



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-19201080D1TZQW-TH8H
APPROVED BY	
DATE	

Preliminary Specification

Formal Specification

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This Specification is subject to change without notice.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2019/08/22 2019/12/30	-- 1819 26	New Release Led Driving Conditions Add Tape	Mark Mantle

1.0 General Descriptions

1.1 Introduction

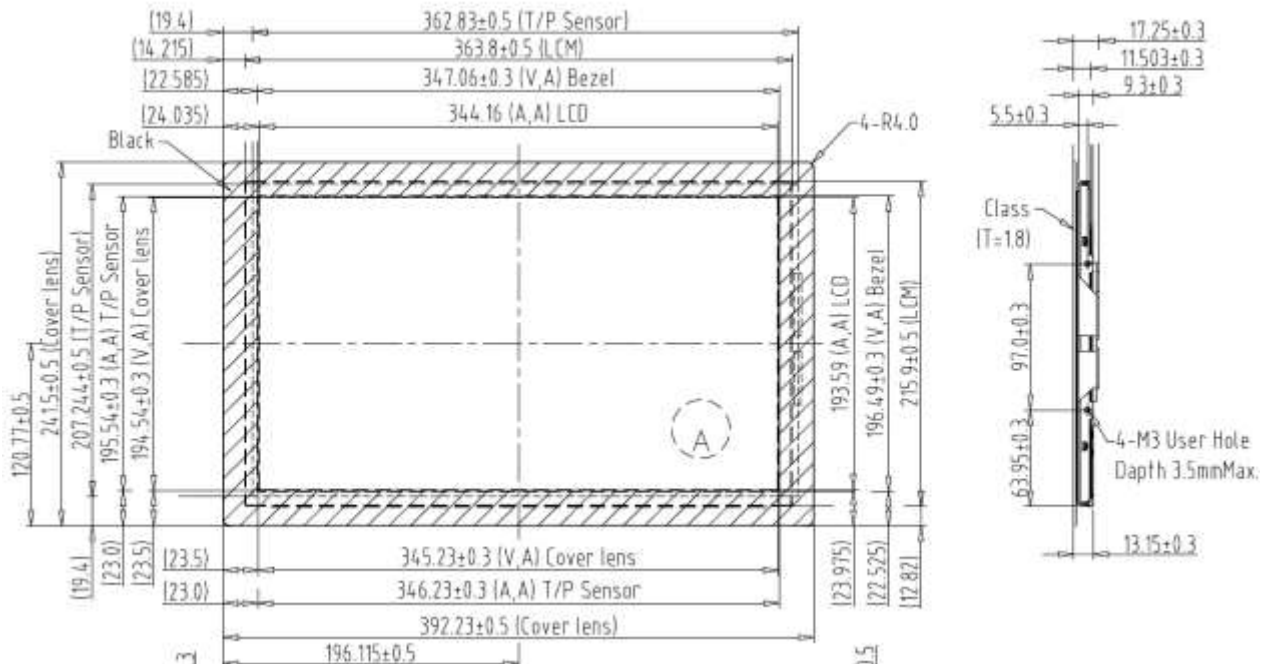
The LCM is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 15.6 inch diagonally measured active area with FHD resolutions (1920 horizontal by 1080 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical Stripe and this module can display 16M colors(6bit+FRC). The TFT-LCD panel used for this module is a low reflection and higher color type.

1.2 Features

- 3.3 V Logic Power
- LVDS (2ch) Interface for 1920 RGB x 1080 resolution
- 16M Colors(6bit+FRC)
- On board LED Driving circuit
- Green Product (RoHS)
- Touch panel
 - ✧ Controller: ILI2510
 - ✧ Interface: USB
- Cover glass
 - ✧ Thickness: 2mm
 - ✧ Printing: Black
- HDMI Board
 - ✧ Connect to J3 connector

1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	15.6	Inch
Active Area	344.16 (H) x 193.59 (V)	mm
Pixel Format	1920 (H) x RGB x 1080 (V)	-
Pixel Pitch	0.17925 (H) X 0.17925 (V)	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally Black	-
White Luminance	850 (Typ)	cd /m2
Contrast Ratio	800 : 1 (Typ)	-
Input Voltage	3.3	V
Support Color	16M(6Bit+FRC)	-



2.0 Absolute Maximum Ratings

ITEM	SYMBOL	VALUES		UNIT	REMARK
		MIN	MAX		
Logic Signal Input Level	V _{in}	-0.3	4.0	V	
Power Supply Voltage	V _{cc}	-0.3	3.6	V	
Operation Temperature	T _{op}	-20	70	°C	
Storage Temperature	T _{st}	-30	80	°C	

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) T_a = 25±2°C

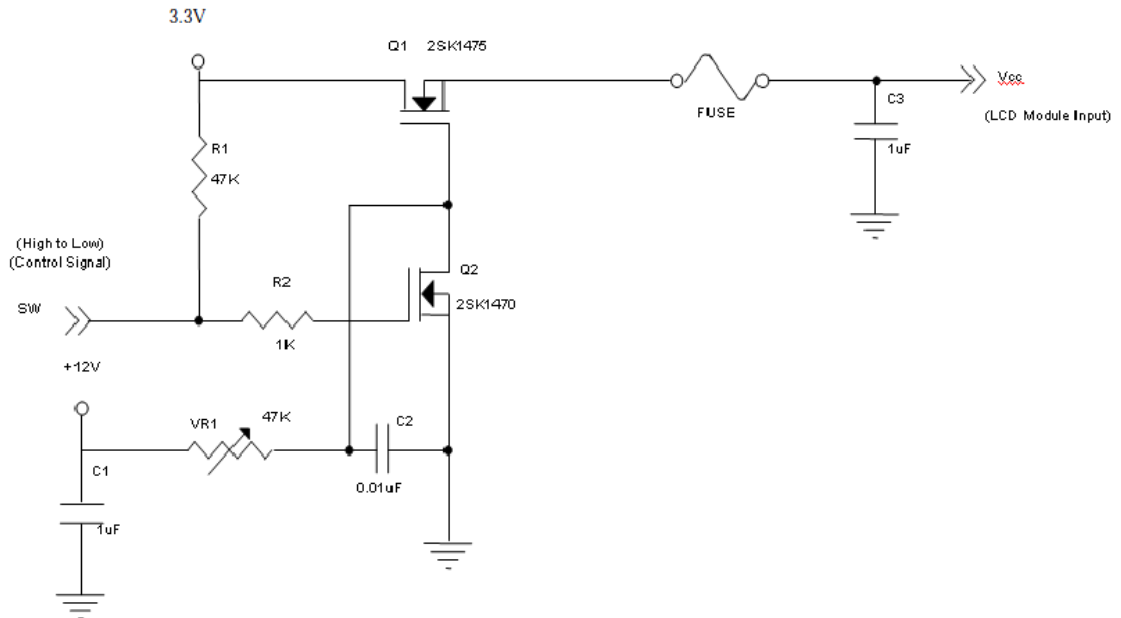
3.0 ELECTRICAL SPECIFICATIONS

3.1 LCD ELECTRONICS SPECIFICATION

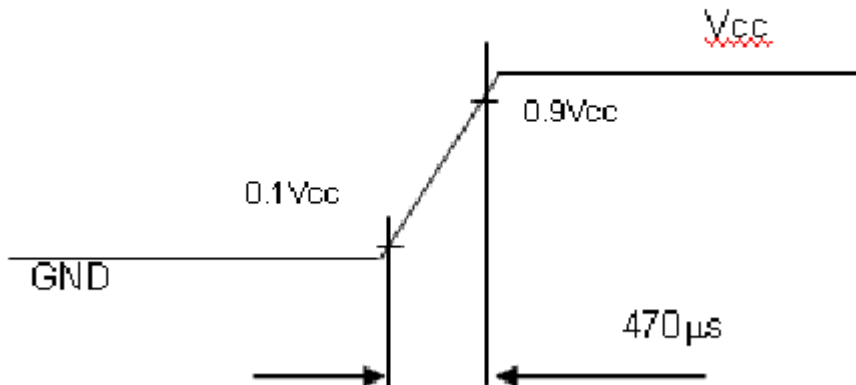
Parameter	Symbol	Value			Unit	Note
		Min	Typ.	Max.		
Power Supply Voltage	Vcc	3.15	3.3	3.6	V	-
Ripple Voltage	VRP	-	-	150	mV	-
Rush Current	IRUSH	-	-	3	A	(2)
Power Supply Current	White	-	1.22	1.5	A	(3)a
	Black	-	0.51	0.7	A	(3)b
	Vertical Stripe	-	0.82	1	A	(3)c
Power Consumption	PLCD	-	4	5	Watt	(4)
LVDS differential input voltage	Vid	200		600	mV	(5)
LVDS common input voltage	Vic	1.0	1.2	1.4	V	(6)
LVDS terminating resistor	Rt		100		ohm	

