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-1920720C1TZQW-00H**
Approved by	
Date	

☐ **Preliminary Specification**
☑ **Formal Specification**

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Approved by	Checked by	Organized by
Patrick	Simon	Tank

*This specification is subject to change without notice.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2020/04/16	--	New Release	Tank

1.0 General Descriptions

1.1 Introduction

The LCM is a color active matrix Thin Film Transistor (TFT) Liquid Crystal Display (LCD) module that uses amorphous silicon TFT as an active switching device. This module has a 10.25 inch diagonally measured active area with FHD resolutions (1920 horizontal by 720 vertical pixel array).

1.2 Features

- Supported FHD Resolution
- LVDS interface
- Wide View Angle

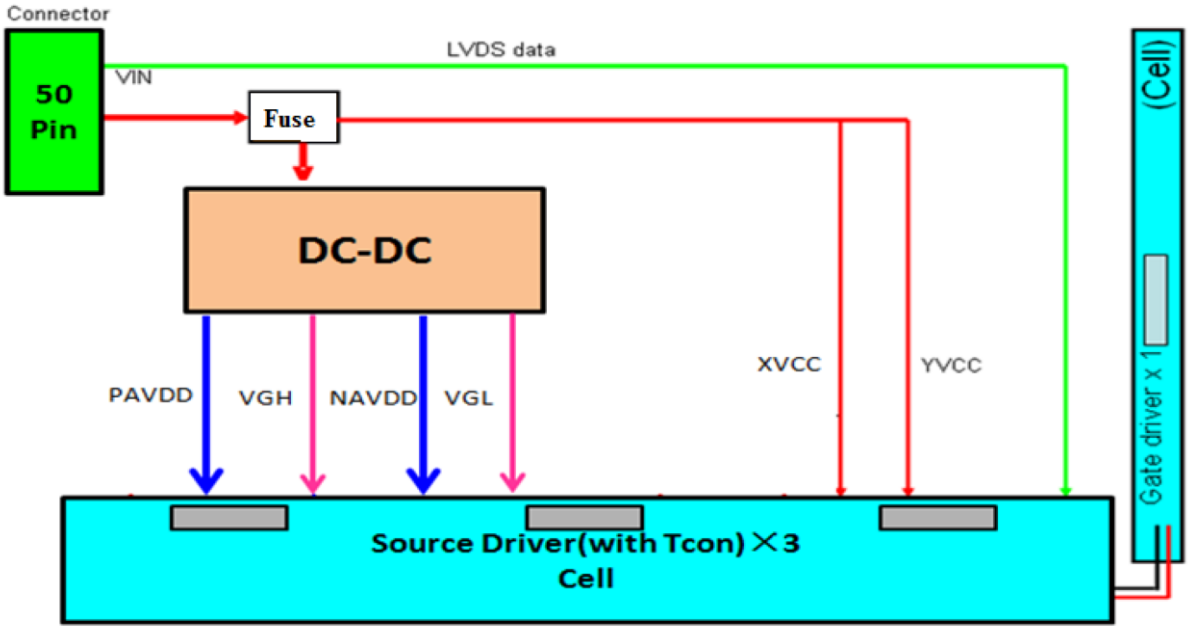
1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	10.25	Inch
Active Area	243.65 (H) × 91.37 (V)	mm
Pixel Format	1920 (H) x RGB x 720 (V)	-
Pixel Pitch	0.1269 (H) X 0.1269 (V)	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally Black	-
White Luminance	800 (Typ.)	cd /m2
Contrast Ratio	900 : 1 (Typ.)	-
Outline Dimensions (without Screw column)	261.14(Typ.) x 109.3(Typ.) x 8.521(Max.)	mm
Support Color	16.7M (8bits)	-
Electrical Interface	LVDS	
Surface Treatment	HC, 3H	

