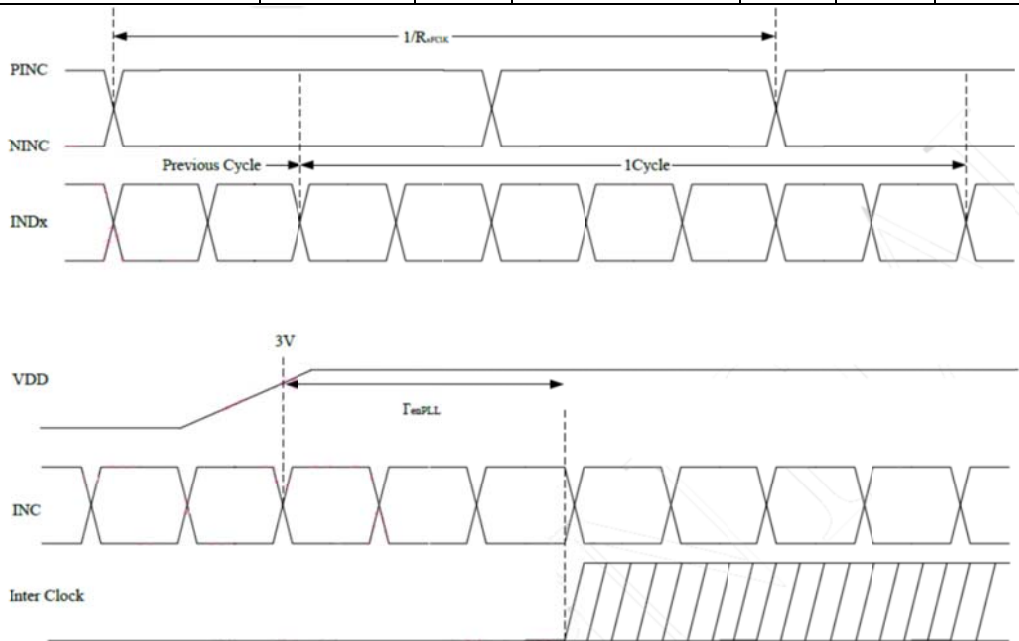
Note (2) Brightness to be decreased to 50% of the initial value. Ta=25°C



5. Timing Chart

5.1 AC Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Clock Frequency	R_{xFCLK}	20	-	71	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	$ VID =400mV$, $R_{XVCM}=1.2V$ $R_{XFCLK}=71MHz$
Clock high time	T_{LVCH}	-	$4/(7 * R_{xFCLK})$	-	ns	
Clock low time	T_{LVCL}	-	$3/(7 * R_{xFCLK})$	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	

