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-480272MITZQW-02H**
Approved by	
Date	

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

AMPIRE CO., LTD.
4F., No.116, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)
22181 新北市 汐止區 新台五路一段 116 號 4 樓(東方科學園區 A 棟)
TEL:886-2-26967269 . FAX:886-2-26967196 or 26967270

APPROVED BY	CHECKED BY	ORGANIZED BY
Patrick	*Simon*	*Benson*

This Specification is subject to change without notice

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2025/4/1	--	New Release	Benson

1. FEATURES

(1)   Construction: An amorphous silicon TFT-LCD with driving system, stainless bezel, and white LED backlight.

(2)   LCD type: Transmissive, Normally Black.

(3)   Interface: 24bit RGB interface

(4)   Power Supply Voltage: 3.3V power input for TFT, built-in power supply circuit.

(5)   RoHS Compliance

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
Display size (diagonal)	4.3	inch
Resolution	480 RGB(H) x 272(V)	Dot
Display area	95.04 (H) x 53.856 (V)	mm
Pixel pitch	0.198 (H) x 0.198 (V)	mm
Color configuration	R.G.B Vertical stripe	
Brightness	1000	cd/m^2
Backlight unit	LED	
LCD Driver IC	ST7282A-G6-H	
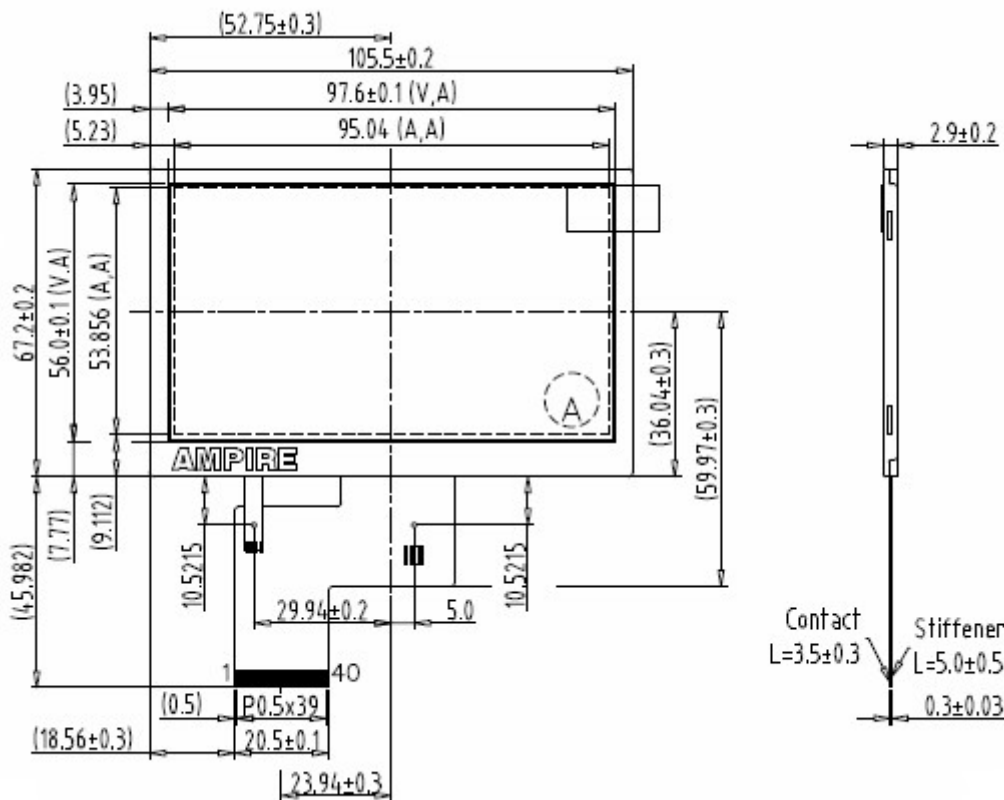
3. ABSOLUTE MAXIMUM RATINGS

The following values are maximum operation conditions, If exceeded , it may cause faulty operation or damage

3.1 Electrical Absolute max. ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power voltage	V_{DD}	GND=0	-0.3	4.0	V	
Input voltage	V_{in}		-0.3	V_{DD}+0.3	V	Note 1

Note1:Hsync, Vsync, DE, DCLK, DISP, R0~R7, G0~G7, B0~B7

3.2 Environmental Absolute max. ratings

Item	OPERATING		STORAGE		Remark
	MIN	MAX	MIN	MAX	
Temperature	-20	70	-30	80	Note2,3,4,5,6,7
Humidity	Note1		Note1		
Corrosive Gas	Not Acceptable		Not Acceptable		

Note1 : Ambient temperature Ta <= 40℃ : 85% RH max

Ta > 40℃: Absolute humidity must be lower than the humidity of 85%RH at 40℃

Note2 : For storage condition Ta at -30℃ < 48h , at 80℃ < 100h

For operating condition Ta at -20℃ < 100h

Note3 : Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

Note4 : The response time will be slower at low temperature.

