

Specifications for LCD module

Customer	
Customer part no.	
Ampire part no.	AM-800480N6TZQW-T06H
Approved by	
Date	

Preliminary Specification

Formal Specification

<i>Patrick</i>	<i>Mark</i>	<i>Mantle</i>
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*This Specification is subject to change without notice.

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2020/07/31		New Release	Mantle

1. Features

5 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This TFT LCD has a 5.0 (5:3) inch diagonally measured active display area with 800x480 (800 horizontal by 480 vertical pixels) resolution. This module is composed of a 5" TFT-LCD panel and backlight unit.

- (1) Construction: a-Si TFT-LCD with driving system, White LED Backlight.
- (2) LCD type : IPS
- (3) Number of the Colors : 262K colors (R,G,B 6 bit digital each)
- (4) LVDS Interface 20 pin.
- (5) LCD Power Supply Voltage: 3.3V single power input, built-in power supply circuit.
- (6) PCB : 800480L-A0. Built-in LED Driver
- (7) HDMI Board
- (8) Capacitive-type touch panel :
 - Touch controller: ILI2511
 - Interface: USB
 - Cover lens: 1.1mm

2. Physical Specifications

Item	Specifications	unit
Display size (diagonal)	5.0	inch
Resolution	800 (W) x RGB x 480 (H)	dot
Pixel pitch	0.135 (W) x 0.135 (H)	mm
Color configuration	R.G.B Vertical stripe	
Display Mode	Normally Black	
Module size	118.5(w) x 77.1(H) x9.985 (T)	mm

3. Absolute Maximum Ratings

3.1 Electrical Absolute max. ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power voltage	VCC	GND=0	-0.3	4.0	V	
Input Signal Voltage	VI	GND=0	-0.5	VCC + 0.5	V	Note(1)

Note (1): Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

3.2 Environmental Absolute Maximum Ratings

Item	Operating		Storage		Remark
	Min.	Max.	Min.	Max.	
Temperature	-20	70	-30	80	Note(2),(3) ,(4),(5),(6),(7)
Humidity	Note(1)		Note(1)		
Corrosive Gas	Not Acceptable		Not Acceptable		

Note(1) Ambient temperature Temp. $\leq 60^{\circ}\text{C}$: 90% RH max

Note(2) For storage condition Ta at $-30^{\circ}\text{C} < 240\text{h}$, at $80^{\circ}\text{C} < 240\text{h}$

Note(3) For operating condition Ta at $-20^{\circ}\text{C} < 100\text{h}$, at $70^{\circ}\text{C} < 240\text{h}$

Note(4) Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

Note(5) The response time will be slower at low temperature.

Note(6) Only operation is guaranteed at operating temperature. Contrast, response time, another display quality are evaluated at $+25^{\circ}\text{C}$

Note(7) When LCM panel is operated over 60°C (center of the panel surface temperature), the IAK of the LED back-light should be adjusted to 105mA

Note(8) This is center of the panel surface temperature, not ambient temperature.

Note(9) At 25°C

4. Optical Characteristics

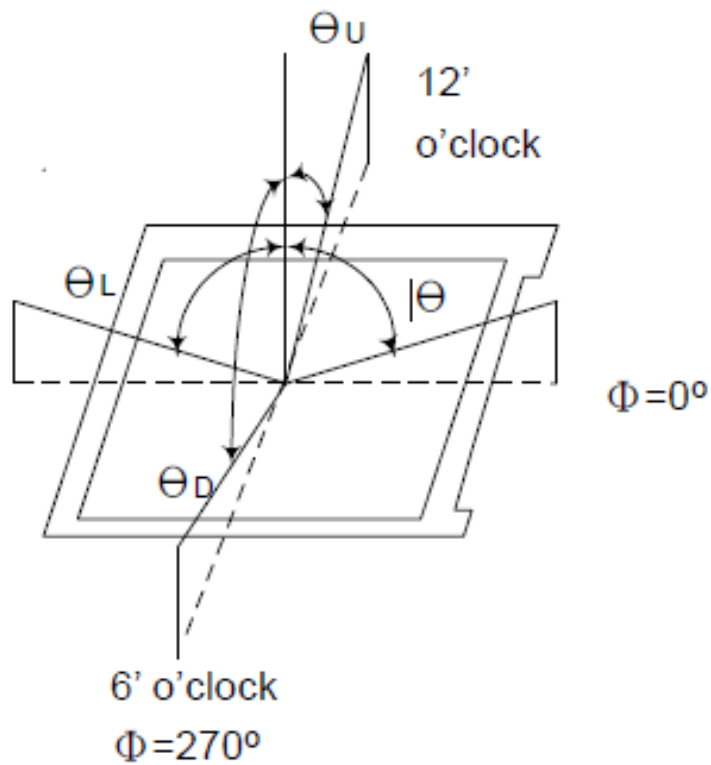
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Viewing Angle	Hor.	θU	$CR \geq 10$	75	85	--	deg.	(1),(4)
		θD		75	85	--		
	Ver.	θL		75	85	--		
		θR		75	85	--		
Contrast ratio	CR	$\Theta = \Phi = 0^\circ$	800	1000	--	--	(1),(2)	
Response Time	$T_R + T_F$	$\Theta = \Phi = 0^\circ$	--	30	40	msec	(1),(3)	
Color Gamut	(%)		45	50	--	%		
Color chromaticity	Red	R_x	$\Theta = \Phi = 0^\circ$	Typ. -0.05	TBD	Typ. +0.05	--	(1),(4),(5)
		R_y			TBD			
	Green	G_x			TBD			
		G_y			TBD			
	Blue	B_x			TBD			
		B_y			TBD			
	White	W_x			0.32			
		W_y			0.37			
Luminance (IAK=140mA)	L	$\Theta = \Phi = 0^\circ$	340	425	--	cd/m ²	(1),(6)	
Luminance Uniformity	ΔL	$\Theta = \Phi = 0^\circ$	70	-	-	%	(7)	

Measuring Condition

Ta=25°C. To be measured on the center area of panel after 10 minutes operation. LED Back-light IAK=140mA.

- Measuring surrounding : Dark room
- Ambient temperature : 25±2°C
- 15min. Warm-up time.

Note(1) Definition of Viewing Angle

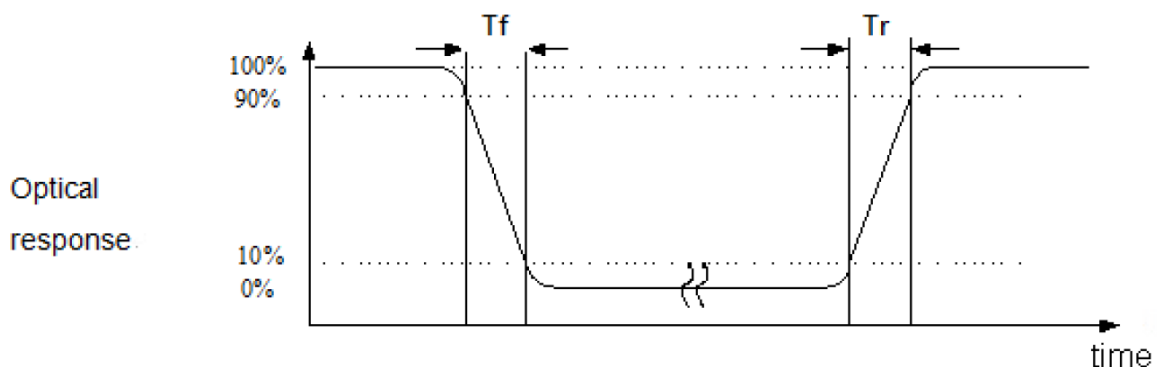


Note(2) Definition of Contrast Ratio (CR) :