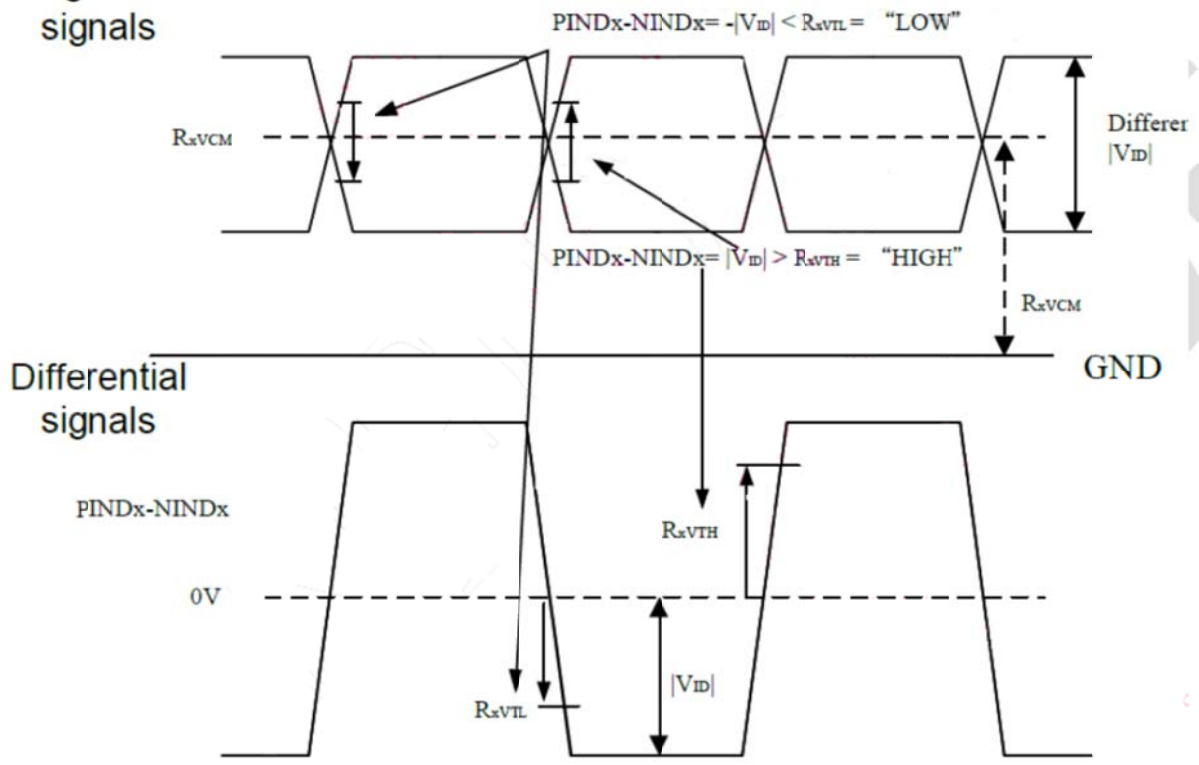


Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Modulation Frequency	SSC_{MF}	23	-	93	kHz	
Modulation Rate	SSC_{MR}	-	-	+/-3	%	LVDS spread clock=71MHz center

5.2 DC Electrical Characteristics

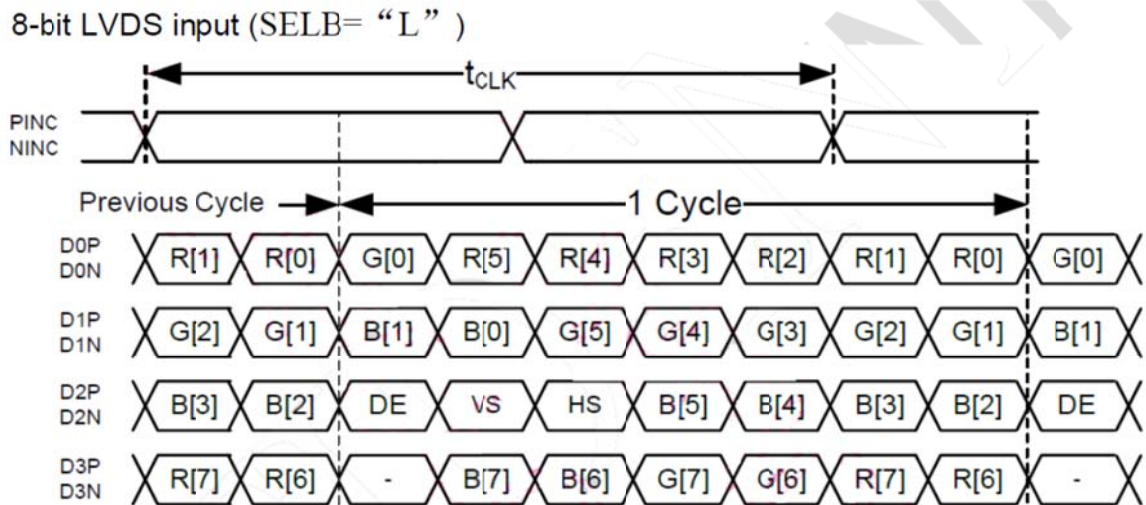
Parameter	Symbol	Min	Typ	Max	Unit	Remark
Differential input high Threshold voltage	R_{XVTH}	-	-	0.2	V	$R_{XVCM}=1.2V$
Differential input Low Threshold voltage	R_{XVTL}	-0.2	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	$VDD-1.2$	V	
Differential input common mode voltage	R_{XVCM}	$ V_{ID} /2$	-	$VDD-1.2- V_{ID} /2$	V	
Differential input voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage Current	$R_{V_{XliZ}}$	-10	-	10	μA	
LVDS Digital Operating Current	I_{ddlvds}	-	15	30	mA	Fclk=65MHz,VDD=3.3V
LVDS Digital Stand-by Current	I_{stlvds}	-	10	50	μA	Clock & all functions are stopped