1.4 Functional Block Diagram

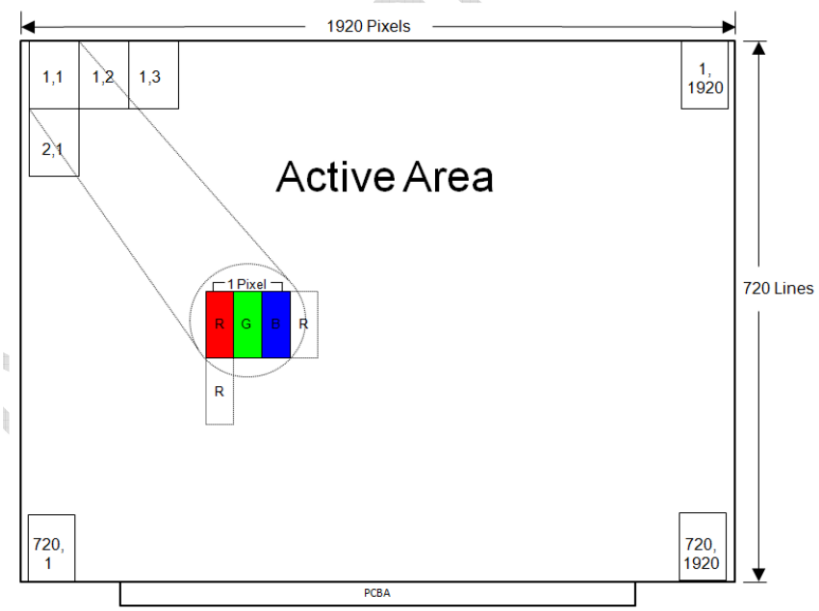
The functional block diagram of the LCD module is shown below.

Figure 1 Block Diagram



1.5 Pixel Mapping

Figure 2 Pixel Mapping



2.0 Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Logic Supply Voltage	LCD_VCC	-0.3	+4.0	V	
Operation Temperature	TOP	-30	85	℃	
Storage Temperature	TST	-40	90	℃	

Note(1) Permanent damage may occur to the LCD module if you operate beyond this specification. Functional operation should be restricted to the conditions which described under normal operating conditions.

Note(2) Ta =25±2℃

3.0 Electrical Specifications

3.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LCD Drive Voltage	VDD	3	3.3	3.6	V	
Current of power supply	IDD	--	--	257	mA	VDD=3.3V White pattern
VDD Power	PDD	--	--	925.2	mW	VDD=3.3V White pattern
Inrush current	I_{RUSH}	-	-	T.B.D	A	Note (2)

Note(1) The supply voltage is measured and specified at the interface connector of LCM.

Note(2) Inrush current test circuit and rising time setting (power on)

3.2 Switching Characteristics for LVDS Receiver

The built-in LVDS receiver is compatible with (ANSI/TIA/TIA-644) standard.

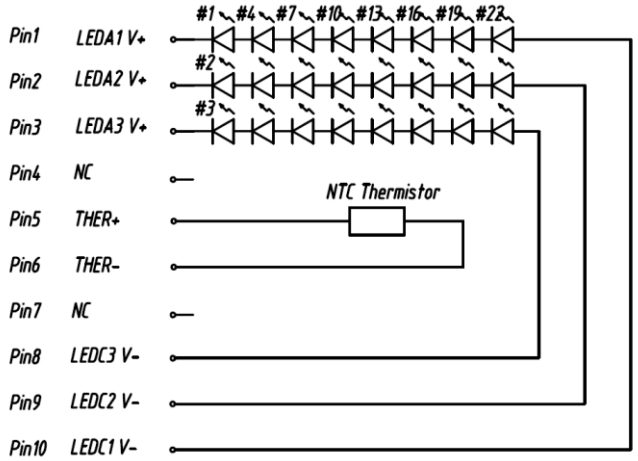
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	--	--	300	mV	V_{CM}=1.2V
Differential Input Low Threshold	Vtl	-300	--	--	mV	
Magnitude Differential Input Voltage	$\|V_{ID}\|$	300	--	600	mV	
Input Voltage Range (Singled-end)	V_{INLV}	0.7	--	1.7	V	
Differential Input leakage Voltage	$\|V_{leak}\|$	-10	--	10	mV	
Common Mode Voltage	V_{CM}	1.0	1.2	1.4	V	