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(3) Definition of Response Time : Sum of TR and TF

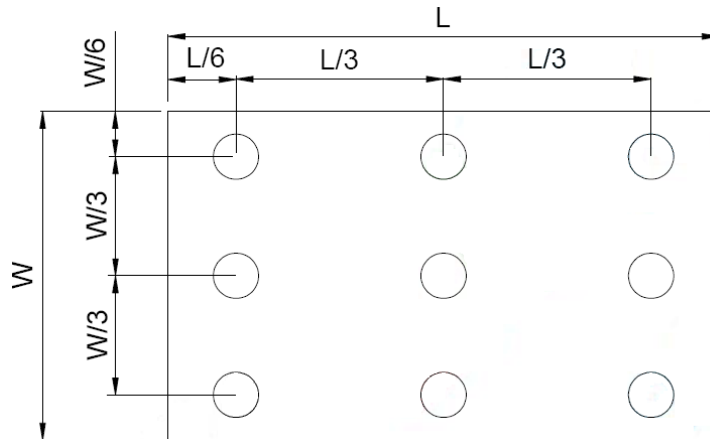


Note(7) Definition of Luminance Uniformity

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



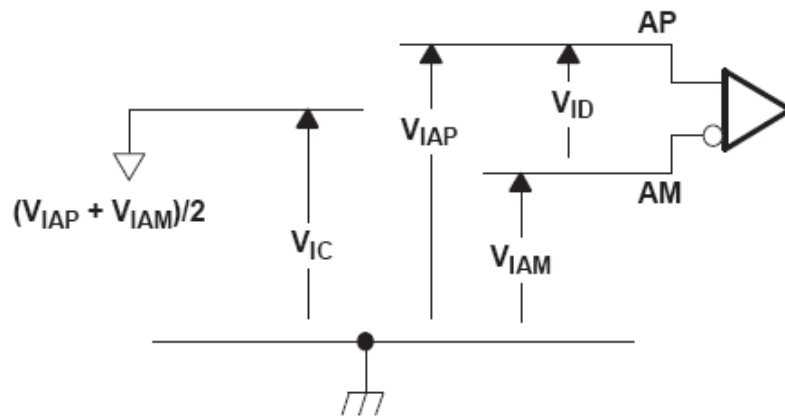
B_{\max} : The measured maximum luminance of all measurement position.

B_{\min} : The measured minimum luminance of all measurement position.

5. Electrical Characteristics

5.1. LVDS input

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	3	3.3	3.6	V
I_{CC}	Current of Supply voltage		100		mA
V_{IH}	High-level input voltage (SHTDN)	2			V
V_{IL}	Low-level input voltage (SHTDN)			0.8	V
$ V_{ID} $	Magnitude differential input voltage	0.1		0.6	V
V_{IC}	Common-mode input voltage	$\frac{ V_{ID} }{2}$		$2.4 - \frac{ V_{ID} }{2}$	V



5.2. Electrical characteristic of LED Back-light

5-2-1 LED DRIVER POWER INPUT

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	CONDITION
Power Supply Voltage For LED	VLED	4.5	5	5.5	V	
Power Supply Current For LED	ILED	-	320	420	mA	VLED=5V ADJ=3.3V
ADJ signal frequency	f_{PWM}	200	--	1K	Hz	
ADJ signal logic level High	V_{IH}	1.2	3.3	5.0	V	
ADJ signal logic level Low	V_{IL}	-	-	0.5	V	

5-2-2 LED BACK_LIGHT UNIT

(For design reference only, user does not need to supply this power)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED Forward Current	IF	--	140	--	mA	Ta=25°C , A1+A2 total current
LED Forward Voltage	VF	8.4	9.0	10.2	V	IF=140mA, Ta=25°C
LED life time			30,000	-	Hr	IF=140mA, Ta=25°C

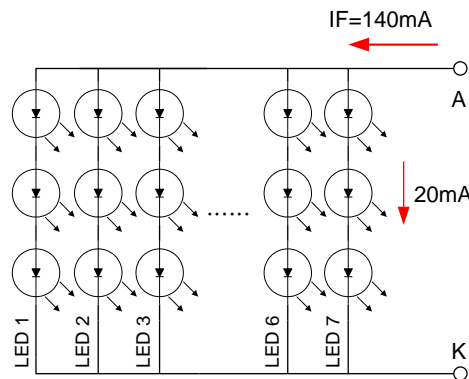
Note 1: Ta means ambient temperature of TFT-LCD module.

Note 2: If the module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

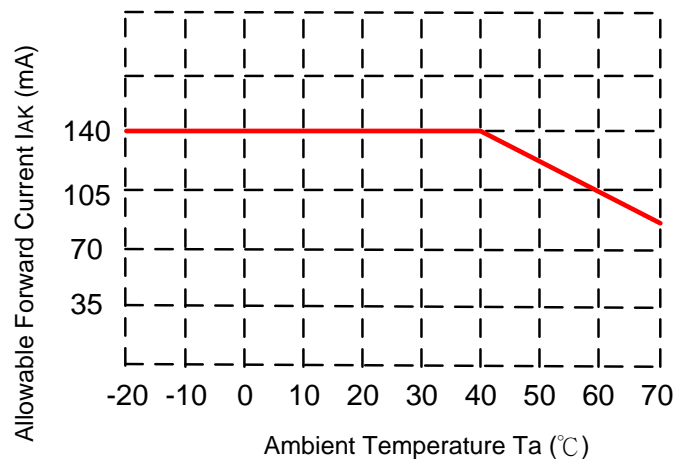
Note 3: The constant current source is needed for LED back-light driving.

Note 4: Operating life means brightness goes down to 50% minimum brightness. LED life time is estimated data. Ta=25°C

Note 5: the structure of LED B/L shows as below.



Note(1) When LCM is operated over 60°C ambient temperature, the IAK of the LED backlight should be adjusted to 105mA max