Note(1) The ambient temperature is $T_a = 25 \pm 2^\circ\text{C}$

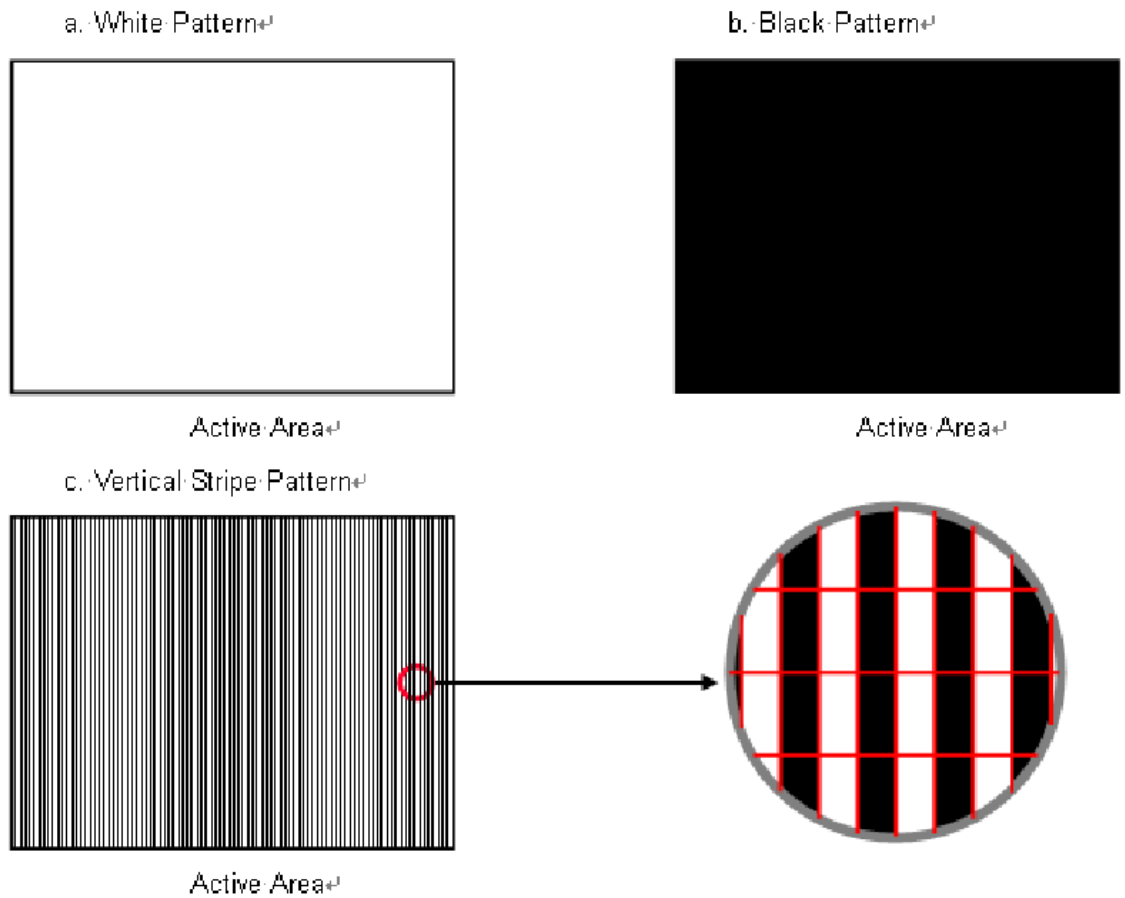
Note(2) Measurement Conditions:



Vcc rising time is 470μs

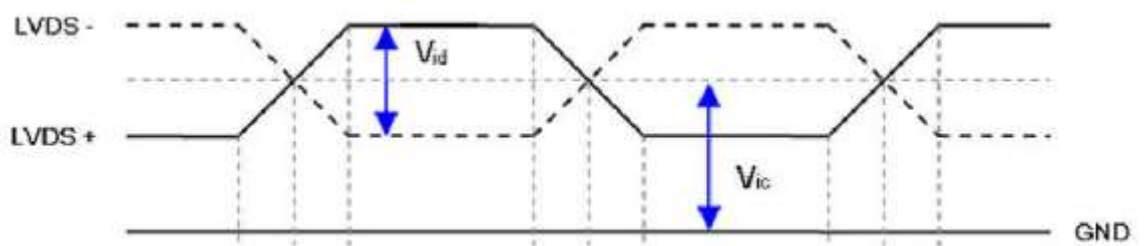


Note(3) The specified power supply current is under the conditions at $V_{CC}=3$ 3V, $T_a=25\pm 2^\circ\text{C}$, $F_r=60\text{Hz}$, whereas a power dissipation check pattern below is displayed.



Note(4) The power consumption is specified at the pattern with the maximum current.

Note(5) VID waveform condition



4. Interface Timings

4.1 DISPLAY TIMING SPECIFICATIONS

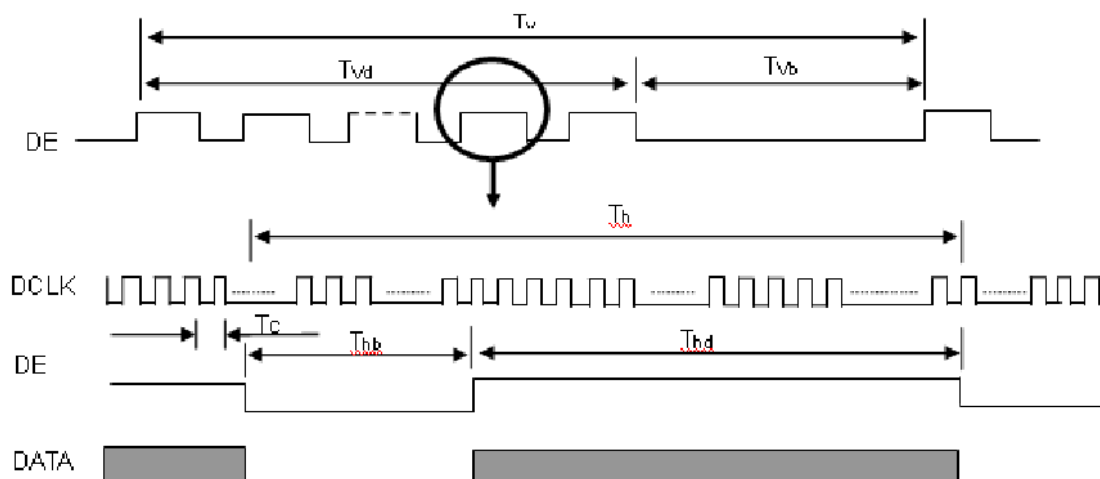
The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	F _c	60	70.93	75	MHz	-
	Period	T _c		14.1		ns	
	Input cycle to cycle jitter	T _{rd}	-0.02*T _c		0.02*T _c	ns	(3)
	Input clock to data skew	TLVCCS	-0.02*T _c		0.02*T _c	ns	(4)
	Spread spectrum modulation range	F _{ckin_mod}	FC*98%		FC*102%	MHz	(5)
	Spread spectrum modulation frequency	F _{SSM}			200	KHz	
Vertical Display Term	Frame Rate	Fr	50	60	60	Hz	T _v =T _v d+T _v b
	Total	T _v	1090	1110	1130	Th	-
	Active Display	T _v d	1080	1080	1080	Th	-
	Blank	T _v b	T _v -T _v d	30	T _v -T _v d	Th	-
Horizontal Display Term	Total	T _h	1050	1065	1075	T _c	T _h =T _h d+T _h b
	Active Display	T _h d	960	960	960	T _c	-
	Blank	T _h b	T _h -T _h d	105	T _h -T _h d	T _c	-

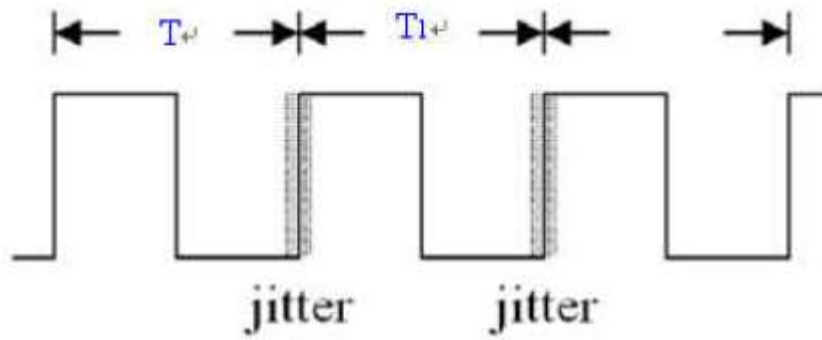
Note(1) Because this module is operated by DE only mode, Hsync and Vsync input signals are ignored.

Note(2) The T_v (T_vd+T_vb) must be integer, otherwise this module would operate abnormally.