Note5 : Only operation is guaranteed at operating temperature. Contrast, response time, another display quality are evaluated at +25℃

Note6 : When LCM panel is operated over 60℃ (center of the panel surface temperature), the I_{LED} of the LED back-light should be adjusted to 45mA

Note7 : This is center of the panel surface temperature, not ambient temperature.

4. OPTICAL CHARACTERISTICS

4.1 Optical specification

| Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Left	Θ_L	CR≧10	75	85	--	deg.	(1)(4)
	Right	Θ_R		75	85	--		
	Up	Θ_U		75	85	--		
	Down	Θ_D		75	85	--		
Contrast ratio		CR	Θ=0 Normal viewing angle	640	800	--	--	(2)(4)
Response Time		$T_r + T_f$		--	30	40	ms	(3)(4)
Color chromaticity (CIE1931)	Red	Rx		Typ. -0.05	0.629	Typ. +0.05	--	(4)(5)
		Ry			0.326			
	Green	Gx			0.337			
		Gy			0.546			
	Blue	Bx			0.136			
		By			0.143			
	White	Wx			0.320			
		Wy			0.345			
Brightness		Y_L		800	1000	--	cd/m²	(4)(5) (I_L=60mA)
Brightness Uniformity		B_{UNI}		75	80	--	%	(4)(5)

4.2 Measuring Condition

(1)   Measuring surrounding: dark room

(2)   LED current I_L: 60mA

(3)   Ambient temperature: 25±2℃

(4)   15min warm-up time.

4.3 Measuring Equipment

(1)   FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

(2)   Measuring spot size : 20 ~ 21 m
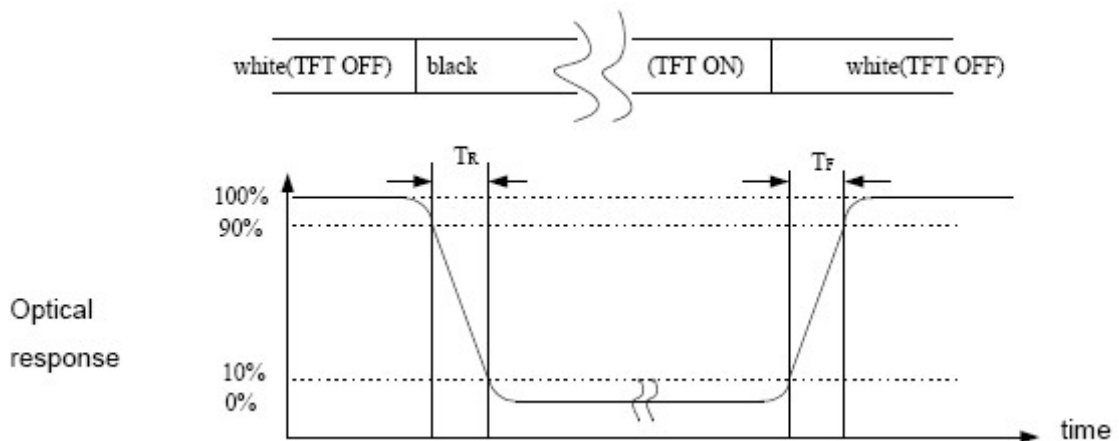
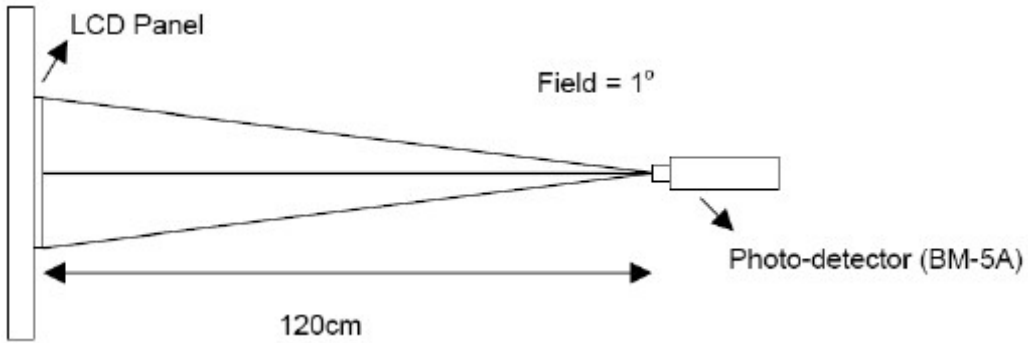Note (1)   Definition of Viewing Angle:
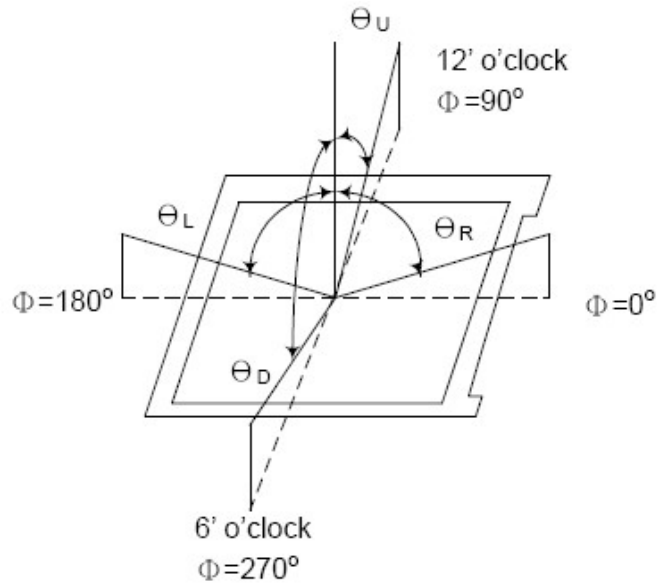
Note (2)   Definition of Contrast Ratio (CR): it measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$
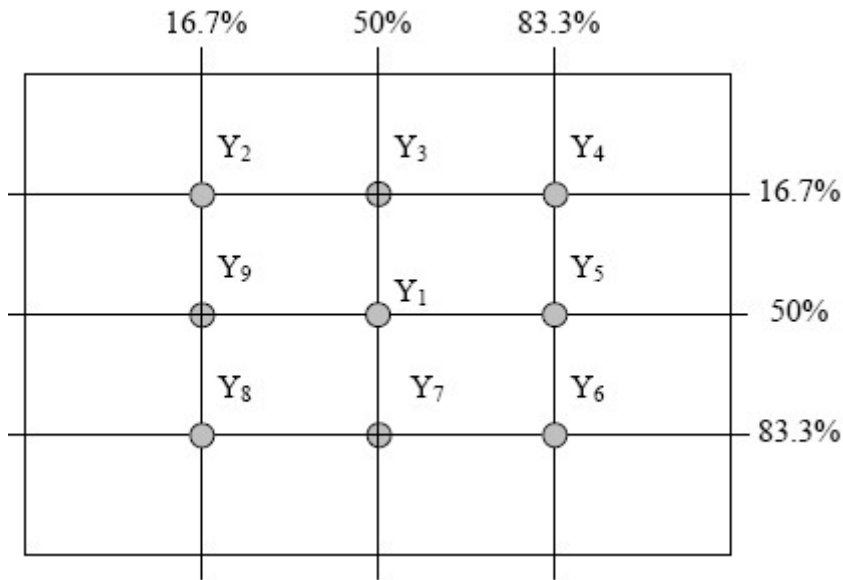
Note (3)   Definition of Response Time : Sun of T_R and T_F