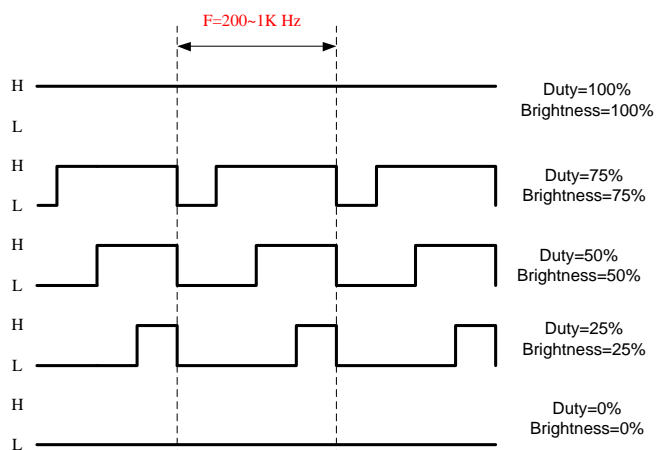


6. INTERFACE PIN ASSIGNMENT

TFT_LCD: CN3 P1.0x20PIN CP100-S20G-H16 / DF-19G-20P-1H or Equivalent

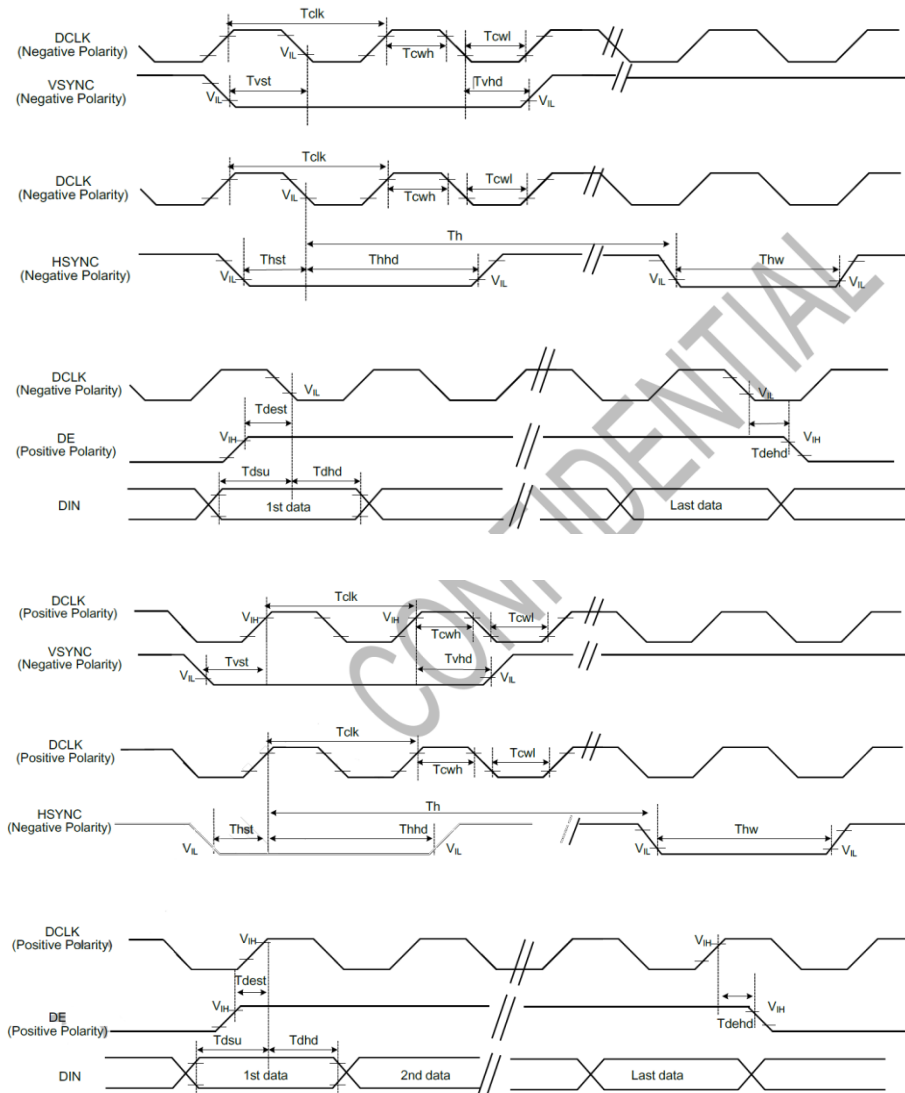
Pin No.	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	GND	Power Ground
4	GND	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	GND	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	GND	Power Ground
11	IN2-	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	VLED	POWER SUPPLY for Backlight : 5V
18	VLED	POWER SUPPLY for Backlight : 5V
19	GND	Power Ground
20	ADJ	LED PWM SIGNAL

Note1: ADJ is PWM signal input. It is for brightness control.

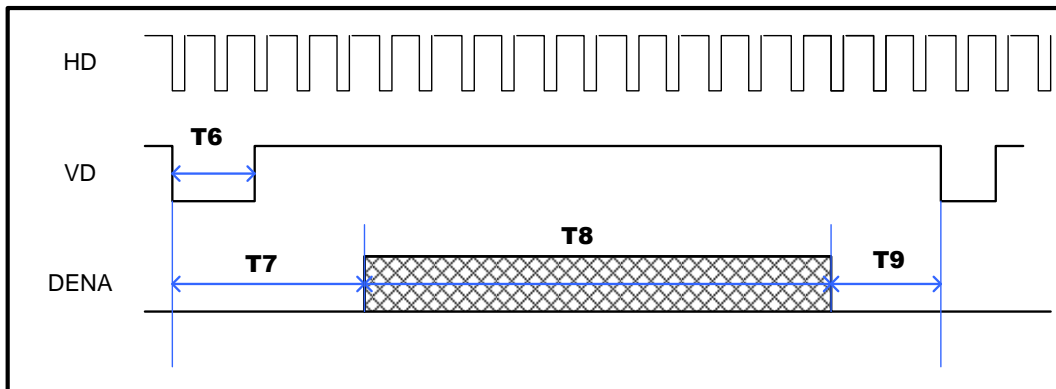
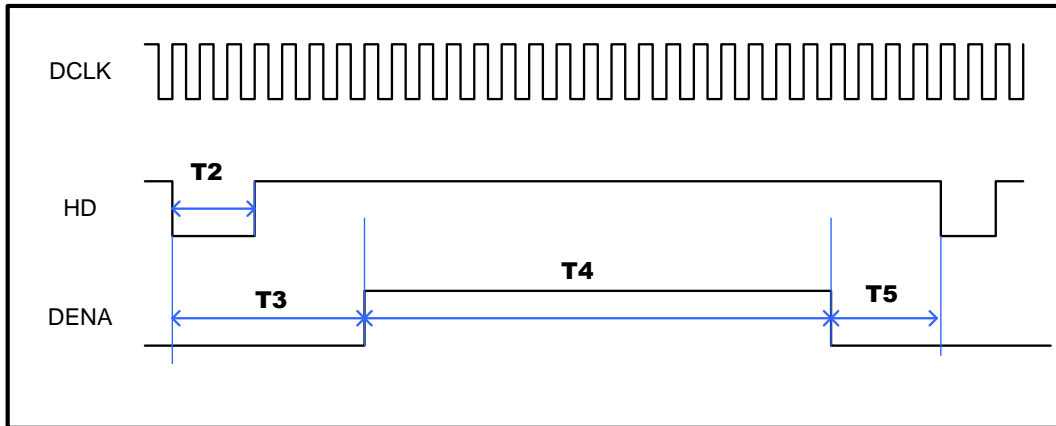
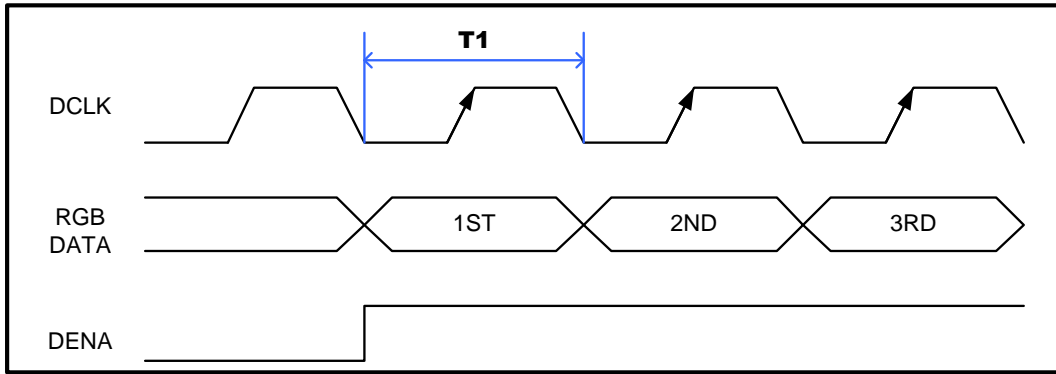