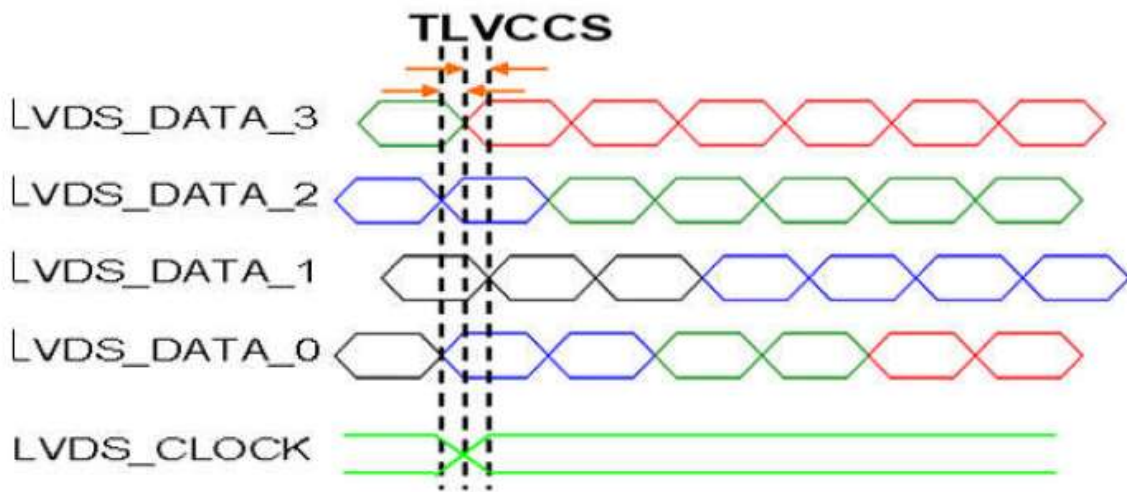
INPUT SIGNAL TIMING DIAGRAM



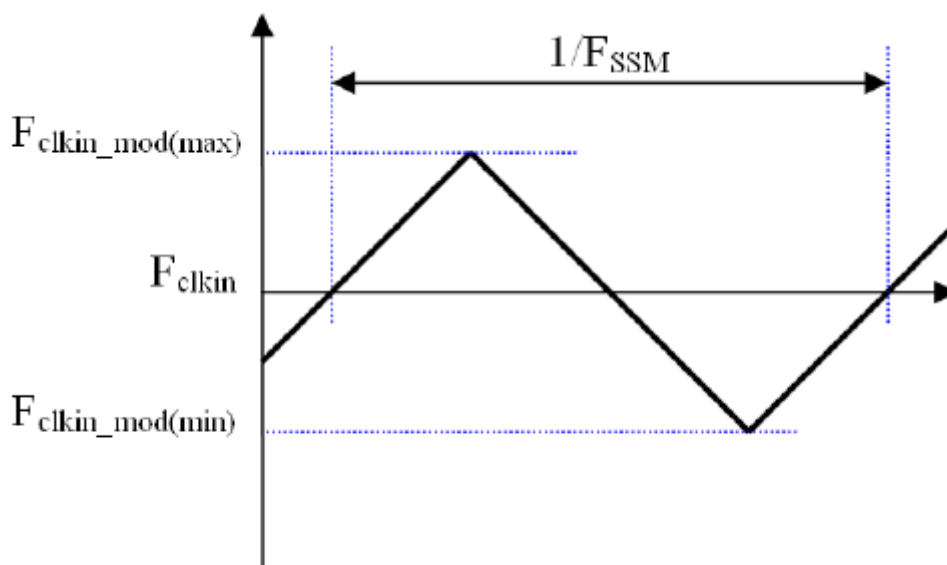
Note(3) The input clock cycle-to-cycle jitter is defined as below figures. $Trcl = |T_1 - T_2|$



Note(4) Input Clock to data skew is defined as below figures.

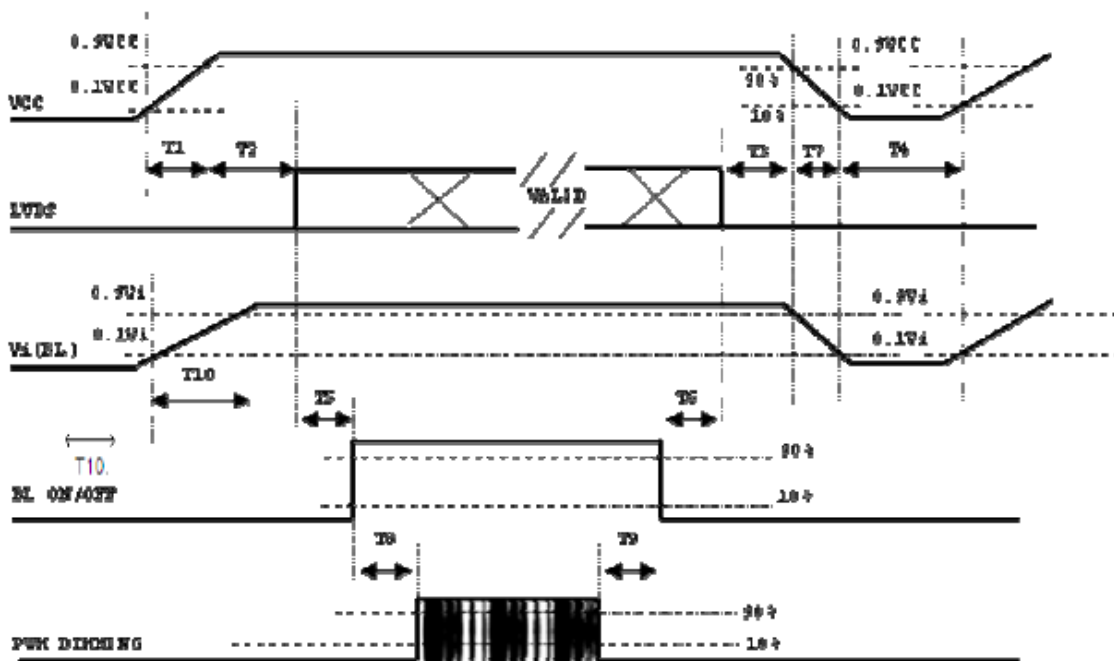


Note(5) The SSCG (Spread spectrum clock generator) is defined as below figures.



4.2 POWER ON/OFF SEQUENCE

The power swquence specifications are shown as the following table and diagram.



Timing Specifications:

Parameter	Value			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	0	-	50	ms
T4	500	-	-	ms
T5	450	-	-	ms
T6	200	-	-	ms
T7	10	-	100	ms
T8	10	-	-	ms
T9	10	-	-	ms
T10	20	-	50	ms

Note (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.

Note (2) When the backlight turns on before the LCD operation of the LCD turns off, the display may momentarily become abnormal screen.

- Note (3) In case of Vcc = off level, please keep the level of input signals on the low or keep a high impedance.
- Note (4) T4 should be measured after the module has been fully discharged between power off and on period.
- Note (5) Interface signal shall not be kept at high impedance when the power is on.
- Note (6) There might be slight electronic noise when LCD is turned off(even backlight unit is also off).To avoid this symptom, we suggest "Vcc falling timing" o follow"T7 spec".

4.3 LVDS INPUT SIGNAL SPECIFICATIONS

4.3.1 LVDS DATA MAPPING TABLE

LVDS Channel O0	LVDS output	D7	D6	D4	D3	D2	D1	D0
	Data order	OG0	OR5	OR4	OR3	OR2	OR1	OR0
LVDS Channel O1	LVDS output	D18	D15	D14	D13	D12	D9	D8
	Data order	OB1	OB0	OG5	OG4	OG3	OG2	OG1
LVDS Channel O2	LVDS output	D26	D25	D24	D22	D21	D20	D19
	Data order	DE	NA	NA	OB5	OB4	OB3	OB2
LVDS Channel O3	LVDS output	D23	D17	D16	D11	D10	D5	D27
	Data order	NA	OB7	OB6	OG7	OG6	OR7	OR6
LVDS Channel E0	LVDS output	D7	D6	D4	D3	D2	D1	D0
	Data order	EG0	ER5	ER4	ER3	ER2	ER1	ER0
LVDS Channel E1	LVDS output	D18	D15	D14	D13	D12	D9	D8
	Data order	EB1	EB0	EG5	EG4	EG3	EG2	EG1
LVDS Channel E2	LVDS output	D26	D25	D24	D22	D21	D20	D19
	Data order	DE	NA	NA	EB5	EB4	EB3	EB2
LVDS Channel E3	LVDS output	D23	D17	D16	D11	D10	D5	D27
	Data order	NA	EB7	EB6	EG7	EG6	ER7	ER6

4.3.2 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
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	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gray Scale Of Green	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
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	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	

Note (1) 0: Low Level Voltage, 1: High Level Voltage

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		600	800	-	-	Note2
Response Time	Rising + Falling		-	25	35	ms	Note5
Color Chromaticity (CIE1931)	Red	x	Typ. -0.05	0.652	Typ. +0.05	-	Note3
	Red	y		0.338		-	
	Green	x		0.333		-	
	Green	y		0.613		-	
	Blue	x		0.150		-	
	Blue	y		0.050		-	
	White	x		0.313		-	
	White	y		0.329		-	
White Luminance	Center		680	850	-	cd/m ²	Note4
Luminance Uniformity	9Points		70	-	-	%	Note4

Notes 1 : Viewing angle is the angle at which the contrast ratio is greater than 10.

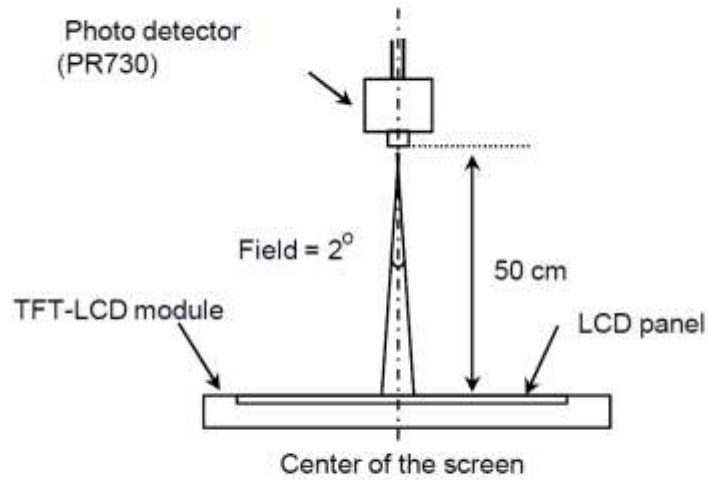
The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface(see Figure1).

Notes 2 : Contrast measurements shall be made at viewing angle of $\Theta = 0$ 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 $CR = \text{Luminance when displaying a white raster} / \text{Luminance when displaying a black raster}$.