Single-end signals



5.3 Data input format

5.3.1 LVDS data mapping



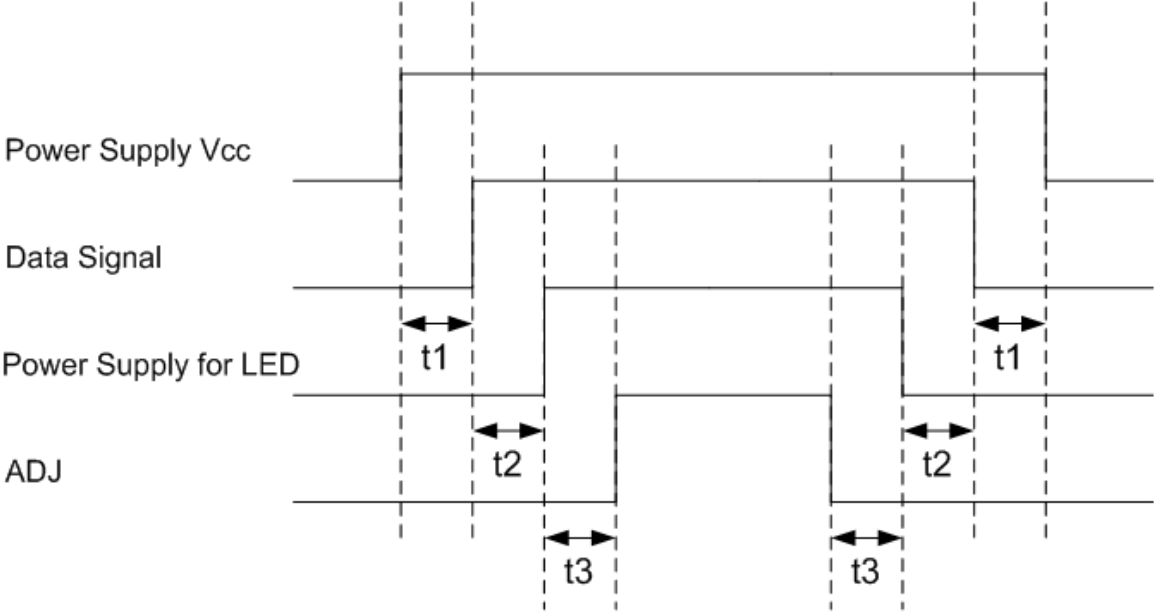
5.3.2 Parallel RGB input timing table

- DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	52	65	71	MHz
Horizontal Display Area	thd	1024			DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	768			T_H
VSD period	t_v	778	806	845	T_H
VSD Blanking	tvbp+tvfp	10	38	77	T_H

DE mode(1024x768)

5.4 Power ON/OFF Sequence



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

Note : Data Signal includes LVDS.