7. Interface Timing

Timing for RGB Interface

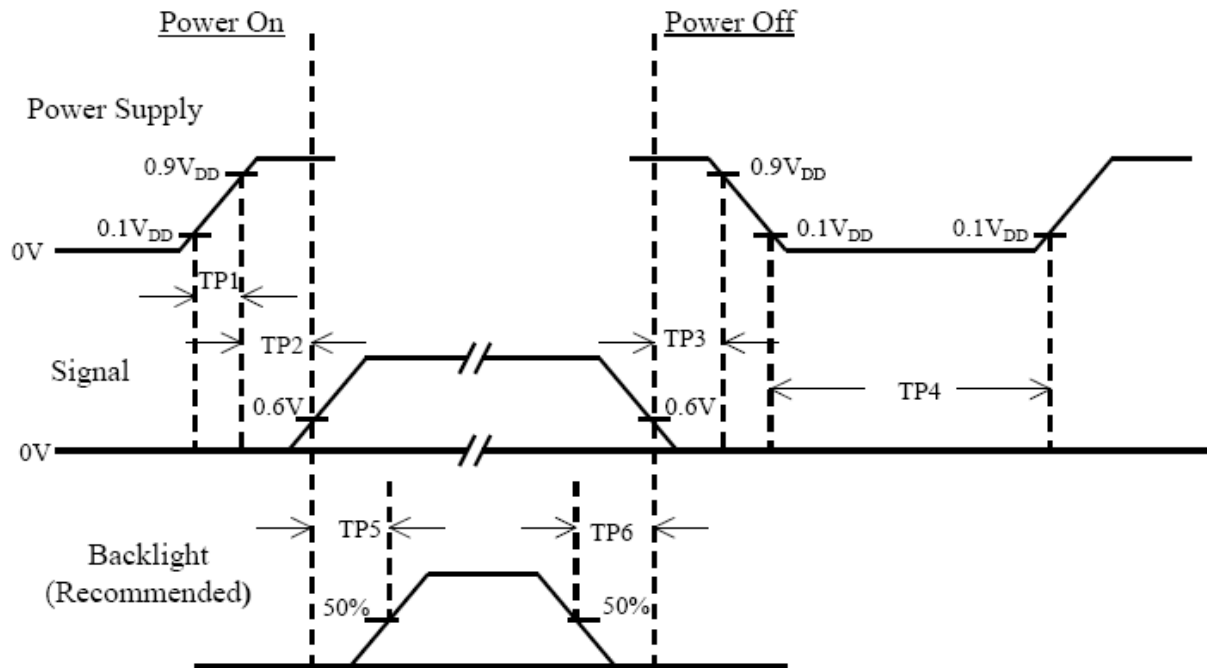


Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	T_{cw}	40	50	60	%	
HSYNC Width	T_{hw}	2	-	-	DCLK	
HSYNC Period	T_h	55	60	65	us	
VSYNC Setup Time	T_{vst}	12	-	-	ns	
VSYNC Hold Time	T_{vhd}	12	-	-	ns	
HSYNC Setup Time	T_{hst}	12	-	-	ns	
HSYNC Hold Time	T_{hhd}	12	-	-	ns	
Data Setup Time	T_{dsu}	12	-	-	ns	
Data Hold Time	T_{dhhd}	12	-	-	ns	
DE Setup Time	T_{dst}	12	-	-	ns	
DE Hold Time	T_{dhd}	12	-	-	ns	



Item	Symbol	Min.	Typ.	Max.	Unit
Clock Frequency	1/T1	23	25	27	MHz
HSYNC Pulse Wide	T2	2	8	8	clocks
HSYNC Back Porch	T3	4	8	48	Clocks
HSYNC Front Porch	T5	4	8	48	Clocks
Horizontal Display Period	T4	800			Clocks
Horizontal total Period	T3+T4+T5	808	816	896	Clocks
VSYNC Pulse Wide	T6	2	4	8	Lines
VSYNC Back Porch	T7	4	8	12	Lines
VSYNC Front Porch	T9	4	8	12	Lines
Vertical Display Period	T8	480			Lines
Vertical total Period	T7+T8+T9	488	496	504	Lines

8. Power On/Off Sequence



Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	200	--	--	msec	
TP6	200	--	--	msec	

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

Note(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.

Note(3) In case of VCC = off level, please keep the level of input signal on the low or keep a high impedance.

Note(4) TP4 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.

9. Displayed Color and Input Data Data Signal

COLOR		INPUT DATA																							
		R DATA						G DATA						B DATA											
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
MSB			LSB			MSB			LSB			MSB			LSB										
BASIC COLOR	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(255)	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(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	1	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	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
RED	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	
	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	0
GREEN	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	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	0	0	0	0	0	0	0	0	0
BLUE	BLUE(1)	0	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	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1

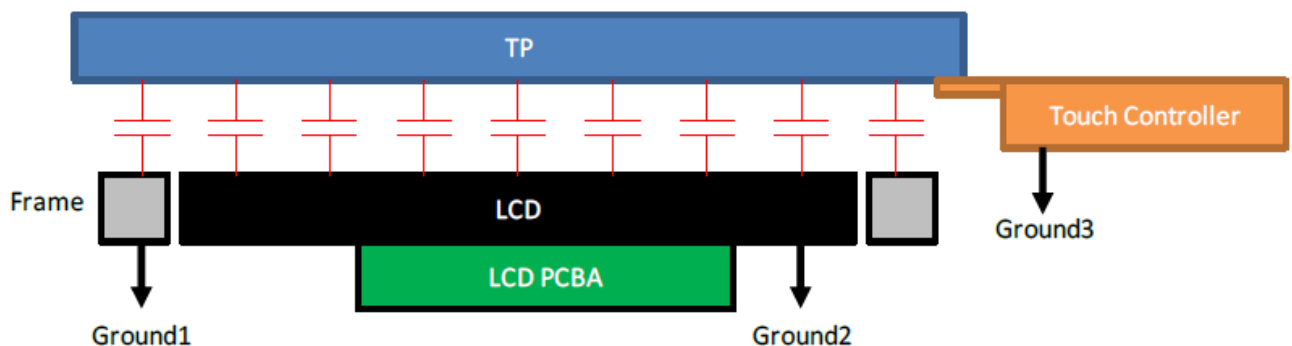
10.Touch Panel

ITEM	SPECIFICATION
Type	Projective Capacitive Touch Panel
Activation	Two-fingers or Single-finger
X/Y Position Reporting	Absolute Position
Touch Force	No contact pressure required
Calibration	No need for calibration
Report Rate	Approx. 100 points/sec
Interface	USB
Control IC	ILI2511

Pin definition of TP FPC:

CN6		
Pin No.	Symbol	Function
1	GND	POWER GND
2	USB D-	USB data.
3	USB D+	
4	VDD	5V Input
5	NC	No connection
6	NC	No connection

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

11. Reliability Test Conditions

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 Humidity Test	60 °C, Humidity 90%, 240 hrs	(1),(2)
Vibration Test (Packing)	Sweep frequency : 10 ~ 50 ~ 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 inspired 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 initial value.

12. Use Precautions

12.1 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.
- (4) 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.

12.2 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. $1M\Omega$ 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.

12.3 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.