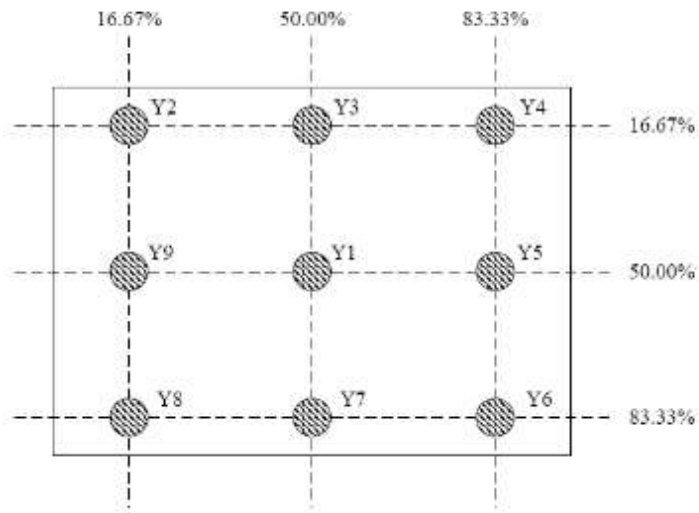
Notes 3 : Reference only / Standard Front Surface Treatment Measured with green cover glass. The color chromaticity coordinates specified in Table 4 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the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

Figure 1. Measurement Set Up



Optical characteristics measurement setup

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

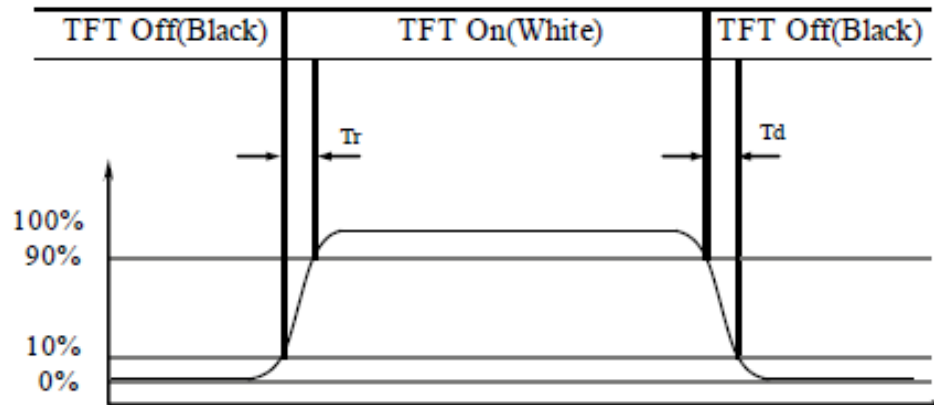


(Min Luminance of 9 points)

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

(Max Luminance of 9 points)

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 T_r , and 90% to 10% is T_d .

6. Interface Connections

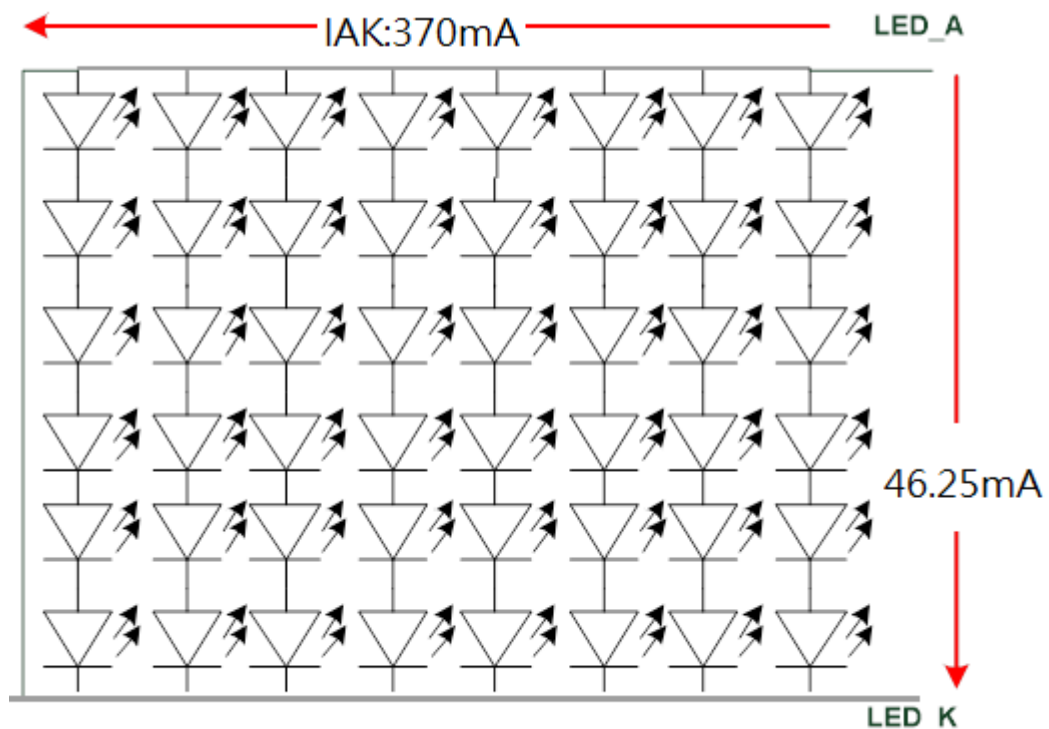
Pin #	Signal Name	Description
1	GND	Ground
2	NC	Not Connect
3	VDD	Power Supply
4	VDD	Power Supply
5	GND	Ground
6	GND	Ground
7	NC	Not Connect
8	NC	Not Connect
9	GND	Ground
10	IN0-	-LVDS differential data input
11	IN0+	+LVDS differential data input
12	IN1-	-LVDS differential data input
13	IN1+	+LVDS differential data input
14	IN2-	-LVDS differential data input
15	IN2+	+LVDS differential data input
16	CLK-	-LVDS differential clock
17	CLK+	+LVDS differential clock
18	IN3-	-LVDS differential data input
19	IN3+	+LVDS differential data input
20	E_IN0-	-LVDS differential data input
21	E_IN0+	+LVDS differential data input
22	E_IN1-	-LVDS differential data input
23	E_IN1+	+LVDS differential data input
24	E_IN2-	-LVDS differential data input
25	E_IN2+	+LVDS differential data input
26	E_CLK-	-LVDS differential clock
27	E_CLK+	+LVDS differential clock
28	E_IN3-	-LVDS differential data input
29	E_IN3+	+LVDS differential data input
30	GND	Ground
31	GND	Ground
32	VLED	LED Power Supply
33	VLED	LED Power Supply

34	VLED	LED Power Supply
35	VLED	LED Power Supply
36	LED_EN	LED Enable Pin : High→Enable
37	LED_PWM	PWM Signal for LED Dimming Control
38	GND	Ground
39	GND	Ground
40	GND	Ground

7. LED Driving Conditions

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED Driver voltage	VLED	-	12	-	V	
Power Supply Current For LED Driver	I _{LED}	-	1600	-	mA	VLED=12V VADJ=5V (duty 100%)
ADJ Input Voltage	V _{ADJ}	-	5	VLED	V	duty=100%
ADJ Dimming Freq.	F _{ADJ}	0.1		30	kHz	
LED voltage	V _{AK}	--	35.2		V	I _{AK} =370mA Ta=25°C
LED current	I _{AK}	--	370	--	mA	Ta=25°C
		--	277.5	--	mA	Ta=60°C
LED Life Time	-	--	50K	--	Hour	Note (2)

Note (1) The constant current source is needed for white LED back-light driving. When LCM is operated at 60 deg.C ambient temperature, the I_L of the LED back-light should be adjusted to 277.5mA max

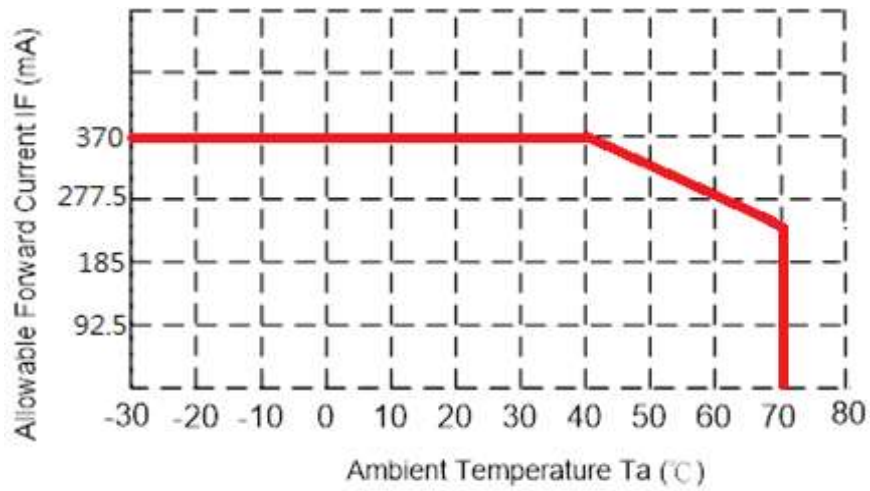


Note (2) : Condition: $T_a=25^{\circ}\text{C}$, continuous lighting

Life time is estimated data. Definitions of failure:

1. LCM brightness becomes half of the minimum value.
2. LED doesn't light normally.

When LCM is operated over 40°C ambient temperature, the ILED should follow :



8.Touch panel electrical specification

8.1 Electrical characteristics

Item	Specification
Type	Projective Capacitive Touch Panel
Activation	Multi-fingers or Single-finger
X/Y Position Reporting	Absolute Position
Touch Force	No contact pressure required
Calibration	No need for calibration
Report Rate	Approx. 200 points/sec
Control IC	ILI2510

Item	Symbol	Min.	Typ.	Max.	Unit
Touch panel power supply	VIN	4.75	5	5.25	V
Touch panel power supply current at Normal operation mode	IVIN	--	45(Reference)	--	mA
Touch panel power supply current at USB suspend mode	IVIN	--	TBD	--	uA

8.2 Interface

Pin No.	Symbol	Function
1	GND	GND
2	DA-	USB Data-
3	DA+	USB Data+
4	VIN	USB POWER 5V
5	NA	No connection
6	NA	No connection

9. Reliability Test

The reliability test items and its conditions are shown below.

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	50°C, 80% RH , 240 hrs	1,2
Thermal Shock Test	-20°C (30min) ~ 60°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 axes Duration : 30 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 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.

10 . GENERAL PRECAUTION

10.1 Use Restriction

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

10.2 Disassembling or Modification

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.

10.3 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.
- (4) Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.4 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 in order to prevent electric shock.

