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-800480S5LMQW-00
APPROVED BY	
DATE	

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

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Approved by	Checked by	Organized by
Kokai	Mark	Lawlite

This Specification is subject to change without notice.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2022/05/13	--	New Release	Lawlite

1. INTRODUCTION

Ampire Display Module is a color active matrix TFT-LCD that uses amorphous silicon TFT as a switching device . This model is composed of a TFT-LCD panel, timing controller . This TFT-LCD has a high resolution (800(R.G.B) X 480) and can display up to 262,144 colors .

1-1. Features

- 7” WVGA (16:9 diagonal) configuration
- Input interface voltage : 3.3V
- Data enable mode

1-2. Applications

- Portable TV
- Car user DVD
- Industrial application
- HMI (Human machine interface)

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
Display resolution(dot)	800RGB (W) x 480(H)	dots
Active area	152.4 (W) x 91.44 (H)	mm
Pixel pitch	0.1905 (W) x 0.1905 (H)	mm
Color configuration	R.G.B Vertical stripe	
Overall dimension	165.0(W)x104.44(H)X5.2(T)	mm
View direction	6 O’clock	
Brightness	390 nit	cd/m^2
Contrast ratio	1000 : 1	
Backlight unit	LED	
Display color	262,144	colors

3. ABSOLUTE MAX. RATINGS

ITEM	SYMBOL	MIN	MAX	UNIT
Power Supply Voltage for LCD	Vcc	0.3	6.0	V
Operation Temperature	Top	-20	70	℃
Storage Temperature	Tstg	-30	80	℃

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

4. ELECTRICAL CHARACTERISTICS

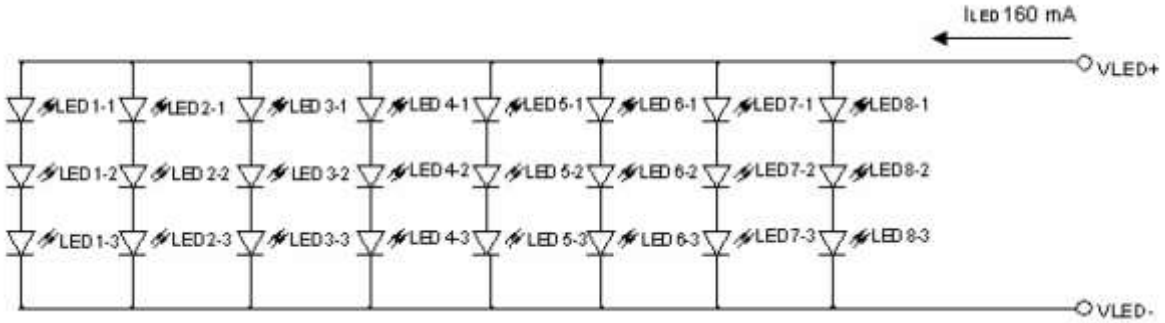
4-1 TFT LCD Module voltage

ITEM		SYMBOL	MIN	TYP	MAX	UNIT	CONDITION
Power Supply Voltage For LCD		Vcc	3.0	3.3	3.6	V	
Power Supply Current For LCD		Icc	-	T.B.D	-	mA	VCC=3.3V
LED Backlight Voltage		V_{BL}	-	8.85	-	V	For reference
LED Backlight Current		I_{BL}	-	160	-	mA	
Logic Input Voltage	Threshold Voltage(High)	V_{TH}	0.7Vcc	-	Vcc	V	
	Threshold Voltage(Low)	V_{TL}	0	-	0.3Vcc	V	

4-2 LED Driving Conditions

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	CONDITION
LED Backlight Voltage	V_{BL}	-	9.9	-	V	Note1
LED Backlight Current	I_{BL}	-	160	-	mA	
LED Life Time	-	10000	20000		Hr	Note2

Note 1 : There are 8 Groups LED shown as below , V_{LED}=9.9V , I_{LED}=160mA.



Note 2 : Brightess to be decreased to 50% of the initial value.