12.4 Operating precautions

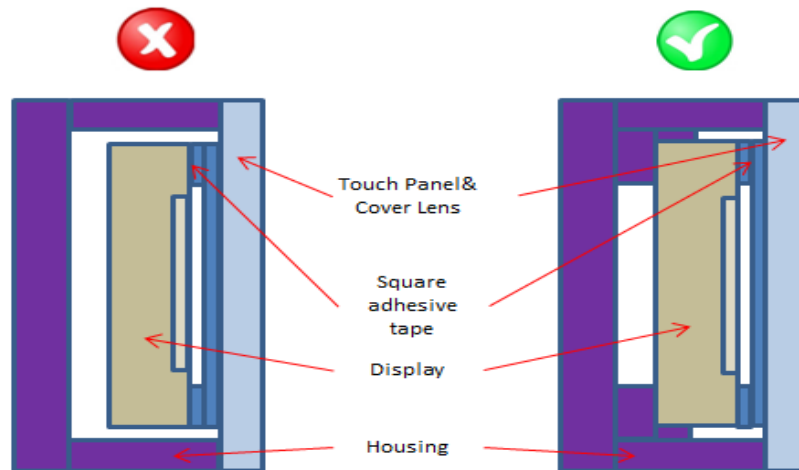
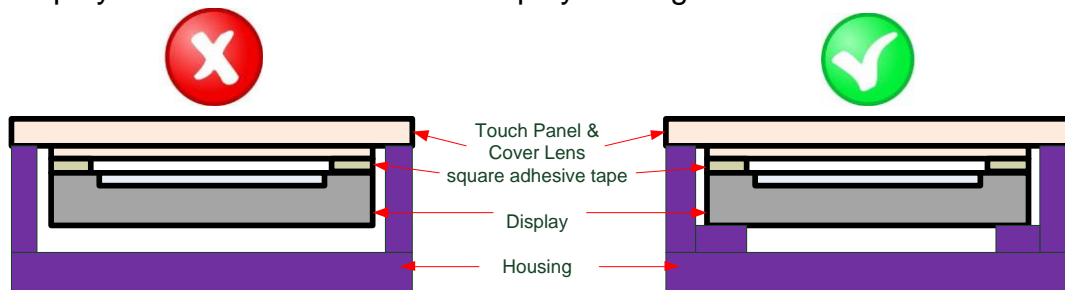
- (1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input 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 drive 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: 0.2V_{dd} or less and H level: 0.8V_{dd} 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.

12.5 Other

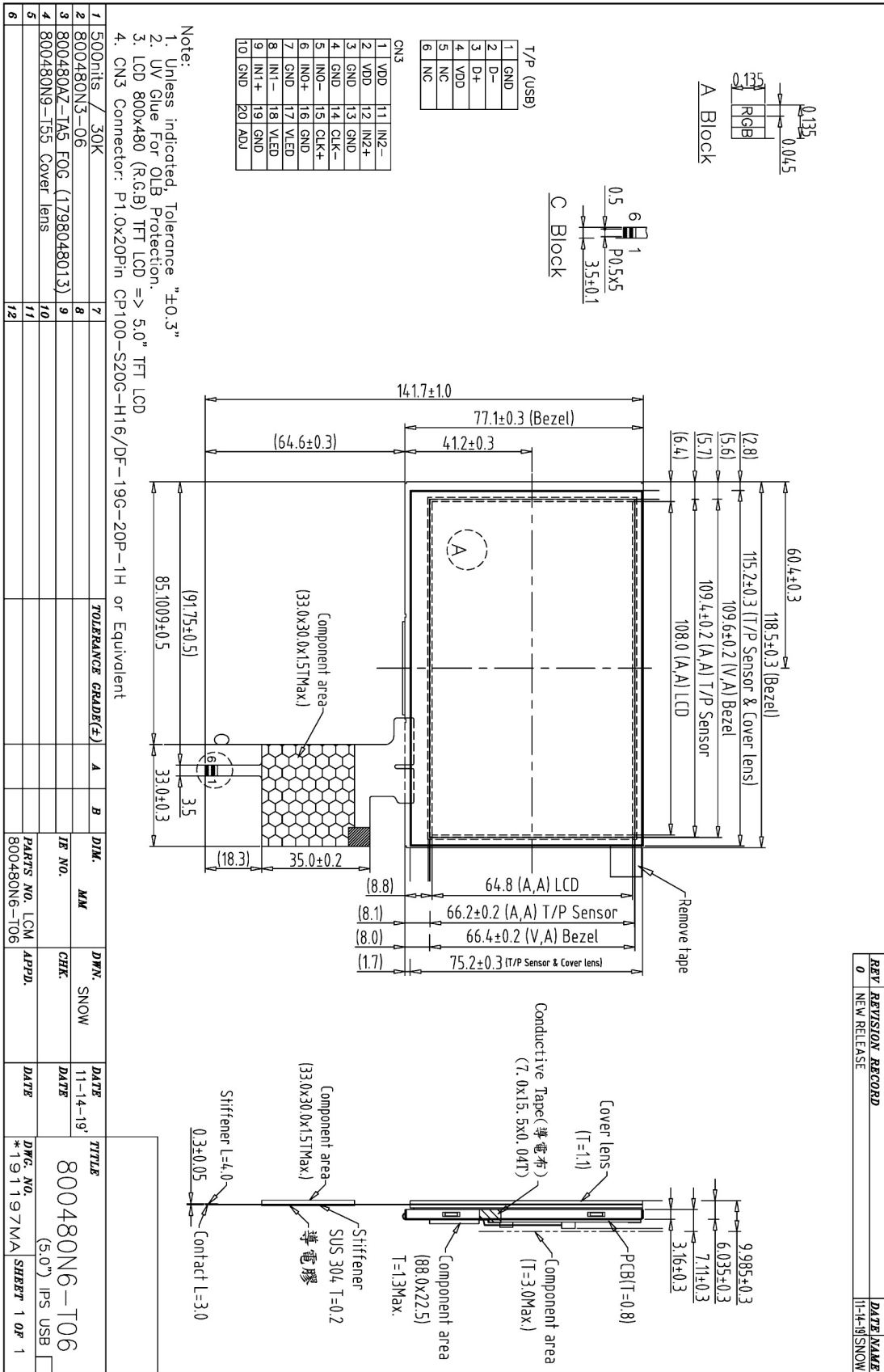
- (1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
- (2) Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.
- (3) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.

12.6 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.