Note (4)   Definition of optical measurement setup

Note (5)   Definition of brightness uniformity

$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

Note (6)   Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.)

Note (7)   Measured at the brightness of the panel when all terminals of LCD panel ate electrically open.

5. ELECTRICAL CHARACTERISTICS

5.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
Input signal voltage	V_{IH}	$0.7V_{DD}$	--	V_{DD}	V	Note(1)
	V_{IL}	0	--	$0.3V_{DD}$	V	
Current of power supply	I_{DD}	--	32	--	mA	V_{DD}=3.3V

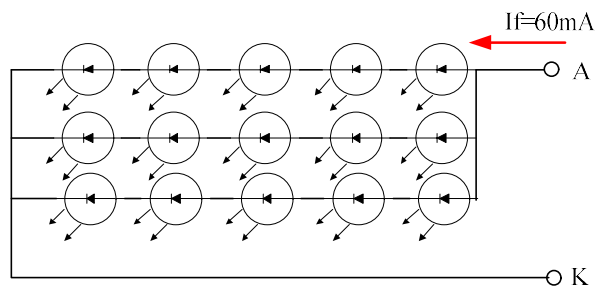Note (1) : HSYNC , VSYNC , DE , R/G/B Date

Note (2): GND = 0V

5.2 Back-Light Unit

The back-light system is an edge-lighting type with 15 LED.

The characteristics of the LED are shown in the following tables.

| Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	IL	--	60	--	mA	(2)
LED voltage	VL	13.5	15	16.5	V	
Operating LED life time	Hr	40K	50K	--	Hours	(1)(2)

Note (1)   LED life time (Hr) can be defined as the time when it continuously operates under the condition: Ta=25±3℃, and typical IL value indicates in the above table until the brightness becomes less than 50%.