3.3 LED Driving Conditions

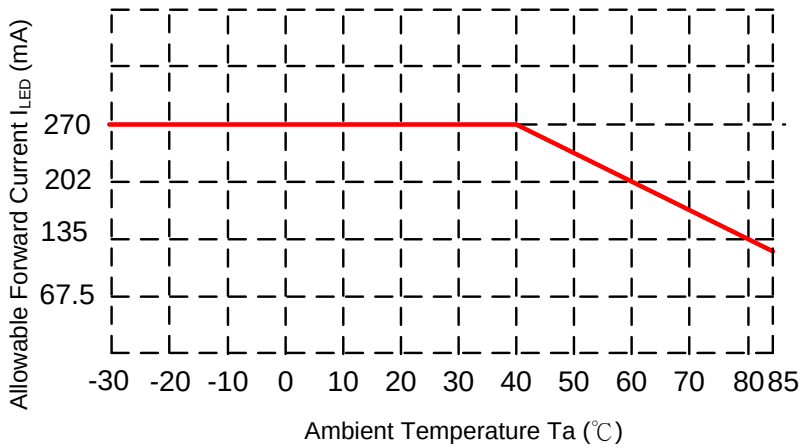
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED Backlight Voltage	V_{LED}	--	--	26.4	V	Ta=25℃
LED Backlight Current	I_{LED}	--	270	--	mA	Ta=25℃
LED Forward Voltage	V_F	--	--	3.3	V	Ta=25℃
LED Forward Current	I_F	--	90	--	mA	Ta=25℃
LED Life Time	-	10K	--	--	Hour	Ta=25℃ Note (1)

Note(1) The life time is determined as the sum of the lighting time till the luminance of LCD at the typical LED current reducing to 50% of the minimum value under normal operating condition.

Note(2) Definition of V_{LED} and I_{LED}: $V_{LED} = V_F \times 8$, $I_{LED} = I_F \times 3$



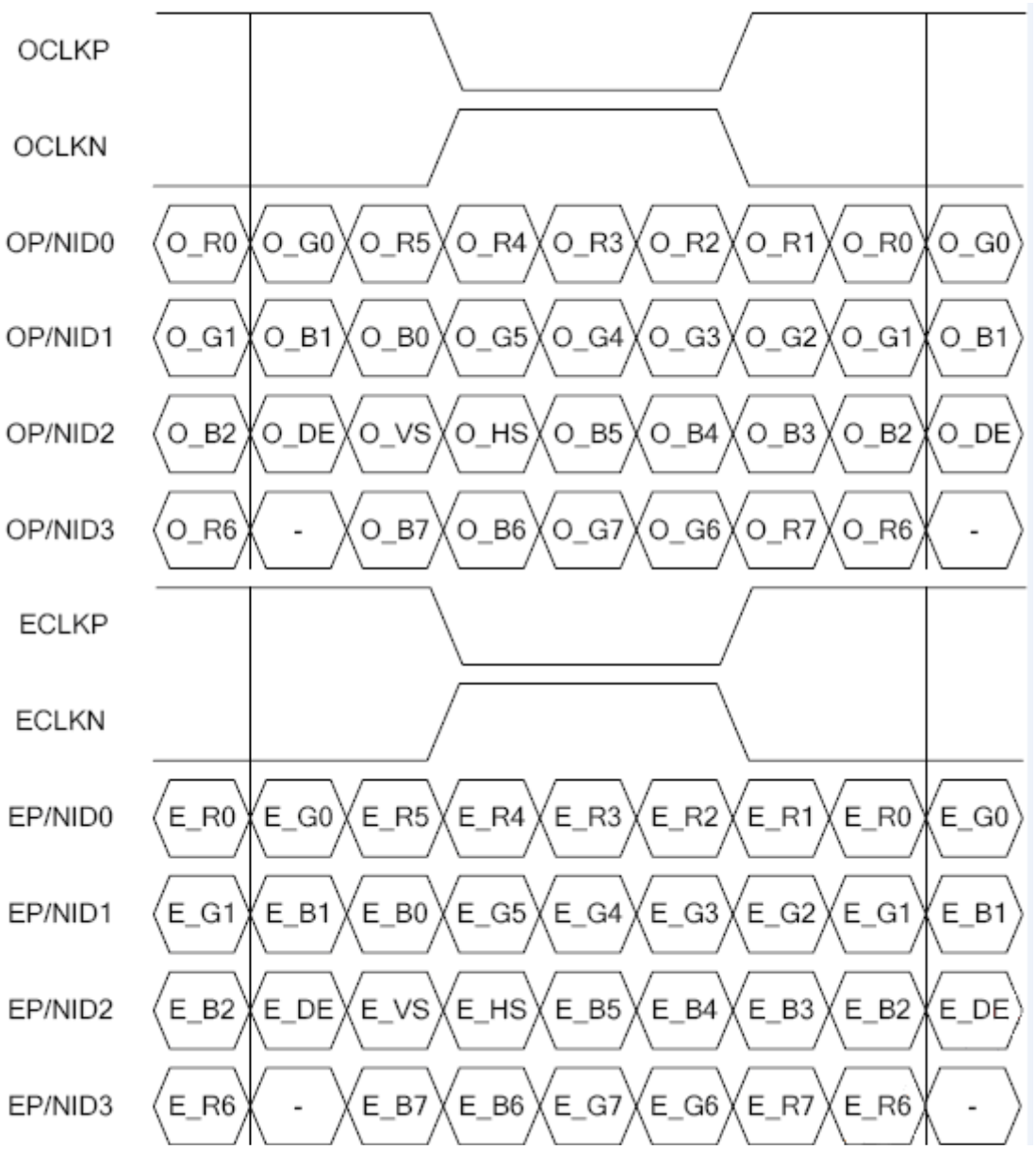
When LCM is operated over 40℃ ambient temperature, the I_F should follow :