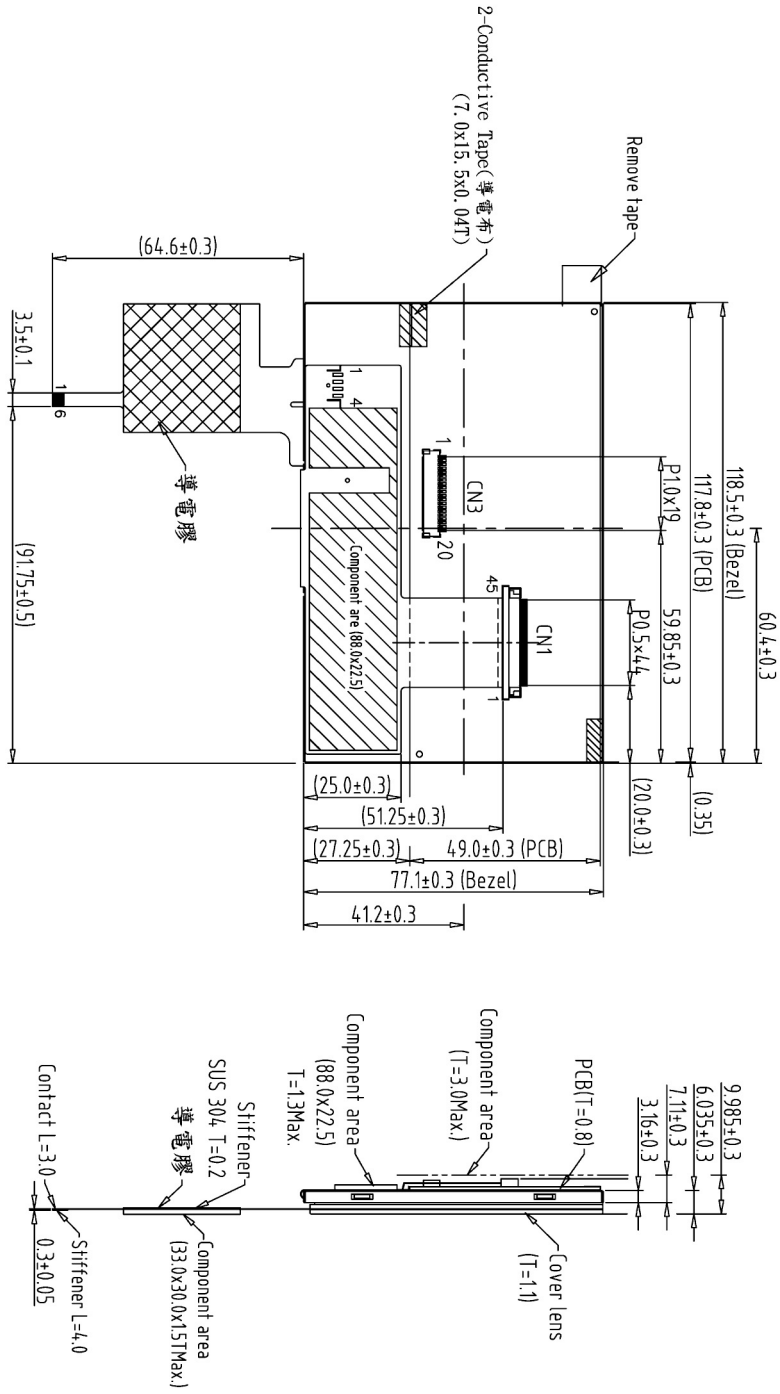


13. Outline Dimension



REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	11-4-19	SNOW

REV	REVISION RECORD	DATE NAME
0	NEW RELEASE	11-14-19] SNOW



Note:
1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. LCD 800x480 (RGB) TFT LCD => 5.0" TFT LCD
4. CN3 Connector: P1.0x20Pin CP100-S20G-H16/DF-19G-20P-1H or Equivalent

Back view

1	500Units / 30K	7		TOLERANCE GRAD(E)	A	B	DIM.	M/M	D/W	SNOW	DATE	TITLE
2	800480N3-06	8					IE NO.				11-14-19	800480N6-T06
3	800480AZ-1A5 FOG (1798048013)	9					CHK.				DATE	(5.0") IPS USB
4	800480N9-T55 Cover lens	10									DATE	DWG. NO. *191198MA
5		11										SHEET 1 OF 1
6		12										

Auxiliary

AMPIRE HDMI Board

REV.D

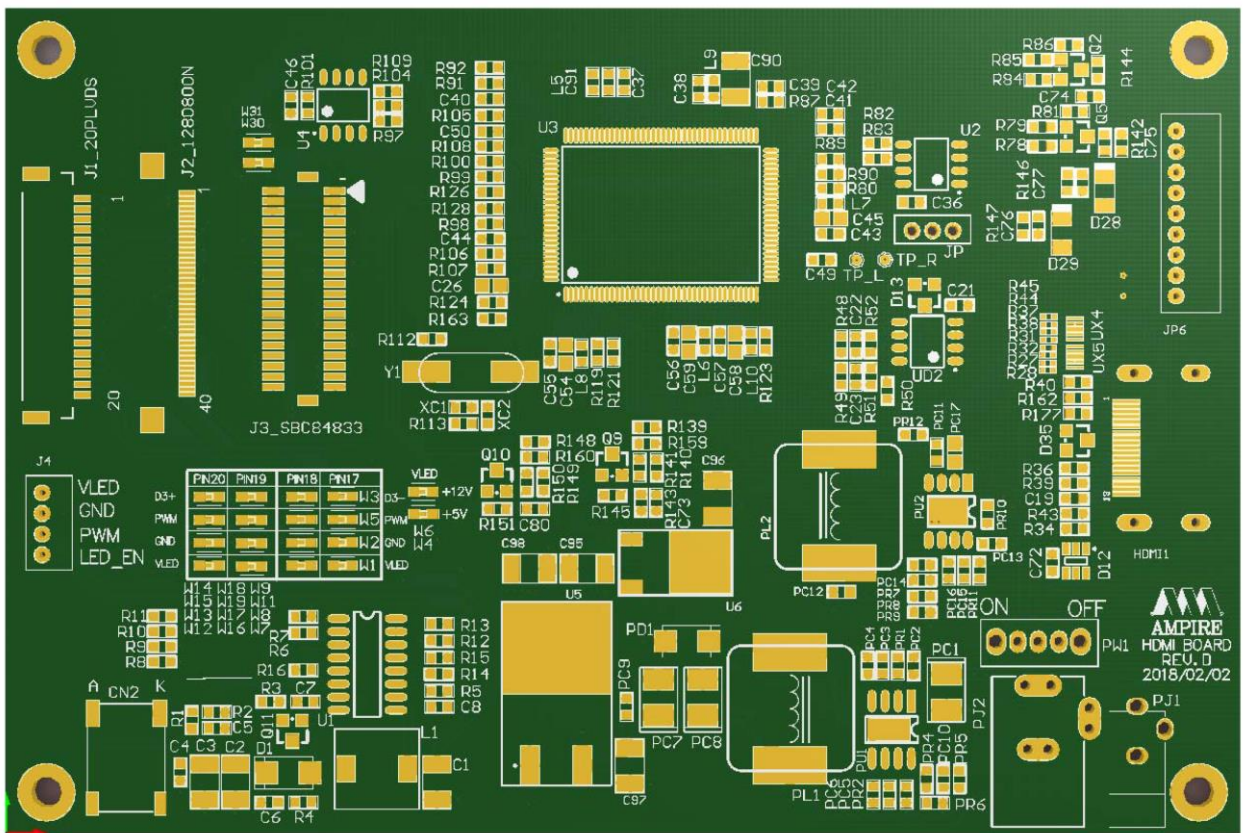
RECORD OF REVISION

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.