Note (2)   The "LED life time" is defined as the module brightness which decreases to 50% of original brightness at Ta=25℃ and IL=40mA. The LED lifetime could be decreased if it operates IL over 40mA. The constant current driving method is suggested.
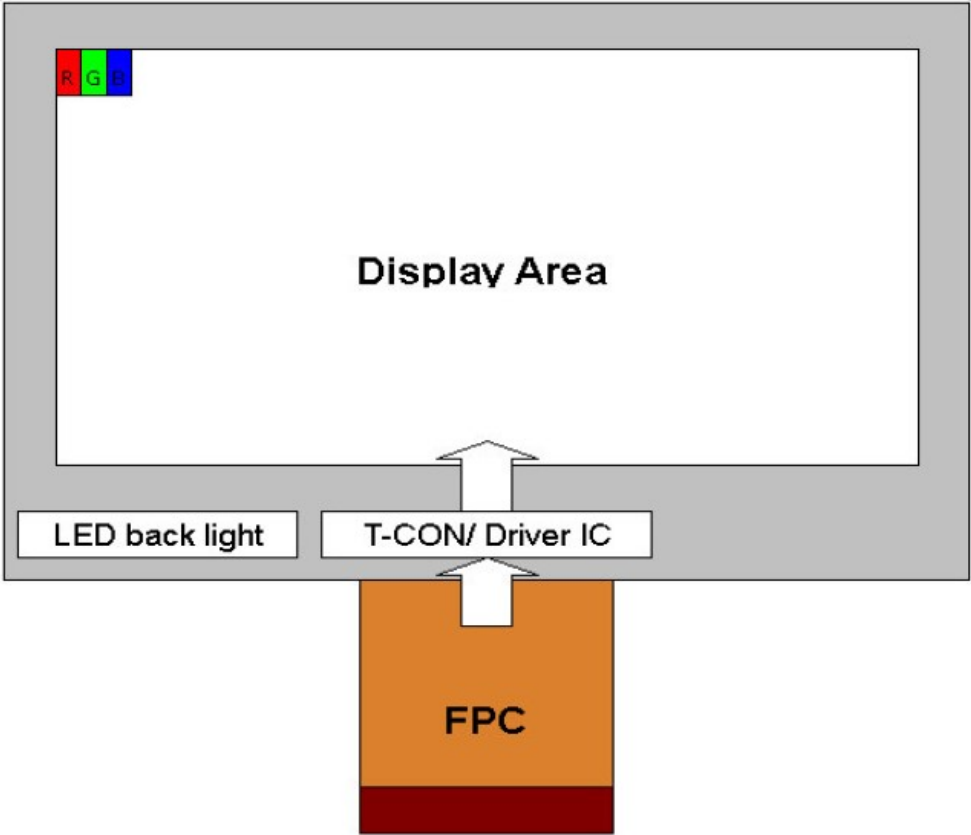
Note (3)   The constant current source is needed for white LED back-light driving. When

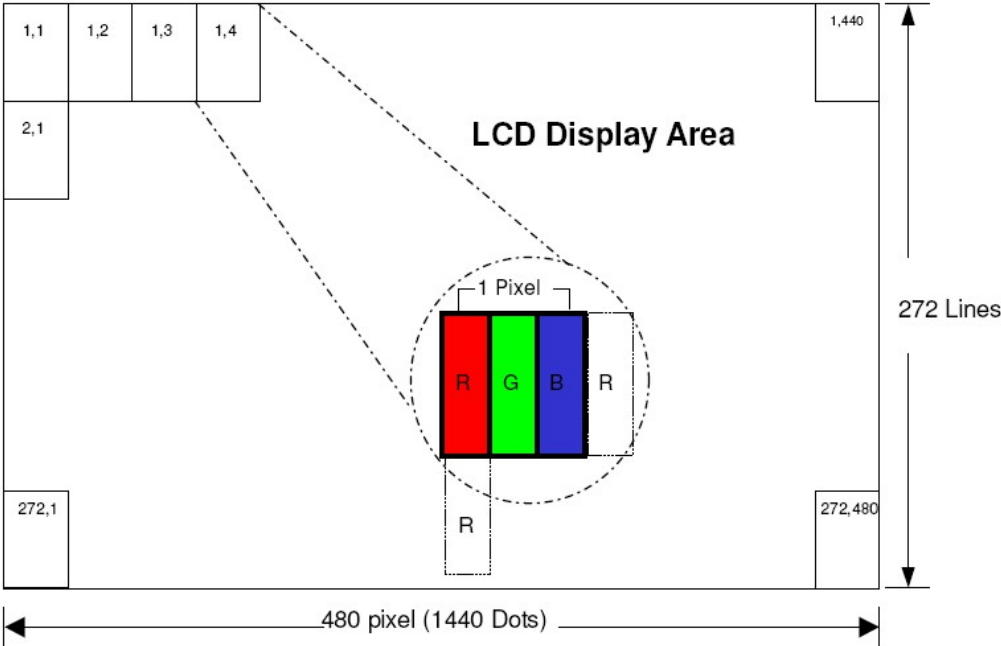LCM is operated over 60℃ ambient temperature, the I_L of the LED back-light should be adjusted to 45mA max.
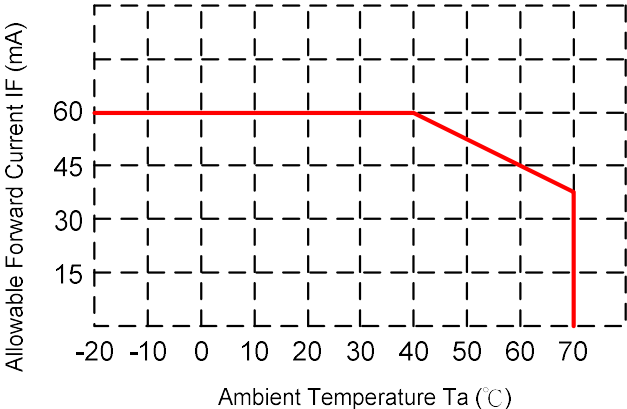
6. BLOCK DIAGRAM