10.5 Absolute Maximum Ratings and Power Protection Circuit

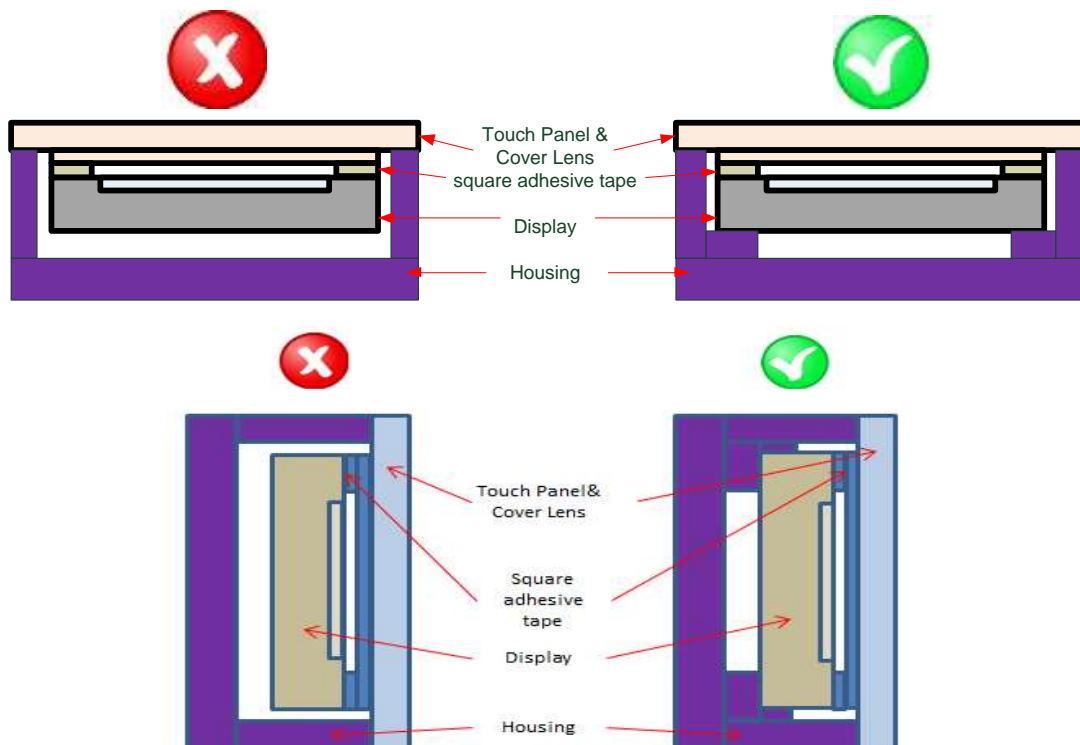
- (1) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
- (2) Please do not leave LCD module in the environment of high humidity and high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

10.6 Operation

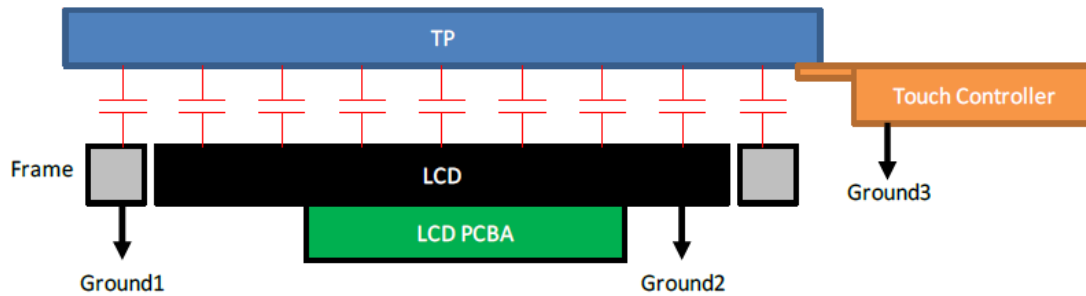
- (1) Do not touch, push or rub the polarizer with anything harder than HB pencil lead.
- (2) Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
- (3) When the surface is dusty, please wipe gently with absorbent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

10.7 Mechanism

- (1) Please mount LCD module by using mounting holes arranged in four corners tightly.
- (2) The square adhesive tape which is between the touch panel and display can't provide well supporting in the long term and high ambient temperature condition. Whether upright or horizontal position the support holder which is in the back side of the display is needed. Do not let the display floating.



- (3) TP needs to work in environment with stable stray capacitance. In order to minimize the variation in stray capacitance, all conductive mechanical parts must not be floating. Intermittent floating any conductive part around the touch sensor may cause significant stray capacitance change and abnormal touch function. It is recommended to keep all conductive parts having same electrical potential as the GND of the touch controller module.



GND1, GND2 and GND3 should be connected together to have the same ground

10.8 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.

10.9 Strong Light Exposure

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

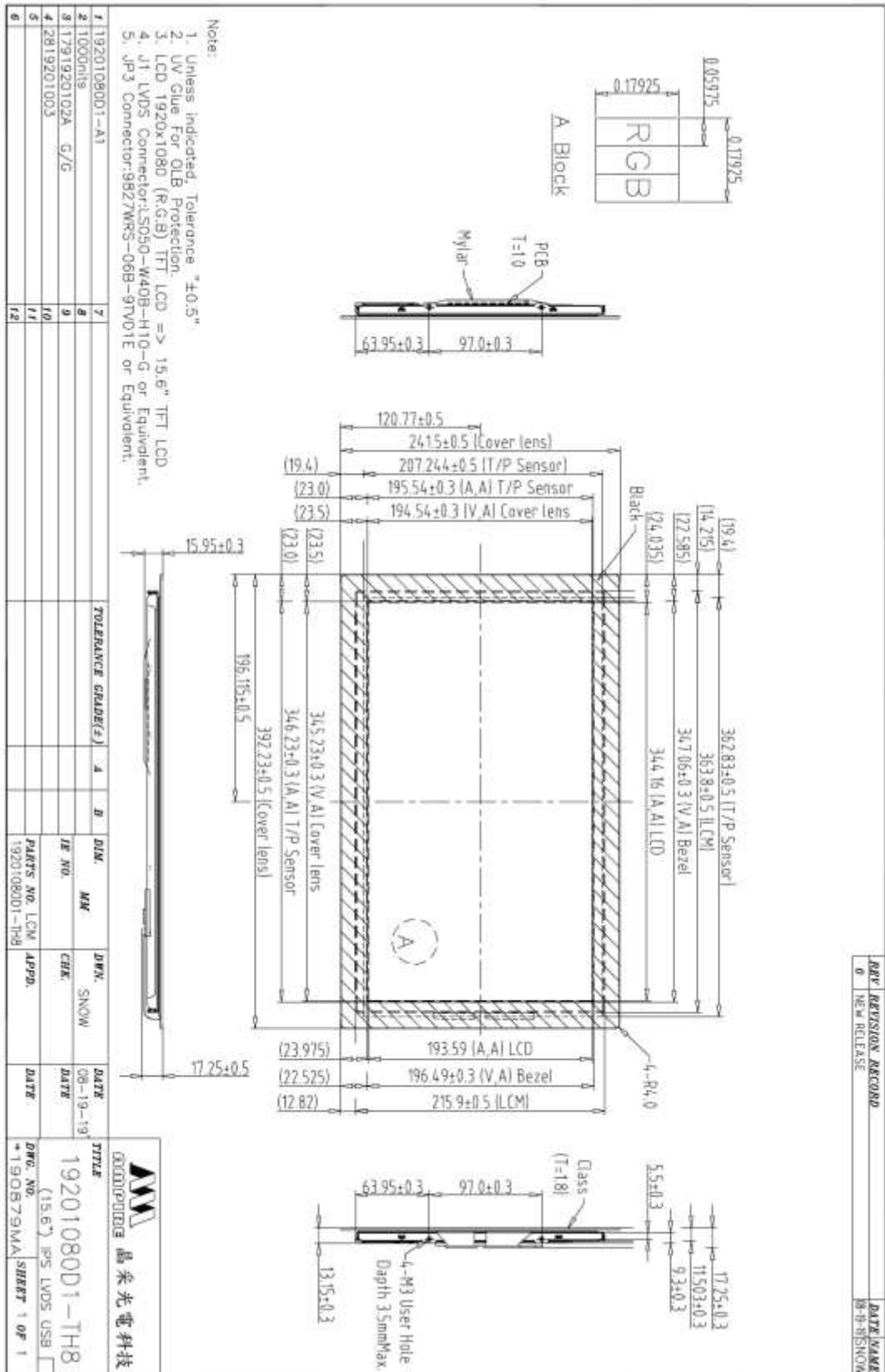
10.10 Disposal

When disposing LCD module, obey the local environmental regulations.

10.11 Others

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.

11.0 Outline Dimension



REV. REVISION RECORD		DATE/MAKE
0	NEW RELEASE	08-19(SNOW)
1	Added Tape (20.0x4.5.0)	12-13-19(SNOW)