5. INTERFACE

Pin no	Symbol	Function
1	GND	Ground
2	GND	Ground
3	NC	No connection
4	VCC	Power supply for Digital Circuit
5	VCC	Power supply for Digital Circuit
6	VCC	Power supply for Digital Circuit
7	VCC	Power supply for Digital Circuit
8	NC	No connection
9	DE	Data Enable Timing Signal
10	GND	Ground
11	GND	Ground
12	GND	Ground
13	B5	Blue data (MSB)
14	B4	Blue data
15	B3	Blue data
16	GND	Ground
17	B2	Blue data
18	B1	Blue data
19	B0	Blue data (LSB)
20	GND	Ground
21	G5	Green data (MSB)
22	G4	Green data
23	G3	Green data
24	GND	Ground
25	G2	Green data
26	G1	Green data
27	G0	Green data (LSB)
28	GND	Ground
29	R5	Red data (MSB)
30	R4	Red data
31	R3	Red data
32	GND	Ground
33	R2	Red data
34	R1	Red data
35	R0	Red data (LSB)
36	GND	Ground
37	GND	Ground
38	DCLK	Data Clock :Latch Data at Falling Edge
39	GND	Ground
40	GND	Ground

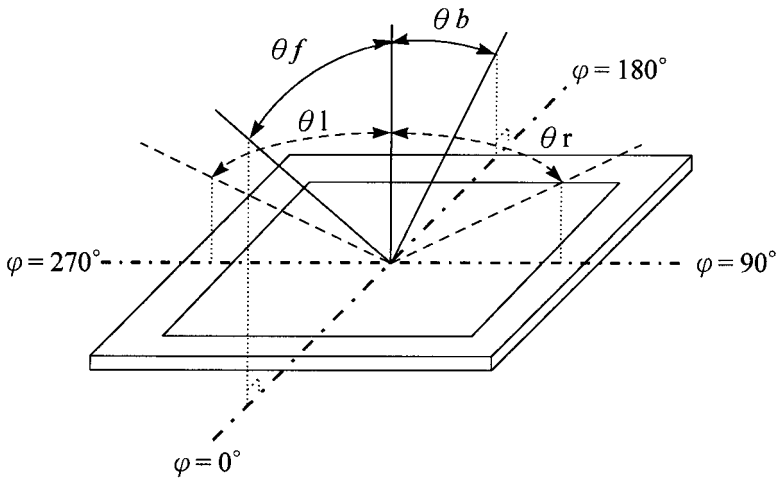
Note: User's connector part number is CF39402D0R0-NH manufactured by CviLux or equivalent

6. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Front	θ f	CR≧10	50	60	--	deg.	(1)(2)(3)
	Back	θ b		60	70	--		
	Left	θ l		60	70	--		
	Right	θ r		60	70	--		
Contrast ratio		CR	Θ=Φ=0°	700	1000	--	--	(1)(3)
Response Time		T_r	Θ=Φ=0°	--	5	10	ms	(1)(4)
		T_f		--	15	20	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°	320	390	--	cd/m²	(1)(5)
Color Saturation		NTSC	Θ=Φ=0°	--	50	--	%	(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 3: Definition of contrast ratio:

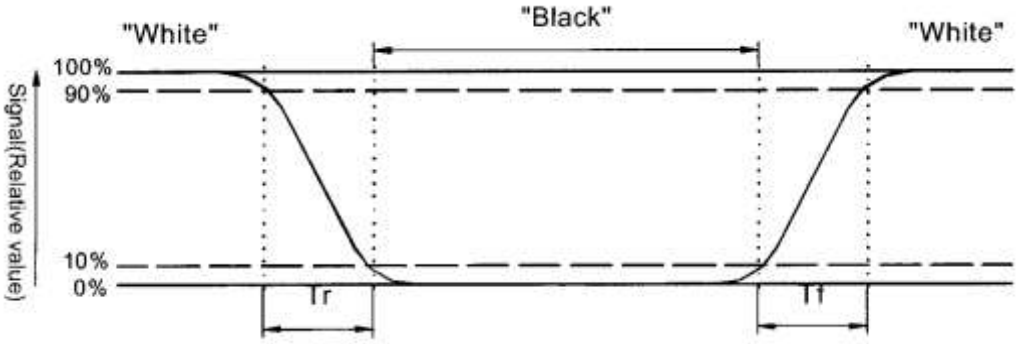
Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio(CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector Output when LCD is at "Black" state}}$$