6.1 A TFT LCD Module

6.2 Pixel Format

7. INTERFACE PIN ASSIGNMENT

FPC connector is used for electronics interface. The recommended model is FH19SC-40S-0.5SH (05) manufactured by HIROSE

Pin no	Symbol	I/O	Function	Note
1	VLED-	P	Power for LED Backlight Cathode	
2	VLED+	P	Power for LED Backlight Anode	
3	GND	P	Power Ground	
4	VDD	P	Power Voltage	
5	R0	I	Red Data (LSB)	
6	R1	I	Red Data	
7	R2	I	Red Data	
8	R3	I	Red Data	
9	R4	I	Red Data	
10	R5	I	Red Data	
11	R6	I	Red Data	
12	R7	I	Red Data (MSB)	
13	G0	I	Green Data (LSB)	
14	G1	I	Green Data	
15	G2	I	Green Data	
16	G3	I	Green Data	
17	G4	I	Green Data	
18	G5	I	Green Data	
19	G6	I	Green Data	
20	G7	I	Green Data (MSB)	
21	B0	I	Blue Data (LSB)	
22	B1	I	Blue Data	
23	B2	I	Blue Data	
24	B3	I	Blue Data	
25	B4	I	Blue Data	
26	B5	I	Blue Data	

27	B6	I	Blue Data	
28	B7	I	Blue Data (MSB)	
29	GND	P	Power Ground	
30	DCLK	I	Pixel Clock Data latched at rising edge of this signal.	
31	DISP	I	Display On(Hi)/ Off(Lo)	
32	HSYNC	I	Horizontal Sync Signal	
33	VSYNC	I	Vertical Sync Signal	
34	DE	I	Data Enable	
35	NC	--	No connect	
36	GND	P	Power Ground	
37	Y_T	I/O	No Connection	
38	X_L	I/O	No Connection	
39	Y_B	I/O	No Connection	
40	X_R	I/O	No Connection	