4.0 Bit LVDS input signal

4.1 8 Bit LVDS input

Single 8 bit LVDS input



4.2 Interface Timing

Table 7 Interface Timings

Parameter	Symbol	Min.	Typ.	Max.	Unit
LVDS Clock Frequency	Fclk	-	82	-	MHz
H Total Time	HT	-	2,044	-	Clocks
H Active Time	HA		1,920		
V Total Time	VT	-	729	-	Lines
V Active Time	VA		720		
Frame Rate	FV	-	55	-	Hz

Note1：single link LVDS

Note2：All reliabilities are specified for timing specification based on refresh rate of 55Hz.

5.0 Optical Specifications

The optical characteristics are measured under stable conditions as following notes

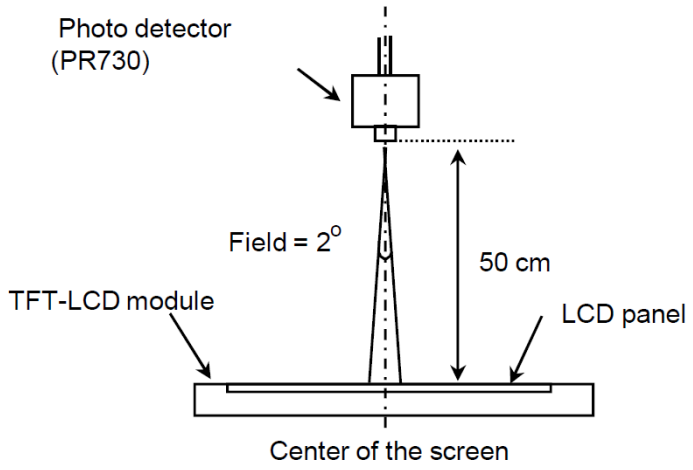
Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle （CR>10）	Horizontal	θ_L	80	85	-	degree	Note1
		θ_R	80	85	-		
	Vertical	θ_T	80	85	-		
		θ_B	80	85	-		
Contrast Ratio	Center		700	900	-	-	Note2
Response Time	Rising + Falling		-	20	30	ms	Note5
Color Chromaticity (CIE1931)	Red	x	Typ. -0.05	0.636	Typ. +0.05	-	Note3
	Red	y		0.322		-	
	Green	x		0.320		-	
	Green	y		0.632		-	
	Blue	x		0.147		-	
	Blue	y		0.078		-	
	White	x		0.307		-	
	White	y		0.335		-	
White Luminance	Center		600	800	-	cd/m^2	Note4
Luminance Uniformity	9Points		75	80	-	%	Note4

Note(1) Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure1).

Note(2) Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state (see Figure1). Luminance Contrast Ratio (CR) is defined mathematically as CR = Luminance when displaying a white raster / Luminance when displaying a black raster.