6. Optical Specifications

6.1 TFT Optical Characteristics

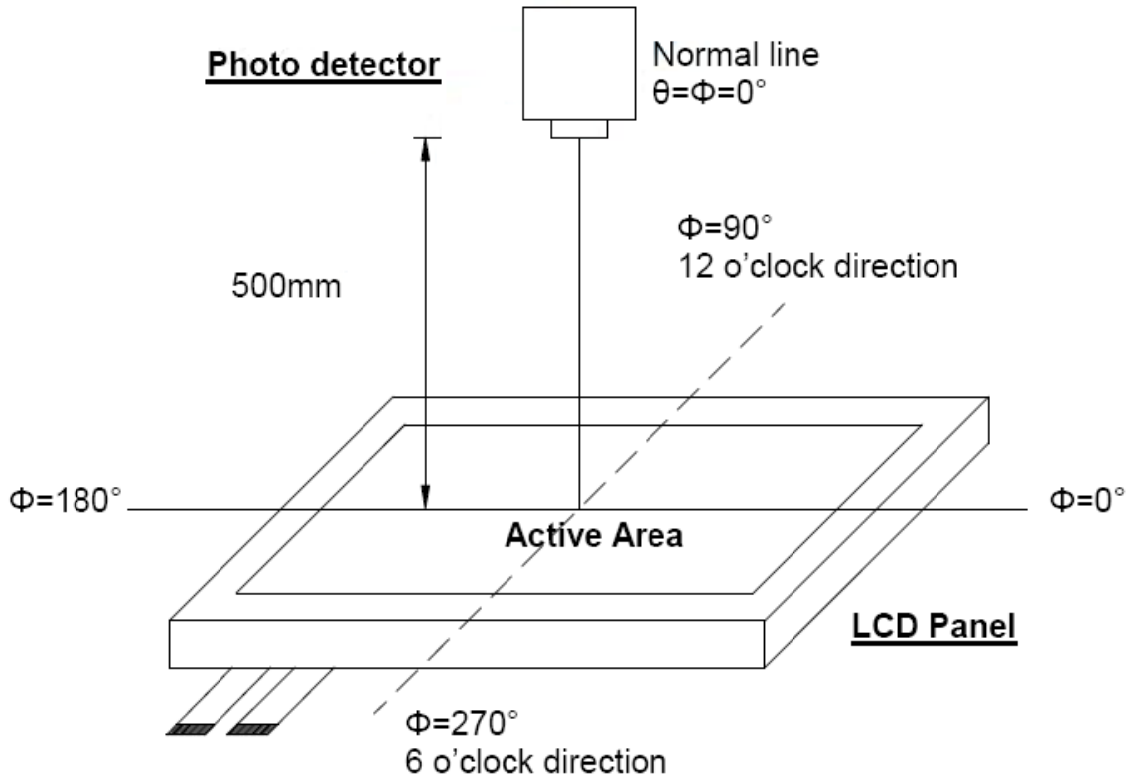
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	$CR \geq 10$	75	85	-	Degree	Note 2
	θB		75	85	-		
	θL		75	85	-		
	θR		75	85	-		
Contrast Ratio	CR	$\theta = 0^\circ$	1500	1800	-		Left/right 0° Top/bottom 5°
Response Time	T_{ON}	$25^\circ C$	-	35	45	ms	Note1 Note4
	T_{OFF}						
Chromaticity	White	x	-0.05	0.310	+0.05		Note5 Note1
		y		0.329			
	Red	x		0.587			
		y		0.330			
	Green	x		0.358			
		y		0.586			
	Blue	x		0.156			
		y		0.098			
Uniformity	U		80	85	-	%	Note1、Note6
NTSC			45	50	-	%	
Luminance	L		400	460	-	cd/m ²	Note7

Test Conditions:

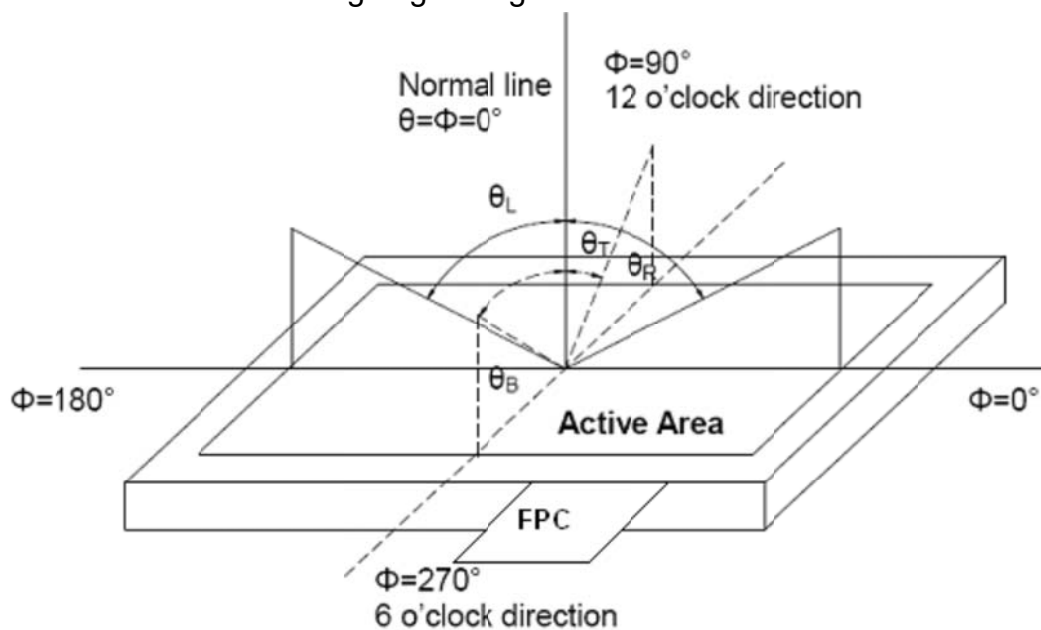
1. $I_F = 180mA$, the ambient temperature is $25^\circ C$.
2. The test systems refer to Note 1 and Note2.

Note 1 : 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.)

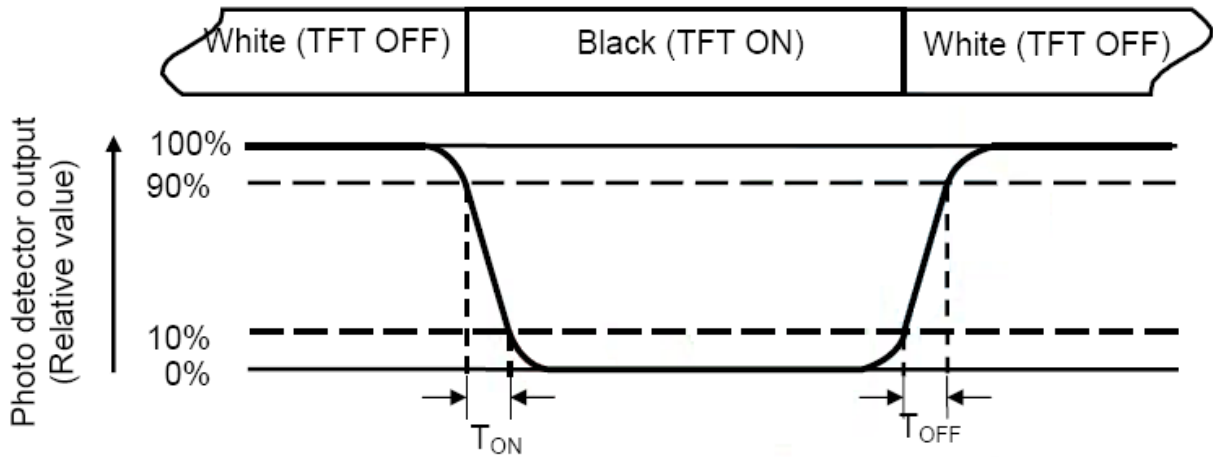


Note 2 : Definition of viewing angle range



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.

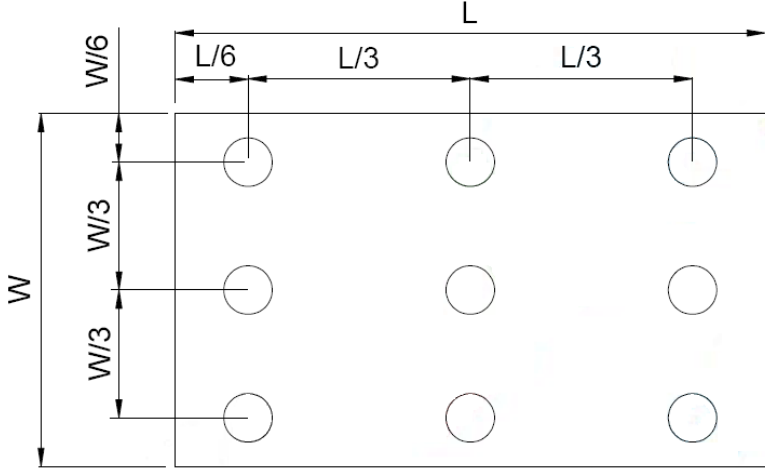
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

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.