I/O: I: input, O: output, P: power

8. INTERFACE TIMING

8.1 Parallel 24*bit RGB Input Timing Table
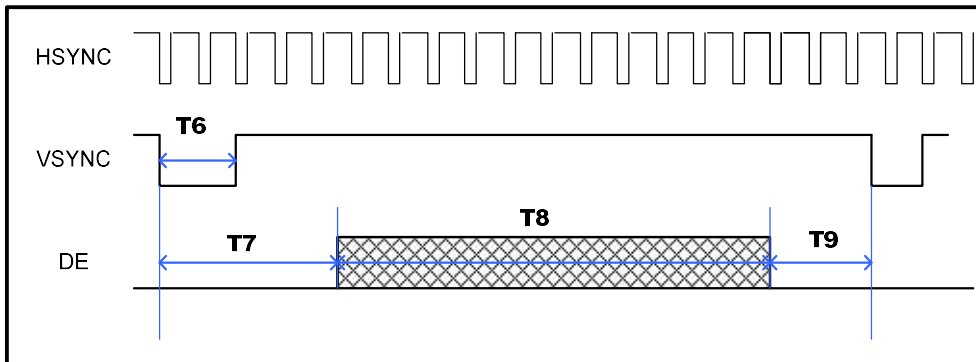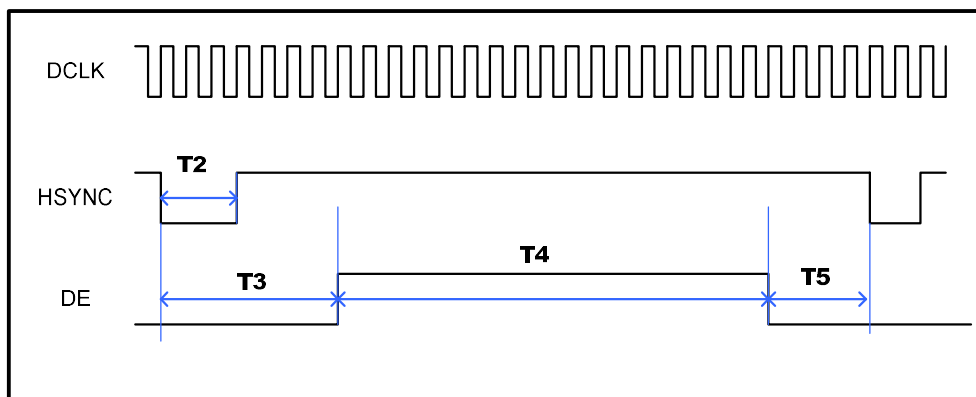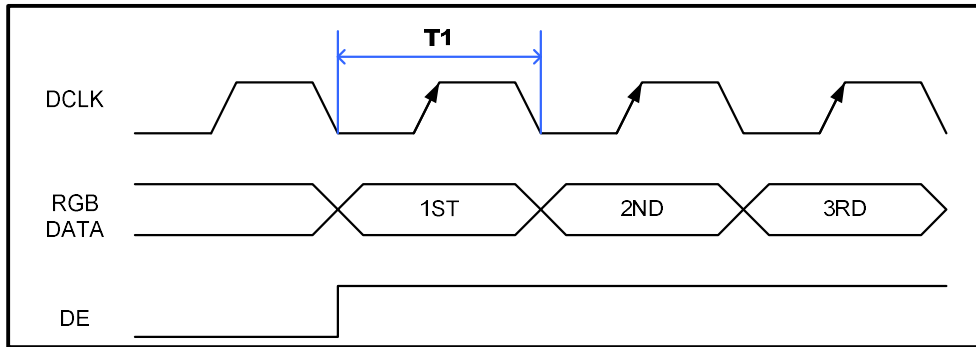
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Clock Frequency	1/T1	8	9	12	MHz
HSYNC Pulse Wide	T2	2	4	75	clocks
HSYNC Back Porch	T3	3	43	43	Clocks
HSYNC Front Porch	T5	2	8	75	Clocks
Horizontal Display Period	T4		480		Clocks
Horizontal total Period	T3+T4+T5	485	531	598	Clocks
VSYNC Pulse Wide	T6	2	4	37	Lines
VSYNC Back Porch	T7	2	12	12	Lines
VSYNC Front Porch	T9	2	8	37	Lines
Vertical Display Period	T8		272		Lines
Vertical total Period	T7+T8+T9	276	292	321	Lines

8.2 Power Sequence
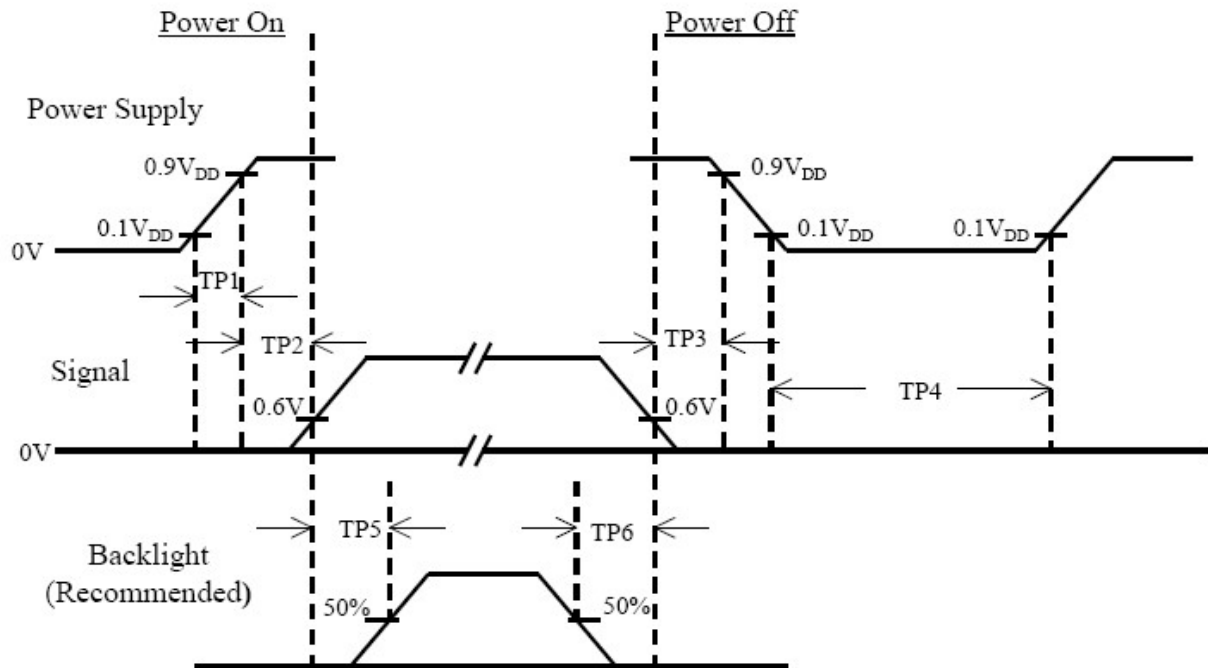
Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	250	--	--	msec	
TP6	100	--	--	msec	

Note：

(1) The supply voltage VDD from external system should be follow the definition

(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) All other signals should be high impedance when VDD = 0V DC/switched off.