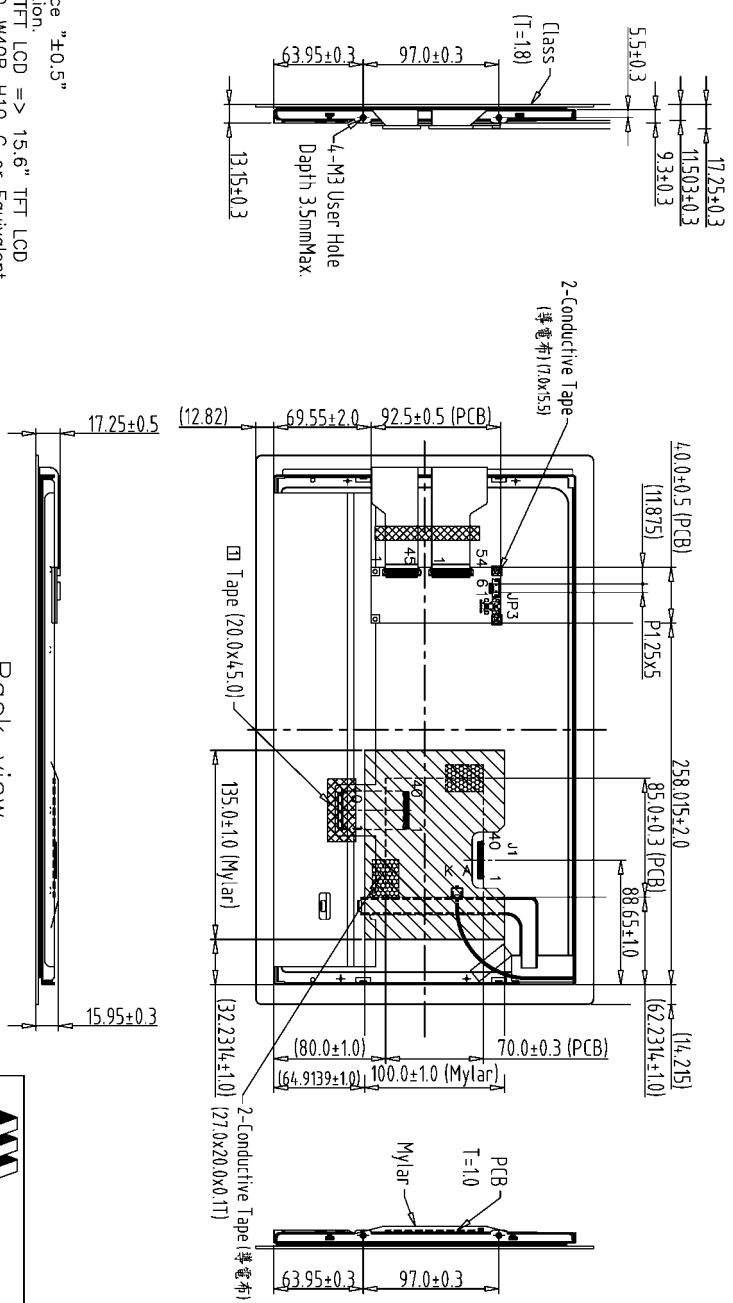
USB Interface

1	GND
2	DA-
3	DA+
4	VIN
5	NA
6	NA

J1

1	GND	21	E_IN0+
2	NC	22	E_IN1-
3	VDD	23	E_IN1+
4	VDD	24	E_IN2-
5	GND	25	E_IN2+
6	GND	26	E_CLK-
7	NC	27	E_CLK+
8	NC	28	E_IN3-
9	GND	29	E_IN3+
10	GND	30	GND
11	IN0+	31	GND
12	IN1-	32	VLED
13	IN1+	33	VLED
14	IN2-	34	VLED
15	IN2+	35	VLED
16	CLK-	36	LED_EN
17	CLK+	37	LED_PWM
18	IN3-	38	GND
19	IN3+	39	GND
20	E_IN0-	40	GND

- Note:
1. Unless indicated, Tolerance "±0.5"
 2. UV Glue For OLB Protection.
 3. LCD 1920x1080 (R.G.B) TFT LCD => 15.6" TFT LCD
 4. J1 LVDS Connector: S050-W40B-H10-G or Equivalent.
 5. JP3 Connector: 9827WRS-06B-9TV01E or Equivalent.



REV.	DESCRIPTION	DATE	BY	CHK.	APPD.	DATE
1	19201080D1-A1					
2	1000htg					
3	1791920102A G/G					
4	2819201003					
5						
6						

TOLERANCE GRADE(F)	A	B	DIM.	MM	DWN.	SNOW	DATE
			TR. NO.		CHK.		DATE
			PARTS NO. LCM-1		APPD.		DATE
			19201080D1-TH8				

TITLE	19201080D1-TH8
DWG. NO.	(15.6") IPS LVDS USB T
SHEET	1 OF 1



晶采光電科技股份有限公司
AMPIRE CO., LTD.

Auxiliary

AMPIRE HDMI Board

REV.D

AMPIRE CO., LTD.
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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

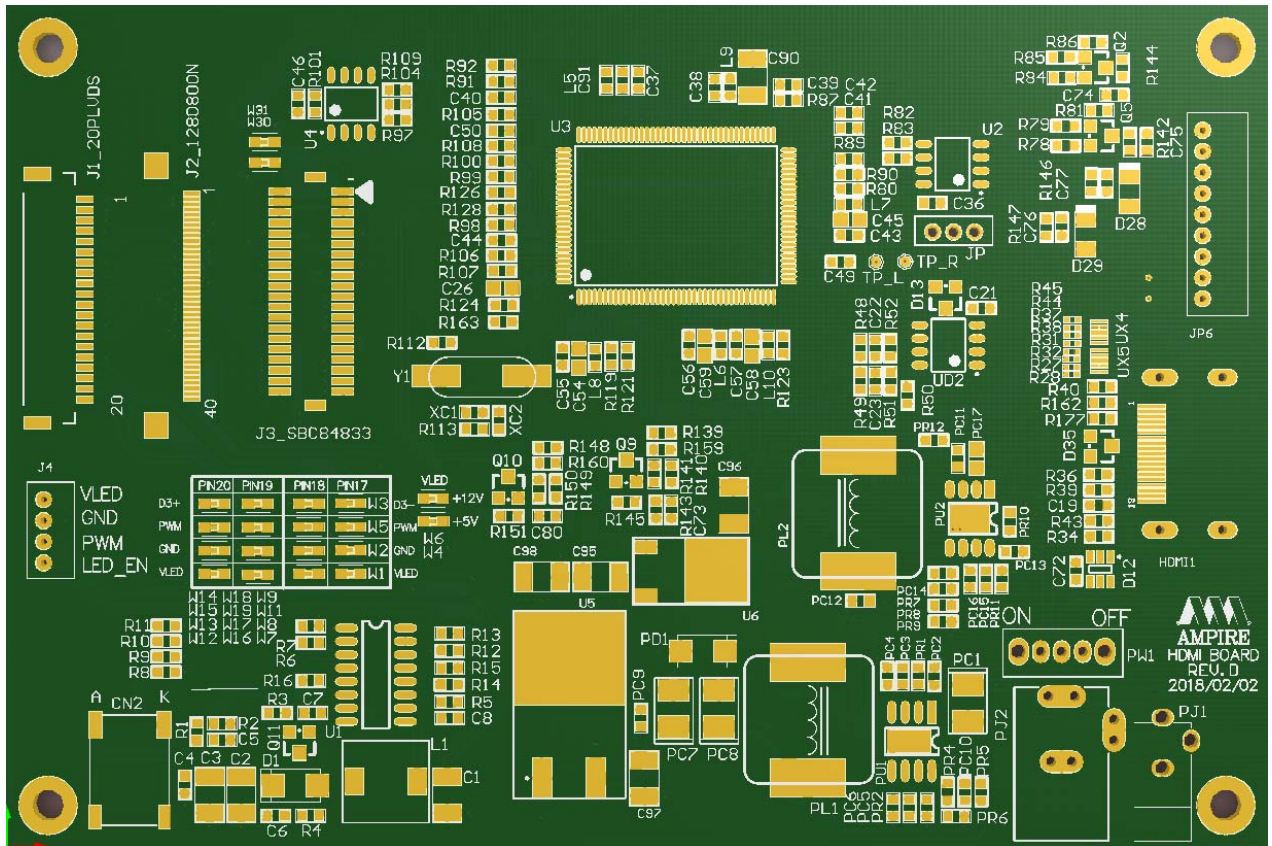
RECORD OF REVISION

Revision Date	Page	Contents	Editor
2018/06/19	-	New Release	Mark

1. Features

HDMI to LCD interface board

- Single Power input: 12V / 2A power input. (Connector: PJ1 or PJ2).
- LCD LVDS output: 24 BIT Single LVDS
- HDMI Digital input : (Connector: HDMI1)
 - ◆ HDMI 1.4a Compliant
 - ◆ Single-link (Type A HDMI) on-chip TMDS receiver up to 225MHz. Support long cable.
 - ◆ Do not support HDCP.

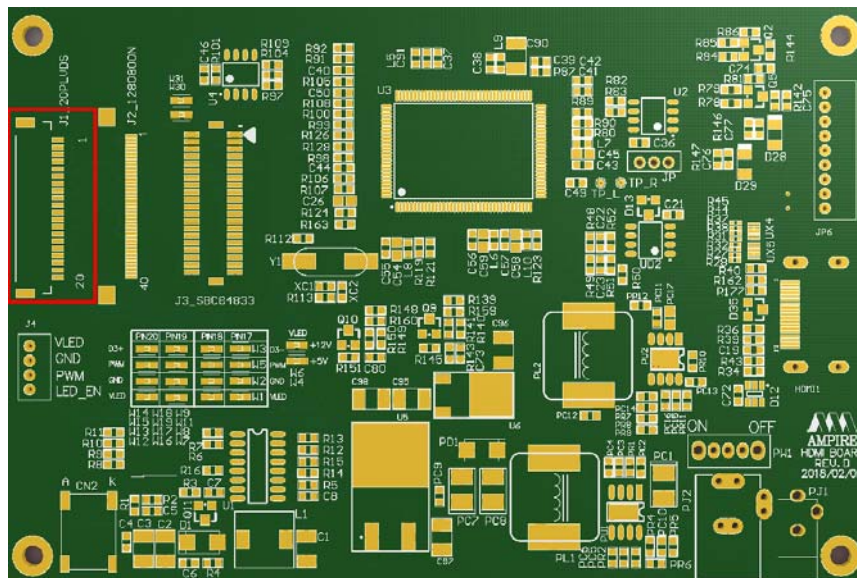


2. Support input video format :

Resolution	V Sync	Resolution	V Sync
640x480	60	1280x800	60
640x480	72	1280x800	75
640x480	75	1280x960	60
800x600	56	1280x1024	60
800x600	60	1280x1024	75
800x600	72	1360x768	60
800x600	75	1366x768	60
848x480	60	1400x1050	60
1024x768	60	1400x1050	75
1024x768	70	1440x900	60
1024x768	75	1440x900	75
1152x864	75	1600x900	60
1280x720	60	1680x1050	60
1280x768	60	1680x1050	75
1280x768	75	1920x1080	60