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

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.

7. INTERFACE

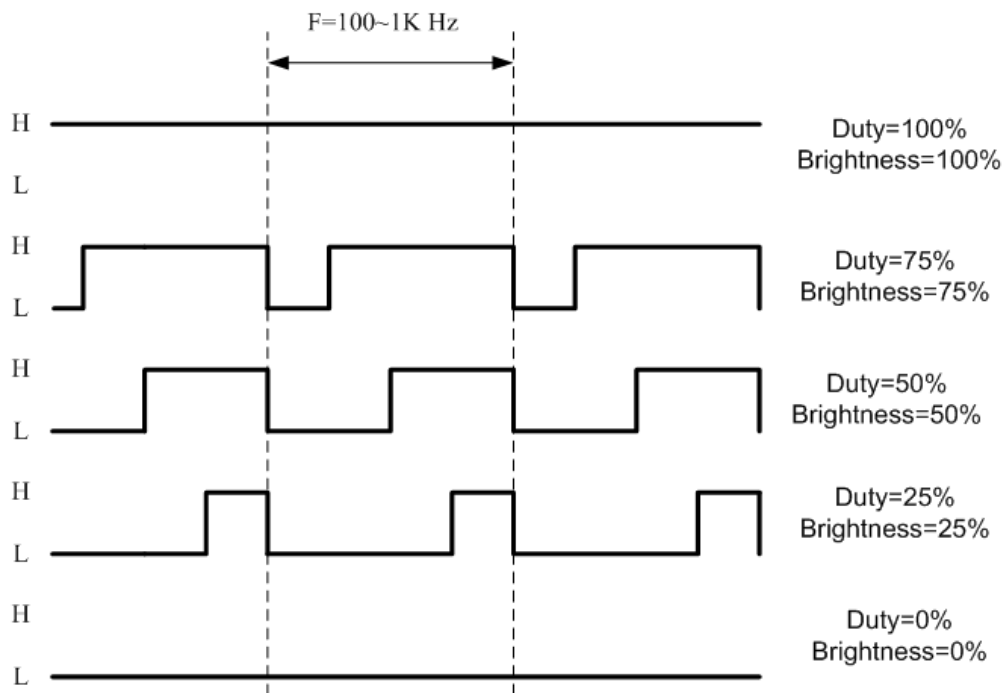
Pin No	Symbol	I/O	Function	Remark
1	VDD	P	Power Voltage 3.3V	
2	VDD	P	Power Voltage 3.3V	
3	GND	P	Ground	
4	GND	P	Ground	
5	RXIN0-	I	- LVDS differential data input	
6	RXIN0+	I	+ LVDS differential data input	R[0]~G[0]
7	GND	P	Ground	
8	RXIN1-	I	- LVDS differential data input	
9	RXIN1+	I	+ LVDS differential data input	G[1]~B[1]
10	GND	P	Ground	
11	RXIN2-	I	- LVDS differential data input	
12	RXIN2+	I	+ LVDS differential data input	DE/VS/HS/ B[2]~B[5]
13	GND	P	Ground	
14	RXCLKIN-	I	- LVDS differential clock input	
15	RXCLKIN+	I	+ LVDS differential clock input	
16	GND	P	Ground	
17	RXIN3-	I	- LVDS differential data input	
18	RXIN3+	I	+ LVDS differential data input	R[6]/R[7]/ G[6]/G[7]/ B[6]/ B[7]
19	VLED	P	LED driving voltage (5V)	
20	LEDADJ	I	LED PWM signal	