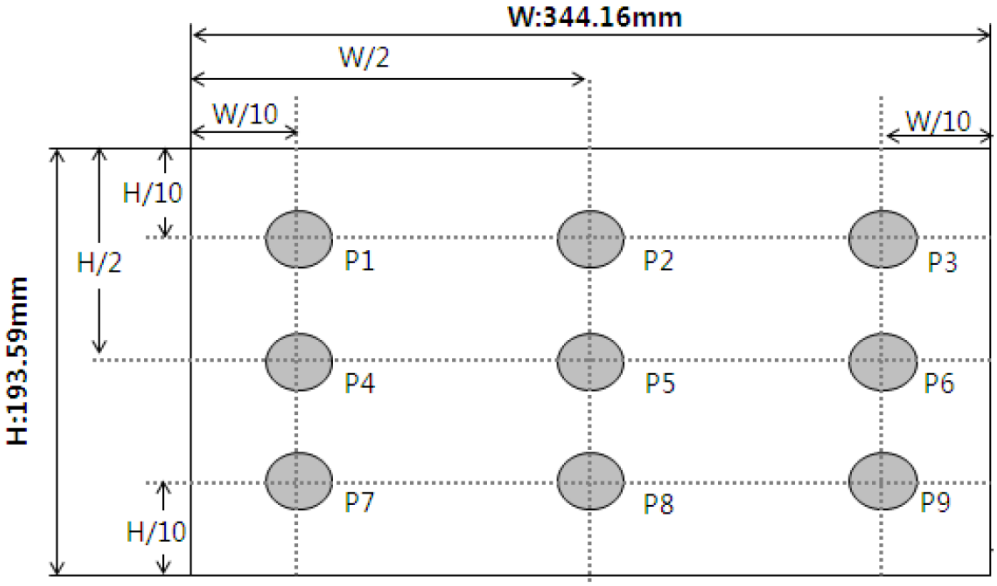
Note(3) Reference only / Standard Front Surface Treatment Measured with green cover glass. The color chromaticity coordinates specified in Table 4 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

Figure 1. Measurement Set Up



Optical characteristics measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (9 points)



Center Luminance of white is defined as luminance values of center 9 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.

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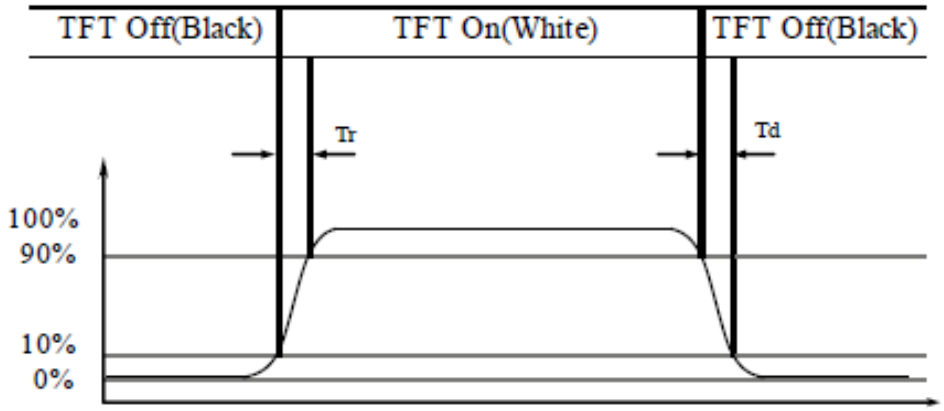
Figure 3. Response Time Testing



Note 5.
The electro-optical response time measurements shall be made as Figure 4 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

6.0 Interface Connections

6.1 Electrical Interface Connector: JUSTCONN/101049-205050

Pin #	Signal Name	Description
1	GND	Power Ground
2	GND	Power Ground
3	GND	Power Ground
4	VDD	Power 3.3V+/-0.3V
5	VDD	Power 3.3V+/-0.3V
6	VDD	Power 3.3V+/-0.3V
7	VDD	Power 3.3V+/-0.3V
8	GND	Power Ground
9	NC	No connection
10	NC	No connection
11	NC	No connection
12	GND	Power Ground
13	OLV0N	Odd LVDS Data input 0-
14	OLV0P	Odd LVDS Data input 0+
15	GND	Power Ground
16	OLV1N	Odd LVDS Data input 1-
17	OLV1P	Odd LVDS Data input 1+
18	GND	Power Ground
19	OLV2N	Odd LVDS Data input 2-
20	OLV2P	Odd LVDS Data input 2+
21	GND	Power Ground
22	OLVCKN	Odd LVDS Clock input -
23	OLVCKP	Odd LVDS Clock input +
24	GND	Power Ground
25	OLV3N	Odd LVDS Data input 3-
26	OLV3P	Odd LVDS Data input 3+
27	GND	Power Ground
28	ELV0N	Even LVDS Data input 0-
29	ELV0P	Even LVDS Data input 0+
30	GND	Power Ground