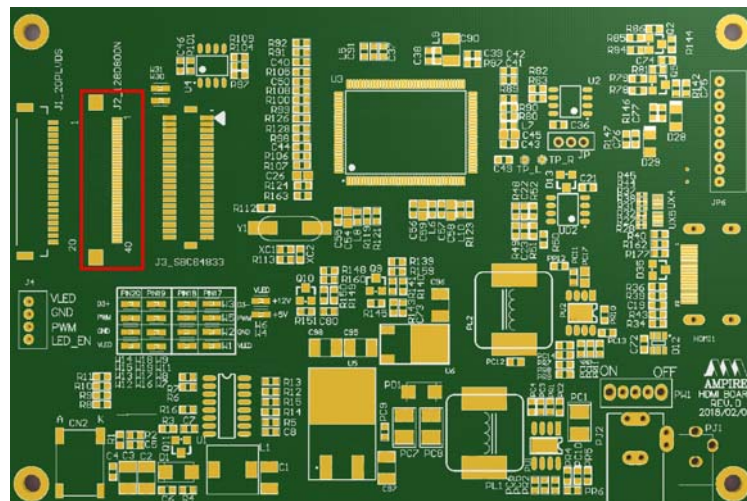
3.2 J1_20PIN LVDS

Pin No.	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	GND	Power Ground
4	GND	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	GND	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	GND	Power Ground
11	IN2-	Transmission Data of Pixels 2
12	IN2+	Transmission Data of Pixels 2
13	GND	Power Ground
14	CLK-	Sampling Clock
15	CLK+	Sampling Clock
16	GND	Power Ground
17	JUMP	JUMP
18	JUMP	JUMP
19	GND	Power Ground
20	JUMP	JUMP



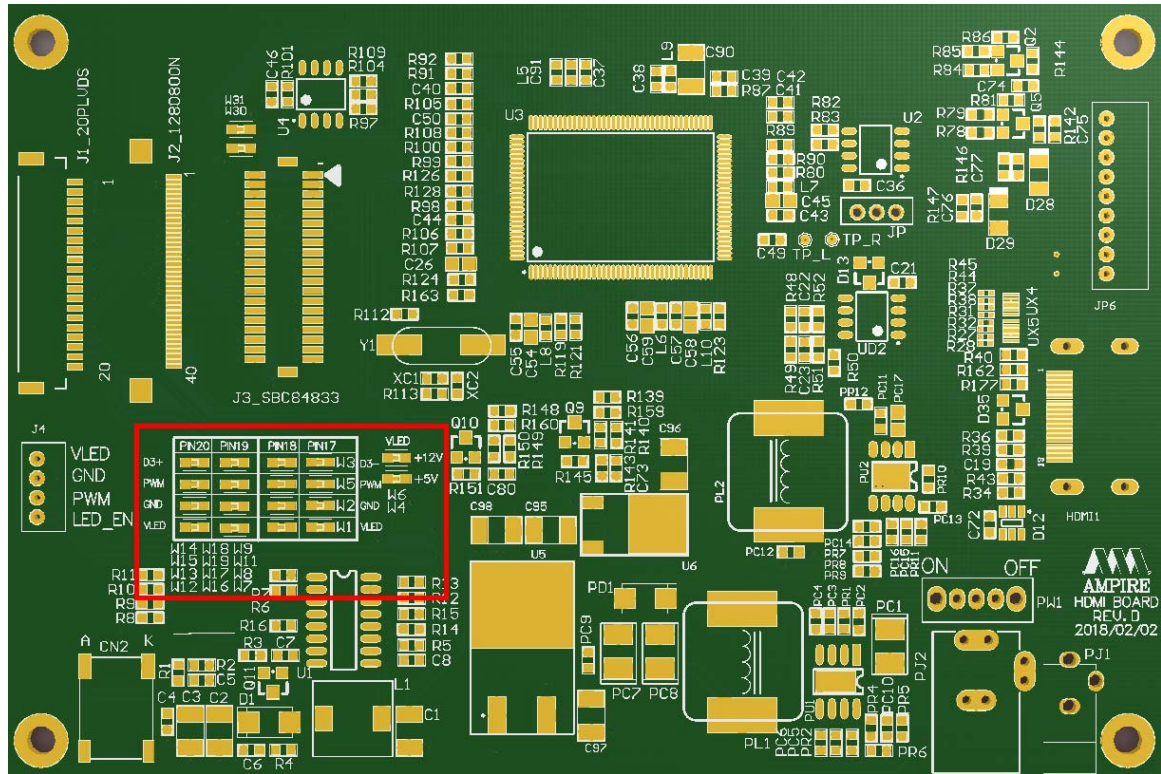
3.3 J2_40PIN LVDS

Pin #	Signal Name	Description	Remarks
1	NC	Not Connect	-
2	VDD	Power Supply, 3.3V (typical)	-
3	VDD	Power Supply, 3.3V (typical)	
4	NC	Not Connect	
5	NC	Not Connect	
6	NC	Not Connect	
7	NC	Not Connect	
8	LV0N	-LVDS differential data input	
9	LV0P	+LVDS differential data input	
10	GND	Ground	
11	LV1N	-LVDS differential data input	
12	LV1P	+LVDS differential data input	
13	GND	Ground	
14	LV2N	-LVDS differential data input	
15	LV2P	+LVDS differential data input	
16	GND	Ground	
17	LVCLKN	-LVDS differential data input	
18	LVCLKP	+LVDS differential data input	
19	GND	Ground	
20	LV3N	-LVDS differential data input	
21	LV3P	+LVDS differential data input	
22	GND	Ground	
23	LED_GND	Ground for LED Driving	
24	LED_GND	Ground for LED Driving	
25	LED_GND	Ground for LED Driving	
26	NC	Not Connect	
27	LED_PWM	PWM Input signal for LED driver	
28	LED_EN	LED Enable Pin	
29	Not Connect	NC	
30	NC	Not Connect	
31	LED_VCC	Power Supply for LED Driver	
32	LED_VCC	Power Supply for LED Driver	
33	LED_VCC	Power Supply for LED Driver	
34	NC	Not Connect	
35	BIST	BIST pin	
36-40	NC	Not Connect	



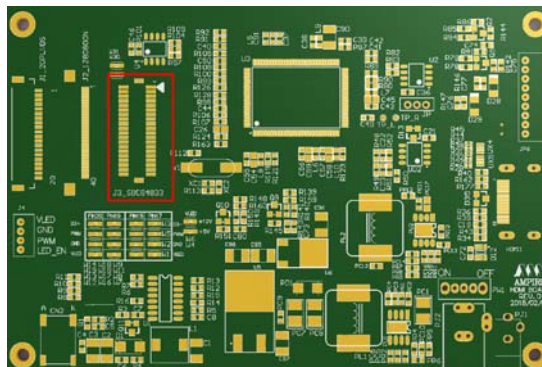
JUMP FOR PIN17 to PIN20 and VLED

- These jump only for J1_20PLVDS
- For Design reference only. These supply voltage and signals do not need to input by end user.



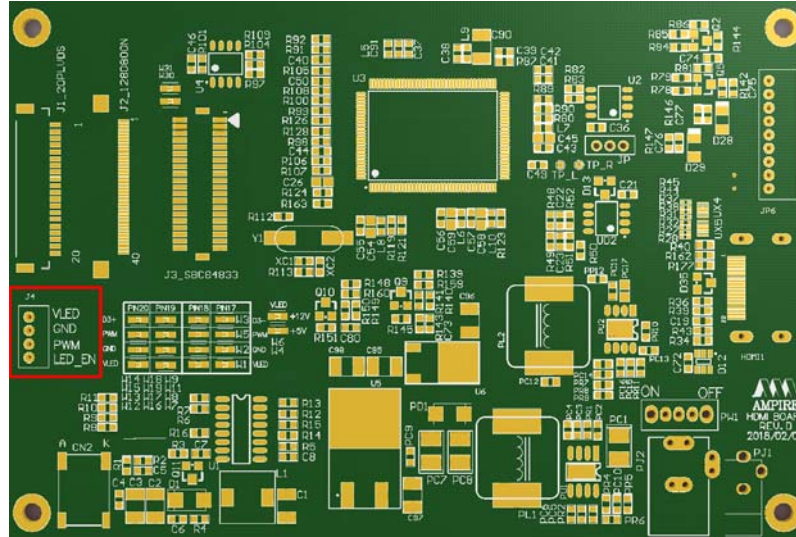
3.4 J3 40PIN LVDS

Pin #	Signal Name	Description	Remarks
1	VDD	Power Supply, 3.3V (typical)	-
2	VDD	Power Supply, 3.3V (typical)	-
3	VDD	Power Supply, 3.3V (typical)	
4	VDD	Power Supply, 3.3V (typical)	
5	VDD	Power Supply, 3.3V (typical)	
6	VDD	Power Supply, 3.3V (typical)	
7	NC	Not Connect	
8	NC	Not Connect	
9	GND	Ground	
10	GND	Ground	
11	LV8N	-LVDS differential data input	
12	LV5N	-LVDS differential data input	
13	LV8P	+LVDS differential data input	
14	LV5P	+LVDS differential data input	
15	GND	Ground	
16	GND	Ground	
17	LVCLK1N	-LVDS differential data input	
18	LV6N	-LVDS differential data input	
19	LVCLK1P	+LVDS differential data input	
20	LV6P	+LVDS differential data input	
21	GND	Ground	
22	GND	Ground	
23	LV0N	-LVDS differential data input	
24	LV7N	-LVDS differential data input	
25	LV0P	+LVDS differential data input	
26	LV7P	+LVDS differential data input	
27	GND	Ground	
28	GND	Ground	
29	LV1N	-LVDS differential data input	
30	LV3N	-LVDS differential data input	
31	LV3P	+LVDS differential data input	
32	LV7P	+LVDS differential data input	
33	GND	Ground	
34	GND	Ground	
35	LV2N	-LVDS differential data input	
36	LVCLK0N	-LVDS differential data input	
37	LV2P	+LVDS differential data input	
38	LVCLK0P	+LVDS differential data input	
39	GND	Ground	
40	GND	Ground	