I/O----definition, I----Input, O----Output, P----Power,

NOTE :

(1) Pin20: 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	V_{IH}	2V	--	V_{LED} (5.0V)	V
ADJ signal logic level Low	V_{IL}	0	--	0.5	V



8. RELIABILITY TEST CONDITIONS

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=240 hrs	
Low Temperature Operation	-20±3°C , t=240 hrs	
High Temperature Storage	80±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Thermal Shock Test	-30°C ~ 80°C 30 min. ~ 30 min. (1 cycle) Total 100cycle	1,2
Storage Humidity Test	60 °C, Humidity 90%, 240 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 50 ~ 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).

Note 3 : The module shouldn't be tested more than one condition, and all the test conditions are independent.

Note 4 : All the reliability tests should be done without protective film on the module.

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 the initial value.

9. General Precautions

9.1 Handling Precautions

1. Display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.
3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:
 - Isopropyl alcohol
 - Ethyl alcoholSolvents other than those mentioned above may damage the polarizer. Especially, do not use the following:
 - Water
 - Ketone
 - Aromatic solvents
6. Do not attempt to disassemble the LCD Module.
7. If the logic circuit power is off, do not apply the input signals.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - a. Be sure to ground the body when handling the LCD Modules.
 - b. Tools required for assembly, such as soldering irons, must be properly ground.
 - c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
 - d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

