



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-1280800PTZQW-50H
Approved by	
Date	

Approved For Specifications

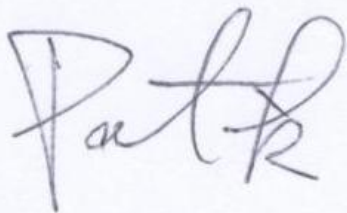


Approved For Specifications & Sample

AMPIRE CO., LTD.

**Building A., 4F., No.116, Sec. 1, Sintai 5th Rd., Xizhi Dist,
New Taipei City 221, Taiwan (R.O.C.)**

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
		

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2016/1/26	--	New Release	Emil

1. Features

It's a 7 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module which is composed of a 7" TFT-LCD panel, LED backlight, and LED driving board.

- (1) Construction: 7" a-Si TFT active matrix, White LED Backlight.
- (2) Resolution (pixel): 1280(R.G.B) X800
- (3) Number of the Colors : 16.7M colors (R , G , B 8 bit digital each)
- (4) LCD type :IPS Normally Black

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	7 inch (Diagonal)	
Resolution	1280 x (RGB) x 800	dot
Dot pitch	0.039(H) x 0.117(V)	mm
Active area	149.76(W) x 93.6(H)	mm
Module size	161.0(W) x 107.0(H) x 6.15(D)	mm
Surface treatment(Up Polarizer)	HC	
Color arrangement	RGB-stripe	
Contrast Ratio	800:1	
Interface	LVDS 20 Pin	
Brightness	400	cd/m ²

Note (1) Viewing direction which has best image quality is different from gray scale inversion direction which is a 180 degree shift.

3. ABSOLUTE MAX. RATINGS

3.1 TFT Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	VDD	-0.5	5.0	V	
	VCC	-0.5	8	V	
Backlight Forward Current	IF	—	25	mA	For each LED
Operating Temperature	TOPR	-20	70	°C	
Storage Temperature	TSTG	-30	80	°C	

4. ELECTRICAL CHARACTERISTICS

4.1. Driving TFT LCD Panel

Ta = 25°C

Item	Symbol	Min	Typ	Max	Unit	Remark
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	

4.2 TFT Driving Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
LED Driver Power Voltage	V _{CC}		5	-	7.5	V	
LED Driver Current Consumption	I _{CC}		--	326	--	mA	VLED=5V ADJ=high_level (duty 100%)
ADJ(Dimming)signal frequency	f _{PWM}		5	--	100	KHz	Note 4
ADJ signal logic level High	V _{IH}		1.2	--	--	V	
ADJ signal logic level Low	V _{IL}		--	--	0.4	V	
ADJ signal logic level High	ON/OFF_H		5	--	--		
ADJ signal logic level Low	ON/OFF_L		--	--	0.4		
Forward Voltage	V _{AK}	I _{AK} =140mA	--	9.3	10.2	V	Note 1
Forward Current	I _{AK}	--	--	140	--	mA	
Backlight Power Consumption	WBL	I _{AK} =140mA	--	1302	1428	mW	
Life Time	-	I _{AK} =140mA	10,000	30,000	--	Hrs	Note 3

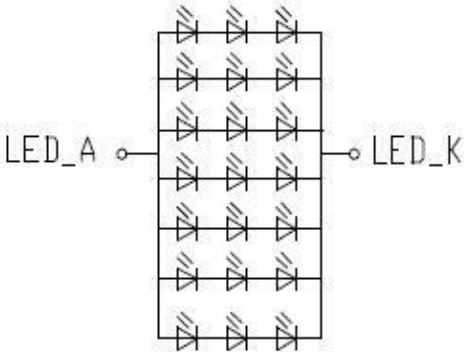
Note (1) If it defines as one channel LED, there are total three LED channels in backlight unit. Under LCM operating, the stable forward current should be inputted.

Note (2) Optical performance should be evaluated at Ta=25°C only.