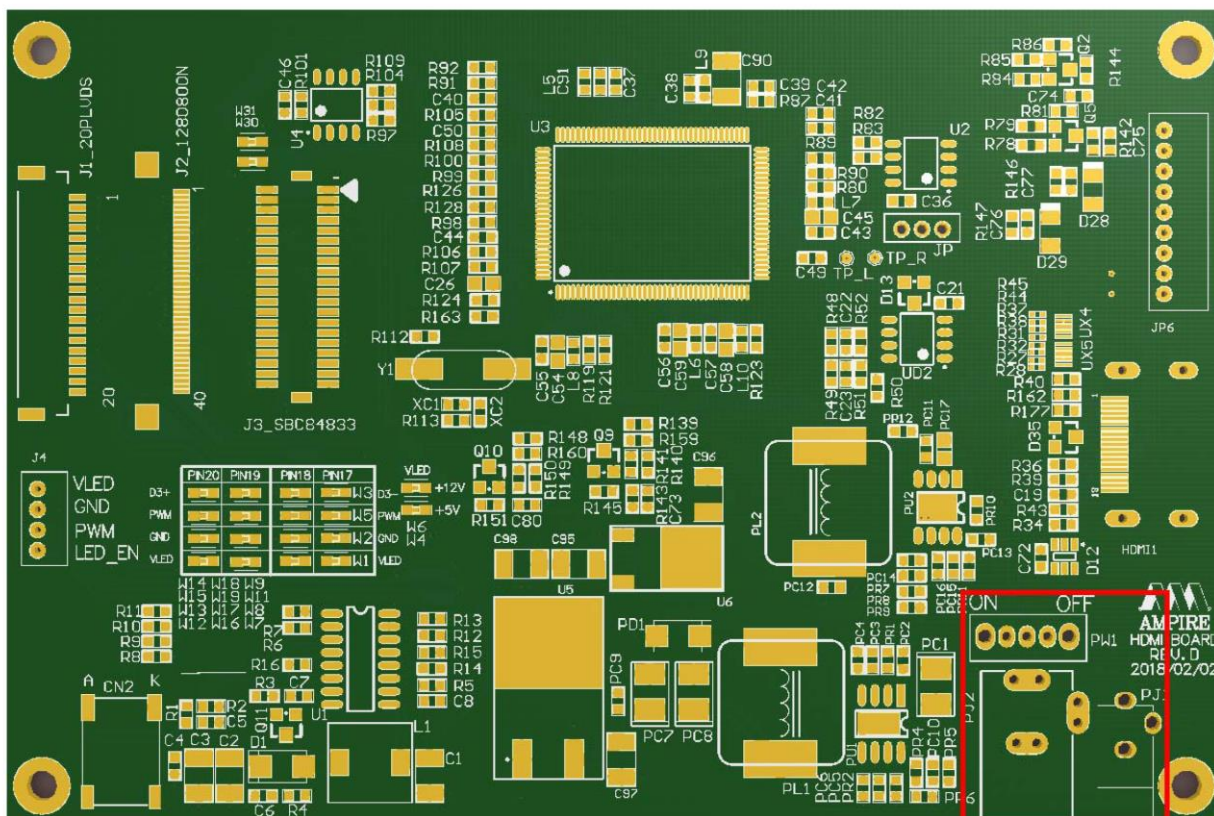
2. Support input video format :

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. CONNECTOR

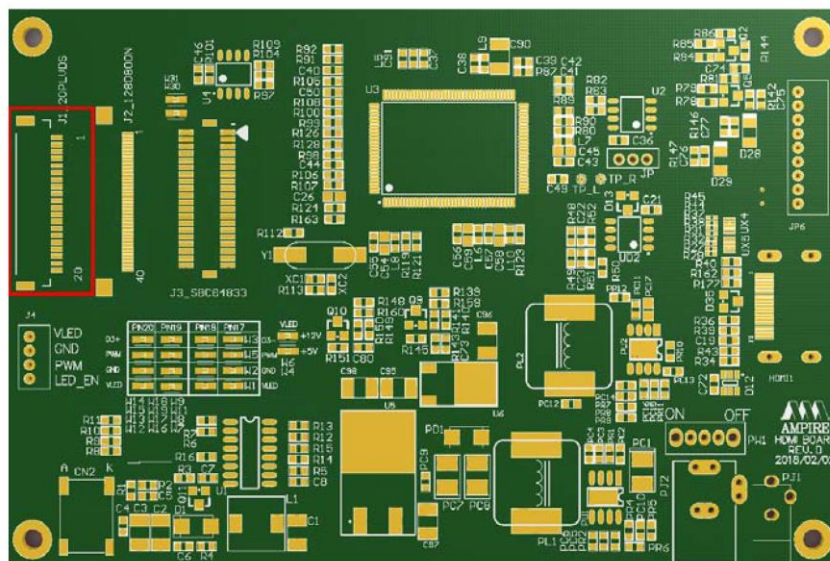
3.1 POWER CONNECTOR (PJ1、PJ2)