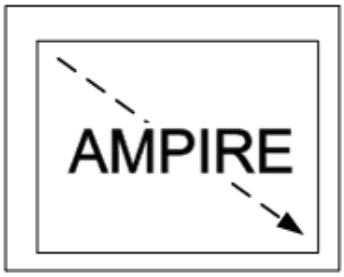
31	ELV1N	Even LVDS Data input 1-
32	ELV1P	Even LVDS Data input 1+
33	GND	Power Ground
34	ELV2N	Even LVDS Data input 2-
35	ELV2P	Even LVDS Data input 2+
36	GND	Power Ground
37	ELVCKN	Even LVDS Clock input -
38	ELVCKP	Even LVDS Clock input +
39	GND	Power Ground
40	ELV3N	Even LVDS Data input 3-
41	ELV3P	Even LVDS Data input 3+
42	GND	Power Ground
43	RESET	Global reset pin, active low
44	STBYB	Standby mode setting pin, active low
45	SHLR	Horizontal shift direction detection, Set High or Low, Don't floating (Note.)
46	UPDN	Vertical shift direction detection, Set High or Low, Don't floating (Note.)
47	Fail_T	Output for fail detection If LVDS/Power/Gate fail is detected, Then this signal will have different output to note.
48	GND	Power Ground
49	BIST	LCD Panel Self-Test Enable, (Keep GND If not use.)
50	NC	No connection

Note(1): Fail_T signal has a normal voltage of 0V, an abnormal voltage of 3.3V when LVDS/Power/Gate fail is detected.

Note(2):

SHLR: High (2.6~3.6V), UPDN: High (2.6~3.6V) (Default)

SHLR: H, UPDN: H



SHLR: High (2.6~3.6V), UPDN: Low (0~0.5V)

SHLR: H, UPDN: L

SHLR: Low (0~0.5V), UPDN: High (2.6~3.6V)

SHLR: L, UPDN: H

SHLR: Low (0~0.5V), UPDN: Low (0~0.5V)

SHLR: L, UPDN: L

6.2 LED FPC Pin Assignment

Pin #	Signal Name	Description
1	ANODE1	LED Power Supply voltage
2	ANODE2	LED Power Supply voltage
3	ANODE3	LED Power Supply voltage
4	NC	No connection
5	THERMISTORS+	Thermistors
6	THERMISTORS-	Thermistors
7	NC	No connection
8	CATHODE3	LED Cathode (Negative)
9	CATHODE2	LED Cathode (Negative)
10	CATHODE1	LED Cathode (Negative)

7.0 Reliability Test

The reliability test items and its conditions are shown below.

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	90±3°C , t=240 hrs	1,2
Low Temperature Storage	-40±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	+50°C, 90% RH , 240 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 8~33.3 Hz/1min Amplitude : 1.3mm Test direction : X.Y.Z/3 axes Duration : 15 min/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 over one condition, and all the tests are independent.

Note(4) 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 the initial value.

8.0General Precaution

8.1 Disassembling or Modification

(1) Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. AMPIRE does not warrant the module, if customers disassemble or modify the module.

8.2 Breakage of LCD Panel

(1) If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
(2) If liquid crystal contacts mouth or eyes, rinse out with water immediately.
(3) If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
Handle carefully with chips of glass that may cause injury, when the glass is broken.

8.3 Electric Shock

(1) Disconnect power supply before handling LCD module.
(2) Do not pull or fold the LED cable.
(3) Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

8.4 Absolute Maximum Ratings and Power Protection Circuit

(1) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
(2) Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
(3) It's recommended to employ protection circuit for power supply.

8.5 Operation

(1) Do not touch, push or rub the polarizer with anything harder than HB pencil lead.
(2) Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
(3) When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

(4) Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may cause deformation or color fading.
(5) When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene or other adequate solvent.