Note (3) If LED is driven by high current, high ambient temperature, and humidity condition, the life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

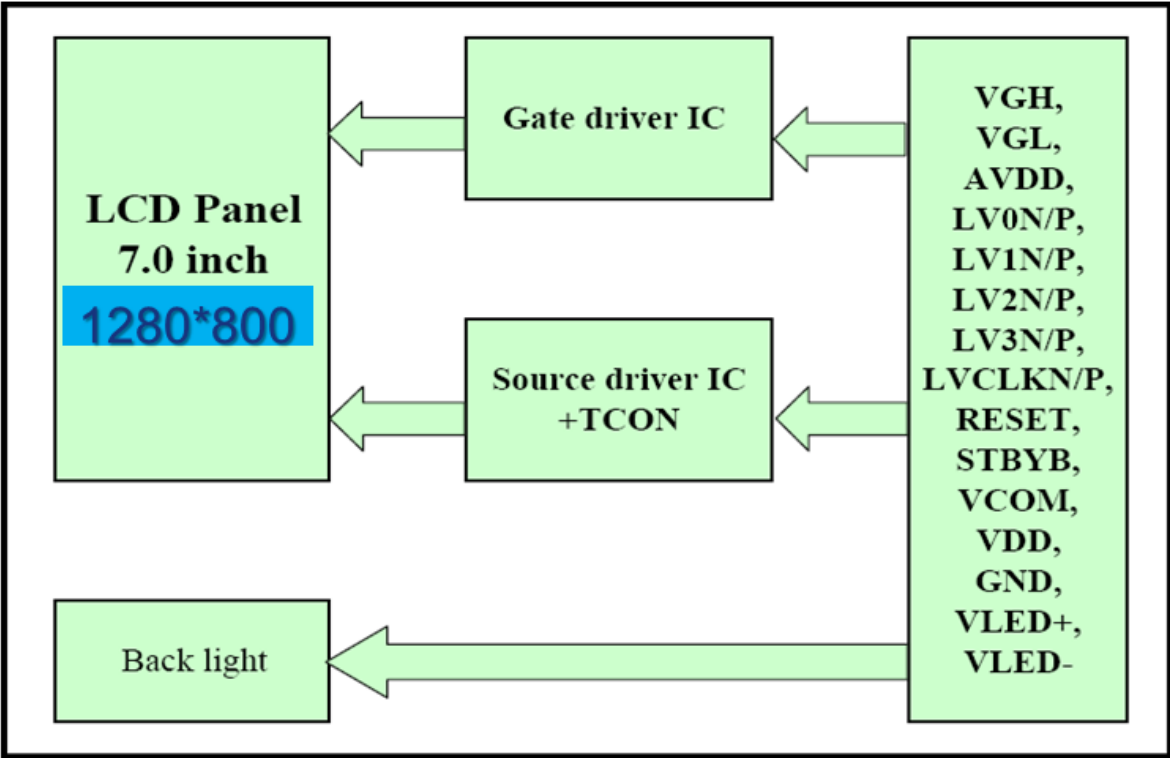
Note (4) VLEDADJ is PWM signal input. It is for brightness control.

LED Circuit diagram



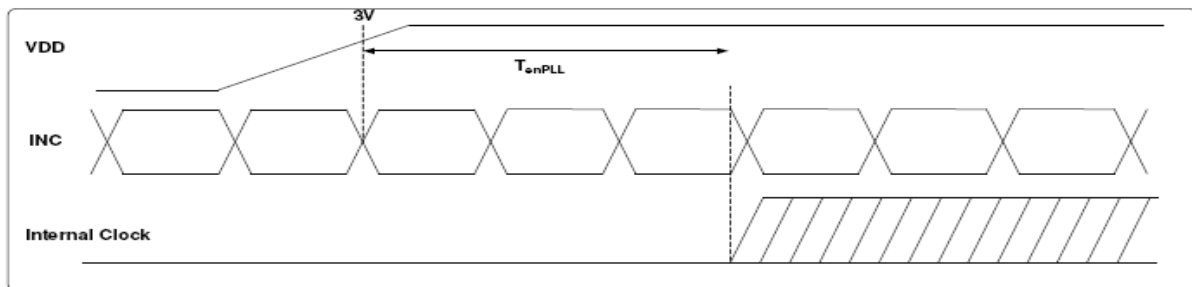
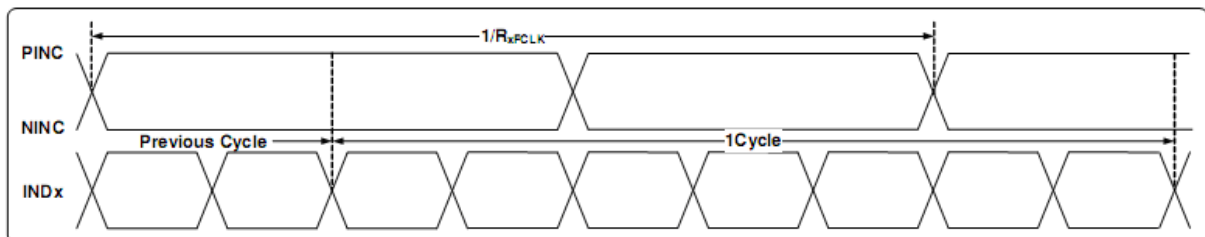
LED circuit
 $V_f=9.3V$, $I_f=140mA$