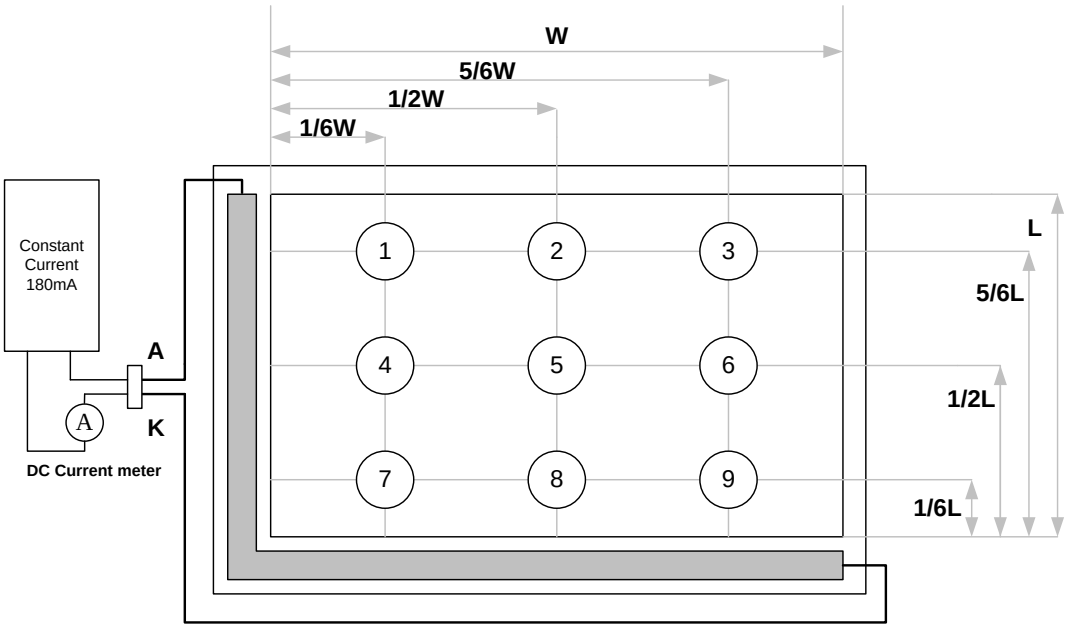
Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black" (rising

time) respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



Note 5 : Luminance is measured at point 5 of the display.



Note 6 : Definition of Luminance Uniformity

ΔL = [L(min.) of 9 points / L(max.) of 9 points] X 100%

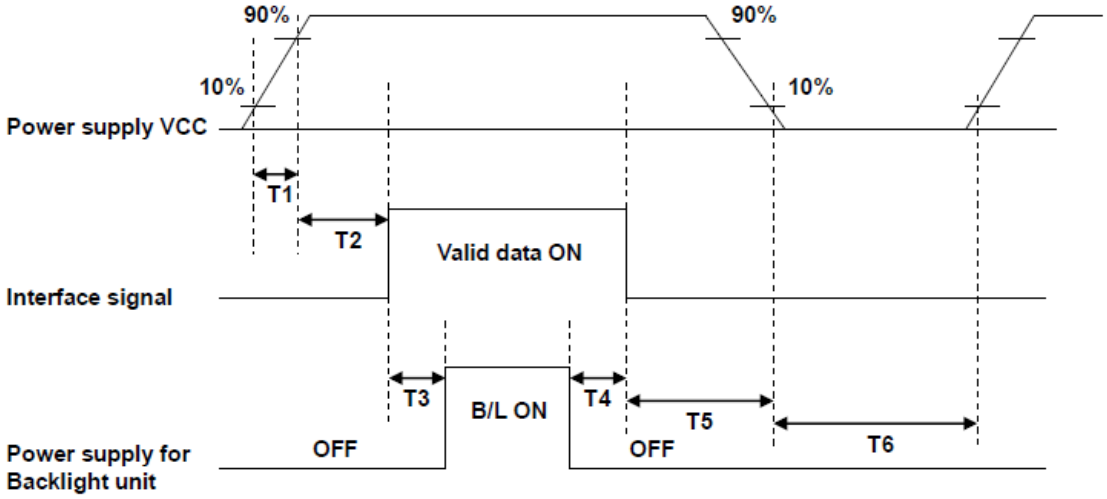
7. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	6	40	DCLK	
HS Blanking	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	204	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tvpw	1	3	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