8.6 Mechanism

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

8.7 Static Electricity

(1) Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
(2) Because LCD modules use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

8.8 Strong Light Exposure

(1) The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

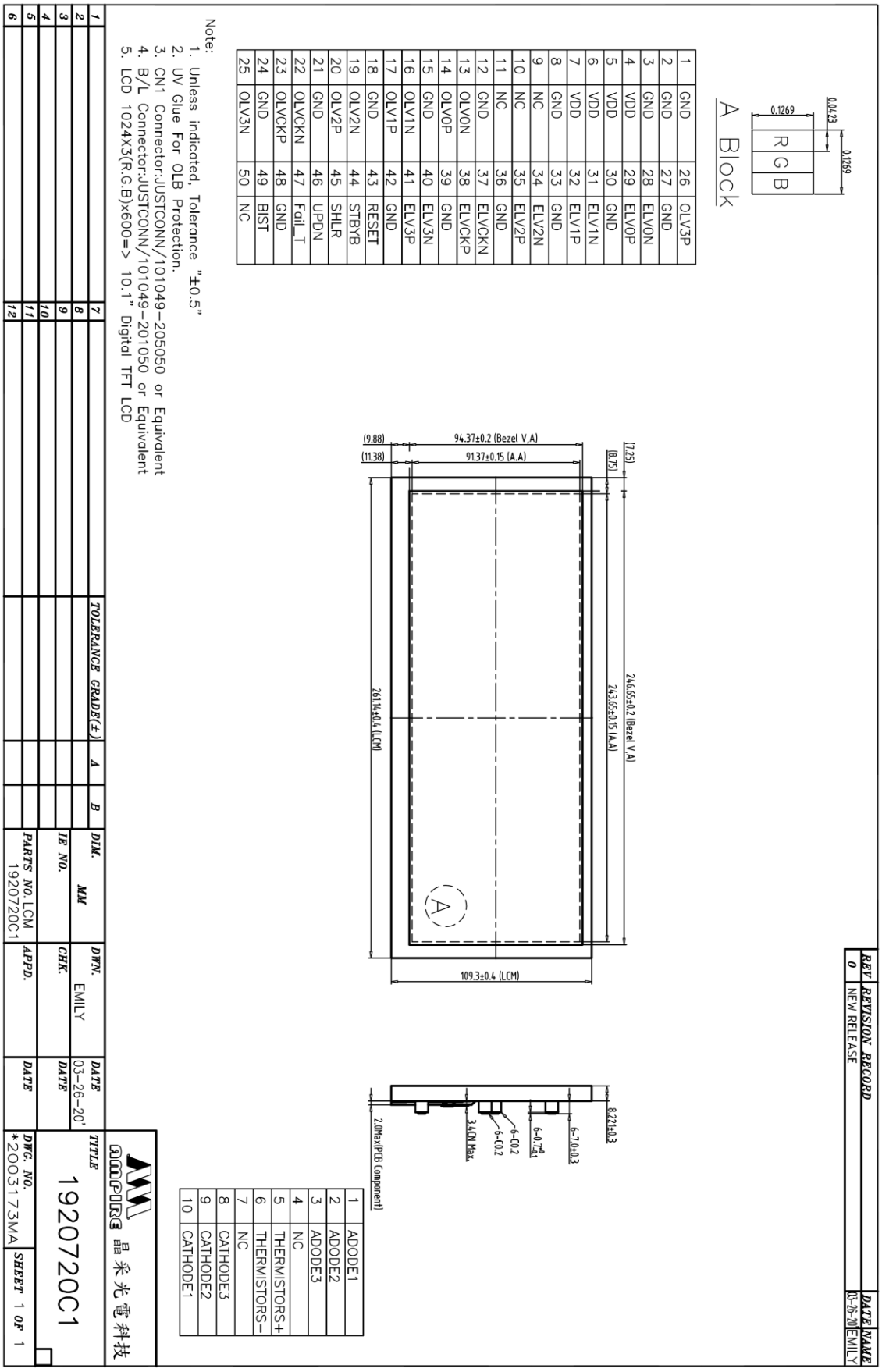
8.9 Disposal

(1) When disposing LCD module, obey the local environmental regulations.

8.10 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.