4.3 Power and Signal sequence



5. Timing Chart

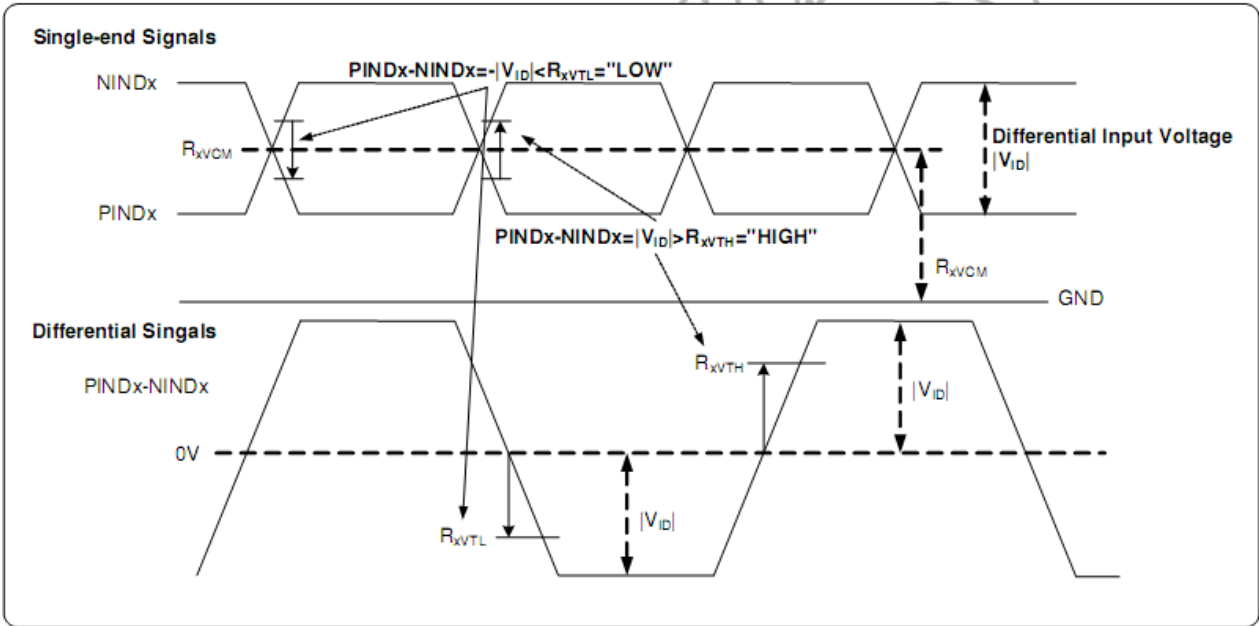
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Clock Frequency	RxFCLK	20	-	80	MHz	
Input data skew margin	TRSKM	500	-	-	ps	$ VID =400\text{mV}$, $RxVCM=1.2\text{V}$ $RxFCLK=80\text{MHz}$
Clock high time	TLVCH	-	$4/(7 * RxFCLK)$	-	ns	
Clock low time	TLVCL		$3/(7 * RxFCLK)$	-	ns	
PLL wake-up time	TenPLL	-	-	150	us	