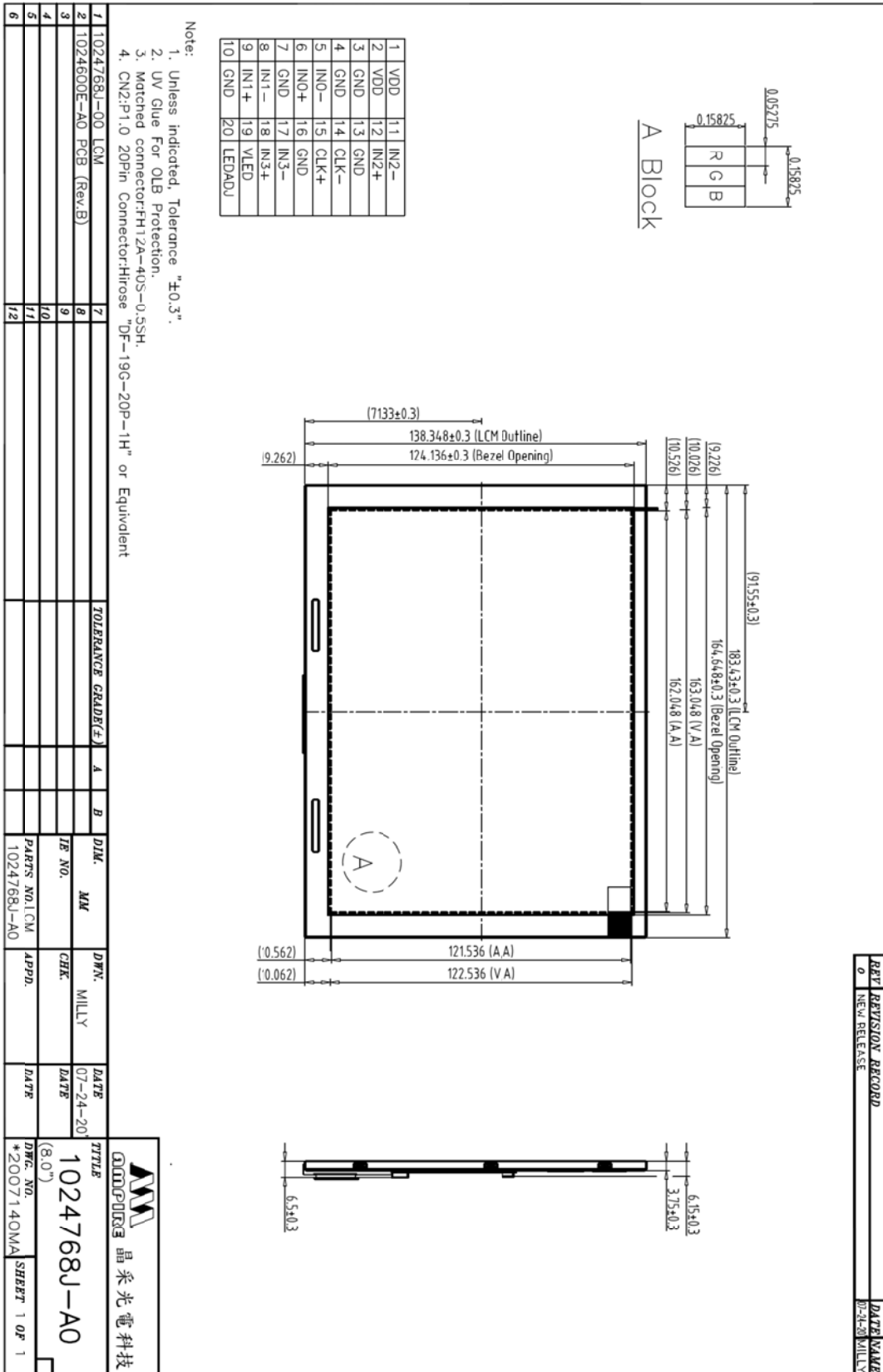
9.2 Storage precautions

1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
2. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature : 0°C ~ 40°C
Relatively humidity: ≤80%
3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.3 General Precautions

1. 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.
2. The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

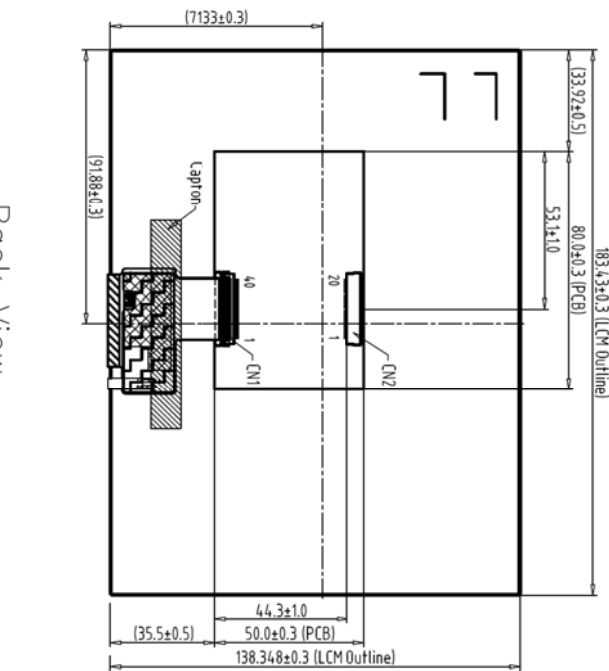
10. OUTLINE DIMENSION



REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	07-24-20	MILLY

AMPIRE 晶采光電科技
TITLE 1024768J-A0
 (8.0")
DWG. NO. *200714QMA
SHEET 1 OF 1

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	20-24-20	MILLY



Back View

1	VDD	11	IN2-
2	VDU	12	IN2+
3	GND	13	GND
4	GND	14	CLK-
5	INO-	15	CLK+
6	INO+	16	GND
7	GND	17	IN3-
8	IN1-	18	IN3+
9	IN1+	19	ILED
10	GND	20	LEDADJ

- Note:
1. Unless indicated, Tolerance "±0.3".
 2. UV Glue For OLB Protection.
 3. Matched connector: FH12A-40S-0.5SH.
 4. CN2: P1.0 20Pin Connector: Hirose "DF-19G-20P-1H" or Equivalent

1	1024768J-00 LCM	7	TOLERANCE GRADE(F)	A	B	DN.	MM	DN.	MILLY	DATE	TITLE	DRG. NO.	SHEET 1 OF 1
2	1024600E-A0 PCB (Rev.B)	8				IP NO.	CHK.	DATE		07-24-20	1024768J-A0	*2007141MA	
3		9											
4		10											
5		11											
6		12											