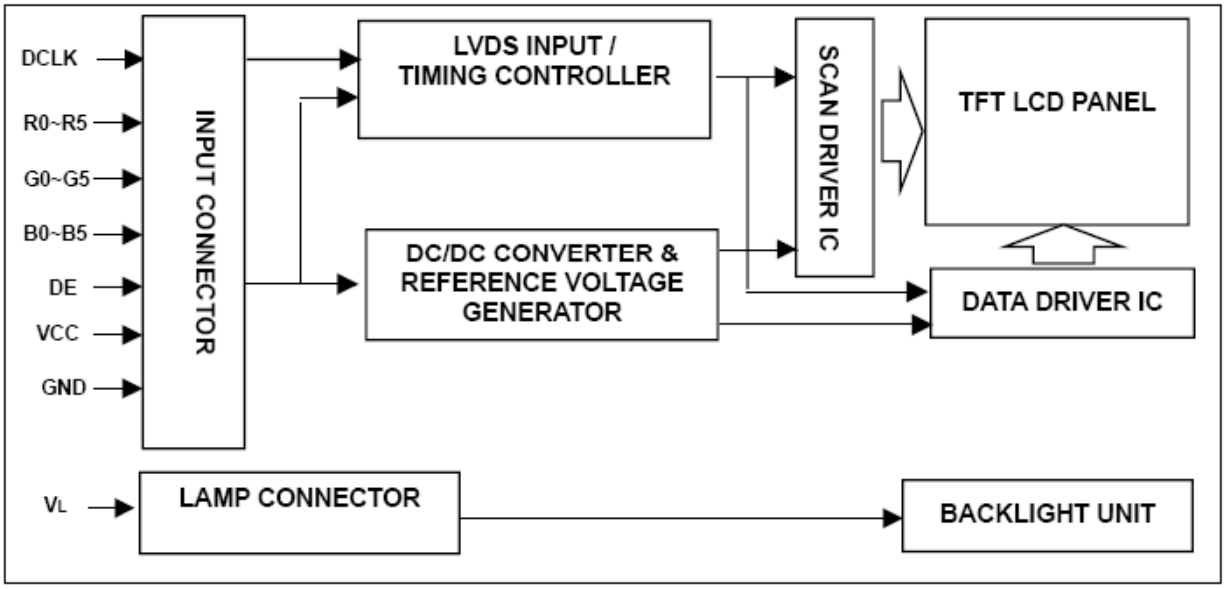
Note: Frame rate is 60±5Hz

7.1 Power Sequence



Parameter	SPEC.			Unit
	Min.	Typ.	Max.	
T1	1		2	ms
T2	200			ms
T3	180			ms
T4	180			ms
T5	200			ms
T6	1000			ms

8. BLOCK DIAGRAM



9. RELIABILITY TEST CONDITIONS

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C ,Dry t=240 hrs	
Low Temperature Operation	-20±3°C, Dry t=240 hrs	
High Temperature Storage	80±3°C , Dry t=240 hrs	1,2
Low Temperature Storage	-30±3°C ,Dry t=240 hrs	1,2
Thermal Shock Test	-15°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 100 cycle(Dry)	1,2
Humidity Test	60 °C, Humidity 90%, 240 hrs	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 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.