5.2 DC Electrical Characteristics

VDD=3.3V, AVDD=11V, AGND=GND=0V, Ta=25°C

Parameter	Symbol	Min	Typ	Ma	Unit	Remark
Differential input high Threshold voltage	RXVTH	–	–	+0.1	V	
Differential input Low Threshold voltage	RXVTL	-0.1	–	–	V	
Input voltage range	RXVIN	0	–	VDD-1.0	V	
Differential input common ode voltage	RXVCM	VID /2	–	2.4- VID /2	V	
Differential input voltage	VID	0.2	–	0.6	V	
LVDS Digital Operating Current	RVXliz	-10	–	+10	uA	
LVDS Digital Operating Current	Iddlvds	–	(40)	(50)	mA	Fclk=65MHz, VDD=3.3V
LVDS Digital Stand-by Current	Istlvds	–	(10)	(50)	uA	Clock & all functions are stopped



6. Optical Specifications

6.1 TFT Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
ViewAngles	θT	CR ≥ 10	70	80	-	Degree	Note 2
	θB		70	80	-		
	θL		70	80	-		
	θR		70	80	-		
Contrast Ratio	CR	θ=0°	600	800	-		Left/right 0° Top/bottom 5°
Response Time	TON	25°C	-	35	40	ms	Note1 Note4
	TOFF						
Chromaticity	White	x	0.256	0.306	0.356		Note5 Note1
		y	0.279	0.329	0.379		
	Red	x	0.520	0.570	0.620		
		y	0.280	0.330	0.380		
	Green	x	0.300	0.350	0.400		
		y	0.542	0.592	0.642		
	Blue	x	0.105	0.155	0.205		
		y	0.051	0.101	0.151		
Uniformity	U		70	75	-	%	Note1、Note6
NTSC			45	50	-	%	
Luminance	L		320	400	-	cd/m ²	Note7

Test Conditions:

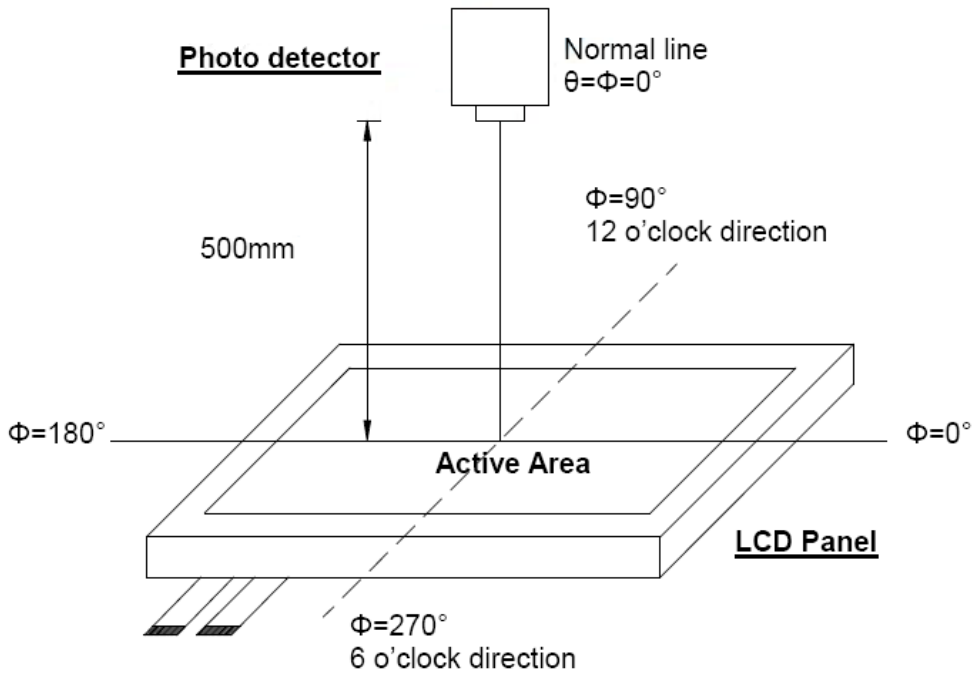
- (1) IF= 20mA (one channel), and the ambient temperature is 25°C.
- (2) The test systems refer to Note 1 and Note2.