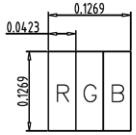
9.0 Outline Dimension



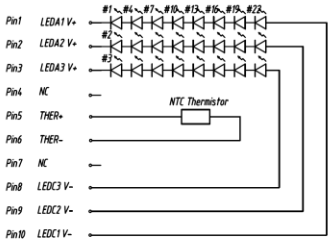
1	GND	26	OLV3P
2	GND	27	GND
3	GND	28	ELV0N
4	VDD	29	ELV0P
5	VDD	30	GND
6	VDD	31	ELV1N
7	VDD	32	ELV1P
8	GND	33	GND
9	NC	34	ELV2N
10	NC	35	ELV2P
11	NC	36	GND
12	GND	37	ELVCKN
13	OLV0N	38	ELVCKP
14	OLV0P	39	GND
15	GND	40	ELV3N
16	OLV1N	41	ELV3P
17	OLV1P	42	GND
18	GND	43	RESET
19	OLV2N	44	STBYB
20	OLV2P	45	SHLR
21	GND	46	UPDN
22	OLVCKN	47	Fail_T
23	OLVCKP	48	GND
24	GND	49	BIST
25	OLV3N	50	NC

1	ADODE1
2	ADODE2
3	ADODE3
4	NC
5	THERMISTORS+
6	THERMISTORS-
7	NC
8	CATHODE3
9	CATHODE2
10	CATHODE1

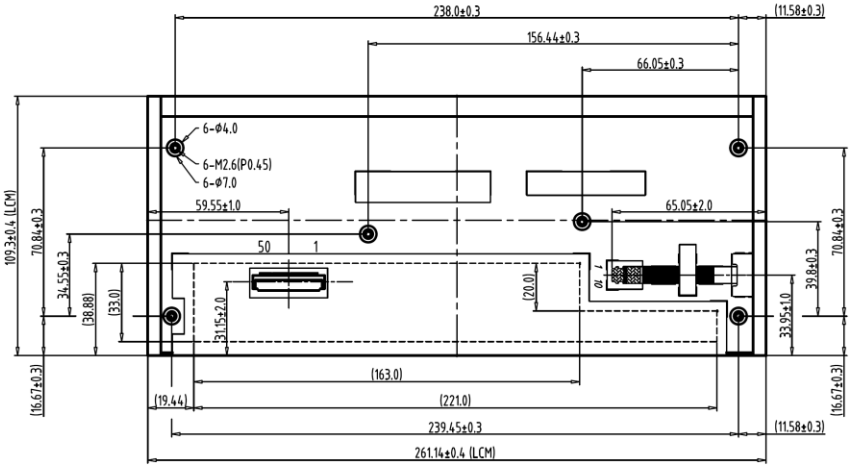
REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	03-26-20	EMILY



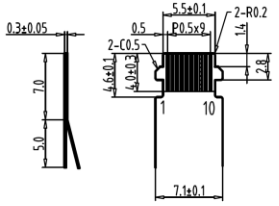
A Block



1	GND	26	OLV3P
2	GND	27	GND
3	GND	28	ELV0N
4	VDD	29	ELV0P
5	VDD	30	GND
6	VDD	31	ELV1N
7	VDD	32	ELV1P
8	GND	33	GND
9	NC	34	ELV2N
10	NC	35	ELV2P
11	NC	36	GND
12	GND	37	ELVCKN
13	OLV0N	38	ELVCKP
14	OLV0P	39	GND
15	GND	40	ELV3N
16	OLV1N	41	ELV3P
17	OLV1P	42	GND
18	GND	43	RESET
19	OLV2N	44	STBYB
20	OLV2P	45	SHLR
21	GND	46	UPDN
22	OLVCKN	47	Fail_T
23	OLVCKP	48	GND
24	GND	49	BIST
25	OLV3N	50	NC



Back View



B Block

1	ADODE1
2	ADODE2
3	ADODE3
4	NC
5	THERMISTORS+
6	THERMISTORS−
7	NC
8	CATHODE3
9	CATHODE2
10	CATHODE1

Note:
1. Unless indicated, Tolerance "±0.5"
2. UV Glue For OLB Protection.
3. CN1 Connector:JUSTCONN/101049-205050 or Equivalent
4. B/L Connector:JUSTCONN/101049-201050 or Equivalent
5. LCD 1024X3(R.G.B)x600=> 10.1" Digital TFT LCD

1		7		TOLERANCE GRADE(±)	A	B	DIM. MM	DWN. EMILY	DATE 03-26-20'	TITLE 1920720C1
2		8					IE NO.	CHK.	DATE	
3		9								
4		10								
5		11					PARTS NO LCM-1 1920720C1	APPD.	DATE	DWG. NO. *2003174MA / SHEET 1 OF 1
6		12								

AMPIRE 晶采光電科技