(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.

9. Reliability Test Items

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
Storage at High Temperature and Humidity	60°C, 90% RH , 240 hrs	1,2
Thermal Shock Test	-20°C (30min) ~ 70°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).

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.

11. GENERAL PRECAUTION

11-1 Use Restriction

(1)   This product is not authorized for using in life supporting systems, aircraft navigation control systems, military systems, and any other application where performance failure could be life-threatening or catastrophic.

11-2 Disassembling or Modification

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

11-3 Breakage of LCD Panel

(1)   If LCD panel breaks, and liquid crystal spills out. Do not ingest or inhale liquid crystal, and 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.

(4)   Handle carefully with chips of glass that may cause injury when the glass is broken.

11-4 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 which prevent it from electric shock.

11-5 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)   We recommend employing protection circuit for power supply.

11-6 Operation

(1) Do not touch, push or rub the polarizer with anything which is harder than HB pencil lead.

(2) Use fingerstalls of soft gloves to keep clean display quality when someone handles 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 and contacts 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 benzine or other adequate solvent.

11-7 Mechanism

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

11-8 Static Electricity

(1) Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

(2) Because LCD module uses CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Person who handles the module should be grounded through adequate methods.

11-9 Strong Light Exposure

(1) The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.
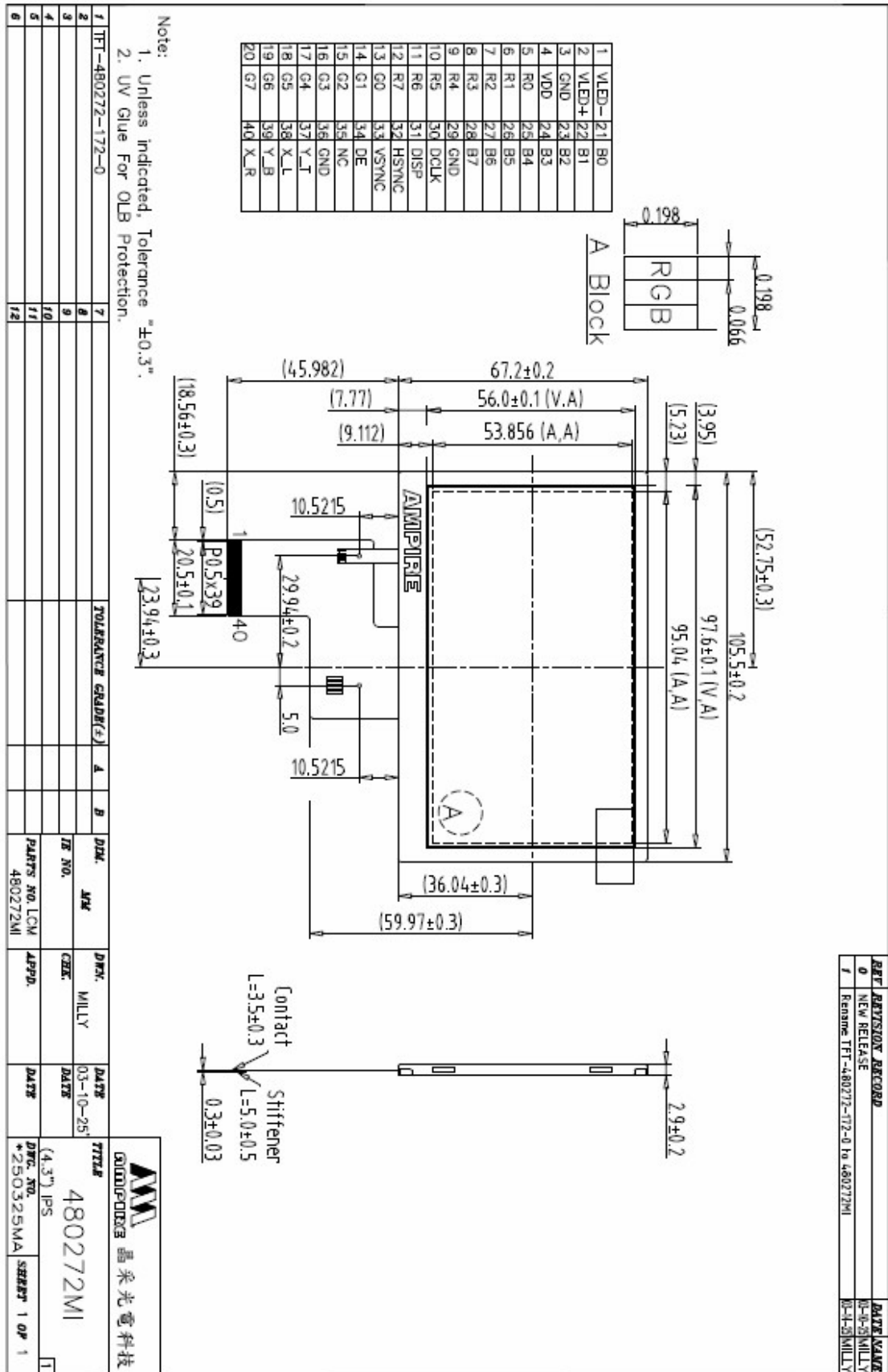
11-10 Disposal