Note (1) Definition of optical measurement system

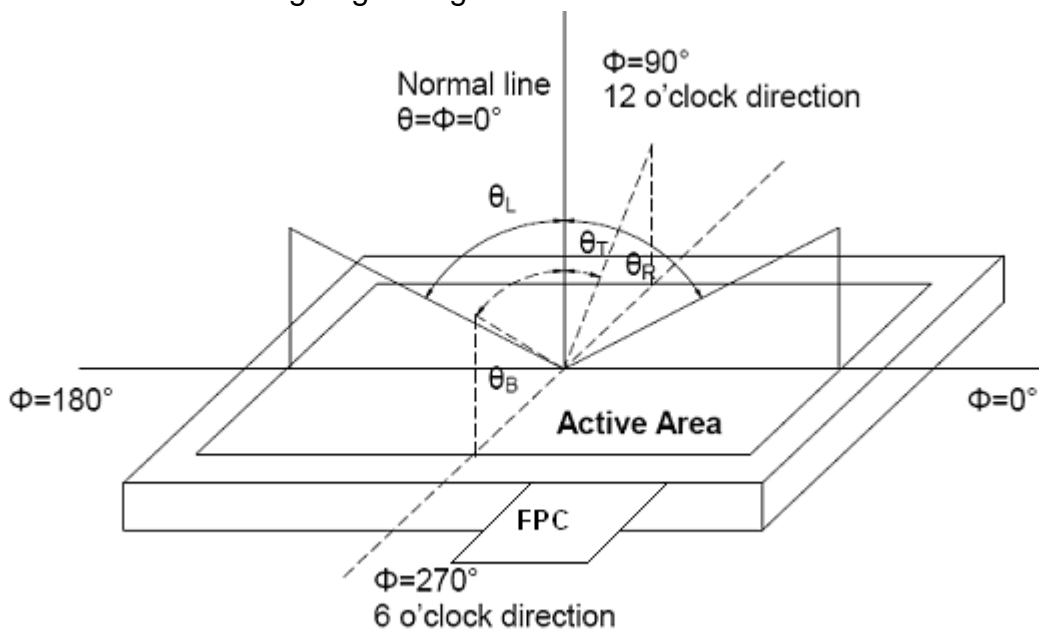
The optical characteristics should be measured in dark room. After 10 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Note (2) Definition of optical measurement system

The optical characteristics should be measured in dark room. After it operates 30 minutes, the optical properties can be obtained by measuring 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.)

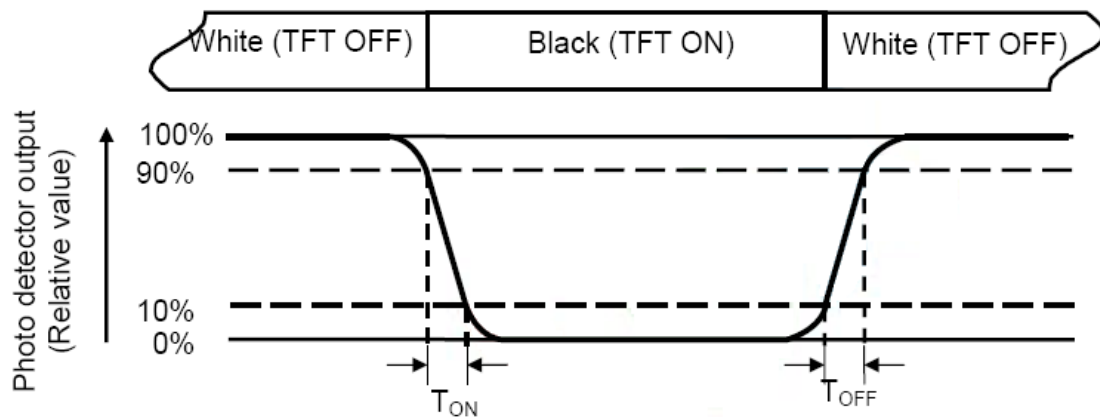


Note (3) Definition of viewing angle range



Note (4) 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%. Moreover, fall time (TOFF) is the time between photo detector output intensity which changed from 10% to 90%.



Note (5) 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 (6) Definition of color chromaticity (CIE1931) Color coordinated measured at center point of LCD.