10. USE PRECAUTIONS

10-1 Handling precautions

(1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.

(2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.

(3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.

(1) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

10-2 Installing precautions

(1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. 1MΩ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.

(2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.

(3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.

(4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off

10-3 Storage precautions

(1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.

(2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.

(3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

10-4 Operating precautions

(1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.

(2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.

(3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC dive voltage.

(4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.

(5) Make certain that each signal noise level is within the standard (L level: 0.2Vdd or less and H level: 0.8Vdd or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.

(6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.

(7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.

(8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

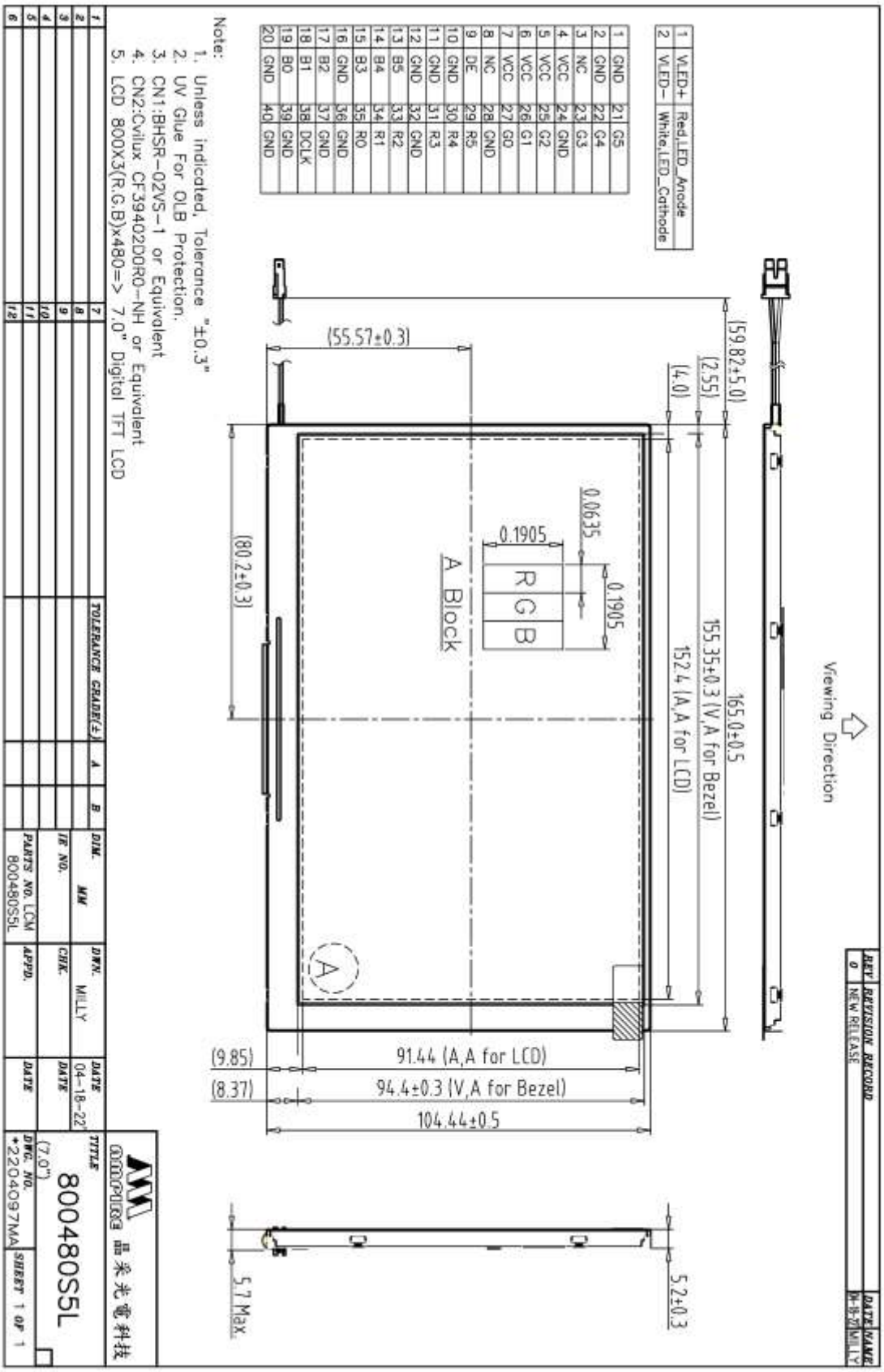
10-5 Other

(1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.

(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.

(3) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products..

11. OUTLINE DIMENSION