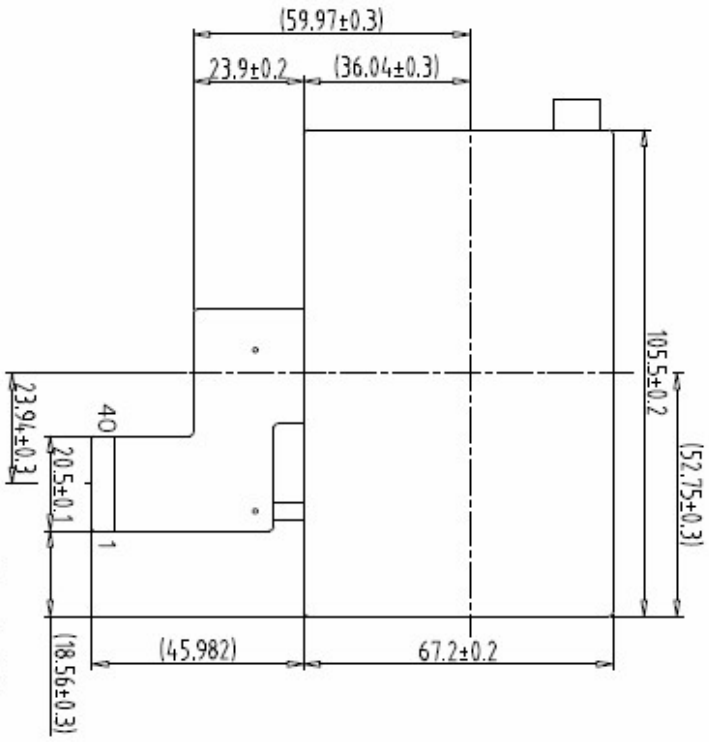(1) When you are disposing LCD module, obey the local environmental regulations.

11-11 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.

12. OUTLINE DIMENSION

1	VLED-	21 B0
2	VLED+	22 B1
3	GND	23 B2
4	VDD	24 B3
5	R0	25 B4
6	R1	26 B5
7	R2	27 B6
8	R3	28 B7
9	R4	29 GND
10	R5	30 DCLK
11	R6	31 DISP
12	R7	32 HSYNC
13	G0	33 VSYNC
14	G1	34 DE
15	G2	35 NC
16	G3	36 GND
17	G4	37 Y_T
18	G5	38 X_L
19	G6	39 Y_B
20	G7	40 X_R

Note:
1. Unless indicated, Tolerance "±0.3".
2. UV Glue For OLB Protection.

TFT-480272-172-0

A Block

R G B

Contact L=3.5±0.3
Stiffener L=5.0±0.5

AMPIRE 晶采光電科技

TITLE 480272MI
(4.3") IPS
DWG. NO. *250325MA
SHEET 1 OF 1

No.	Pin	No.	Pin
1	VLED-	21	B0
2	VLED+	22	B1
3	GND	23	B2
4	VDD	24	B3
5	R0	25	B4
6	R1	26	B5
7	R2	27	B6
8	R3	28	B7
9	R4	29	GND
10	R5	30	DCLK
11	R6	31	DISP
12	R7	32	HSYNC
13	G0	33	VSYNC
14	G1	34	DE
15	G2	35	NC
16	G3	36	GND
17	G4	37	Y_T
18	G5	38	X_L
19	G6	39	Y_B
20	G7	40	X_R

Note:
1. Unless indicated, Tolerance "±0.3."
2. UV Glue For OLB Protection.

TFT-480272-172-0

Back View

(59.97 ± 0.3)
23.9 ± 0.2 (36.04 ± 0.3)
105.5 ± 0.2
(52.75 ± 0.3)
23.94 ± 0.3
40
20.5 ± 0.1
1
(18.56 ± 0.3)
(45.982)
67.2 ± 0.2

TOLERANCE GRADE(±)

	A	B	DIM.	M/M	DWN.

DWN. MILLY
DATE 03-10-25'
PARTS NO. LCM-1 480272MI
DWG. NO. *250324MA
(4.3") IPS

晶采光電科技

TITLE 480272MI
SHEET 1 OF 1

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	03-10-25	MILLY
1	Rename TFT-480272-172-0 to 480272MI	03-11-25	MILLY