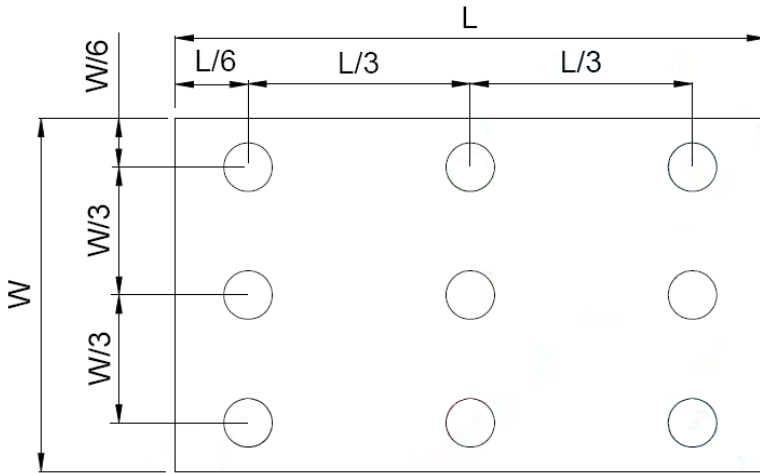
Note (7) All input terminals LCD panel must be ground when you are measuring the center area of the panel.

Note (8) 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



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.

6. INTERFACE

6.1 TFT LCD Panel Driving Section

Pin No.	Symbol	I/O	Function
1	VDD	P	Power Voltage for digital circuit
2	VDD	P	Power Voltage for digital circuit
3	GND	P	Ground
4	GND	P	Ground
5	IN0-	I	- LVDS differential data input
6	IN0+	I	+LVDS differential data input
7	GND	P	Ground
8	IN1-	I	-LVDS differential data input
9	IN1+	I	+LVDS differential data input
10	GND	P	Ground
11	IN2-	I	-LVDS differential data input
12	IN2+	I	+LVDS differential data input
13	GND	P	Ground
14	CLKIN-	I	-LVDS differential clock input
15	CLKIN+	I	+LVDS differential clock input
16	GND	P	Ground
17	IN3-	I	-LVDS differential data input
18	IN3+	I	+LVDS differential data input
19	GND	P	Ground
20	GND	P	Ground

Note (1) I/O definition: I---Input, O---Output, P--- Power/Ground, N--- No connection

CN3 LED connector: ENTERY 3808K-F05N-03L

Pin No.	Symbol	I/O	Description	Note
1	VCC	P	Power Voltage for LED driver circuit	
2	GND	P	Power Ground	
3	ON/OFF	I	Backlight ON/OFF, "H" LED ON.	
4	Dimming	I	PWM Adjust the LED brightness	
5	NA	-	No Connection	

7. RELIABILITY TEST CONDITIONS

N	Test Item	Condition	Remarks
1	High Temperature Operation	Ta = +70°C , 240 hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20°C , 240 hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta = +80°C , 240 hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta = -30°C , 240 hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta=+60°C 、RH=90%, 240 hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30°C (30min) ⇔ 80°C (30min) ,Change Time:5min,20cycle	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,G B2423.22-2002
7	ESD	C=150pF 、R=330Ω Air: ±8KV Contact:±4KV 5point/panel, 5times (Environment:15°C ~35°C , 30%~60%.86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	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)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Mechanical Shock (Non OP)	Half Sine Wave 60G,6ms,±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:60cm, 1corner,3edges,6surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note (1) The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted.

1. The sample will not be accepted if it appears these defects:
 - Air bubble in the LCD
 - Seal leak
 - Non-display
 - Missing segments
 - Glass crack
 - CR reduction >40%
 - IDD increase >100%
 - Brightness reduction >50%
 - Color coordinate tolerance >0.05
2. The samples of these tests will not be accepted if it appears these defects:
 - Air bubble in the LCD
 - Seal leak
 - Non-display
 - Missing segments
 - Glass crack
3. Each test item applies for a test sample only once, and the test sample cannot be used again in any other test item.
4. For damp proof test, pure water (Resistance > 10MΩ) should be used.
5. In the case of malfunction defect which caused by ESD damage, it would be recovered to normal state after resetting, and then it would be judge as a good part.
6. In the test of high temperature and humidity operation, the operation temperature is defined as the surface temperature of module.
7. High temperature operation, low temperature operation, high temperature storage, low temperature storage, high temperature and humidity operation, high temperature and humidity storage test will increase the test time to 1000 hours which is the same condition to test out the ability of a module, and we cannot guarantee that the module will not fail during 1000 hours.
8. These items only test once thermal shock which will be changed to 1000 cycles to test out the ability of module, and we cannot guarantee that the module will not fail after the test.