1	VLED+	Red.LED_Anode
2	VLED-	White.LED_Cathode

1	GND	21	G5	41	GND	61	B5	81	R5
2	GND	22	G4	42	NC	62	B4	82	R4
3	NC	23	G3	43	NC	63	B3	83	R3
4	VCC	24	GND	44	GND	64	B2	84	R2
5	VCC	25	G2	45	NC	65	B1	85	R1
6	VCC	26	G1	46	NC	66	B0	86	R0
7	VCC	27	G0	47	NC	67	GND	87	GND
8	NC	28	GND	48	NC	68	DCLK	88	GND
9	DE	29	R5	49	NC	69	GND	89	NC
10	GND	30	R4	50	NC	70	NC	90	NC
11	GND	31	R3	51	NC	71	NC	91	NC
12	GND	32	GND	52	NC	72	NC	92	NC
13	B5	33	R2	53	NC	73	NC	93	NC
14	B4	34	R1	54	NC	74	NC	94	NC
15	B3	35	R0	55	NC	75	NC	95	NC
16	GND	36	GND	56	NC	76	NC	96	NC
17	B2	37	GND	57	NC	77	NC	97	NC
18	B1	38	DCLK	58	NC	78	NC	98	NC
19	B0	39	GND	59	NC	79	NC	99	NC
20	GND	40	GND	60	NC	80	NC	100	NC

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	04-18-22	MILLY

TOLERANCE GRADE(±)	A	B	DIM. MM
			IF NO.
DWN. MILLY			
CHK.			
APPD.			
DATE			

PARTS NO. LCM 800480S5L

TITLE 800480S5L (7.0")

DWG. NO. *2204097MA

DATE 04-18-22

SHEET 1 OF 1

REV
0
REVISION RECORD
NEW RELEASE
DATE/NAME
04-18-22/MILLY
1 VLED+ Red,LED_Anode
2 VLED- White,LED_Cathode
1 GND 21 G5
2 GND 22 G4
3 NC 23 G3
4 VCC 24 GND
5 VCC 25 G2
6 VCC 26 G1
7 VCC 27 G0
8 NC 28 GND
9 DE 29 R5
10 GND 30 R4
11 GND 31 R3
12 GND 32 GND
13 B5 33 R2
14 B4 34 R1
15 B3 35 R0
16 GND 36 GND
17 B2 37 GND
18 B1 38 DCLK
19 B0 39 GND
20 GND 40 GND
Note:
1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN1:BHSR-02VS-1 or Equivalent
4. CN2:Cvilux CF39402D0R0-NH or Equivalent
5. LCD 800X3(R.G.B)x480=> 7.0" Digital TFT LCD
Back View
64.0±0.3
60.93±0.5
(34.945±0.5)
21.6±0.3
45.0±0.5
4.0
CN2
CN1
TOLERANCE GRADE(±)
A
B
DIM.
MM
DRN.
MILLY
DATE
04-18-22
TE NO.
CHK.
DATE
PARTS NO.LCM-1
800480S5L
APPD.
DATE
TITLE
800480S5L
(7.0")
DWG. NO.
*2204098MA
SHEET 1 OF 1