PIN	Symbol	Description
1	+12V	POWER SUPPLY +12V
3	GND	POWER SUPPLY GROUND



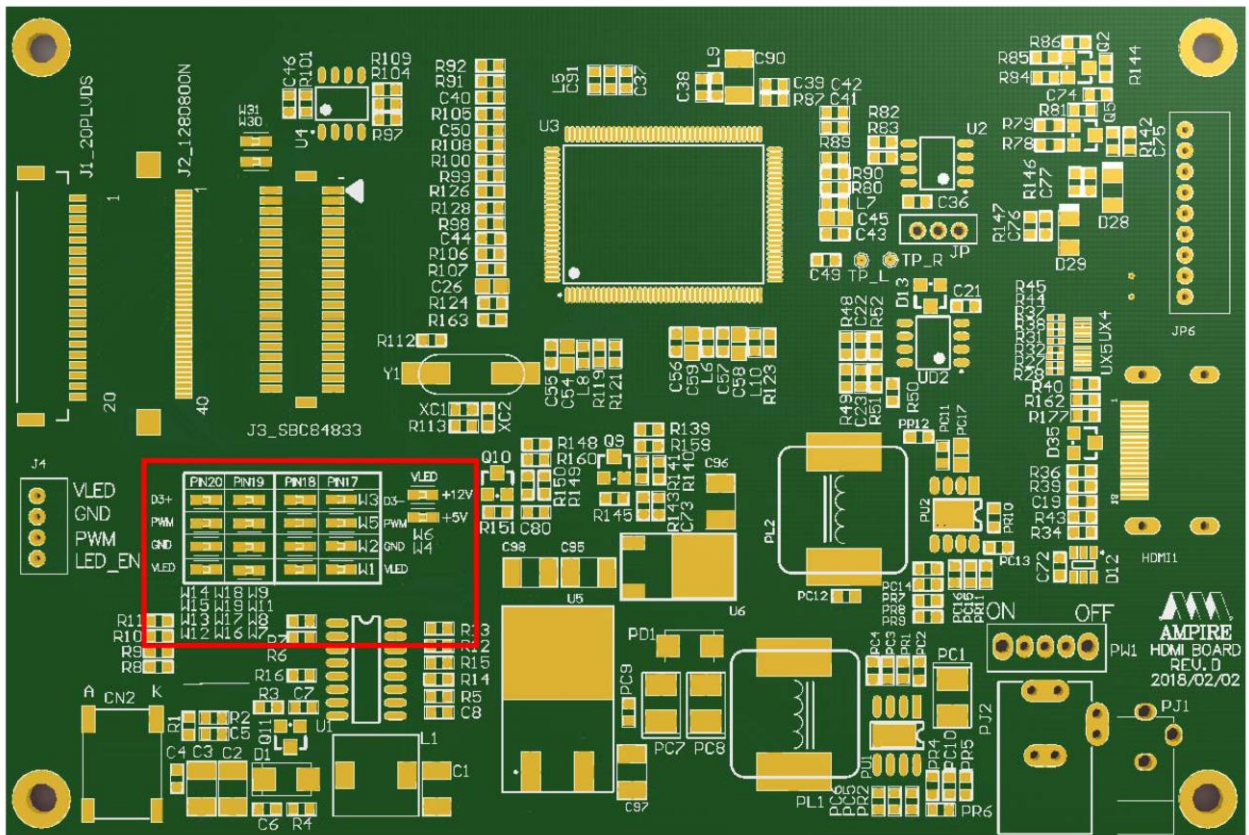
3.2 J1_20PIN LVDS

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	JUMP	JUMP
20	JUMP	JUMP



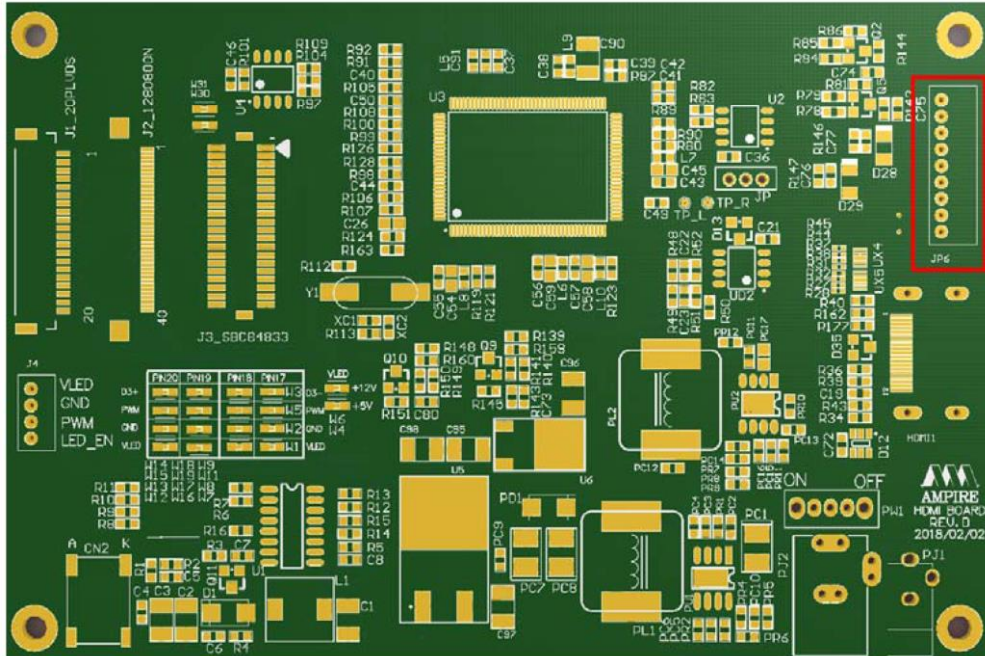
JUMP FOR PIN17,18,19 and VLED

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



3.3 JP6 Keypad connector for HDMI Board

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

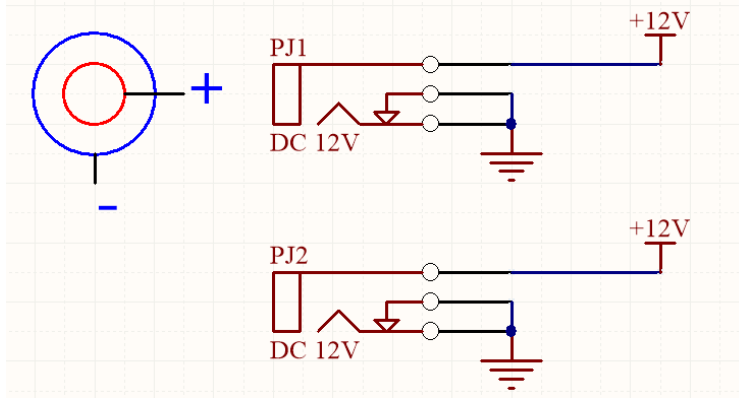


4. INTERFACE PIN CONNECTION

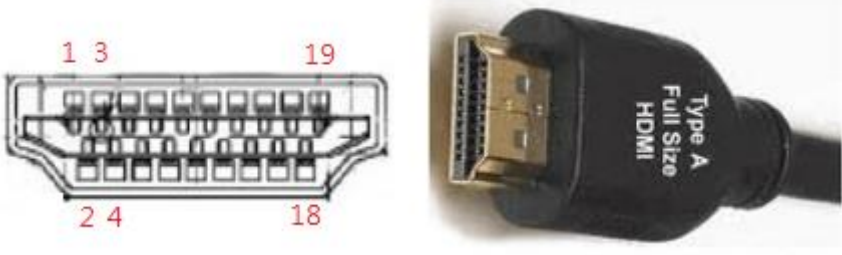
INTERFACE (HDMI Interface Board)

- **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. 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	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 100 cycle(Dry)	1,2
Storage 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

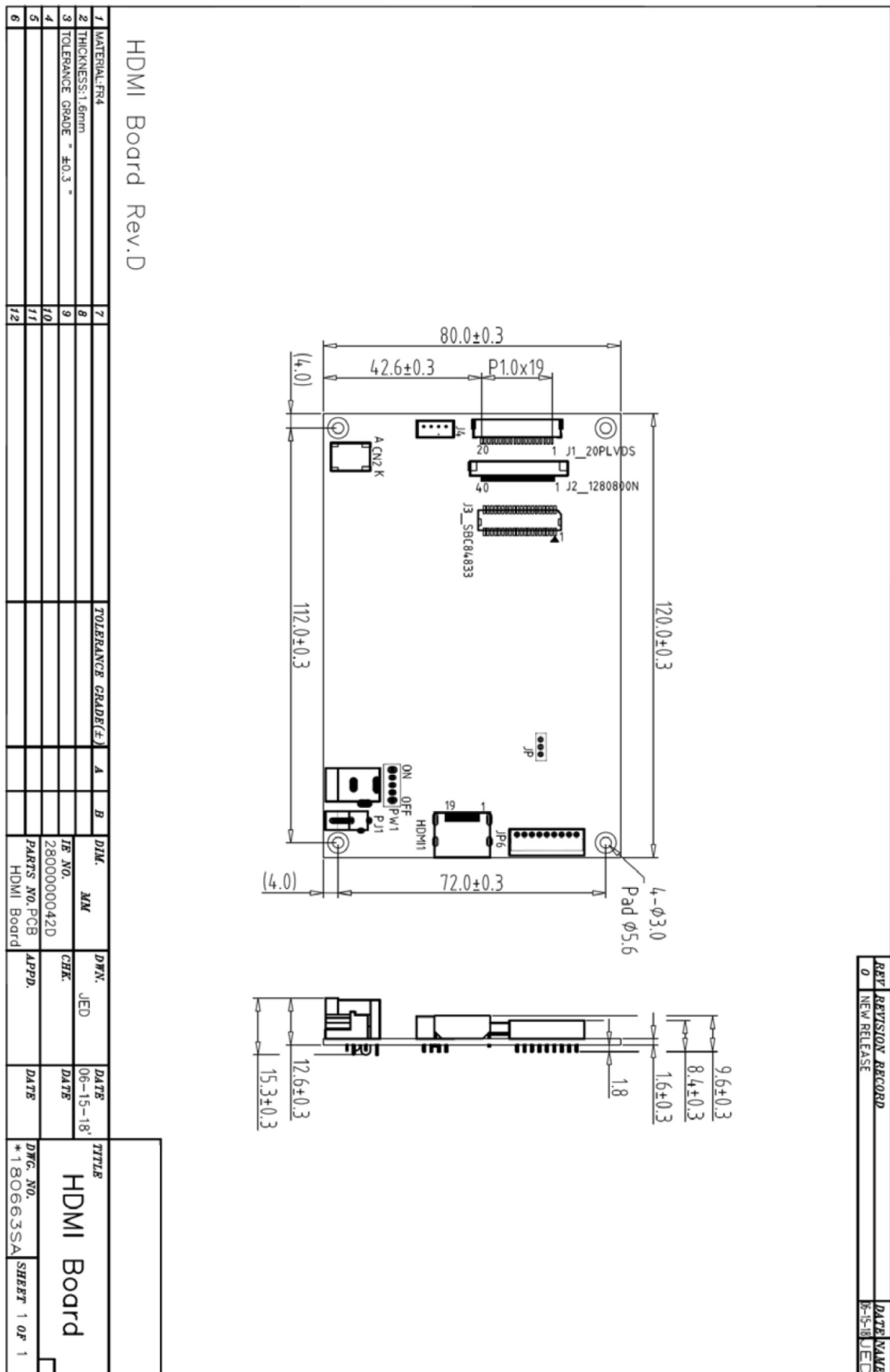
Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

Definitions of life end point :

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.

6. Outline Dimension



7. Photo



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