9. General Precautions

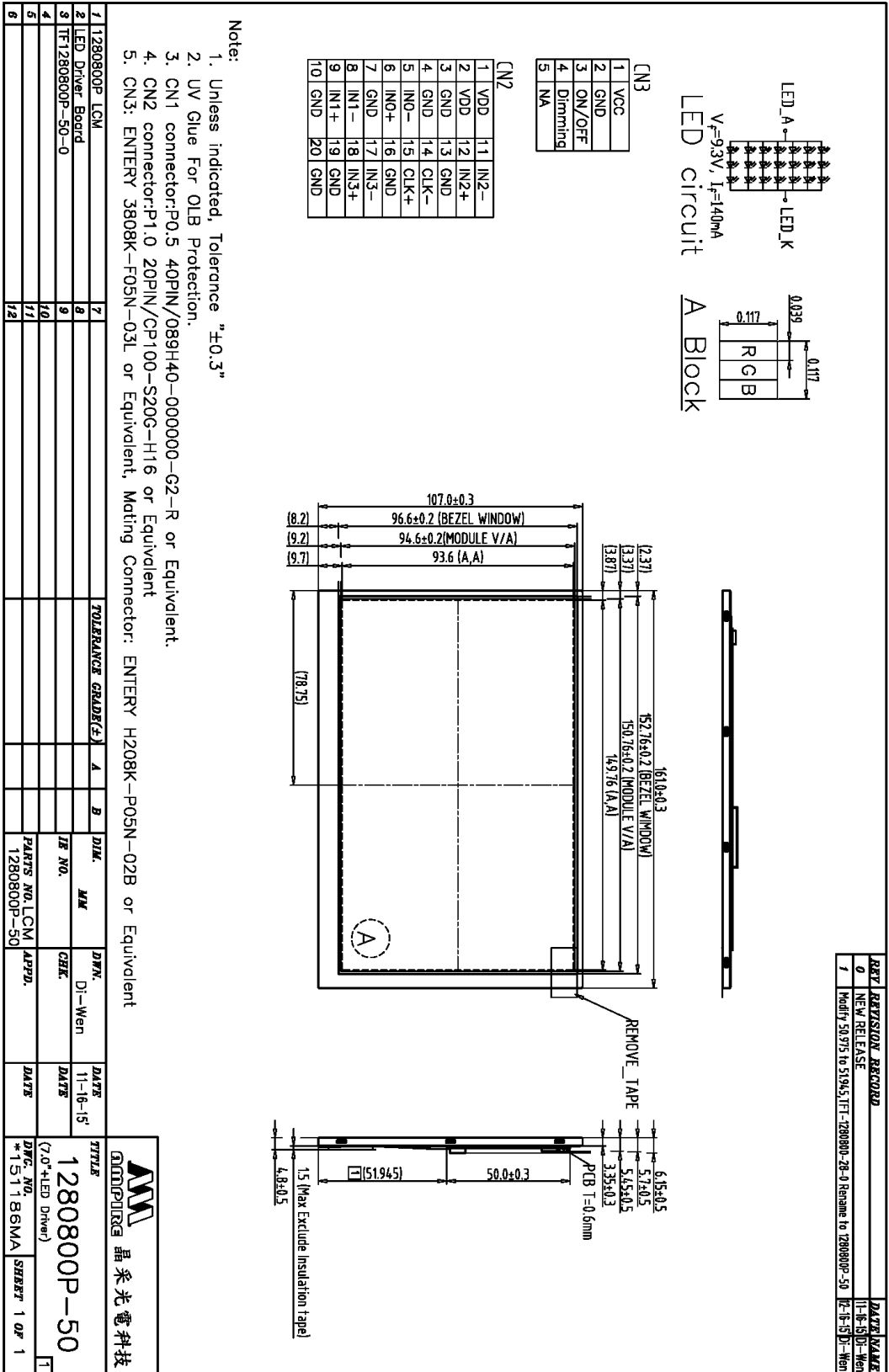
9.1 Handling Precautions

- (1) The 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, the liquid crystal substance inside it leaks out. Be sure not to get any liquid crystal substance into your mouth. If the substance contacts with your skin or clothes, you need to promptly wash it off with soap and water.
- (3) Do not apply excessive force to the display surface or the adjoining area 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 it is still not completely clear, moisten cloth with one of the following solvents: Isopropyl alcohol, Ethyl alcohol. Solvents other than those which mentioned above, it may damage the polarizer. Especially, do not use the following solvents: 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.
 - Be sure to ground the body when you are handling the LCD Modules.
 - Tools required for assembly, such as soldering irons, and it must be properly ground.
 - To reduce the amount of static electricity, do not conduct assembly and other work under the dry conditions.
 - The LCD Module is coated with a film to protect the display surface. Be careful to peel off this protective film since static electricity may be generated.

9.2 Storage precautions

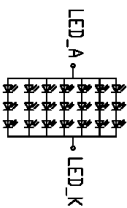
- (1) When you store the LCD modules, you need to avoid exposing to the direct sunlight or light of fluorescent lamps.
- (2) The LCD modules should be stored under the storage temperature range. If the LCD modules would be stored for a long time, the recommend condition is:
Temperature: $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$, relatively humidity: $\leq 80\%$
- (3) The LCD modules should be stored in the room without acid, alkali, and harmful gas.
- (4) The LCD modules should be no falling and violent shock during transportation, and it also should avoid excessive press, water, damp, and sunshine.

10. OUTLINE DIMENSION



Note:

1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN1 connector: P0.5 40PIN/089H40-000000-G2-R or Equivalent.
4. CN2 connector: P1.0 20PIN/CP100-S20G-H16 or Equivalent
5. CN3: ENTERY 3808K-F05N-03L or Equivalent, Mating Connector: ENTERY H208K-P05N-02B or Equivalent



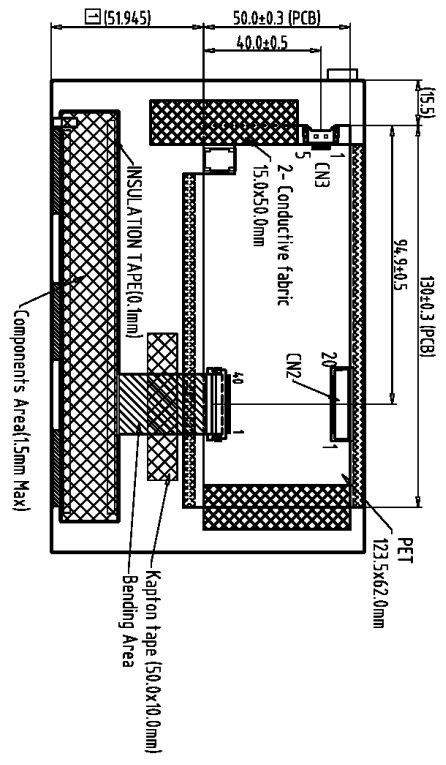
LED circuit

CN3

1	VCC
2	GND
3	ON/OFF
4	Dimming
5	NA

CN2

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



Note:

1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN1 connector: P0.5 40PIN/O89H40-000000-G2-R or Equivalent.
4. CN2 connector: P1.0 20PIN/CP100-S20G-H16 or Equivalent
5. CN3: ENTERY 3808K-F05N-03L or Equivalent, Mating Connector: ENTERY H208K-P05N-02B or Equivalent

1	1280800P LGM	7		TOLERANCE	GRADE	A	B	DIM.	MM	DWG.	Di-Wen	DATE	11-16-15	TITLE	MM 晶采光电科技
2	LED Driver Board	8						FE NO.		CHK.		DATE		1280800P-50	(7.0*LED Driver)
3	TF1280800-28-0	9						PARTS NO.	LGM-1	APPD.		DATE		*151187MA	SHEET 1 OF 1
4		10													
5		11													
6		12													

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	11-16-15	Di-Wen
1	Modify 50.975 to 51.945, 1TF-1280800-28-0 Rename to 1280800P-50	12-16-15	Di-Wen