3.5 J4 BackLight Contrller Connector

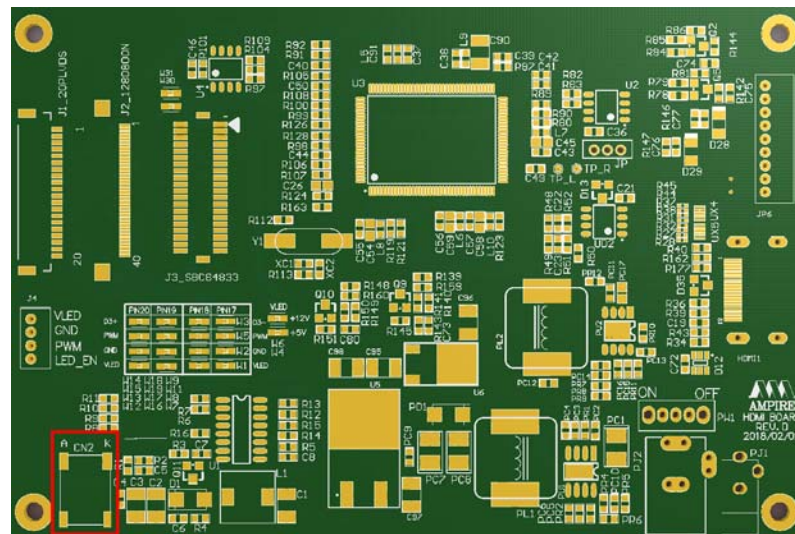
Pin No.	Symbol	I/O	Description	Note
1	VLED	P	Voltage for LED circuit (5.0V or 12V)	
2	GND	I	Power ground	
3	ADJ	P	Adjust the LED brightness by PWM	
4	LED_EN	I	LED BLU ON/OFF. High level: ON; Low level: OFF.	



3.6 BackLight A,K Connector

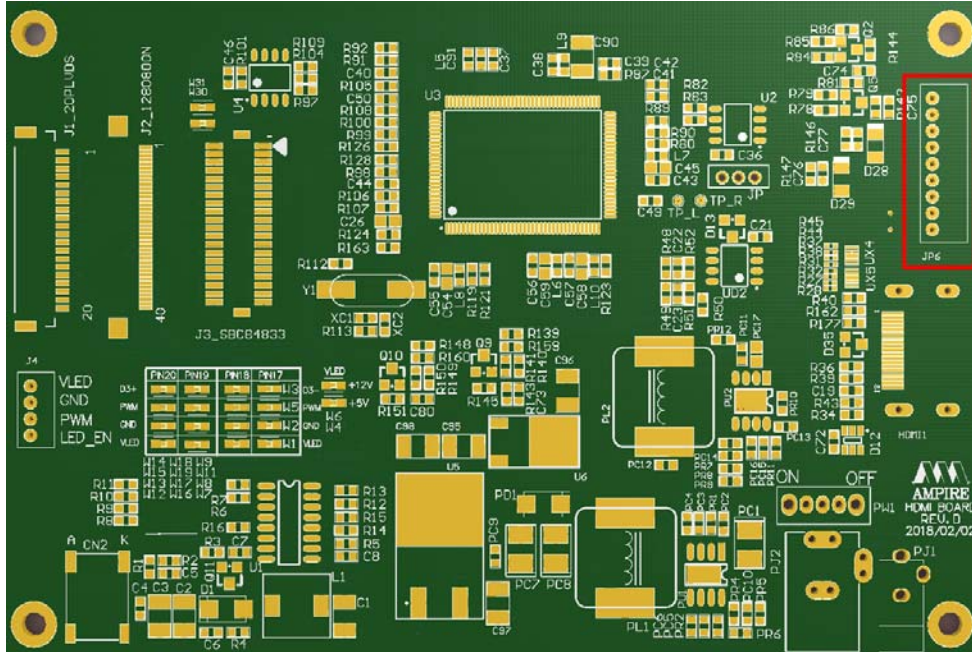
- Only for external backlight connector

Pin No.	Symbol	Description
1	A	Anode
2	K	Cathode



3.7 JP6 Keypad connector for HDMI Board

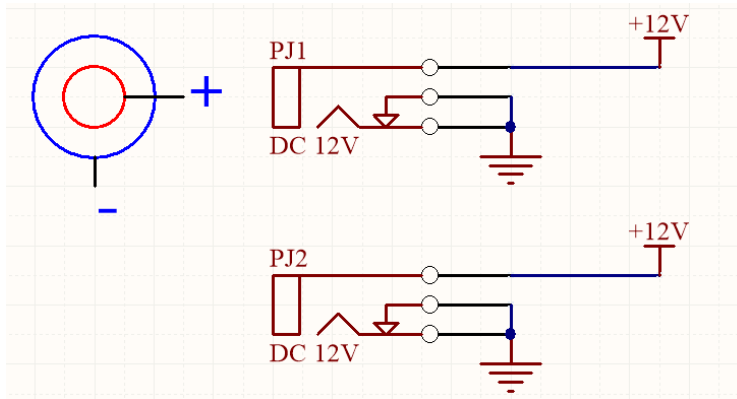
- **Optional item**
- **If customer need, please check with Ampire sales for new part no. and sample.**




4. INTERFACE PIN CONNECTION INTERFACE (HDMI Interface Board)

- **PJ1 & PJ2 Power Supply Power Jack:**

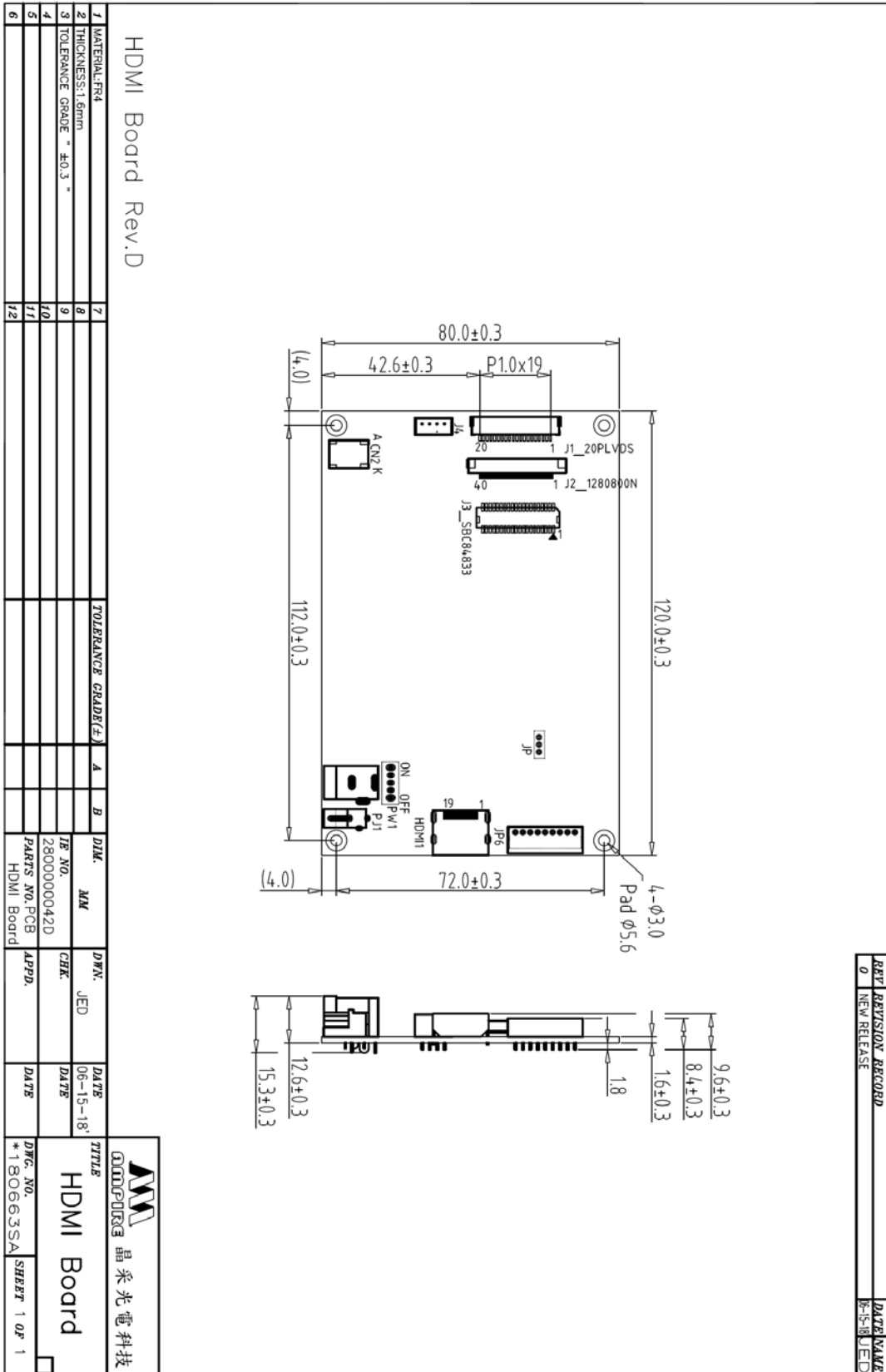
Inner terminal is positive. Outer terminal is GND



- **HDMI1: HDMI Type A Connector**

HDMI			
			
PIN	SIGNAL	PIN	SIGNAL
1	TMDS Data2+	11	TMDS Clock Shield (Ground)
2	TMDS Data2 Shield (Ground)	12	TMDS Clock-
3	TMDS Data2-	13	CEC (not used)
4	TMDS Data1+	14	Reserved (No Connection)
5	TMDS Data1 Shield (Ground)	15	SCL
6	TMDS Data1-	16	SDA
7	TMDS Data0+	17	DDC/CED (Ground)
8	TMDS Data0 Shield (Ground)	18	+5V input
9	TMDS Data0-	19	Hot Plug Detect
10	TMDS Clock+		

5. Outline Dimension



6. Photo

